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no. 212
1938

Special Publication No. 212

TRIANGULATION IN WYOMING

[1927 DATUM]

BY
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UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON : 1938

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National Oceanic and Atmospheric Administration

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January 1, 2006

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TRIANGULATION IN WYOMING (1927 DATUM)

GENERAL STATEMENT

This volume contains the results of all triangulation which has been established by the U. S. Coast and Geodetic Survey in Wyoming before and during the year 1933. It also contains the results of all triangulation established between the years 1933 and 1936, inclusive, with the exception of one small arc on the Montana boundary in the northeast section of Wyoming. Results of this arc of triangulation established in 1934 are not included for the reason that the field work has not been sufficiently completed to warrant an adjustment and computation of final geographic positions. The area covered by this survey is shown on sketch 6 at the end of this publication. Preliminary data of this survey are now available in manuscript form at the office of the Coast and Geodetic Survey. Final data in manuscript form may be obtained after the adjustments have been made.

The geographic positions herein contained are on the North American datum of 1927 (see p. 2) and supersede the positions of the same points listed elsewhere on the North American (United States standard) datum. The locations of the arcs of triangulation can be most readily seen by referring to the index sketch (fig. 7) at the back of this volume. On page 3 instructions are given on how to find data for a given station or for stations in a particular region.

This volume is the fifteenth of a series of publications, each of which contains the geographic positions on the new datum, and the descriptions and other data, for the available first-order (and, in some cases, the second-order) triangulation and traverse of a State, or occasionally of two States. The following volumes have already been published:

	Special pub. no.
Triangulation in Colorado	160
First-Order Triangulation in Southeast Alaska	164
First- and Second-Order Triangulation in Oregon	175
First-Order Triangulation in Kansas	179
First-Order Triangulation and Traverse in Louisiana	183
First-Order Triangulation in Missouri	186
First-Order Triangulation and Traverse in Arkansas	187
Triangulation in Texas	189
Triangulation in Oklahoma	190
First- and Second-Order Triangulation and Traverse in North Carolina	192
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First- and Second-Order Triangulation in California	202
First- and Second-Order Triangulation and Traverse in Minnesota	203
Triangulation in Utah	209

READJUSTMENT OF THE TRIANGULATION NET

The triangulation of the United States has been built up by continually adding new arcs to those already measured, and for many years in adjusting this triangulation the plan had to be followed of

fitting the new arcs of triangulation to the old ones which had been previously adjusted. This method was the only one that could be followed until a comprehensive net had been built up and it led to no serious difficulty until the point was reached where the new arcs formed closed loops with the old arcs. It then developed that the last arc to close the loop received excessive corrections when adjusted to the previous triangulation because the entire error of closure of the loop had to be absorbed by it.

It was realized that the only way to overcome this difficulty was to adjust the entire network at one time. It was impracticable, however, to readjust the network each time a new arc was added or an additional loop was closed as the time required to do so was too great and if this were done, the geographic positions of the triangulation stations would be in a continual state of change, a condition very disturbing to those using the data.

In 1926 the triangulation net west of the ninety-eighth meridian had become so extended that it could serve as a framework for all future triangulation in that area and it was found desirable to adjust this portion of the United States net in one piece. In preparation for this adjustment a method was devised, in 1924, at the office of the Coast and Geodetic Survey,[1] by means of which a large network of triangulation could be adjusted within a reasonable time and at a comparatively small cost. This method was applied first to the triangulation west of the ninety-eighth meridian, involving 12,500 miles of arcs in 16 closed loops. Later it was applied to the eastern half of the net involving 13,000 miles of arcs forming 26 loops. The adjusted net of the country is now of such extent and strength that it is thought that all new arcs hereafter can be fitted to it without having to disturb the old work and without causing excessive corrections to the new work.

NORTH AMERICAN DATUM OF 1927

The original adjustment of the older triangulation included in this publication was computed upon the Clarke spheroid of 1866, on what was called at that time the North American datum. In the readjustment of the triangulation in the western part of the United States the same spheroid was used as surface of reference, but only one station was held in position. The station, Meades Ranch, in Kansas, was assigned the same position that it had in the original United States standard datum, later called the North American datum. This position of Meades Ranch is as follows:

Latitude =39°13′26″.686
Longitude=98 32 30 .506

This position was held in the new datum because it had been found to be best in accord with the country as a whole in the extensive investigation that was carried out at the time of the adoption of the original datum. If any are interested in the procedure followed in the establishment of this former datum, an account of it can be found in any one of the following publications, which contain triangulation and traverse data based on the datum in use prior to

[1] For a description of the method used see Special Publication No. 159.

FIGURE 1.—STATION MARK OF STATION UCOLWY.

FIGURE 1A.—REFERENCE MARK OF STATION UCOLWY.

1927: Special Publications Nos. 11, 13, 16, 17, 19, 24, 30, 31, 43, 46, 54, 62, 70, 74, 76, 78, 79, 86, 88, 101, and 114.

The orientation in the new adjustment is controlled by the various Laplace azimuths distributed throughout the network of arcs. The position of Meades Ranch, together with the Laplace azimuths included in the arcs, serves to define the North American datum of 1927. The date is appended to the name of the new datum to distinguish it from the old North American datum. A station is said to be on this North American datum of 1927 when it is rigidly adjusted to the scheme of the readjusted triangulation.

ARCS INCLUDED IN THIS PUBLICATION

The triangulation included in this publication consists of six first-order arcs and one second-order arc. The first-order arcs are: the one-hundred-and-fourth meridian arc; the one-hundred-and-eleventh meridian arc; the Sundance, Wyo., to Bozeman, Mont., arc; the one-hundred-and-eighth meridian arc; the forty-second parallel arc; and the Hanna to Buffalo arc. The second-order arc is the Shoshone Indian Reservation area.

Triangulation near the boundary in adjoining States is included in this publication so that all data for surveys to be made in Wyoming, even near the boundaries, are available in this one volume. All of the one-hundred-and-eleventh meridian arc and part of the Sundance, Wyo., to Bozeman, Mont., arc are outside of Wyoming.

COMPUTATIONS

The adjustments of the one-hundred-and-fourth and one-hundred-and-eleventh meridian arcs and the arc extending from Sundance to Bozeman, Mont., were included in the general adjustment of the first-order triangulation in the western half of the United States. This adjustment was made under the direction of Dr. O. S. Adams. The adjustments on the North American datum of 1927 of the one-hundred-and-eighth meridian arc and the forty-second parallel arc were made by H. P. Kaufman and other members of the Division of Geodesy of this Bureau. The adjustment of the Hanna to Buffalo arc was made by F. L. Culley. The Shoshone Indian Reservation arc of triangulation was adjusted under the supervision of O. P. Sutherland. The descriptions were prepared under the direction of Hugh C. Mitchell. The sketches at the back of this publication were prepared under the supervision of R. L. Pfau. Much valuable assistance in assembling the data for this publication was rendered by D. C. Ritchie.

There is one small arc in the northeastern part of the State, shown in Figure 6, for which the adjustment has not been made and the positions for which are not included in this volume. Field computations have been made for this arc, however, and the results may be obtained by writing to the Director, U. S. Coast and Geodetic Survey, Washington, D. C.

GENERAL DESCRIPTION OF TABLES AND SKETCHES

The tables of geographic positions, on pages 17 to 63, also contain the distances between contiguous triangulation stations in meters and feet, the logarithms of the distances in meters, and the azimuths of

the lines joining these stations. The distances are corrected for elevation above mean sea level, and the azimuths are referred to the true south. Anyone who wishes to obtain the actual distances between the triangulation stations should use the formula given on page 16, by which the true distance at the mean elevation of the stations can be derived from the distance at sea level. The descriptions of the stations, given on pages 73 to 195, are designed to enable the engineer to recover and identify the station mark after he has visited the general locality of the station. There will be times when the description, so far as witness and other marks are concerned, will have become out of date from changes by nature or by the work of man. Any engineer who may visit a station and find that the description does not truly represent the present conditions, or who finds the mark destroyed or mutilated, should report the facts to the Director of the Coast and Geodetic Survey, at Washington, D. C., in order that the files of this office may be kept up to date. The engineer should realize that the triangulation extended over the country by the Coast and Geodetic Survey is a public survey, made for the use of the people. The stations really belong to the States in which they are located, and the engineer who is so fortunate as to find one of these stations located near his work should help to perpetuate the monuments in order that they may be of continuous service and value to his locality. The Coast and Geodetic Survey officials will, from time to time, visit the stations established and will re-mark and redescribe them if necessary.

At most of the stations there are reference and witness marks that were established to assist in locating the station. The distance and azimuth from the station to each of these additional marks are usually given in the description of the station, and the measurements are supposed to be so carefully made, at least to the reference marks, that if the station mark becomes lost or destroyed the station can be relocated accurately enough for use in third-order and local surveys.

Near the back of this publication will be found a number of sketches which show graphically the approximate locations of the stations, especially with reference to State and county boundaries, and the lines over which the main-scheme observations were made. It is suggested that if one should wish to learn whether there are triangulation stations in the vicinity of his work he should first consult the sketches. He can obtain from them the names of the stations that may be of help to him; then he should turn to the index on page 217 of this volume, from which he can find the pages upon which the descriptions and geographic positions of the stations appear.

OTHER PUBLICATIONS OF VALUE TO THE ENGINEER

If an engineer wishes to compute geographic positions for the stations of any triangulation that he may execute, he should procure a copy of Coast and Geodetic Survey Special Publication No. 8 from the Superintendent of Documents, Washington, D. C. The cost of this publication is 30 cents. If he is interested in knowing the length in meters of the degrees, minutes, and seconds of latitude and longitude in the region in which he is working, he can obtain them from

Special Publication No. 5, which can be purchased at a cost of 30 cents from the Superintendent of Documents.

There are occasions, especially in cities, when the engineer wishes to use plane coordinates for his triangulation stations rather than spherical coordinates. Until the adoption in 1934 of State-wide systems of plane coordinates by the Coast and Geodetic Survey, the engineer was advised to secure a copy of Special Publication No. 71, entitled "Relation between Plane Rectangular Coordinates and Geographic Positions." This publication was sold by the Superintendent of Documents for 10 cents. In it is described both the reduction of geographical coordinates to plane coordinates, and also the transformation of plane coordinates to geographical coordinates. While the engineer may still find this publication useful in rare cases where his survey is of limited extent and is not rigidly adjusted to the national triangulation survey, its use is largely superseded by the adoption of systems of plane coordinates for the various States, making it possible for the engineer to utilize the formulas and methods of plane surveying across wide areas, and at the same time secure the accuracy that comes from the determination of positions by geodetic methods. The system of plane coordinates adopted for the State of Wyoming is described further on page 67, and the plane coordinates of all stations within the State, the geographic data for which are included in this volume, are given with the descriptions of stations. (See p. 64.)

The Coast and Geodetic Survey has issued a number of manuals on the various classes of its work. The ones that would be of value to an engineer in connection with triangulation, including base measurements, are Special Publication No. 120, Manual of First-Order Triangulation, cost 20 cents; Special Publication No. 145, Manual of Second and Third Order Triangulation and Traverse, cost 25 cents; and Special Publication No. 137, Manual of First-Order Traverse, cost 30 cents. If he is interested in the determination of azimuth to a high degree of accuracy, he should procure a copy of Special Publication No. 14, Determination of Time, Longitude, Latitude, and Azimuth, cost 45 cents. If he is interested only in the determination of approximate azimuths, he should secure a copy of Serial 592, Magnetic Declination in the United States, 1935, cost 20 cents.

In computing his triangulation the engineer will find that Special Publication No. 138, Manual of Triangulation Computation and Adjustment, cost 60 cents, will be of great assistance to him.

The reader can secure from the Director of the United States Coast and Geodetic Survey, free of charge, several leaflets which describe geodetic surveying and which also show how triangulation can be used in connection with the boundary surveys of private and public property.

CLASSIFICATION OF TRIANGULATION

Triangulation is divided into different classes according to accuracy. Four classes of triangulation are now defined by the Federal Board of Surveys and Maps, viz, first, second, third, and fourth orders. The first three of these are, respectively, equal in accuracy to the classes primary, secondary, and tertiary as formerly defined and used by the Coast and Geodetic Survey.

The ultimate criterion applied in classifying the different grades of triangulation is the actual error in the length of any line. This is indicated by the discrepancy between the measured length of a base line and its length as computed through the triangulation from the last preceding base. In first-order triangulation such discrepancies must not exceed 1 part in 25,000, in second-order triangulation 1 part in 10,000, and in third-order triangulation 1 part in 5,000. Before making the comparison between the computed and measured lengths the adjustment of the triangulation should be carried to the point where the side and angle equations have been satisfied. It is also necessary to take into consideration the maximum actual error in the measurement of the base lines.

To secure the accuracy indicated above, certain standards are adopted for the field work, the most important one of which relates to the closing errors of the triangles or the discrepancy between the sum of the measured angles in a triangle and 180° plus the spherical excess of the triangle. In first-order triangulation the average closing error of the triangles must not be greatly in excess of 1 second, in second-order it should not be more than 3 seconds, and in third-order not more than about 5 seconds. The shape of the figures in the triangulation scheme, the frequency of bases, the size and type of instrument, and the number and kind of observations are all selected with due regard to the accuracy desired.

Under certain conditions the proportionate error in the length of a line as specified above may be found to be exceeded in any class of triangulation. Where two points are fairly close together as compared with the size of the triangulation scheme, the distance between those points may be in error in excess of that indicated by the class of triangulation of the scheme. The accuracy of the computed length of any line can be estimated by computing the ΣR_1 in accordance with the formula for the strength of figures as given in Coast and Geodetic Survey Special Publication No. 145. In any class of triangulation the subsidiary stations will be located with a less degree of accuracy than the main-scheme stations.

CHARACTERISTICS OF FIRST-ORDER TRIANGULATION

The triangulation contained in this volume is of the first and second order. First-order triangulation is done with such accuracy that the average closing errors of the triangles is of the order of 1 second. In order that the angles may have this high degree of accuracy, precise theodolites are used. The theodolite, as is well known, is similar in its appearance to the surveyor's transit. The main differences are in the excellence of the workmanship, in the accuracy of graduation of the circle, in having micrometer microscopes for reading this circle, and in having a telescope with a high resolving power. Observations are made either on heliotropes, by which the light of the sun is reflected toward the observer, or on acetylene or electric signal lamps. The heliotrope, or lamp, and the theodolite must be centered directly over the station marks.

At certain intervals, depending upon the shape of the triangles, base lines are measured. A base is necessarily a side of one of the triangles. The ends of the base must be intervisible from the ground or from towers that may be erected over them. In the early years of

the Coast and Geodetic Survey's existence the base lines were measured with metal bars, but near the beginning of the present century steel tape lines began to be used in the measurements. Since 1907 all of the bases of the survey have been measured with invar tapes. The probable error of a measured base is about 1 part in 1,000,000 of its length. This accuracy meets all the requirements of engineering and science.

The azimuths of the triangulation depend upon what are called Laplace azimuths, or azimuths determined by observations on Polaris, which have been corrected for the deflection of the vertical at each Laplace station. These deflections are due to the attraction of mountain or plateau masses that are comparatively near the place at which the observations are made. The probable error of a Laplace azimuth is about ±0.3 second.

If one is interested in the accuracy with which the triangulation of the Coast and Geodetic Survey is done and the reliability of the geographic positions which are given in this publication, he should refer to Special Publication No. 159, The Bowie Method of Triangulation Adjustment as Applied to the First-Order Net in the Western Part of the United States.

CHARACTERISTICS OF SECOND-ORDER TRIANGULATION

In second-order triangulation the same general principles apply as in first-order triangulation, but the details of the work will vary with the circumstances. The angles are nearly always determined with a smaller number of measures. The accuracy of second-order triangulation is represented by an average closing error of a triangle of not more than 3 seconds of arc.

Second-order triangulation has been used principally for three purposes: First, for the main scheme of an isolated region of moderate extent such as the Philippine Islands; second, to connect third-order with first-order triangulation when the latter lies at a considerable distance from the area requiring the detailed third-order control; and third, as the detailed control over areas of economic importance. The increasing demand for second-order horizontal control, under the last set of conditions, and the growing economic importance of the entire coastal region of the United States, led the Director of the Coast and Geodetic Survey to decide, early in 1928, to make the entire coastal main-scheme triangulation of first- or second-order accuracy.

SUPPLEMENTARY STATIONS

In this volume appear a number of stations established by other survey agencies of the United States Government, namely: U. S. Geological Survey (U. S. G. S.); Forest Service (U. S. F. S.); Soil Conservation Service (S. C. S.); and General Land Office (G. L. O.). These stations have been occupied or observed on by the U. S. Coast and Geodetic Survey.

In addition to the stations which form the main network of triangulation in Wyoming, a number of objects, such as water tanks, stacks, and church spires, were observed upon from stations of the main scheme. The geographic positions of these secondary stations

have been computed and the data are included in the tables on pages 17 to 63. These stations are shown on the sketches and in the index, but only a few of them are described, as in most cases the name of the object is all the description that is available. Ordinarily the name of the supplementary station is sufficient for its accurate identification by the engineer who may wish to use it.

In the readjustment of the triangulation of the western part of the United States each of the unoccupied or intersection stations was computed by means of a single triangle, even though several additional lines to the station had been observed. If the lengths and azimuths of any of these additional lines are needed at any time, the data may be obtained by writing to the Director, Coast and Geodetic Survey, Washington, D. C.

USE OF HORIZONTAL CONTROL DATA

The plan or map for any extensive engineering project, whether or not map construction is the primary object, should have all of its parts properly correlated and should be on the same datum as adjacent surveys. Federal and State mapping organizations have long been aware of the necessity for having all surveys based upon a common datum, but local engineers and surveyors in this country have too often in the past been content, and in many cases compelled to use a local datum for their surveys. The future economic disadvantage of a local system is now becoming recognized, with the result that city and county surveys are being more generally placed upon a permanent basis by connecting them to stations on the North American datum of 1927.

One other factor must be taken into consideration by the engineer of today. As the States develop industrially they will undoubtedly follow the lead of one of the Eastern States, Massachusetts, which with splendid foresight has extended its triangulation control over the entire State for the purpose of defining property boundaries in terms of latitude and longitude. The advantage of such a system is well stated in the following extracts from the report on the Maryland oyster survey:

> The difficulties of accurately locating and permanently defining the boundaries of a farmer's plantation on land, even with the aid of monuments, public roads, streams of water, and other points of reference, are often great, judging from the disputes frequently arising in connection with boundaries. * * *
>
> There is only one point on the earth's surface at the intersection of any one parallel of latitude and any one meridian of longitude, and therefore there can be no dispute as to the meaning of such a geographic definition of the location of a point, even though all the original triangulation station marks used in its determination, together with the chart on which its position was originally plotted, have been totally destroyed.
>
> In the case of the destruction of an original triangulation station mark, or any other point defined by a geographic position, a competent geodetic engineer can reestablish its exact location by means of a new system of triangulation connecting with other distant triangulation marks which have not been destroyed.

Another Eastern State, New Jersey, early in the year 1935 through legislative enactment,[2] gave legal recognition to the use of its State

[2] Ch. 116, Laws of 1935, State of New Jersey.

plane-coordinate system for describing the boundaries of private properties. Similar action was taken by Pennsylvania in 1937, and other States are showing considerable interest in the action of these States with the evident intent of at least considering similar legislation for themselves.

There are a number of instances where corporations owning large tracts of land have attempted to make surveys of their boundaries and of subdivisions of property by means of traverse. This method can be used if certain precautions are taken, but most of these corporations have found it advisable to use the method of triangulation for the determination of relative positions of their boundary monuments and of other points which lie within those boundaries. If the triangulation in question is connected with the triangulation system of the Coast and Geodetic Survey, then true geographic positions can be obtained as well as the relative ones.

In a section of the country covered by adequate geodetic control the data are available to the engineer for any of the following operations, in addition to their possible future use as a basis for cadastral surveys:

1. Extensive mapping.—The topographer needs as initial data for beginning a topographic survey the distance and direction between two points and the geographic position of one of them in latitude and longitude. His local triangulation or traverse, based on this control, will prevent the accumulation of excessive errors as he carries on his mapping operations. In the event that the available first-order triangulation in that region has lines of too great length to join to conveniently, he can measure a base and azimuth at some place visible from a first- or second-order triangulation station and connect his base to the station by triangulation, thus obtaining proper geographic positions for his local surveys.

2. Boundary lines.—If it is desired to locate or delimit accurately and permanently the boundaries of political subdivisions, such as States, counties, or cities, the methods indicated in the preceding paragraph may be followed. Whenever possible, a line of the adjusted triangulation or traverse should be used as a basis for local surveys rather than a point, since a line gives the three essentials of position, length, and direction.

3. Local intensive surveys.—The necessity for such surveys arises most frequently in connection with extensive improvements over a considerable area or as a basis for city planning, where the needs of a city are being anticipated for a number of years. Here the requirements are somewhat different from those in the two preceding operations, for it is often necessary to extend first- or second-order control in considerable detail over the entire area affected, third-order triangulation or traverse then being used to furnish additional points for the survey. Such a control survey should invariably be started from a line of adjusted triangulation or traverse.

While it may be noted in the preceding paragraphs that the azimuth and length of one line and the geographic position of one end of that line constitute the essential data for the complete utilization of old work as a basis for new work, there is always grave danger in depending upon this minimum of data. There may be failure to identify

the true station mark, or the mark, though genuine, may have been tampered with or otherwise disturbed in position. This will, of course, introduce an error into the new work based on these stations. It is the present practice in this Survey, unless unusual conditions render it unnecessary, to establish the integrity of the recovered points by using at least three old stations as a basis for new work, the third station serving as a check for the two stations on which the new work may actually depend.

PLANE-COORDINATE SYSTEMS

It has been the practice of the local cadastral surveyor and the engineer making surveys for public works or for projects of a private character to make the computations as if the region involved were a plane and the results would thus be based on a local plane-coordinate system. This is satisfactory when the work is limited to a very restricted area, but when extensions of the surveys are made to surrounding areas trouble is apt to arise. Two adjoining local systems can be coordinated only with a great deal of extra computation. It seemed advisable, therefore, to give study to the possibility of establishing plane-coordinate systems for more extended areas so as to provide the advantages of plane coordinates and at the same time to make possible a perfect coordination of the work of different engineers throughout the whole region for which one system is adequate.

As a result of these studies State-wide systems of plane coordinates were devised for the various States, many States being covered by a system of plane coordinates consisting of a single zone, while for the larger States systems having several zones were required. In order to keep to a minimum the errors of scale which arise from projecting from a curved surface onto a plane, it was necessary to establish 4 such zones for Wyoming. (See p. 67.)

DIFFICULTIES IN USING SPHERICAL COORDINATES

The surface of the earth is not a plane but is very irregular. For purposes of mapping, an ideal surface is assumed that approaches very nearly to what the earth's surface would be if it were entirely covered with water. This assumed surface is not even a sphere, but is an ellipsoid of revolution of the form that approaches most nearly the sea-level surface. This spheroidal shape introduces complications in the calculations of survey work when it is extended over a large area. Geodetic surveying is such exact and extensive work that all computations arising in it have to take into consideration this assumed spheroidal shape which fits closely the actual shape of the earth. All geodetic stations on the earth have to be located by latitude and longitude; that is, each one is referred to a definite place in the net work of meridians and parallels that are assumed to cover the surface of the earth in a definite and standardized way. The longitude and latitude of a place on the curved surface of the earth thus correspond in a general way to the x and y coordinates of a place on the usual system of plane coordinates which presupposes

a flat surface. But the x and y coordinates of a local plane system have no relation to anything but the assumed origin and the assumed directions of the X and Y axes. Much has therefore been gained through the establishment of State-wide systems of plane coordinates (see pp. 67 to 73), which not only make unnecessary the further use of local independent systems, but which permit the establishment of a definite relationship, for points over a wide area, between plane coordinates on a single plane and geographic positions referred to the meridians and parallels of the earth.

USEFULNESS OF THE SYSTEMS

The establishment of a plane-coordinate system not only simplifies the use of control data but it gives a permanent general grid for large parts of a State. County boundaries, township boundaries, property boundaries, intersections of roads and streets, and any prominent features of a region can be accurately located with definite x and y coordinates. In the general system these plane coordinates can readily be transformed into latitude and longitude, and the point can thus be definitely located in the network of meridians and parallels that serve to locate points on the earth's surface. If the marker at such a point should in some way be destroyed, it could be definitely relocated on the ground from its relation to other marked points. This is a very important characteristic and one that should be given due consideration by all engineers and surveyors.

IMPORTANCE OF PLANE COORDINATES

The establishment of these general systems of plane coordinates are of the utmost importance to State, city, county, and private engineers. Such systems immediately make the general control network of the country easily available for actual use by the field surveyor. This should convince any who are interested in such matters that they constitute an important advance in the execution of local surveys.

Anyone interested in plane-coordinate systems should refer to Special Publication No. 193, Manual of Plane-Coordinate Computation, and Serial No. 562. The Coast and Geodetic Survey has also published two manuals on coordinate systems dealing particularly with traverse. They are Special Publication No. 194, Manual of Traverse Computation on the Lambert Grid, and Special Publication No. 195, Manual of Traverse Computation on the Transverse Mercator Grid.

EXPLANATION OF TABLE FOR POLYCONIC MAP PROJECTION

The engineer or surveyor who makes use of the data in this publication may find it desirable to construct a map covering the territory he is surveying. He may wish to show on this map the meridians and parallels so as to be able to plot the positions of the triangulation stations included in the area and show the details of his survey in the correct geographic positions. To enable him to do this with the least possible difficulty, the following table, reprinted in an ab-

breviated form from Coast and Geodetic Survey Special Publication No. 5, has been inserted. This table may also be used to interpret in terms of degrees, minutes, and seconds of arc any relatively short distance measured along a meridian or parallel. The method of using the table is described below.

To make a projection for a large-scale map (1 to 20,000 and larger), first draw a straight line for a central meridian and a construction line *ab* perpendicular thereto, each to be as central to the sheet as the selected interval of latitude and longitude will permit. (See fig. 2 below.) On the central meridian lay off, on the desired scale, the distances mm_2 and mm_4, using the length of 1 minute along the meridian for the latitude of m, as given in the table in the column headed "Arc of the meridian, 1′", and multiplying this length by the number of minutes for the interval between the central parallel and the extreme parallels. Through m_2 and m_4 draw straight lines, *cd* and *ef*, parallel to the line *ab*. On the lines *ef*, *ab*, and *cd* lay off to the scale of the map the distances m_4x_2, mx_2, and m_2x_2 on both sides of the central meridian, taking the values from the column headed "Arc of the parallel, 1′", corresponding to the latitude of m_4, m, and m_2, respectively. The value of 1 minute as taken from the table must be multiplied by the number of minutes out from the central meridian. Draw straight lines through the points thus determined for the extreme meridians—that is, through the x_2 points.

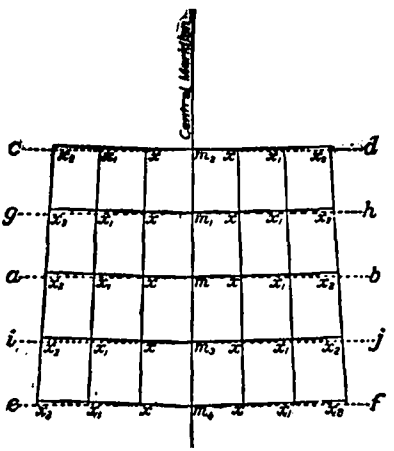

FIGURE 2.—Sketch showing construction of polyconic projection.

NOTE.—In this figure the angles made at the central meridian by the parallels are grossly exaggerated. In an actual projection the parallels appear practically as straight lines.

At the two points designated x_2 on the line *ab* lay off along the meridians the value of Y as given in the table under "Y coordinate of curvature", using as argument the interval in minutes between the central meridian and the extreme meridian. Draw straight lines from these points to the point m for the middle parallel, and from the points of intersection with the extreme meridians lay off distances along these meridians, above and below, equal to the distances mm_2 and mm_4 to locate points in the extreme parallels.

Subdivide each of the three meridians and three parallels already determined into parts corresponding with the projection interval and join the corresponding points of subdivision by straight lines to complete the projection.

The method outlined above may be used for all large-scale maps regardless of the number of meridians and parallels shown. For small-scale maps the method is somewhat more complicated, and it becomes necessary to make use of Special Publication No. 5, which may be obtained for 30 cents from the Superintendent of Documents, Washington, D. C.

Polyconic map projection table

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature latitude 40°
	1″	1′	1″	1′		
° ′	*Meters*	*Meters*	*Meters*	*Meters*	° ′	*Meters*
40 00	23.721	1,423.3	30.842	1,850.54	0 01	0.1
05	23.692	1,421.5	30.843	1,850.57	03	1.2
10	23.663	1,419.8	30.843	1,850.60	05	3.3
15	23.634	1,418.1	30.844	1,850.63	07	6.5
20	23.605	1,416.3	30.844	1,850.65	10	13.3
25	23.576	1,414.6	30.845	1,850.68	15	29.9
30	23.547	1,412.8	30.845	1,850.71	20	53.2
35	23.518	1,411.1	30.846	1,850.73	25	83.2
40	23.489	1,409.3	30.846	1,850.76	30	119.8
45	23.460	1,407.6	30.846	1,850.79	40	212.9
50	23.430	1,405.8	30.847	1,850.81	50	332.6
55	23.401	1,404.1	30.847	1,850.84	1 00	479.0

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature latitude 41°
	1″	1′	1″	1′		
° ′	*Meters*	*Meters*	*Meters*	*Meters*	° ′	*Meters*
41 00	23.372	1,402.3	30.848	1,850.87	0 01	0.1
05	23.342	1,400.5	30.848	1,850.90	03	1.2
10	23.313	1,398.8	30.849	1,850.92	05	3.3
15	23.283	1,397.0	30.849	1,850.95	07	6.6
20	23.253	1,395.2	30.850	1,850.98	10	13.4
25	23.224	1,393.4	30.850	1,851.01	15	30.1
30	23.194	1,391.6	30.851	1,851.03	20	53.5
35	23.164	1,389.9	30.851	1,851.06	25	83.6
40	23.134	1,388.1	30.851	1,851.09	30	120.4
45	23.105	1,386.3	30.852	1,851.11	40	214.1
50	23.075	1,384.5	30.852	1,851.14	50	334.5
55	23.045	1,382.7	30.853	1,851.17	1 00	481.7

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature latitude 42°
	1″	1′	1″	1′		
° ′	*Meters*	*Meters*	*Meters*	*Meters*	° ′	*Meters*
42 00	23.015	1,380.9	30.853	1,851.20	0 01	0.1
05	22.985	1,379.1	30.854	1,851.22	03	1.2
10	22.955	1,377.3	30.854	1,851.25	05	3.4
15	22.924	1,375.5	30.855	1,851.28	07	6.6
20	22.894	1,373.7	30.855	1,851.30	10	13.4
25	22.864	1,371.8	30.856	1,851.33	15	30.2
30	22.834	1,370.0	30.856	1,851.36	20	53.8
35	22.803	1,368.2	30.856	1,851.39	25	84.0
40	22.773	1,366.4	30.857	1,851.41	30	120.9
45	22.742	1,364.5	30.857	1,851.44	40	215.0
50	22.712	1,362.7	30.858	1,851.47	50	336.0
55	22.681	1,360.9	30.858	1,851.50	1 00	483.8

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature latitude 43°
	1″	1′	1″	1′		
° ′	*Meters*	*Meters*	*Meters*	*Meters*	° ′	*Meters*
43 00	22.651	1,359.1	30.859	1,851.52	0 01	0.1
05	22.620	1,357.2	30.859	1,851.55	03	1.2
10	22.590	1,355.4	30.860	1,851.58	05	3.4
15	22.559	1,353.5	30.860	1,851.61	07	6.6
20	22.528	1,351.7	30.861	1,851.63	10	13.5
25	22.497	1,349.8	30.861	1,851.66	15	30.3
30	22.466	1,348.0	30.861	1,851.69	20	53.9
35	22.435	1,346.1	30.862	1,851.72	25	84.3
40	22.404	1,344.3	30.862	1,851.74	30	121.3
45	22.373	1,342.4	30.863	1,851.77	40	216.7
50	22.342	1,340.5	30.863	1,851.80	50	337.0
55	22.311	1,338.7	30.864	1,851.82	1 00	485.3

Polyconic map projection table—Continued

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature latitude 44°
	1″	1′	1″	1′		
° ′	*Meters*	*Meters*	*Meters*	*Meters*	° ′	*Meters*
44 00	22.280	1,336.8	30.864	1,851.85	0 01	0.1
05	22.249	1,334.9	30.865	1,851.88	03	1.2
10	22.218	1,333.1	30.865	1,851.91	05	3.4
15	22.186	1,331.2	30.866	1,851.93	07	6.6
20	22.155	1,329.3	30.866	1,851.96	10	13.5
25	22.124	1,327.4	30.866	1,851.99	15	30.4
30	22.092	1,325.5	30.867	1,852.02	20	54.0
35	22.061	1,323.6	30.867	1,852.04	25	84.4
40	22.029	1,321.7	30.868	1,852.07	30	121.5
45	21.998	1,319.9	30.868	1,852.10	40	216.1
50	21.966	1,318.0	30.869	1,852.13	50	337.7
55	21.934	1,316.1	30.869	1,852.15	1 00	486.2

Latitude	Arc of the parallel		Arc of the meridian		Interval of longitude from central meridian	Y coordinate of curvature	
	1″	1′	1″	1′		Lat. 45°	Lat. 46°
° ′	*Meters*	*Meters*	*Meters*	*Meters*	° ′	*Meters*	*Meters*
45 00	21.903	1,314.2	30.870	1,852.18	0 01	0.1	0.1
05	21.871	1,312.2	30.870	1,852.21	03	1.2	1.2
10	21.839	1,310.3	30.871	1,852.24	05	3.4	3.4
15	21.807	1,308.4	30.871	1,852.26	07	6.6	6.6
20	21.775	1,306.5	30.872	1,852.29	10	13.5	13.5
25	21.743	1,304.6	30.872	1,852.32	15	30.4	30.4
30	21.711	1,302.7	30.872	1,852.35	20	54.1	54.0
35	21.679	1,300.7	30.873	1,852.37	25	84.5	84.4
40	21.647	1,298.8	30.873	1,852.40	30	121.6	121.6
45	21.615	1,296.9	30.874	1,852.43	40	216.2	216.1
50	21.583	1,295.0	30.874	1,852.46	50	337.9	337.7
55	21.550	1,293.0	30.875	1,852.48	1 00	486.5	486.3
60	21.518	1,291.1	30.875	1,852.51			

CONVERSION TABLE

In previous triangulation publications of this Bureau complete tables have been printed for the conversion of feet to meters and meters to feet. As these tables require eight pages, it seemed advisable in the interests of economy to substitute for them the condensed table shown below. This table can be used readily for converting a rather large number of one unit to the corresponding number in the other unit by simply taking the conversion value for each digit of the first number, moving the decimal point if necessary, and adding the values together. For example, to convert 24.6 feet to meters we take from the table the value in meters corresponding to 2 feet and move the decimal point one place to the right. We then take the value for 4 feet as given in the table, and next the value for 6 feet, and move the decimal point one place to the left. This gives, by rounding off to the third decimal place, 6.096+1.219+0.183=7.498 meters.

Meters	Feet	Feet	Meters
1	3.280833	1	0.3048006
2	6.561667	2	0.6096012
3	9.842500	3	0.9144018
4	13.123333	4	1.2192024
5	16.404167	5	1.5240030
6	19.685000	6	1.8288037
7	22.965833	7	2.1336043
8	26.246667	8	2.4384049
9	29.527500	9	2.7432055
10	32.808333	10	3.0480061

EXPLANATION OF TABLES OF GEOGRAPHIC POSITIONS

In the tables of geographic positions the latitude and longitude of each point are given on the North American datum of 1927, and there are also given the length and azimuth of each line observed over, whether in one or both directions. No lengths and azimuths are repeated, and for a given line the length and azimuth will be found opposite the position of one or the other of the two stations involved.

To aid in the use of the tables, a column of the logarithms of the lengths in meters is given. It must be remembered that it is the logarithm which is derived first from the computation, the lengths given in the table being then derived from the corresponding logarithms. A final column gives these lengths reduced to feet, the reduction being made from the lengths in meters.

The rule usually followed in publications of this Office has been to give the latitudes and longitudes of the stations to thousandths of seconds for all points the positions of which are fixed by fully adjusted triangulation. Points the positions of which are given to hundredths of seconds only are marked by footnotes as being without check (not occupied and observed from two stations only) or checked by vertical angles only. Points whose positions are derived from a measured distance and azimuth are listed to thousandths of a second and are marked as being without check.

In the columns giving azimuths, distances, and logarithms of distances the accuracy is indicated to a certain extent by the number of decimal places given, it being understood that in each case some of the final figures are doubtful. In some cases there is very little doubt of the correctness of the second figure from the right, while in a few cases some doubt may exist as to the correctness of even the third figure from the right.

If the station is described but not marked, the letter "d." is given in the first column of the table; if marked and not described, the letters "m. n. d." are given; and if described and marked, the letters "d. m." are given. Other letters used in this column are "n. d.", not described; "r.", recovered; "l.", lost; and "d. n. m.", described and not marked.

The tables may be conveniently consulted by using as finders the sketches and the index at the end of this publication. In the second column of the index will be found for each point a reference to the page on which its geographic position is given, in the third column the page on which the description and plane coordinates are given,

in the fourth column the page on which the elevation of the station is given (that is, providing the elevation was determined), and, finally, in the fifth column, the figure number of the sketch on which the station appears.

EXPLANATION OF LENGTHS

The lengths as given in the tables are all reduced to sea level. If the actual length of a line on the ground reduced only to the horizontal is desired—that is, its length in its actual elevation on the surface of the earth—it may be obtained by adding to the sea-level length as given in meters the following correction:

$$\text{Cor.} = \frac{Sh_m}{6{,}370{,}000},$$

in which S is the length of the line in meters and h_m is the mean elevation of the two ends of the line in meters. The correction for the length in feet can also be found by the same formula if S is taken in feet, but h_m must still be kept in meters, since the denominator is the approximate length of the radius of the earth in meters.

AZIMUTH AND BACK AZIMUTH

The azimuth of a line of triangulation is its true direction reckoned clockwise from true south. The cardinal points of the compass on this system are as follows: South is 0° (or 360°), west 90°, north 180°, and east 270°.

Because of the convergence of the meridians, the azimuth and the back azimuth of a line do not differ by exactly 180°, the amount of the divergence varying with the latitude and the difference of longitude of the two ends of the line. To illustrate from the tables on page 17, the azimuth from Cheyenne east base to Cheyenne west base is 108°14′16″.07, while the back azimuth, or azimuth from Cheyenne west base to Cheyenne east base, is 288°11′16″.93.

The azimuths of the triangulation lines offer a very convenient and accurate means of testing the deflection of the magnetic needle on a surveyor's transit, and even the azimuth over such short distances as those between a station mark and its reference mark may be used for this purpose with fair accuracy, provided the distance is greater than 100 feet. On all recent triangulation a special azimuth mark has been set for each station at a distance of not less than one-fourth mile. The azimuth of the line from the station to this mark has been determined and may be used as the starting azimuth for traverse lines and other local surveys.

GEOGRAPHIC POSITIONS

One-hundred-and-fourth meridian arc

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points	° ′ ″	° ′ ″	° ′ ″				
Horsetooth (U. S. G. S.) (Colo.), 1912 (d. m.)	40 32 22.460						
	105 11 46.382						
Dewey (U. S. G. S.) (Colo.), 1912 (d. m.)	40 30 25.498	94 00 14.52	273 35 13.43	Horsetooth (U. S. G. S.)	4.7363952	54,499.84	178,804.9
	104 33 16.163	309 56 08		Reference mark			
Twin, 1912 (d. m.)	41 02 53.670	314 43 27.82	135 11 24.08	Dewey (U. S. G. S.)	4.9296674	85,048.65	279,030.4
	105 16 02.630	353 54 21.57	173 57 08.99	Horsetooth (U. S. G. S.)	4.7543889	56,805.30	186,368.7
Warren, 1912 (d. m.)	41 01 11.369	334 54 04.44	155 06 23.44	Dewey (U. S. G. S.)	4.7981169	62,822.74	206,110.9
	104 52 07.959	27 29 51.48	207 17 01.78	Horsetooth (U. S. G. S.)	4.7786190	60,064.65	197,062.1
		95 30 36.72	275 14 54.84	Twin	4.5271324	33,661.42	110,437.5
Wadill, 1912 (d. m.)	41 15 12.228	344 22 06.34	164 25 30.66	Warren	4.4302654	26,931.80	88,358.7
	104 57 18.548	49 06 18.24	228 53 58.53	Twin	4.5406971	34,729.38	113,941.3
Russell, 1912 (d. m.)	41 14 11.781	266 22 16.57	86 36 37.54	Wadill	4.4838065	30,465.37	99,951.8
	105 19 04.478	302 24 31.73	122 42 14.99	Warren	4.6506680	44,737.11	146,775.0
		348 31 22.88	168 33 22.51	Twin	4.3292830	21,344.35	70,027.3
Greentop, 1912 (d. m.)	41 21 00.802	288 46 12.30	109 01 03.66	Wadill	4.5212416	33,207.92	108,949.6
	105 19 49.042	351 02 21.90	171 04 51.02	Twin	4.5308303	33,949.26	111,381.9
		355 17 53.25	175 18 22.66	Russell	4.1024536	12,660.58	41,537.3
Whitaker, 1912, r. 1933 (d. m.)	41 23 55.980	348 33 51.13	168 35 23.83	Wadill	4.2170639	16,484.05	54,081.4
	104 59 38.928	79 13 58.77	259 00 38.91	Greentop	4.4569133	28,636.06	93,950.1
Ragged (U. S. G. S.), 1912, r. 1933 (d. m.)	41 26 20.438	278 32 28.91	98 46 22.73	Whitaker	4.4713987	29,607.29	97,136.6
	105 20 39.320	302 12 17.03	122 27 42.39	Wadill	4.5859361	38,542.17	126,450.4
		353 14 24.18	173 14 57.42	Greentop	3.9969369	9,929.72	32,577.8
Cheyenne west base, 1913 (d. m.)	41 17 56.075	198 18 14.99	18 19 59.45	Whitaker	4.0680252	11,695.67	38,371.5
	105 02 17.049	306 00 39.77	126 03 56.69	Wadill	3.9340644	8,591.41	28,187.0
Cheyenne east base, 1913 (d. m.)	41 16 48.697	348 04 04.10	168 04 21.92	Wadill	3.4831118	3,041.67	9,979.2
	104 57 45.560	108 14 16.07	288 11 16.93	Cheyenne west base	3.8228501	6,650.437	21,818.98
		168 42 07.29	348 40 52.41	Whitaker	4.1284811	13,442.53	44,102.7

GEOGRAPHIC POSITIONS—Continued

One-hundred-and-fourth meridian arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Chugwater, 1912, r. 1933 (d. m.)	41 48 05.778	356 10 14.52	176 11 40.08	Whitaker	4.6515427	44,827.31	147,070.9
	105 01 47.801	33 08 52.34	212 56 20.79	Ragged (U. S. G. S.)	4.6816170	48,041.55	157,616.3
		359 19 43		Rainsford's "Hill Ranch" on Maxwell Creek, chimney of large stone house.			
Notch, 1912, r. 1933 (d. m.)	42 02 21.141	316 36 56.14	136 48 56.77	Chugwater	4.5593365	36,252.38	118,938.0
	105 19 46.432	338 27 33.67	158 40 57.25	Whitaker	4.8830900	76,399.40	250,653.7
		1 03 18.85	181 02 43.64	Ragged (U. S. G. S.)	4.8239491	66,672.86	218,742.5
Coleman, 1912, r. 1933 (d. m.)	42 22 03.169	353 10 03.79	173 13 42.43	Chugwater	4.8014494	63,306.66	207,698.6
	105 07 14.017	25 23 53.43	205 15 27.98	Notch	4.6058361	40,349.31	132,379.4
Haystack, 1912 (d. m.)	42 20 29.194	28 44 31.02	208 28 37.76	Chugwater	4.8344237	68,300.47	224,082.5
	104 38 05.170	59 54 33.43	239 26 33.58	Notch	4.8227627	66,490.97	218,145.8
		94 18 25.80	273 58 47.57	Coleman	4.6034685	40,129.94	131,659.6
Willow, 1912 (d. m.)	42 41 10.602	356 24 22.23	176 25 33.24	Haystack	4.5841053	38,380.03	125,918.5
	104 39 50.265	46 48 47.04	226 30 15.95	Coleman	4.7125254	51,585.24	169,242.6
Hobbs, 1912 (d. m.)	42 34 50.366	8 44 30.26	188 42 29.76	Haystack	4.4294813	26,883.22	88,199.4
	104 35 06.686	61 54 51.97	241 33 10.51	Coleman	4.6988557	49,986.84	163,998.5
		151 11 05.20	331 07 53.13	Willow	4.1269219	13,394.36	43,944.7
Rawhide, 1912 (d. m.)	42 35 11.842	23 22 29.19	203 16 42.15	Haystack	4.4721570	29,659.03	97,306.3
	104 29 31.132	85 04 54.34	265 01 07.29	Hobbs	3.8853828	7,680.38	25,198.0
		128 10 54.54	308 03 55.18	Willow	4.2536154	17,931.45	58,830.1
Manville, 1912 (d. m.)	42 50 57.954	346 15 58.15	166 19 30.39	Rawhide	4.4778422	30,049.84	98,588.5
	104 34 44.005	21 02 42.69	200 59 14.73	Willow	4.2881545	19,415.76	63,699.9
		83 13 33		Reference mark.			
Kirtley, 1912, r. 1913 (d. m.)	42 51 44.295	46 27 43.27	226 11 46.65	Rawhide	4.6468922	44,349.86	145,504.5
	104 06 01.178	67 13 08.93	246 50 10.95	Willow	4.6998538	50,101.85	164,375.8
		88 04 08.44	267 44 36.65	Manville	4.5926293	39,140.77	128,414.3
		158 50 32		Reference mark.			
Alkali, 1912, r. 1913 (d. m.)	43 38 12.510	339 50 17.30	160 06 10.04	Kirtley	4.9618171	91,583.47	300,470.1
	104 29 11.644	4 55 52.41	184 52 04.71	Manville	4.9434715	87,795.35	288,041.9
Parker (S. Dak.), 1912 (d. m.)	43 23 55.990	29 21 09.21	209 04 21.01	Kirtley	4.8344018	68,297.03	224,071.2
	103 41 26.485	50 07 23.53	229 30 57.73	Manville	4.9759192	94,606.11	310,386.9
		112 36 18.71	292 03 25.80	Alkali	4.8424094	69,567.98	228,240.9
Cottonwood, 1912 (d. m.)	43 15 13.884	143 50 57.28	323 35 02.11	Alkali	4.7224682	52,779.85	173,161.9
	104 06 02.640	244 00 40.31	64 17 33.18	Parker	4.5676859	36,956.08	121,246.7
Sullivan (S. Dak.), 1912 (d. m.)	43 35 33.156	310 23 58.68	130 36 50.23	Parker	4.5201461	33,124.25	108,675.1
	104 00 07.428	12 01 22.09	191 57 17.92	Cottonwood	4.5850887	38,467.04	126,203.9
		97 20 02.18	276 59 59.01	Alkali	4.5957155	39,419.90	129,330.1
Provo east base (S. Dak.), 1912 (d. m.)	43 12 14.144	100 54 57.08	280 40 14.00	Cottonwood	4.4715812	29,619.73	97,177.4
	103 44 33.314	190 59 05.06	11 01 13.19	Parker	4.3436999	22,064.80	72,390.9
		358 13 37		Reference mark.			
Provo astronomic (S. Dak.), 1912, r. 1913 (d. m.)	43 11 43.757	106 24 49.92	286 13 37.88	Cottonwood	4.3631540	23,075.65	75,707.4
	103 49 41.356	206 13 34.97	26 19 14.35	Parker	4.4014073	25,200.39	82,678.3
		262 17 29.24	82 21 00.12	Provo east base	3.8461966	7,017.73	23,024.0
Provo west base (S. Dak.), 1912 (d. m.)	43 10 23.036	121 01 36.84	300 54 03.06	Cottonwood	4.2416761	17,445.20	57,234.8
	103 54 59.921	216 05 22.26	36 14 39.98	Parker	4.4924298	31,076.34	101,956.3
		250 52 16.21	70 55 54.21	Provo astronomic	3.8815694	7,613.24	24,977.8
		256 19 08.75	76 26 17.60	Provo east base	4.1631390	14,559.251	47,760.48
Elk (S. Dak.), 1912 (d. m.)	43 43 41.369	321 29 21.77	141 44 11.72	Parker	4.6690526	46,671.59	153,121.7
	104 02 57.840	345 45 47.26	165 47 44.90	Sullivan	4.1915544	15,543.70	50,996.3
		74 05 20.47	253 47 13.50	Alkali	4.5644646	36,682.98	120,350.7
Cambria, 1912, r. 1913 (d. m.)	44 02 43.502	341 44 38.10	161 50 38.16	Elk	4.5694672	37,107.97	121,745.1
	104 11 37.220	27 31 25.55	207 19 15.19	Alkali	4.7088170	51,146.62	167,803.5
Crow (S. Dak.), 1912 (d. m.)	44 03 18.783	10 58 36.30	190 54 57.99	Elk	4.5683504	37,012.67	121,432.4
	103 57 42.958	86 43 29.99	266 33 49.93	Cambria	4.2695982	18,603.65	61,035.5
Laird (S. Dak.), 1912 (d. m.)	44 12 34.364	347 52 23.01	167 54 18.27	Crow	4.2439880	17,538.32	57,540.3
	104 00 28.479	39 15 12.56	219 07 26.94	Cambria	4.3716105	23,529.38	77,196.0
Inyankara, 1912, r. 1925 (d. m.)	44 12 47.200	270 42 42.33	90 57 00.33	Laird	4.4364817	27,320.06	89,632.6
	104 20 58.934	326 06 56.55	146 13 27.65	Cambria	4.3508435	22,430.74	73,591.5
		9 47 15.48	189 41 33.67	Alkali	4.8127080	64,969.27	213,153.3
Terry (S. Dak.), 1912, r. 1928 (d. m.)	44 19 39.495	46 30 01.98	226 22 47.71	Laird	4.2797087	19,041.83	62,473.1
	103 50 06.335	72 58 15.81	252 36 42.62	Inyankara	4.6336073	43,013.75	141,120.9
		246 34 00		Terry Catholic Church.			
Sundance, 1912, r. 1928 (d. m.)	44 28 44.202	288 42 12.31	109 08 03.39	Terry	4.7147927	51,855.25	170,128.4
	104 27 03.099	310 07 32.81	130 26 07.40	Laird	4.6655884	46,300.79	151,905.2
		344 41 27.35	164 45 41.90	Inyankara	4.4860117	30,620.46	100,460.6

GEOGRAPHIC POSITIONS—Continued

One-hundred-and-fourth meridian arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Wymonkota (U. S. G. S.) (Mont.), 1912 (d. m.)	45 00 35.005 104 05 08.153	345 13 31.49 26 15 16.10 263 03 22	165 24 05.48 205 59 50.44	Terry Sundance Haystack Butte, highest peak.	4.8940740 4.8175331	78,356.31 65,695.12	257,074.0 215,534.7
Castle (S. Dak.), 1912, r. 1925 (d. m.)	45 00 36.285 103 27 14.791	21 51 22.72 53 34 01.30 90 10 40.03 181 59 53	201 35 18.49 232 51 55.26 269 43 52.23	Terry Sundance Wymonkota (U. S. G. S.) Haystack Butte, highest peak.	4.9118628 4.9937259 4.6970874	81,632.44 98,565.73 49,783.72	267,822.4 323,377.7 163,332.1
Supplementary points							
Dover B. M. eccentric (Colo.), 1912 (d. n. m.)	40 46 45.494 104 48 42.175	50 49 07.5 128 01 49.5	230 34 05.6 307 43 55.1	Horsetooth (U. S. G. S.) Twin	4.623499 4.686982	42,024.2 48,638.7	137,874 159,575
Dover B. M. E 3 (Colo.), 1912 (d. m.) [1]	40 46 45.328 104 48 42.563	240 38 01	60 38 01	Dover B. M. eccentric	1.018700	10.440	34.25
Dover B. M. reference mark (Colo.), 1912 (d. m.) [1]	40 46 46.969 104 48 43.264	330 42 32 342 01 13	150 42 33 162 01 13	Dover B. M. eccentric Dover B. M. E 3	1.717504 1.726138	52.180 53.2	171.19 175
Terry (U. S. G. S.), 1912 (d. m.)	41 01 33.093 104 52 21.366	334 56 44.9 94 24 41.1	154 56 53.7 274 09 08.0	Warren Twin	2.869084 4.522332	739.7 33,291.4	2,427 109,224
Colorado-Wyoming boundary, milepost 44 (Colo.-Wyo.), 1912 (d. m.).	40 59 53.777 104 53 33.673	208 52 11.7 219 54 57.8 75 17 36	28 52 59.2 39 55 54.0	Terry Warren Reference mark.	3.543908 3.494302	3,498.7 3,121.1	11,479 10,240
East Twin (U. S. G. S.), 1912 (d. m.) [1]	41 02 53.680 105 16 02.748	276 09	96 09	Twin	0.441538	2.764	9.07
Otto, Union Pacific Railroad Co., water tank, 1912 (n. d.).	41 05 27.291 105 04 29.785	292 56 47.5 73 44 04.5	113 04 45.9 253 36 29.3	Terry Twin	4.266700 4.226746	18,479.9 16,855.7	60,629 55,301
Cheyenne, State Capitol, dome, 1912 (n. d.)	41 08 24.966 104 49 10.892	17 11 16.7 104 31 15.8	197 09 20.4 284 11 34.7	Warren Russell	4.146121 4.634947	13,999.8 43,146.6	45,931 141,557
Fort D. A. Russell, water tank, 1912 (n. d.)	41 09 23.246 104 52 12.934	359 33 39.4 103 28 55.6	179 33 42.7 283 11 14.2	Warren Russell	4.181100 4.586503	15,174.0 38,592.5	49,783 126,616
Ritzke's windmill, 1912 (n. d.)	41 15 23.491 104 56 39.667	69 00 14.0 165 14 42.2	248 59 48.3 345 12 43.8	Wadill Whitaker	2.986583 4.213530	969.6 16,350.5	3,181 53,643
Tall new house, west gable, 1912 (n. d.)	41 15 45.801 105 02 34.997	195 08 01.9 277 58 24.6	15 09 58.2 98 01 53.3	Whitaker Wadill	4.194967 3.871538	15,666.3 7,439.4	51,399 24,407
Kipp's house, chimney, 1912 (n. d.)	41 16 40.246 104 56 42.031	17 23 10.5 163 00 10.3	197 22 46.4 342 58 13.5	Wadill Whitaker	3.454117 4.147906	2,845.2 14,057.4	9,335 46,120
Hollingswood's barn, 1912 (n. d.)	41 17 03.204 104 58 58.150	175 44 44.4 325 53 08.2	355 44 17.5 145 54 13.9	Whitaker Wadill	4.106165 3.616439	12,769.2 4,134.7	41,894 13,565
T. 17 N., R. 68 W., sec. 33, southwest corner, stone post, 1912 (d. m.).[1]	41 23 37.840 105 00 03.544	225 37 03	45 37 19	Whitaker	2.903155	800.12	2,625.1
B. M. Denver 6702 (U. S. G. S.), 1912, r. 1933 (d. m.) [1]	41 23 37.933 105 00 20.305	239 55 01.9	59 55 29.3	Whitaker	3.045644	1,110.82	3,644.4
Wheatland, standpipe, 1912 (d. n. m.)	42 02 43.430 104 57 27.074	12 32 01.2 88 50 44.5	192 29 06.9 268 35 47.5	Chugwater Notch	4.443052 4.488723	27,736.5 30,812.2	90,999 101,090
Laramie Peak, 1933 (d. m.)	42 16 05.228 105 26 31.214	247 16 00.87 339 53 04.66	67 28 59.94 159 57 36.32	Coleman Notch	4.4580177 4.4325145	28,708.97 27,071.64	94,189.3 88,817.5
Jireh College, cupola, 1912 (n. d.) [1]	42 46 29.43 104 42 34.62	232 10 51 339 10 32	52 16 11 159 12 24	Manville Willow	4.131205 4.022205	13,527.1 10,524.6	44,380 34,529
Manville, Chicago and North Western Railway Co., water tank, 1912 (n. d.).[1]	42 46 54.50 104 36 52.34	201 12 01 20 53 37	21 13 28 200 51 36	Manville Willow	3.906241 4.055284	8,058.3 11,357.5	26,438 37,262
Manville, Congregational Church, steeple, 1912 (n. d.) [1]	42 46 44.70 104 36 52.68	21 24 57 200 29 49	201 22 56 20 31 16	Willow Manville	4.044252 3.921359	11,072.7 8,343.7	36,328 27,374
Nebraska-Wyoming boundary monument 123 eccentric, 1912 (d. m.).	42 46 48.440 104 03 09.631	59 18 45.0 156 54 02.6	239 00 52.8 336 52 06.0	Rawhide Kirtley	4.622564 3.996790	41,933.8 9,926.4	137,578 32,567
Nebraska-Wyoming boundary monument 123 (Nebr.-Wyo.), 1912 (d. m.).[1]	42 46 47.950 104 03 09.122	142 35 48	322 35 48	Nebraska-Wyoming boundary monument 123 eccentric.	1.279941	19.052	62.51
Bluff, 1912 (d. m.)	43 01 44.100 104 12 31.854	225 30 49.7 334 23 27.3 51 40 29	45 52 06.9 154 27 53.5	Parker Kirtley Reference mark.	4.769677 4.312156	58,840.6 20,519.0	193,046 67,319
South Dakota-Nebraska boundary monument eccentric (Nebr.), 1912 (d. m.).	43 00 06.063 104 00 02.744	27 43 48.2 100 10 57.6	207 39 44.0 280 02 26.6	Kirtley Bluff	4.242724 4.236322	17,487.4 17,231.5	57,373 56,534
South Dakota-Nebraska boundary monument (S. Dak.-Nebr.), 1912 (d. m.).[1]	43 00 06.146 104 00 02.732	5 57	185 57	South Dakota-Nebraska boundary monument eccentric.	0.410271	2.572	8.44
South Dakota-Wyoming boundary monument (S. Dak.-Wyo.), 1912 (d. m.).	43 03 30.595 104 03 10.118	10 06 10.6 75 33 41.3	190 04 14.0 255 27 17.9	Kirtley Bluff	4.345129 4.118352	22,137.5 13,132.6	72,629 43,086

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

One-hundred-and-fourth meridian arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
Sullivan (U. S. G. S.) (S. Dak.), 1912 (d. m.)[1]	43 35 33.030 104 00 07.530	210 29 31	30 29 31	Sullivan	0.65610	4.53	14.9
Alkali (U. S. G. S.), 1912 (d. m.)[1]	43 38 11.639 104 29 12.086	200 14 01	20 14 01	Alkali	1.456973	28.640	93.96
Elk (U. S. G. S.) (S. Dak.), 1912 (d. m.)[1]	43 43 41.402 104 02 57.832	10 20	190 20	Elk	0.014940	1.035	3.40
Crows Nest (U. S. G. S.) (S. Dak.), 1912 (d. m.)[1]	44 03 18.769 103 57 43.047	257 56	77 56	Crow	0.304490	2.016	6.61
Peak south of station Terry (S. Dak.), 1912 (n. d.)[1]	44 14 39.30 103 44 04.44	139 08 30 194 33 29	319 04 18 14 45 18	Terry Castle	4.088395 4.944304	12,257.3 87,963.8	40,214 288,595
Bear Lodge Mountains, highest peak, 1912 (n. d.)	44 28 33.868 104 26 36.261	118 16 24.2 205 24 57.4	298 16 05.4 25 40 04.2	Sundance Wymonkota (U. S. G. S.)	2.828314 4.817732	673.5 65,725.2	2,210 215,633
Northeast corner Wyoming, boundary monument eccentric (Mont.), 1912, r. 1913 (d. m.)	44 59 58.571 104 03 18.840	346 45 45.0 28 34 45.5	166 55 02.1 208 18 03.0	Terry Sundance	4.884713 4.818220	76,685.5 65,799.1	251,592 215,876
Northeast corner Wyoming, boundary monument (Mont.-S.Dak.-Wyo.), 1912, r. 1913 (d. m.).[1]	44 59 51.449 104 03 25.948	215 18 11	35 18 16	Northeast corner Wyoming, boundary monument eccentric.	2.430414	269.41	883.9
Southeast corner Montana, boundary monument eccentric (S. Dak.), 1912 (d. m.).	44 59 49.292 104 02 32.125	347 28 17.4 29 29 12.7	167 37 01.6 209 11 57.3	Terry Sundance	4.881830 4.819842	76,178.1 66,045.3	249,928 216,684
Southeast corner Montana, boundary monument (Mont.-S. Dak.), 1912 (d. m.).[1]	44 59 53.194 104 02 21.008	63 40 50	243 40 42	Southeast corner Montana, boundary monument eccentric.	2.434026	271.66	891.3

One-hundred-and-eleventh meridian arc

Principal points						
Oxford (Idaho), 1897, r. 1933 (d. m.)	42 16 10.842 112 05 49.460					
Putnam (Idaho), 1915, r. 1936 (d. m.)	42 54 48.667 112 07 45.584	357 52 08.18 307 15 17	177 53 26.77	Oxford Azimuth mark.	4.8547244	71,568.92	234,805.7
Big Butte (Idaho), 1915, r. 1936 (d. m.)	43 23 46.240 113 01 18.054	306 08 58.53 328 32 52.20	126 45 35.81 149 10 35.32	Putnam Oxford	4.9553982 5.1649508	90,239.81 146,201.14	296,061.8 479,661.6
Middle Butte (Idaho), 1915, r. 1936 (d. m.)	43 29 26.924 112 44 14.804	322 10 19.43 65 32 27.47	142 35 18.14 245 20 43.85	Putnam Big Butte	4.9083193 4.4030928	80,969.09 25,298.38	265,646.1 82,999.8
Caribou (Idaho), 1915, r. 1922 (d. m.)	43 05 36.472 111 18 39.027	35 25 13.74 73 36 16.66 111 21 33.24	214 53 14.86 253 02 46.96 290 22 51.42	Oxford Putnam Middle Butte	5.0489169 4.8430311 5.0930908	111,922.37 69,667.65 123,905.56	367,198.6 228,567.9 406,513.5
Sawtelle (Idaho-Mont.), 1922 (d. m.)	44 33 43.449 111 30 14.766	354 29 26.32 40 08 50.71	174 37 28.16 219 17 24.73	Caribou Middle Butte	5.2146110 5.1895990	163,912.08 154,738.72	537,768.2 507,671.9
Garfield (Mont.), 1922 (d. m.)	44 31 13.684 112 37 12.493	266 37 30.73 325 56 27.66 4 44 31.14	87 24 28.90 146 50 50.79 184 39 37.73	Sawtelle Caribou Middle Butte	4.9484982 5.2795694 5.0599134	88,817.43 190,357.24 114,792.46	291,395.2 624,530.4 376,614.9
Black Butte (Mont.), 1922 (d. m.)	44 54 15.421 111 51 15.037	323 46 36.42 55 10 27.00	144 01 23.41 234 38 06.97	Sawtelle Garfield	4.6727048 4.8703062	47,065.73 74,183.31	154,414.8 243,383.1
Taylor (Mont.), 1922 (d. m.)	45 02 13.921 111 27 29.891	3 56 32.27 58 25 43.01 64 49 37.44	183 54 36.09 237 36 36.82 244 32 50.22	Sawtelle Garfield Black Butte	4.7236530 5.0350907 4.5384125	52,924.04 108,415.34 34,547.17	173,635.0 355,692.7 113,343.5
Ruby (Mont.), 1922 (d. m.)	45 18 46.641 112 13 38.160	296 36 40.87 326 59 05.90 19 32 37.74	117 09 24.33 147 14 57.44 199 15 59.08	Taylor Black Butte Garfield	4.8310474 4.7330500 4.9702185	67,771.55 54,081.66 93,372.39	222,347.2 177,432.9 306,339.2
Gallatin (Mont.), 1922 (d. m.)	45 22 05.884 111 21 54.147	11 17 44.02 85 06 22.80	191 13 45.78 264 29 34.90	Taylor Ruby	4.5742557 4.8316188	37,519.38 67,860.77	123,094.8 222,639.9
Jefferson (Mont.), 1922 (d. m.)	45 36 10.556 112 00 21.503	297 15 51.55 325 28 20.33 28 19 07.20	117 43 16.88 145 51 42.26 208 09 39.39	Gallatin Taylor Ruby	4.7519513 4.8816052 4.5632685	56,487.36 76,138.65 36,582.09	185,325.6 249,798.2 120,019.7
Salesville (Mont.), 1922, r. 1925 (d. m.)	45 31 40.973 111 19 03.832	11 47 32.27 99 03 02.12	191 45 30.91 278 33 32.93	Gallatin Jefferson	4.2585405 4.7353708	18,135.96 54,371.44	59,501.1 178,383.6

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

One-hundred-and-eleventh meridian arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance: Logarithm (meters)	Distance: Meters	Distance: Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
London (Mont.), 1922, r. 1923 (d. m.)	45 48 53.858	304 58 05.53	125 23 00.83	Salesville	4.7431422	55,353.13	181,604.4
	111 53 54.133	319 50 05.34	140 12 56.95	Gallatin	4.8114385	64,779.64	212,531.2
		19 36 42.75	199 32 05.48	Jefferson	4.3981345	25,011.20	82,057.6
Bozeman northwest base (Mont.), 1922, r. 1925 (d. m.)	45 51 41.402	357 04 37.31	177 05 39.71	Salesville	4.5694845	37,109.44	121,749.9
	111 20 31.034	83 22 33.42	262 58 36.44	London	4.6388574	43,536.89	142,837.3
Bozeman southeast base (Mont.), 1922, r. 1925 (d. m.)	45 42 27.051	46 36 43.74	226 25 10.00	Salesville	4.4621778	28,985.30	95,095.9
	111 02 53.150	100 32 16.70	279 55 43.67	London	4.8274898	67,218.66	220,533.2
		126 56 12.06	306 43 33.85	Bozeman northwest base	4.4556151	28,550.592	93,669.73
Ross (Mont.), 1922, r. 1923, l. 1925 (d. m.)	45 53 44.960	16 40 01.61	196 36 33.96	Bozeman southeast base	4.3393408	21,844.43	71,667.9
	110 58 03.514	33 49 28.44	213 34 26.25	Salesville	4.6913664	49,132.22	161,194.6
		82 39 20.22	262 23 12.88	Bozeman northwest base	4.4669988	29,308.85	96,157.5
Supplementary points		83 14 48.25	262 34 43.87	London	4.8623886	72,843.13	238,986.2
Henry (Idaho), 1915 (d. m.)	42 55 15.076	89 27 34.2	268 57 54.6	Putnam	4.772921	59,281.8	194,494
	111 24 12.141	201 26 42.7	21 30 30.0	Caribou	4.313999	20,606.3	67,606
Henry (U. S. G. S.) (Idaho), 1915 (d. m.) [1]	42 55 15.201	330 51 35	150 51 35	Henry	0.64345	4.40	14.4
	111 24 12.235						
Stump (U. S. G. S.) (Idaho), 1915, r. 1922 (d. m.)	42 54 05.687	97 02 58.5	276 54 13.3	Henry	4.246212	17,628.4	57,836
	111 11 20.749	155 04 07.6	334 59 08.8	Caribou	4.371348	23,515.2	77,149
Lower Black (Idaho), 1922 (d. m.)	43 06 18.861	13 39 14.3	193 36 29.0	Stump (U. S. G. S.)	4.366993	23,280.5	76,379
	111 07 18.517	85 12 22.2	265 04 37.2	Caribou	4.188782	15,444.8	50,672
Little Star (Idaho), 1922 (d. m.)	42 56 57.482	57 20 33.9	237 16 25.8	Stump (U. S. G. S.)	3.991891	9,815.0	32,201
	111 05 16.515	131 28 03.4	311 18 55.9	Caribou	4.384204	24,221.7	79,467
		170 57 07.3	350 55 44.1	Lower Black	4.244088	17,542.4	57,554
Star Peak (U. S. G. S.), 1922 (n. d.)	43 00 28.929	62 18 20.3	242 07 05.7	Stump (U. S. G. S.)	4.404272	25,367.2	83,226
	110 54 50.706	106 29 48.6	286 13 33.7	Caribou	4.527507	33,690.5	110,533
		122 36 46.1	302 28 15.7	Lower Black	4.302651	20,074.8	65,862
Putnam (U. S. G. S.) cairn (Idaho), 1915 (d.) [1]	42 54 48.518	146 47	326 47	Putnam	0.74036	5.50	18.0
	112 07 45.451						
Caribou (U. S. G. S.) cairn (Idaho), 1915 (d.) [1]	43 05 36.554	7 37	187 37	Caribou	0.40654	2.55	8.4
	111 18 39.012						
Poker Peak (Idaho), 1922 (d. m.) [1]	43 14 34.65	359 35 15	179 35 23	Stump (U. S. G. S.)	4.578935	37,925.8	124,428
	111 11 32.79	30 08 35	210 03 43	Caribou	4.283238	19,197.2	62,983
Etna, Mormon Church, spire, 1922 (n. d.) [1]	43 02 01.56	33 50 25	213 47 16	Little Star	4.052838	11,293.7	37,053
	111 00 39.08	131 20 24	311 15 52	Lower Black	4.080262	12,029.9	39,468
Bedford, Mormon Church, spire, 1922 (n. d.) [1]	42 53 56.72	114 19 22	294 13 10	Little Star	4.132586	13,570.2	44,522
	110 56 11.04	146 37 57	326 30 22	Lower Black	4.438413	27,441.8	90,032
G. L. O. Station 1 (Wyo.-Idaho), 1922, r. 1923 (d. m.)	42 58 34.009	50 42 16.5	230 40 27.1	Little Star	3.672261	4,701.8	15,426
	111 02 36.006	155 59 58.4	335 56 45.6	Lower Black	4.196057	15,705.7	51,528
G. L. O. Station 2 (Wyo.-Idaho), 1922, r. 1923 (d. m.)	43 01 10.349	25 02 34.1	205 00 44.4	Little Star	3.935093	8,611.8	28,254
	111 02 35.712	146 07 08.4	326 03 55.3	Lower Black	4.059608	11,471.2	37,635
Garns (Idaho), 1922 (d. m.)	43 39 48.254	133 09 24.7	312 15 37.7	Garfield	5.147353	140,395.4	460,614
	111 19 55.000	172 12 04.5	352 04 53.1	Sawtelle	5.003463	100,800.6	330,710
		358 26 44.0	178 27 36.2	Caribou	4.801696	63,342.6	207,817
Garns reference mark no. 2 (Idaho), 1922 (d. m.) [1]	43 39 47.180	122 44 15	302 44 13	Garns	1.787390	61.29	201.1
	111 19 52.699						
Garns Mountain south base (Idaho), 1922 (d. m.) [1]	43 39 13.315	146 23 58	326 23 37	Garns reference mark no. 2	3.098594	1,254.9	4,117
	111 19 21.705						
G. L. O. Station 6 (Idaho), 1922 (d. m.) [1]	43 39 29.918	29 36 32	209 36 23	Garns Mountain south base	2.770373	589.350	1,933.56
	111 19 08.712	118 23 49	298 23 18	Garns reference mark no. 2	3.049368	1,120.4	3,676
Teton Peak, 1915 (n. d.) [1]	43 44 31.12	29 59 07	209 38 06	Caribou	4.919270	83,036.7	272,430
	110 48 04.10	49 56 50	229 02 09	Putnam	5.151333	141,688.0	464,855
Road (Idaho), 1922 (d. m.)	44 03 26.940	134 18 36.5	313 50 43.2	Garfield	4.868960	73,953.7	242,630
	111 57 16.283	212 30 08.5	32 49 01.2	Sawtelle	4.823458	66,597.5	218,495
		271 13 54		Reference mark no. 1.			
G. L. O. Station 8 (Idaho), 1922 (d. m.) [1]	44 03 26.650	94 09 12	274 09 08	Road	2.092791	123.82	406.2
	111 57 10.735						
G. L. O. Station 16 (Idaho-Mont.), 1922 (d. m.) [1]	44 33 43.471	278 47	98 47	Sawtelle	0.64345	4.4	14
	111 30 14.963						
G. L. O. Station 11 eccentric (Mont.), 1922 (d. m.)	44 40 57.413	208 31 42.7	28 38 53.0	Black Butte	4.447988	28,053.6	92,039
	112 01 25.743	287 48 32.3	108 10 26.6	Sawtelle	4.637169	43,368.0	142,283

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

One-hundred-and-eleventh meridian arc—Continued.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
G. L. O. Station 11 (Mont.), 1922 (d. m.)[1]	44 40 53.897	199 01 50	19 01 51	G. L. O. Station 11 eccentric	2.060018	114.82	376.7
	112 01 27.443						
G. L. O. Station 10 (Idaho-Mont.), 1922 (d. m.)	44 33 42.039	116 29 00.9	296 14 36.9	G. L. O. Station 11 eccentric	4.480917	30,263.3	99,289
	111 40 55.777	160 22 04.9	340 14 49.1	Black Butte	4.606781	40,437.2	132,668
		269 45 40.6	89 53 10.4	Sawtelle	4.150647	14,146.4	46,412
Black Butte (U. S. G. S.), cairn (Mont.), 1922 (d.)[1]	44 54 15.651	339 18 20	159 18 20	Black Butte	0.88024	7.59	24.9
	111 51 15.159						
G. L. O. Station 18 eccentric (Mont.), 1922 (d. m.)	45 20 59.726	266 53 55.4	87 15 44.6	Gallatin	4.603150	40,100.5	131,563
	111 52 34.165	316 28 37.8	136 46 25.1	Taylor	4.679546	47,813.0	156,866
		81 38 06.9	261 23 07.9	Ruby	4.444506	27,829.5	91,304
G. L. O. Station 18 (Mont.), 1922 (d. m.)[1]	45 20 58.052	124 56 50	304 56 48	G. L. O. Station 18 eccentric	1.955255	90.21	296.0
	111 52 30.768						
Mt. Blackmore (Mont.), 1922 (n. d.)	45 26 40.713	110 45 03.7	290 31 35.6	Salesville	4.419937	26,298.9	86,282
	111 00 10.542	150 25 17.2	330 10 44.4	Bozeman northwest base	4.727035	53,337.8	174,992
		173 08 06.7	353 06 10.6	Bozeman southeast base	4.468763	29,428.2	96,549
Mt. Jefferson (U. S. G. S.), cairn (Mont.), 1922 (n. d.)[1]	45 36 42.02	200 32 23	20 37 04	London	4.382637	24,134.4	79,181
	112 00 26.34	279 32 58	100 02 31	Salesville	4.737414	54,627.8	179,225
Bozeman, Montana State College, main hall, north chimney (Mont.), 1922 (n. d.).	45 40 03.223	53 39 57.1	233 28 24.5	Salesville	4.416824	26,111.0	85,666
	111 02 54.522	133 27 34.9	313 14 57.9	Bozeman northwest base	4.496910	31,398.6	103,014
		180 22 59.1	0 23 00.1	Bozeman southeast base	3.647438	4,440.6	14,569
Bozeman, Irving School, spire (Mont.), 1922 (n. d.)[1]	45 40 40.52	131 09 24	310 56 27	Bozeman northwest base	4.492346	31,070.3	101,936
	111 02 26.60	170 05 43	350 05 24	Bozeman southeast base	3.523583	3,338.7	10,954
Amsterdam, Holland Church, spire (Mont.), 1922 (n. d.).[1]	45 45 03.95	2 48 55	182 48 15	Salesville	4.394808	24,820.4	81,432
	111 18 07.66	165 51 14	345 49 31	Bozeman northwest base	4.102280	12,655.5	41,521
Belgrade, Presbyterian Church, spire (Mont.), 1922 (n. d.).[1]	45 46 26.12	127 35 19	307 28 18	Bozeman northwest base	4.203555	15,979.2	52,425
	111 10 44.06	305 53 44	125 59 21	Bozeman southeast base	4.099490	12,574.5	41,255
G. L. O. Station 19 (Mont.), 1922 (d. m.)	45 47 13.079	52 59 53.9	232 45 00.2	Jefferson	4.530060	33,889.1	111,184
	111 39 32.659	99 34 50.2	279 24 32.6	London	4.275591	18,862.1	61,883
		317 07 26.6	137 22 05.4	Salesville	4.593187	39,191.1	128,579
		333 38 30.1	153 51 06.1	Gallatin	4.715027	51,883.2	170,220
G. L. O. Station 20 (Mont.), 1922 (d. m.)	45 47 15.261	28 21 12.5	208 07 28.1	Gallatin	4.723406	52,894.0	173,536
	111 02 39.842	75 01 16.9	254 19 59.6	Jefferson	4.890179	77,656.7	254,779
		92 55 52.8	272 19 08.8	London	4.822555	66,459.2	218,042
Bridger Peak (Mont.), 1922 (n. d.)[1]	45 47 37.32	42 29 06	222 24 16	Bozeman southeast base	4.113321	12,981.4	42,590
	110 56 07.83	103 33 56	283 16 26	Bozeman northwest base	4.511478	32,469.7	106,528
Ross Peak (Mont.), 1922 (n. d.)	45 51 31.157	37 39 17.3	217 23 43.9	Salesville	4.665878	46,331.7	152,007
	110 57 19.523	23 15 13.6	203 11 14.5	Bozeman southeast base	4.261964	18,279.5	59,972
		90 44 32.8	270 27 54.1	Bozeman northwest base	4.477409	30,019.9	98,490

Sundance, Wyo., to Bozeman, Mont., arc

Principal points							
Oshoto, 1925 (d. m.)	44 32 30.629	278 20 39.95	98 45 15.49	Sundance	4.6722201	47,013.23	154,242.6
	105 02 07.878	303 30 52.04	123 59 38.80	Inyankara	4.8178323	65,740.39	215,683.3
		257 42 14		Devils Tower National Monument.			
Moorecroft, 1925 (d. m.)	44 13 32.672	168 43 00.86	348 39 18.80	Oshoto	4.5541333	35,820.64	117,521.5
	104 56 50.411	234 25 23.17	54 46 12.63	Sundance	4.6863246	48,565.13	159,334.1
		271 28 29.57	91 53 30.04	Inyankara	4.6792347	47,778.74	156,754.1
		204 29 57		Devils Tower National Monument.			
Rozet, 1925 (d. m.)	44 20 12.662	216 11 38.62	36 20 27.73	Oshoto	4.4510484	28,251.95	92,689.9
	105 14 43.589	297 18 57.88	117 31 27.15	Moorecroft	4.4282842	26,809.22	87,956.6
Cow, 1925 (d. m.)	44 27 28.264	250 08 53.60	70 22 38.90	Oshoto	4.4414859	27,636.68	90,671.3
	105 21 45.354	307 46 01.84	128 03 26.71	Moorecroft	4.6229836	41,974.31	137,710.7
		325 11 24.11	145 16 19.19	Rozet	4.2139897	16,367.78	53,700.0
Sharp, 1925 (d. m.)	44 11 10.392	179 58 45.83	359 58 45.49	Cow	4.4797616	30,182.94	99,025.2
	105 21 44.863	209 08 03.24	29 12 57.26	Rozet	4.2826093	19,169.43	62,891.7
		262 18 57.94	82 36 19.93	Moorecroft	4.5246622	33,470.50	109,811.1
Gillette, 1925 (d. m.)	44 18 17.202	223 23 05.93	43 31 35.13	Cow	4.3698035	23,431.68	76,875.4
	105 33 53.374	309 06 32.62	129 15 00.93	Sharp	4.3191596	20,852.57	68,413.8
		201 45 13		Reference mark no. 1.			
Felix, 1925, r. 1934 (d. m.)	44 27 02.334	268 31 21.64	88 49 37.64	Cow	4.5391921	34,609.24	113,547.1
	105 47 50.296	311 05 56.58	131 15 41.92	Gillette	4.3912416	24,617.37	80,765.5
		118 40 27		Azimuth mark.			

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

Sundance, Wyo., to Bozeman, Mont., arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Jay, 1925 (d. m.)	44 06 44.676	171 08 01.01	351 04 55.86	Felix	4.5802533	38,041.12	124,806.6
	105 43 25.119	210 38 57.02	30 45 35.68	Gillette	4.3955032	24,860.12	81,561.9
		216 46 27.38	37 01 34.92	Cow	4.6812345	47,999.26	157,477.6
		254 01 47.07	74 16 52.74	Sharp	4.4776768	30,038.40	98,551.0
Barber, 1925, r. 1934 (d. m.)	44 21 24.405	236 33 09.54	56 41 30.16	Felix	4.2778239	18,959.37	62,202.5
	105 59 45.764	321 11 37.22	141 23 01.32	Jay	4.5415556	34,798.10	114,166.8
		164 20 29		Azimuth mark.			
Robinson, 1925, r. 1934 (d. m.)	44 34 05.153	289 17 29.92	109 37 02.55	Felix	4.5931256	39,185.52	128,561.2
	106 15 43.026	317 52 54.99	138 04 05.50	Barber	4.4998273	31,610.20	103,707.8
		319 31 11.06	139 53 45.52	Jay	4.8220612	66,383.66	217,793.7
		143 18 59		Azimuth mark.			
Buffalo, 1925, r. 1934 (d. m.)	44 13 53.067	222 58 26.07	43 16 54.03	Robinson	4.7097944	51,261.87	168,181.7
	106 42 06.578	255 51 45.14	76 21 19.51	Barber	4.7636241	58,026.20	190,374.3
		279 15 07.78	99 56 01.62	Jay	4.8994961	79,340.71	260,303.6
		21 31 30		Azimuth mark.			
Whitmeyer, 1925 (d. m.)	44 45 19.482	315 21 14.84	135 32 08.74	Robinson	4.4655455	29,210.94	95,836.2
	106 31 13.270	13 59 11.64	193 51 33.78	Buffalo	4.7780806	59,990.24	196,818.0
Banner, 1925 (d. m.)	44 36 08.501	242 18 06.57	62 35 27.22	Whitmeyer	4.5654560	36,766.81	120,625.8
	106 55 53.286	273 51 38.95	94 19 50.90	Robinson	4.7267786	53,306.31	174,889.1
		335 59 32.34	156 09 10.94	Buffalo	4.6541338	45,095.56	147,951.0
Badger, 1925 (d. m.)	44 58 10.078	331 44 45.01	151 51 34.77	Whitmeyer	4.4312114	26,990.53	88,551.4
	106 40 54.154	25 56 22.76	205 45 49.35	Banner	4.6564006	45,331.55	148,725.3
Columbus, 1925 (d. m.)	44 55 33.896	264 50 50.20	85 21 02.07	Badger	4.7515147	56,430.61	185,139.4
	107 23 38.853	285 02 33.71	105 39 31.80	Whitmeyer	4.8551709	71,642.52	235,047.2
		314 19 10.37	134 38 43.25	Banner	4.7104576	51,340.20	168,438.6
Red (Mont.), 1925 (d. m.)	45 02 10.396	280 15 38.80	100 37 18.58	Badger	4.6120889	40,934.44	134,299.1
	107 11 32.235	52 31 01.75	232 22 28.12	Columbus	4.3027917	20,081.29	65,883.4
Rosebud (Mont.), 1925, r. 1934 (d. m.)	45 18 45.123	314 31 12.91	134 52 03.14	Badger	4.7340700	54,208.82	177,850.1
	107 10 17.899	3 01 59.24	183 01 06.52	Red	4.4878554	30,750.73	100,888.0
		22 15 21.07	202 05 53.53	Columbus	4.6663174	46,378.57	152,160.4
		18 23 50		Azimuth mark.			
Wyola (Mont.), 1925 (d. m.)	45 04 21.552	230 56 25.26	51 14 18.67	Rosebud	4.6278093	42,443.31	139,249.4
	107 35 30.852	277 11 14.98	97 28 13.20	Red	4.5015904	31,738.79	104,129.7
		316 10 35.93	136 18 59.38	Columbus	4.3531514	22,550.25	73,983.6
Wolf, 1925 (d. m.)	44 59 55.786	60 20 33.86	240 12 57.26	Columbus	4.2123662	16,306.70	53,499.6
	107 12 52.701	105 33 40.70	285 17 39.75	Wyola	4.4891102	30,839.70	101,179.9
		185 31 28.24	5 33 18.00	Rosebud	4.5444007	35,026.82	114,917.2
		202 58 08.39	22 59 05.31	Red	3.6545099	4,513.46	14,807.9
		274 15 02.84	94 37 39.08	Badger	4.6248910	42,159.07	138,316.9
Ranchester northwest base, 1925 (d. m.)	44 57 16.034	71 45 04.05	251 39 56.75	Columbus	4.0019896	10,045.92	32,959.0
	107 16 23.816	223 08 50.93	43 11 20.15	Wolf	3.8300422	6,761.49	22,183.3
		289 45 16		Reference mark no. 2.			
Ranchester southeast base, 1925 (d. m.)	44 54 53.216	94 11 35.05	274 02 13.10	Columbus	4.2430312	17,499.73	57,413.7
	107 10 23.032	119 09 56.02	299 05 41.20	Ranchester northwest base	3.9569642	9,056.579	29,713.13
		160 39 41.72	340 37 55.97	Wolf	3.9956160	9,899.56	32,478.8
		325 55 38		Reference mark no. 1.			
Fort Smith (Mont.), 1925, r. 1934 (d. m.)	45 15 03.472	262 52 39.00	83 23 31.94	Rosebud	4.7577288	57,243.84	187,807.5
	107 53 45.550	309 32 41.49	129 45 37.74	Wyola	4.4921137	31,053.73	101,882.1
		306 43 36		Azimuth mark.			
Pine (Mont.), 1925, r. 1934 (d. m.)	45 49 31.274	316 59 22.31	137 28 18.49	Rosebud	4.8900857	77,640.04	254,724.0
	107 50 49.166	346 29 31.01	166 40 25.44	Wyola	4.9345089	86,002.06	282,158.4
		3 26 53.15	183 24 47.26	Fort Smith	4.8058616	63,953.10	209,819.5
Haley (Mont.), 1925 (d. m.)	45 42 33.342	241 05 27.19	61 18 25.43	Pine	4.4278560	26,782.80	87,869.9
	108 08 55.313	338 42 26.59	158 53 15.26	Fort Smith	4.7374589	54,633.49	179,243.4
Huntley (Mont.), 1925 (d. m.)	45 48 53.872	267 29 44.33	87 45 08.87	Pine	4.4448934	27,854.37	91,385.5
	108 12 18.339	339 30 05.97	159 32 31.43	Haley	4.0983303	12,540.95	41,144.8
		318 38 42		Reference mark no. 1.			
Pryor (Mont.), 1925 (d. m.)	45 30 18.857	192 48 52.76	12 53 12.19	Huntley	4.5478801	35,308.57	115,941.5
	108 18 21.071	208 20 32.46	28 27 16.73	Haley	4.4112465	25,777.84	84,572.8
		224 58 52.75	45 18 34.32	Pine	4.7028103	50,444.09	165,498.7
		311 12 34.12	131 30 04.34	Fort Smith	4.6311409	42,770.16	140,321.8
Blue (Mont.), 1925, r. 1931 (d. m.)	45 31 07.975	222 46 24.09	43 03 15.04	Huntley	4.6525607	44,932.51	147,416.1
	108 35 51.672	273 42 00.48	93 54 29.98	Pryor	4.3589874	22,855.33	74,984.5
		301 09 14		Reference mark no. 1.			
Reid (Mont.), 1925, r. 1931 (d. m.)	45 52 02.151	277 16 42.50	97 41 13.79	Huntley	4.6496858	44,636.05	146,443.4
	108 46 29.152	317 35 50.33	137 55 58.21	Pryor	4.7351609	54,345.16	178,297.4
		340 19 46.95	160 27 23.14	Blue	4.6138349	41,104.08	134,855.6

GEOGRAPHIC POSITIONS—Continued

Sundance, Wyo., to Bozeman, Mont., arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Shayne (Mont.), 1925, r. 1931 (d. m.)	45 30 38.577	215 14 24.16	35 29 54.40	Reid	4.6866132	48,597.42	159,440.0
	109 08 09.165	268 34 18.03	88 57 20.30	Blue	4.6239109	42,064.03	138,005.1
		183 30 17		Reference mark no. 2.			
Beaver (Mont.), 1925 (d. m.)	45 49 57.678	264 25 39.17	84 48 15.15	Reid	4.6123143	40,955.70	134,368.8
	109 17 58.959	302 16 16.06	122 46 24.10	Blue	4.8120608	64,872.52	212,835.9
		340 18 28.29	160 25 30.21	Shayne	4.5797184	37,994.30	124,653.0
		303 52 43		Reference mark no. 1.			
Weamer (Mont.), 1925 (d. m.)	45 51 40.899	276 30 44.21	96 45 54.67	Beaver	4.4403729	27,565.94	90,439.3
	109 39 07.929	313 54 37.00	134 16 47.00	Shayne	4.7482361	56,006.19	183,747.0
Elk (Mont.), 1925 (d. m.)	45 32 56.959	219 10 26.49	39 26 06.38	Weamer	4.6517053	44,844.10	147,126.0
	110 01 01.071	240 19 09.22	60 49 56.95	Beaver	4.8071641	64,145.19	210,449.7
		273 14 14.29	93 51 57.84	Shayne	4.8386072	68,961.58	226,251.4
Duck (Mont.), 1925 (d. m.)	45 56 18.107	279 46 41.78	100 13 38.27	Weamer	4.6926120	49,273.34	161,657.6
	110 16 38.912	334 47 45.76	154 58 57.47	Elk	4.6791894	47,773.76	156,737.7
Livingston (Mont.), 1925 (d. m.)	45 35 23.661	199 57 00.03	20 04 47.79	Duck	4.6150986	41,219.10	135,233.0
	110 27 31.767	244 02 54.02	64 37 33.20	Weamer	4.8430166	69,665.32	228,560.3
		277 19 21.07	97 38 16.99	Elk	4.5414476	34,789.46	114,138.4
Mount Ellis (Mont.), 1925 (d. m.)	45 34 38.926	79 08 56.71	258 53 24.79	Salesville	4.4600460	28,843.37	94,630.3
	110 57 18.432	136 29 06.26	316 12 29.25	Bozeman northwest base	4.6397832	43,629.80	143,142.1
		153 23 48.34	333 19 49.02	Bozeman southeast base	4.2086698	16,168.50	53,046.2
		232 29 39.09	52 58 46.78	Duck	4.8211575	66,245.67	217,341.0
		267 46 50.47	88 08 06.64	Livingston	4.5883581	38,757.71	127,157.6
Ross 2 (Mont.), 1925 (d. m.)	45 53 44.948	264 42 18.64	85 12 03.42	Duck	4.7303963	53,752.21	176,352.0
	110 58 03.511	310 28 07.06	130 49 58.98	Livingston	4.7176072	52,192.39	171,234.5
		358 25 03.67	178 25 35.95	Mount Ellis	4.5489467	35,395.39	116,126.4
		16 40 03.48	196 36 35.83	Bozeman southeast base	4.3393338	21,844.08	71,666.8
		33 49 29.68	213 34 27.49	Salesville	4.6913638	49,131.93	161,193.7
		82 39 23.09	262 23 15.75	Bozeman northwest base	4.4669993	29,308.89	96,157.6
Supplementary points							
Cement Ridge lookout, 1925 (n. d.) [1]	44 21 17.32	54 24 56	234 13 26	Inyankara	4.431287	26,995.2	88,567
	104 04 30.02	114 52 16	294 36 29	Sundance	4.517987	32,960.0	108,136
G. L. O. Station 1 eccentric (S. Dak.), 1925 (d. m.)	44 12 01.363	93 31 58.3	273 19 37.0	Inyankara	4.373787	23,647.6	77,584
	104 03 15.761	134 31 44.2	314 15 06.7	Sundance	4.645896	44,248.2	145,171
G. L. O. Station 1 (Wyo.-S. Dak.), 1925 (d. m.) [1]	44 11 55.966	180 06 10	0 06 10	G. L. O. Station 1 eccentric	2.221641	166.587	546.54
	104 03 15.774						
G. L. O. Station 2 eccentric, 1925, r. 1928 (d. m.)	44 31 55.122	299 25 36.4	119 46 41.3	Terry	4.662434	45,965.7	150,806
	104 20 13.224	56 58 51.2	236 54 03.9	Sundance	4.033549	10,803.1	35,443
G. L. O. Station 2, reference mark no. 3, 1925, r. 1928 (d. m.) [1]	44 31 56.618	39 19 57	219 19 56	G. L. O. Station 2 eccentric	1.776098	59.717	195.92
	104 20 11.510						
G. L. O. Station 2, reference mark no. 1, 1925, r. 1928 (d. m.) [1]	44 31 56.685	12 47	192 47	G. L. O. Station 2, reference mark no. 3.	0.32490	2.113	6.93
	104 20 11.489						
G. L. O. Station 2, 1928 (d. m.) [1]	44 31 53.277	123 09 58	303 09 55	G. L. O. Station 2 eccentric	2.017434	104.096	341.52
	104 20 09.278	154 27 28	334 27 26	G. L. O. Station 2, reference mark no. 3.	2.058080	114.309	375.03
		155 06 19	335 06 17	G. L. O. Station 2, reference mark no. 1.	2.064361	115.974	380.49
G. L. O. Station 3 eccentric, 1925 (d. m.)	44 10 48.365	97 50 39.7	277 30 58.9	Moorecroft	4.579166	37,946.0	124,495
	104 28 36.777	250 07 05.8	70 12 24.9	Inyankara	4.033764	10,808.5	35,461
G. L. O. Station 3, 1925 (d. m.) [1]	44 10 50.662	50 15 53	230 15 50	G. L. O. Station 3 eccentric	2.044982	110.913	363.89
	104 28 32.937						
Tps. 48 N., Rs. 63 and 64 W., secs. 1 and 6, closing corner, 1925 (d. m.) [1]	44 10 50.652	269 39 54	89 39 56	G. L. O. Station 3	1.732128	53.967	177.06
	104 28 35.367						
G. L. O. Station 4 eccentric, 1925, r. 1931 (d. m.)	44 25 17.042	111 10 33.2	290 52 09.1	Oshoto	4.571792	37,307.1	122,398
	104 35 52.070	241 16 58.2	61 23 08.6	Sundance	4.124826	13,329.9	43,733
G. L. O. Station 4, 1925 (d. m.) [1]	44 25 12.972	201 04 06	21 04 08	G. L. O. Station 4 eccentric	2.129093	134.615	441.65
	104 35 54.257						
B. M. H 7 1925 (d. m.)	44 09 41.923	213 22 54.7	33 35 10.0	Sundance	4.626064	42,273.1	138,691
	104 44 35.549	259 33 41.1	79 50 08.5	Inyankara	4.504856	31,978.3	104,915
G. L. O. Station 5 eccentric, 1925 (d. m.)	44 19 25.878	314 32 38.0	134 38 26.1	Moorecroft	4.191132	15,528.6	50,947
	105 05 09.045	96 31 39.6	276 24 58.1	Rozet	4.107594	12,811.3	42,032
G. L. O. Station 5, 1925 (d. m.) [1]	44 19 20.869	145 36 16	325 36 12	G. L. O. Station 5 eccentric	2.272723	187.380	614.76
	105 05 04.268						

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

Sundance, Wyo., to Bozeman, Mont., arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
G. L. O. Station 6 eccentric, 1925 (d. m.)	44 32 14.339 105 32 00.073	5 33 05.0 65 27 02.8	185 31 45.7 245 15 56.9	Gillette Felix	4.414318 4.363577	25,960.8 23,098.1	85,173 75,781
G. L. O. Station 6, 1925 (d. m.) [1]	44 32 20.724 105 32 06.543	324 04 02	144 04 06	G. L. O. Station 6 eccentric	2.386349	243.416	798.61
G. L. O. Station 7 eccentric, 1925 (d. m.)	44 10 20.077 105 41 30.737	20 56 17.9 164 49 27.4	200 54 58.2 344 45 02.3	Jay Felix	3.852348 4.505949	7,117.8 32,058.9	23,352 105,180
G. L. O. Station 7, 1925 (d. m.) [1]	44 10 18.588 105 41 31.358	196 42 29	16 42 30	G. L. O. Station 7 eccentric	1.681051	47.979	157.41
G. L. O. Station 8A eccentric, 1925 (d. m.)	44 20 30.260 106 02 58.847	76 58 31.8 146 11 05.6 248 38 10.0	256 31 12.4 326 02 10.4 68 40 24.9	Buffalo Robinson Barber	4.728186 4.481452 3.661958	53,479.3 30,300.7 4,591.5	175,457 99,412 15,064
G. L. O. Station 8A, 1925 (d. m.) [1]	44 20 37.372 106 03 26.743	289 33 13 327 40 48	109 33 32	G. L. O. Station 8A eccentric Reference mark no. 2.	2.816755	655.8	2,152
G. L. O. Station 8B, 1925 (d. m.) [1]	44 20 36.078 106 03 26.731	179 36 29	359 36 29	G. L. O. Station 8A	1.601430	39.942	131.04
G. L. O. Station 9 eccentric, 1925 (d. m.)	44 51 32.775 106 33 37.528	344 36 11.9 142 03 21.8	164 37 53.6 321 58 13.5	Whitmeyer Badger	4.077410 4.192037	11,951.2 15,561.0	39,210 51,053
G. L. O. Station 9, 1925 (d. m.) [1]	44 51 38.702 106 33 44.230	321 11 22	141 11 27	G. L. O. Station 9 eccentric	2.370683	234.792	770.31
G. L. O. Station 10 eccentric, 1925 (d. m.)	44 33 24.512 106 38 55.269	102 48 00.9 204 42 57.0	282 36 06.4 24 48 21.7	Banner Whitmeyer	4.362161 4.385677	23,023.0 24,304.0	75,535 79,737
G. L. O. Station 10, 1925 (d. m.) [1]	44 33 25.192 106 38 57.921	289 43 01	109 43 03	G. L. O Station10 eccentric	1.793616	62.175	203.99
G. L. O. Station 11 eccentric, 1925 (d. m.)	44 51 51.101 107 01 59.427	103 41 18.7 136 18 32.8	283 26 01.5 316 10 51.4	Columbus Wolf	4.467316 4.316266	29,330.3 20,714.1	96,228 67,960
G. L. O. Station 11, 1925 (d. m.) [1]	44 51 50.896 107 01 55.391	94 05 16	274 05 13	G. L. O. Station 11 eccentric	1.948540	88.826	291.42
Leiter, reference mark (U. S. G. S.), 1925 (d. m.) [1]	44 45 19.508 106 31 13.987	272 57 22	92 57 22	Whitmeyer	1.198382	15.790	51.80
Ranchester, water tower, 1925 (n. d.) [1]	44 54 32.63 107 09 46.28	120 05 42 128 15 24	300 01 01 308 14 58	Ranchester northwest base Ranchester southeast base	4.003099 3.011399	10,071.6 1,026.6	33,043 3,368
Columbus (U. S. G. S.), 1925 (d. m.) [1]	44 55 33.823 107 23 38.720	127 45 38	307 45 38	Columbus	0.568554	3.703	12.15
Red Bluff (U. S. G. S.) (Mont.), 1925 (d. m.) [1]	45 02 11.436 107 11 31.694	20 14 20	200 14 19	Red	1.534153	34.210	112.24
Wolf Mountain (U. S. G. S.), 1925 (d. m.) [1]	44 59 54.814 107 12 50.946	127 59 02	307 59 01	Wolf	1.688055	48.759	159.97
G. L. O. Station 12 eccentric (Mont.), 1925 (d. m.)	45 00 06.008 107 23 30.625	271 13 51.9 1 13 50.1	91 21 23.0 181 13 44.3	Wolf Columbus	4.145372 3.924377	13,975.6 8,401.9	45,852 27,565
G. L. O. Station 12 (Mont.), 1925 (d. m.) [1]	45 00 04.502 107 23 33.796	236 12 11	56 12 14	G. L. O. Station 12 eccentric	1.922061	83.572	274.19
G. L. O. Station 11 (Mont.), 1925 (d. m.)	45 05 10.192 107 35 19.844	279 56 08.2 9 06 39.9	100 12 58.7 189 06 32.1	Red Wyola	4.501391 3.182038	31,724.2 1,520.7	104,082 4,989
T. 9 S., R. 34 E., sec. 6, quarter-section corner (Mont.), 1925 (d. m.).[1]	45 05 10.197 107 35 20.365	270 44 59	90 45 00	G. L. O. Station 11	1.056448	11.388	37.36
G. L. O. Station 10 eccentric (Mont.), 1925 (d. m.)	45 20 47.011 107 23 27.019	282 16 23.6 335 34 31.1	102 25 44.8 155 42 58.2	Rosebud Red	4.245304 4.577925	17,591.5 37,837.7	57,715 124,139
G. L. O. Station 10 (Mont.), 1925 (d. m.) [1]	45 20 49.652 107 23 17.948	67 33 47	247 33 40	G. L. O. Station 10 eccentric	2.329691	213.644	700.93
G. L. O. Station 9 (Mont.), 1925 (d. m.)	45 27 40.416 107 42 01.441	33 19 42.6 164 16 59.5	213 11 21.6 344 10 42.2	Fort Smith Pine	4.446313 4.623798	27,945.6 42,053.1	91,685 137,969
G. L. O. Station 6 eccentric (Mont.), 1925 (d. m.)	45 57 27.737 108 32 58.288	339 14 53.3 60 10 22.5	159 25 21.5 240 00 40.1	Pryor Reid	4.730358 4.304506	53,747.5 20,160.7	176,337 66,144
G. L. O. Station 6 (Mont.), 1925 (d. m.) [1]	45 57 28.132 108 32 57.719	45 07 21	225 07 21	G. L. O. Station 6 eccentric	1.237845	17.292	56.73
G. L. O. Station 5 eccentric (Mont.), 1925 (d. m.)	45 47 09.905 109 11 30.742	121 45 08.6 254 17 40.3 351 51 47.3	301 40 30.2 74 35 37.3 171 54 11.5	Beaver Reid Shayne	3.993599 4.526917 4.490173	9,853.7 33,644.7 30,915.3	32,328 110,383 101,428
G. L. O. Station 5 (Mont.), 1925 (d. m.) [1]	45 47 02.355 109 11 27.648	164 00 09	344 00 06	G. L. O. Station 5 eccentric	2.384663	242.473	795.51

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

Sundance, Wyo., to Bozeman, Mont., arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
B. M. O 5 (Mont.), 1925 (d. m.)	45 48 39.196	55 04 54.2	234 45 37.2	Livingston	4.630798	42,736.4	140,211
	110 00 35.159	124 22 38.1	304 11 06.3	Duck	4.400622	25,154.9	82,529
G. L. O. Station 2 eccentric (Mont.), 1925 (d. m.)	45 47 03.208	40 50 41.5	220 40 25.9	Livingston	4.455044	28,513.1	93,547
	110 13 11.492	165 23 00.9	345 20 32.0	Duck	4.248142	17,706.9	58,093
G. L. O. Station 2 (Mont.), 1925 (d. m.)[1]	45 47 05.926	343 39 52	163 39 53	G. L. O. Station 2 eccentric	1.941720	87.442	286.88
	110 13 12.630						
G. L. O. Station 1 eccentric (Mont.), 1925, r. 1933 (d. m.)	45 47 11.118	240 26 14.4	60 42 50.5	Duck	4.536252	34,375.7	112,781
	110 39 46.921	323 51 36.1	144 00 22.1	Livingston	4.431696	27,020.7	88,650
G. L. O. Station 1 (Mont.), 1925, r. 1933 (d. m.)[1]	45 47 09.611	244 34 16	64 34 20	G. L. O. Station 1 eccentric	2.034785	108.339	355.44
	110 39 51.451						

One-hundred-and-eighth meridian arc

Principal points							
Red Lodge (Mont.), 1931 (d. m.)	45 11 16.280	187 38 36.67	7 41 14.49	Shayne	4.5587748	36,205.52	118,784.3
	109 11 51.012	231 44 11.85	52 09 48.13	Blue	4.7758933	59,688.86	195,829.2
		307 14 56		Reference mark no. 1.			
Shriver (Mont.), 1931 (d. m.)	45 10 12.363	92 16 05.40	271 45 43.62	Red Lodge	4.7490608	56,112.65	184,096.3
	108 29 02.656	126 46 06.42	306 18 17.34	Shayne	4.8033564	63,585.25	208,612.6
		167 06 09.85	347 01 18.89	Blue	4.5995816	39,772.38	130,486.5
Heart, 1931 (d. m.)	44 39 55.390	173 53 45.37	353 50 24.50	Red Lodge	4.7663817	58,395.81	191,586.9
	109 07 06.579	221 32 45.24	41 59 37.92	Shriver	4.8762310	75,202.28	246,726.1
Sage, 1931 (d. m.)	44 52 27.581	53 22 40.82	233 06 05.35	Heart	4.5887993	38,797.11	127,286.9
	108 43 33.114	133 19 01.43	312 59 00.16	Red Lodge	4.7071085	50,945.81	167,144.7
		210 01 11.25	30 11 26.98	Shriver	4.5797250	37,994.88	124,654.9
Lovell, 1931 (d. m.)	44 43 40.988	83 28 26.46	262 57 16.92	Heart	4.7703821	58,936.19	193,359.8
	108 22 48.565	120 50 37.70	300 36 00.75	Sage	4.5026778	31,818.36	104,390.7
		170 33 33.31	350 29 09.02	Shriver	4.6972695	49,804.61	163,400.6
		94 16 15		Powell, municipal tank.			
Tatman (U. S. G. S.), 1931 (d. m.)	44 18 24.061	127 44 39.77	307 17 13.45	Heart	4.8159215	65,451.79	214,736.4
	108 27 57.191	188 15 09.13	8 18 45.52	Lovell	4.6750132	47,316.57	155,237.8
		21 53 21		Squaw Teat, western butte, highest point.			
Squaw, 1931 (d. m.)	44 06 33.863	145 12 05.28	324 49 18.78	Heart	4.8774162	75,407.79	247,400.4
	108 34 33.107	201 48 45.24	21 53 21.29	Tatman (U. S. G. S.)	4.3732299	23,617.28	77,484.4
Spence, 1931 (d. m.)	44 37 43.237	29 50 21.26	209 33 02.05	Squaw	4.8223200	66,423.23	217,923.5
	108 09 47.000	34 03 59.80	213 51 16.11	Tatman (U. S. G. S.)	4.6348635	43,138.35	141,529.7
		93 24 58.56	272 44 41.41	Heart	4.8802754	75,905.88	249,034.5
		122 45 26.59	302 36 17.05	Lovell	4.3107240	20,451.45	67,097.8
		330 19 06		Greybull, tall tank.			
Worland, 1931 (d. m.)	44 03 10.031	96 25 00.55	275 54 39.16	Squaw	4.7678343	58,591.46	192,228.8
	107 50 54.972	119 57 50.88	299 32 02.17	Tatman (U. S. G. S.)	4.7547657	56,854.61	186,530.5
		158 42 38.24	338 29 27.02	Spence	4.8371446	68,729.73	225,490.8
Owl (U. S. G. S.), 1931, r. 1936 (d. m.)	43 35 39.630	190 10 57.10	10 16 17.35	Squaw	4.7645630	58,151.77	190,786.3
	108 42 15.364	233 12 12.18	53 47 45.21	Worland	4.9326295	85,630.71	280,940.1
		297 27 00		Azimuth mark.			
Copper, 1931, r. 1936 (d. m.)	43 26 49.579	106 58 54.65	286 31 08.18	Owl (U. S. G. S.)	4.7540313	56,758.55	186,215.3
	108 01 55.350	149 26 11.73	329 03 37.19	Squaw	4.9326001	85,624.90	280,921.0
		192 19 11.12	12 26 47.80	Worland	4.8382049	68,897.73	226,042.0
Pilot, 1931, r. 1936 (d. m.)	43 13 48.358	191 05 36.40	11 09 39.52	Owl (U. S. G. S.)	4.6153444	41,242.45	135,309.6
	108 48 09.127	248 38 12.26	69 09 55.94	Copper	4.8258938	66,972.08	219,724.2
		122 48 02		Azimuth mark.			
Shoshone, 1931, r. 1936 (d. m.)	43 10 48.131	95 11 16.26	274 38 35.10	Pilot	4.8122991	64,908.13	212,952.8
	108 00 24.524	129 24 02.65	308 55 17.87	Owl (U. S. G. S.)	4.8626484	72,886.72	239,129.2
		176 03 44.92	356 02 42.61	Copper	4.4733596	29,741.27	97,576.1
		88 22 06		Azimuth mark.			
Sandraw, 1931, r. 1936 (d. m.)	42 44 50.143	130 47 22.33	310 15 53.96	Pilot	4.9166865	82,544.19	270,813.7
	108 01 59.697	182 33 35.58	2 34 40.46	Shoshone	4.6823758	48,125.56	157,891.9
		19 52 57		Azimuth mark.			
Lander, 1931 r. 1936 (d. m.)	42 45 30.308	174 06 03.00	354 03 19.38	Pilot	4.7216520	52,680.76	172,836.8
	108 44 09.194	231 32 00.64	52 01 49.66	Shoshone	4.8791405	75,707.78	248,384.6
		270 59 44.75	91 28 21.87	Sandraw	4.7599525	57,537.70	188,771.6
		238 13 38		Proposer Coal Mine, tallest stack.			

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

One-hundred-and-eighth meridian arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Limestone, 1931 (d. m.)	42 34 42.707	174 32 22.19	354 31 25.25	Lander	4.3026410	20,074.33	65,860.5
	108 42 45.188	251 10 11.02	71 37 48.29	Sandraw	4.7691088	58,763.65	192,793.7
		100 12 01		Symmetrical cone-shaped peak on first high ridge.			
Green, 1931, r. 1933 (d. m.)	42 23 35.191	110 30 44.05	290 03 15.97	Limestone	4.7738866	59,413.70	194,926.4
	108 02 05.067	125 25 04.94	304 56 37.19	Lander	4.8477606	70,430.47	231,070.6
		180 10 40.32	0 10 43.95	Sandraw	4.5948409	39,340.59	129,069.9
		107 40 32		Highest peak to west.			
Steamboat, 1931, r. 1933 (d. m.)	41 58 00.727	197 01 06.33	17 11 20.02	Limestone	4.8517791	71,085.18	233,218.6
	108 57 57.475	238 04 51.87	58 42 22.93	Green	4.9558629	90,336.42	296,378.7
		66 53 32		Reference mark no. 1.			
Red Desert, 1931, r. 1933 (d. m.)	41 53 29.989	97 30 33.58	276 58 47.88	Steamboat	4.8210993	66,236.79	217,311.9
	108 10 25.580	149 56 28.65	329 34 44.87	Limestone	4.9460135	88,310.73	289,732.8
		191 36 46.68	11 42 22.51	Green	4.7548926	56,871.22	186,585.0
		91 43 48		North edge of prominent high flat-topped mountain.			
Table, 1931 (d. m.)	41 32 52.716	139 18 05.54	318 58 45.39	Steamboat	4.7889811	61,515.01	201,820.5
	108 28 55.475	213 48 10.18	34 00 28.81	Red Desert	4.6626870	45,992.50	150,893.7
		92 40 38		High tip at north end of Black Butte.			
Quaking Asp (U. S. G. S.), 1931 (d. m.)	41 26 06.392	191 56 47.83	12 02 48.91	Steamboat	4.7808862	60,379.04	198,093.6
	109 07 00.250	236 50 21.23	57 27 57.90	Red Desert	4.9707370	93,483.94	306,705.2
		256 28 59.18	76 54 12.87	Table	4.7360941	54,462.06	178,680.9
		223 54 24		Cairn on Aspen Mountain.			
Kinney, 1931 (d. m.)	41 06 58.421	126 25 42.60	306 02 53.02	Quaking Asp (U. S. G. S.)	4.7774780	59,907.06	196,545.1
	108 32 24.145	185 45 33.83	5 47 51.64	Table	4.6829957	48,194.30	158,117.5
		66 38 35		J. W. Tucker oil well no. 1.			
Brown (U. S. G. S.), 1931 (d. m.)	41 06 20.453	196 49 55.60	16 55 10.14	Quaking Asp (U. S. G. S.)	4.5824245	38,231.78	125,432.1
	109 14 57.081	232 20 12.46	52 50 36.13	Table	4.9077008	80,853.87	265,268.1
		268 38 25.32	89 06 23.94	Kinney	4.7750798	59,577.16	195,462.7
		40 27 23		Cairn, about 1 mile.			
Middle (Colo.), 1931 (d. m.)	40 58 38.208	119 14 53.03	299 02 54.26	Brown (U. S. G. S.)	4.4665068	29,275.67	96,048.6
	108 56 42.402	245 29 34.69	65 45 32.30	Kinney	4.5727565	37,390.09	122,670.7
		264 12 17		First steel derrick north of W. W. Wilson lease, well no. 1.			
Zenobia (Colo.), 1931 (d. m.)	40 36 26.096	150 04 16.03	329 49 21.58	Brown (U. S. G. S.)	4.8058223	63,947.31	209,800.5
	108 52 09.789	171 11 01.63	351 08 03.52	Middle	4.6189398	41,585.30	136,434.4
		206 03 23.06	26 16 18.76	Kinney	4.7991639	62,974.38	206,608.4
		120 24 38		Low sharp peak, 1 mile westerly.			
Lena (U. S. G. S.) (Utah), 1931 (d. m.)	40 47 12.668	201 23 18.15	21 29 47.77	Brown (U. S. G. S.)	4.5802308	38,039.15	124,800.1
	109 24 51.590	241 42 47.44	62 01 13.03	Middle	4.6517408	44,847.76	147,138.0
		293 14 07.07	113 35 26.29	Zenobia	4.7006350	50,192.06	164,671.8
		325 01 38		Cairn, north end of ridge.			
Supplementary points							
G. L. O. Station A (Mont.), 1931 (d. m.)	45 20 53.807	214 12 55.3	34 19 38.4	Shayne	4.339369	21,845.9	71,673
	109 17 35.065	337 09 01.0	157 13 05.4	Red Lodge	4.286511	19,342.4	63,459
G. L. O. Station 13 (Mont.), 1931 (d. m.) [1]	45 20 53.804	269 55 28	89 55 30	G. L. O. Station A	1.895986	78.702	258.21
	109 17 38.680						
G. L. O. Station 14A (Mont.), 1931 (d. m.)	45 00 25.828	251 44 31.5	72 14 35.4	Shriver	4.767671	58,569.4	192,156
	109 11 29.702	291 42 59.9	112 02 44.2	Sage	4.597839	39,613.1	129,964
		351 19 20.3	171 22 25.9	Heart	4.584550	38,419.3	126,047
G. L. O. Station 14B (Mont.), 1931 (d. m.) [1]	45 00 20.804	194 21 58	14 21 59	G. L. O. Station 14A	2.204375	160.094	525.24
	109 11 31.516						
G. L. O. station 14 eccentric, 1931 (d. m.)	44 52 18.398	91 59 08.8	271 54 41.1	Sage	3.920921	8,335.3	27,347
	108 37 13.608	197 54 57.4	18 00 44.7	Shriver	4.542229	34,852.1	114,344
G. L. O. station 14, 1931 (d. m.) [1]	44 52 17.398	126 31 18	306 31 16	G. L. O. station 14 eccentric	1.714874	51.865	170.16
	108 37 11.709	226 36 18		Reference mark no. 2			
G. L. O. station 15 A eccentric (Mont.), 1931 (d. m.)	45 00 00.905	8 07 05.3	188 05 59.7	G. L. O. station 14 eccentric	4.159008	14,421.4	47,314
	108 35 40.832	36 32 51.9	216 27 18.3	Sage	4.240765	17,408.6	57,115
		48 14 57.7	227 52 48.2	Heart	4.745723	55,683.1	182,687
G. L. O. station 15 A (Mont.); G. L. O. station 13 (Wyo.); Wyoming-Montana boundary milepost 122 (Wyo.-Mont.) 1931 (d. m.) [1]	45 00 01.704 108 35 42.015	313 35 00	133 35 01	G. L. O. station 15 A eccentric	1.553689	35.784	117.40
G. L. O. station 15 B (Wyo.-Mont.), 1931 (d. m.) [1]	45 00 01.690 108 35 44.942	269 37 21	89 37 23	G. L. O. station 15 A (Mont.); G. L. O. station 13 (Wyo.); Wyoming-Montana boundary milepost 122.	1.806904	64.1	210
		285 04 26	105 04 29	G. L. O. station 15 A eccentric	1.969578	93.2	306

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

One-hundred-and-eighth meridian arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
U. S. G. S. cairn near station Sage, 1931 (d.) [1]	44 52 27.617 108 43 33.531	276 56 13	96 56 13	Sage	0.96473	9.22	30.2
G. L. O. station 15 A, 1931 (d. m.)	44 31 13.536 108 23 28.173	14 05 40.9 105 50 22.1 236 20 21.2	194 02 32.7 285 19 43.8 56 29 57.6	Tatman (U. S. G. S.) Heart Spence	4.388908 4.777850 4.337418	24,485.4 59,958.4 21,747.9	80,333 196,714 71,351
G. L. O. station 15 B, 1931 (d. m.) [1]	44 31 14.091 108 23 30.702	287 02 33	107 02 35	G. L. O. station 15 A	1.766606	58.426	191.69
B. M. (U. S. G. S.), 1931 (d. m.) [1]	44 31 11.923 108 23 27.815	170 58 34	350 58 34	G. L. O. station 15 A	1.702620	50.422	165.43
B. M. RDLG 3895 (U. S. G. S.), 1931 (d. m.)	44 21 48.736 108 00 10.257	80 27 15.7 156 40 04.4	260 07 50.8 336 33 20.2	Tatman (U. S. G. S.) Spence	4.573640 4.506504	37,466.2 32,099.9	122,920 105,314
B. M. (U. S. G. S.), near station Tatman (U. S. G. S.), 1931 (d. m.).[1]	44 18 23.979 108 27 57.170	169 49	349 49	Tatman (U. S. G. S.)	0.411620	2.580	8.46
G. L. O. station 16, 1931 (d. m.)	44 15 18.465 107 58 09.267	336 43 33.7 98 23 42.3 159 40 35.3	156 48 36.2 278 02 54.0 339 32 26.8	Worland Tatman (U. S. G. S.) Spence	4.388584 4.602695 4.646243	24,467.2 40,058.5 44,283.6	80,273 131,425 145,287
G. L. O. station 17, 1931 (d. m.)	44 10 08.053 108 49 28.753	157 06 57.4 241 45 56.3 288 16 59.3	336 54 37.0 62 00 57.4 108 27 23.1	Heart Tatman (U. S. G. S.) Squaw	4.777624 4.511797 4.321751	59,927.2 32,493.5 20,977.4	196,611 106,606 68,823
Squaw (U. S. G. S.), 1931 (d. m.) [1]	44 06 33.864 108 34 33.110	298 23	118 23	Squaw	8.92942	0.085	0.28
Worland, Holly Sugar Co., stack, 1931 (n. d.) [1]	44 00 36.87 107 58 07.41	243 48 44 4 41 00	63 53 44 184 38 23	Worland Copper	4.030491 4.797790	10,727.3 62,775.5	35,194 205,956
Kirby (U. S. G. S.), 1931, r. 1936 (d. m.)	43 39 05.609 108 00 34.553	4 34 22.54 83 46 17.20 138 22 45.84 196 08 11.85 82 56 00	184 33 26.86 263 17 31.85 317 59 12.78 16 14 53.39	Copper Owl (U. S. G. S.) Squaw Worland Azimuth mark.	4.3576951 4.7515031 4.8341463 4.6667167	22,787.42 56,429.09 68,256.86 46,421.24	74,761.7 185,134.4 223,939.4 152,300.4
G. L. O. station 18, 1931 (d. m.)	43 48 58.286 108 34 11.102	291 52 11.0 313 11 36.9 23 47 26.6 266 49 24	112 15 25.1 133 33 52.6 203 41 52.1	Kirby (U. S. G. S.) Copper Owl (U. S. G. S.) School house chimney, distant about ½ mile.	4.687487 4.776007 4.430204	48,695.3 59,704.5 26,928.0	159,761 195,881 88,346
G. L. O. station 19 eccentric, 1931 (d. m.)	43 28 08.655 107 58 30.632	103 32 15.4 172 12 02.6 188 53 17.1	283 02 07.6 352 10 37.2 8 58 32.3	Owl (U. S. G. S.) Kirby (U. S. G. S.) Worland	4.782173 4.311002 4.817239	60,558.2 20,464.5 65,650.7	198,681 67,141 215,389
G. L. O. station 19, 1931 (d. m.) [1]	43 28 15.144 107 58 31.993	351 18 46	171 18 47	G. L. O. station 19 eccentric	2.306633	202.597	664.69
G. L. O. station 20 eccentric, 1931 (d. m.)	43 07 29.976 107 44 11.513	105 38 09.1 146 16 11.6	285 27 03.6 326 04 02.2	Shoshone Copper	4.358307 4.634275	22,819.5 43,079.9	74,867 141,338
G. L. O. Station 20, 1931 (d. m.)[1]	43 07 28.739 107 44 07.120	111 01 32	291 01 29	G. L. O. Station 20 eccentric	2.026868	106.382	349.02
Ethete, 1931 (d. m.)	43 00 39.326 108 48 44.248	187 39 52.0 232 20 10.6	7 44 18.8 52 52 14.5	Owl (U. S. G. S.) Copper	4.815618 4.901934	65,406.1 79,787.3	214,587 261,769
G. L. O. Station 21, reference mark no. 2, 1931 (d. m.) [1]	43 00 36.781 108 48 59.467	257 09 38	77 09 48	Ethete	2.548379	353.5	1,160
G. L. O. Station 21, reference mark no. 1, 1931 (d. m.)[1]	43 00 42.872 108 48 56.457	291 35 25 19 56 00	111 35 33 199 55 58	Ethete G. L. O. Station 21, reference mark no. 2.	2.473268 2.300906	297.4 199.943	976 655.98
G. L. O. Station 21, 1931 (d. m.)[1]	43 00 41.072 108 48 49.346	59 58 59 109 01 44	239 58 52 289 01 39	G. L. O. Station 21, reference mark no. 2. G. L. O. Station 21, reference mark no. 1.	2.422771 2.231331	264.7 170.3	868 559
Mt. Black (U. S. F. S.), 1931 (d. m.)[1]	42 50 18.15 109 02 21.98	203 50 40 245 22 53	24 00 22 66 05 09	Pilot Shoshone	4.677680 4.965439	47,608.0 92,350.4	156,194 302,986
G. L. O. Station 22, 1931, r. 1936 (d. m.)	42 46 58.500 108 12 21.320	61 30 14.5 86 35 24.0 153 40 40	241 09 38.1 266 13 48.4	Limestone Lander Azimuth mark	4.675108 4.638096	47,326.9 43,460.6	155,272 142,587
Mt. Arter (U. S. F. S.), 1931, r. 1936 (d. m.)	42 46 01.513 108 59 06.749	196 05 19.7 272 36 59.9 313 02 56.1	16 12 48.1 92 47 09.3 133 14 01.4	Pilot Lander Limestone	4.728761 4.310293 4.486168	53,550.2 20,431.2 30,631.5	175,689 67,031 100,497

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

One-hundred-and-eighth meridian arc—Continued.

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
G. L. O. Station 23, 1931 (d. m.)[1]	42 28 15.79	220 01 48	40 06 45	Limestone	4.193158	15,601.2	51,185
	108 50 05.20	10 59 28	190 54 10	Steamboat	4.756184	57,040.6	187,141
G. L. O. Station 24 eccentric, 1931 (d. m.)	42 05 47.871	243 33 18.3	64 06 03.2	Green	4.873100	74,662.1	244,954
	108 50 47.800	291 59 13.6	112 26 14.2	Red Desert	4.779746	60,220.7	197,574
		34 28 51.0	214 24 03.3	Steamboat	4.242453	17,476.4	57,337
G. L. O. Station 24, 1931 (d. m.)[1]	42 05 50.137	292 55 42	112 55 47	G. L. O. Station 24 eccentric	2.254021	179.482	588.85
	108 50 54.993						
G. L. O. Station 25, 1931 (d. m.)	42 05 23.949	43 28 13.5	223 21 56.9	Steamboat	4.274774	18,826.7	61,767
	108 48 34.979	103 36 22.6	283 34 53.6	G. L. O. Station 24 eccentric	3.496978	3,140.3	10,303
Pole in 7-foot cairn (U. S. G. S.), 1931 (n. d.)[1]	41 58 00.868	7 27 25	187 27 25	Steamboat	0.64246	4.39	14.4
	108 57 57.450						
Pilot (U. S. G. S.), 1931 (d. m.)	41 38 36.528	221 35 42.30	41 51 07.15	Steamboat	4.6823601	48,123.82	157,886.2
	109 21 04.889	278 02 14.75	98 36 52.29	Table	4.8647981	73,248.39	240,315.8
		319 41 25.53	139 50 45.64	Quaking Asp (U. S. G. S.)	4.4816315	30,313.18	99,452.5
		351 49 19.72	171 53 22.82	Brown (U. S. G. S.)	4.7805775	60,336.14	197,952.8
Boar's Tusk, 1931 (n. d.)	41 57 45.869	268 33 18.9	88 42 36.6	Steamboat	4.283578	19,212.2	63,032
	109 11 51.558	353 24 58.0	173 28 11.7	Quaking Asp (U. S. G. S.)	4.770762	58,987.8	193,529
		19 51 44.2	199 45 35.3	Pilot (U. S. G. S.)	4.576230	37,690.3	123,656
G. L. O. Station 26 eccentric, 1931 (d. m.)	41 44 35.274	351 42 13.4	171 44 36.0	Quaking Asp (U. S. G. S.)	4.538702	34,570.2	113,419
	109 10 35.099	52 49 29.9	232 42 31.0	Pilot (U. S. G. S.)	4.262265	18,292.2	60,014
G. L. O. Station 26, 1931 (d. m.)[1]	41 44 36.396	329 46 11	149 46 12	G. L. O. Station 26 eccentric	1.602494	40.040	131.36
	109 10 35.971						
B. M. J 3, 1931 (d. m.)	41 40 03.528	27 34 52.89	207 28 27.65	Quaking Asp (U. S. G. S.)	4.4642432	29,123.48	95,549.3
	108 57 19.458	85 28 45.13	265 12 57.71	Pilot (U. S. G. S.)	4.5197131	33,091.24	108,566.8
Salt Lake-Omaha Airway, site 17, beacon, 1931 (d.)	41 40 18.056	29 16 11.8	209 09 11.3	Quaking Asp (U. S. G. S.)	4.478607	30,102.8	98,762
	108 56 26.323	69 58 19.9	249 57 44.5	B. M. J 3	3.116717	1,308.3	4,292
		84 54 19.0	264 37 56.2	Pilot (U. S. G. S.)	4.535973	34,353.7	112,709
Rock Springs, Municipal airport, beacon, 1931 (d.)	41 38 26.825	204 44 36.6	24 46 07.7	G. L. O. Station 26 eccentric	4.098929	12,558.2	41,201
	109 14 23.020	335 45 51.0	155 50 44.6	Quaking Asp (U. S. G. S.)	4.398682	25,042.7	82,161
		0 45 58.4	180 45 35.9	Brown (U. S. G. S.)	4.774032	59,433.6	194,992
Salt Lake-Omaha Airway, site 16, beacon, 1931 (d.)	41 38 21.249	204 20 29.0	24 28 25.8	Steamboat	4.601634	39,960.8	131,105
	109 09 52.762	349 58 50.0	170 00 44.4	Quaking Asp (U. S. G. S.)	4.362122	23,020.9	75,528
		6 50 02.5	186 46 41.2	Brown (U. S. G. S.)	4.775806	59,676.9	195,790
Salt Lake-Omaha Airway, site 15, beacon, 1931 (d.)	41 34 42.456	214 13 22.6	34 27 32.7	Steamboat	4.718054	52,246.1	171,411
	109 19 13.553	313 02 39.1	133 10 45.1	Quaking Asp (U. S. G. S.)	4.367277	23,295.8	76,430
		353 29 50.1	173 32 39.5	Brown (U. S. G. S.)	4.722994	52,843.8	173,372
G. L. O. Station 27, 1931 (d. m.)	41 24 07.110	263 47 27.7	84 03 53.1	Quaking Asp (U. S. G. S.)	4.541428	34,787.9	114,133
	109 31 49.835	324 17 00.8	144 28 08.6	Brown (U. S. G. S.)	4.607252	40,481.1	132,812
G. L. O. Station 29 eccentric, 1931 (d. m.)	41 00 03.526	84 50 01.2	264 36 41.7	Middle	4.456586	28,614.5	93,879
	108 36 23.459	203 33 54.2	23 36 31.4	Kinney	4.145057	13,965.5	45,818
G. L. O. Station 29 (Wyo.); G. L. O. Station 2 (Colo.); Wyoming-Colorado boundary milepost 239 (Wyo.-Colo.), 1931 (d. m.).[1]	41 00 00.229	123 52 48	303 52 44	G. L. O. Station 29 eccentric	2.261144	182.450	598.59
	108 36 16.978						
W. W. Wilson Lease, well no. 1 (Colo.), 1931 (n. d.)[1]	41 00 03.45	84 50 10	264 36 51	Middle	4.456423	28,603.8	93,844
	108 36 23.91	203 36 03	23 38 41	Kinney	4.145254	13,971.9	45,839
Ucolwy; G. L. O. Station 28 (Wyo.); G. L. O. Station 1 (Colo.); G. L. O. Station 1 (Utah), 1931 (d. m.).	41 00 02.616	124 48 57.9	304 41 05.4	Brown (U. S. G. S.)	4.310654	20,448.2	67,087
	109 02 57.633	173 20 24.8	353 17 44.9	Quaking Asp (U. S. G. S.)	4.686376	48,570.9	159,353

Forty-second parallel arc

Principal points							
North (Nebr.), 1933, r. 1934 (d. m.)	41 59 56.300	63 33 00		Reference mark no. 2.			
	103 40 02.262						
Wildcat (Nebr.), 1933, r. 1934 (d. m.)	41 39 30.430	185 57 15.47	5 59 09.78	North	4.5890941	38,027.18	124,760.8
	103 42 53.660	140 50 05		Reference mark no. 3.			
Roubedeau (Nebr.), 1933 (d. m.)	41 50 25.699	221 40 04.51	41 47 39.76	North	4.3727272	23,589.96	77,394.7
	103 51 23.680	329 42 54.97	149 48 34.58	Wildcat	4.3692149	23,399.95	76,771.3
		99 06		Reference mark no. 3.			
66 Mountain, 1933 (d. m.)	41 42 06.520	226 38 56.60	46 55 52.77	North	4.6830990	48,205.77	158,155.1
	104 05 25.324	231 32 04.59	51 41 25.25	Roubedeau	4.3944632	24,800.66	81,366.8
		278 37 54.32	98 52 53.13	Wildcat	4.5001289	31,632.16	103,779.8
		97 47 32		Reference mark no. 3.			

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

Forty-second parallel arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance: Logarithm (meters)	Distance: Meters	Distance: Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Flower (Nebr.), 1933 (d. m.)	41 30 18.049	143 02 13.82	322 54 21.09	66 Mountain	4.4374064	27,378.30	89,823.6
	103 53 33.337	220 56 55.85	41 04 00.40	Wildcat	4.3537790	22,582.86	74,090.6
		333 43 33		Reference mark no. 2.			
Albin, 1933 (d. m.)	41 29 24.591	180 15 42.95	0 15 46.04	66 Mountain	4.3711892	23,506.57	77,121.1
	104 05 29.972	239 07 47.82	59 22 47.86	Wildcat	4.5630171	36,560.92	119,950.3
		264 16 04.36	84 23 59.19	Flower	4.2228166	16,703.85	54,802.5
		265 14 41		Reference mark no. 2.			
Bear, 1933 (d. m.)	41 40 34.097	259 50 48.57	79 58 29.44	66 Mountain	4.2115717	16,276.90	53,401.8
	104 16 58.262	322 16 17.52	142 23 54.35	Albin	4.4165190	26,092.70	85,605.8
		56 30 30		Reference mark no. 2.			
Hunter, 1933 (d. m.)	41 28 16.538	177 00 36.04	357 00 01.94	Bear	4.3576587	22,785.51	74,755.5
	104 16 06.880	210 04 11.31	30 11 17.15	66 Mountain	4.4713729	29,605.53	97,130.8
		261 51 18.10	81 58 19.97	Albin	4.1739212	14,925.24	48,967.2
		275 02 58		Reference mark no. 1.			
Wauneta, 1933 (d. m.)	41 26 22.214	208 44 57.66	28 51 51.38	Bear	4.4770191	29,992.94	98,401.8
	104 27 21.923	257 15 05.90	77 22 32.80	Hunter	4.2057391	16,059.76	52,689.4
		21 33 15		Reference mark no. 2.			
Wilkins, 1933 (d. m.)	41 44 54.232	47 01 23.50	226 41 37.07	Whitaker	4.7541014	56,767.71	186,245.4
	104 29 51.032	97 46 51.34	277 25 34.37	Chugwater	4.6499344	44,661.61	146,527.3
		294 07 11.74	114 15 45.93	Bear	4.2919209	19,584.88	64,254.7
		328 07 32.68	148 16 39.96	Hunter	4.5588955	36,215.58	118,817.3
		354 14 17.03	174 15 56.02	Wauneta	4.5375711	34,480.30	113,124.1
		0 27 12		Reference mark no. 1.			
Kirkbride, 1933 (d. m.)	41 24 44.457	87 41 31.18	267 24 54.47	Whitaker	4.5445127	35,035.85	114,946.8
	104 34 31.933	138 55 33.84	318 37 27.59	Chugwater	4.7595131	57,479.51	188,580.7
		189 51 50.92	9 54 57.35	Wilkins	4.5784758	37,885.74	124,296.8
		219 43 03.93	39 54 42.73	Bear	4.5813961	38,141.35	125,135.4
		253 09 15.85	73 14 00.37	Wauneta	4.0183054	10,430.51	34,220.8
		69 32 48		Reference mark no. 2.			
King, 1933 (d. m.)	41 27 48.954	224 29 48.57	44 47 32.77	Chugwater	4.7223362	52,763.82	173,109.3
	105 28 29.654	279 58 52.71	100 17 57.97	Whitaker	4.6109000	40,822.54	133,931.9
		35 01 45		Reference mark no. 3.			
Split Rock, 1933 (d. m.)	42 00 59.422	308 05 29.84	128 20 08.48	Chugwater	4.5864264	38,585.70	126,593.2
	105 23 43.223	333 54 37.22	154 10 38.17	Whitaker	4.8824804	76,292.25	250,302.2
		6 10 41.70	186 07 31.01	King	4.7907444	61,765.28	202,641.6
Arlington, 1933 (d. m.)	41 36 14.640	235 53 11.71	56 26 05.06	Split Rock	4.9151896	82,260.17	269,881.9
	106 13 03.224	283 52 55.68	104 22 28.43	King	4.8055797	63,911.60	209,683.3
		324 56 06		Arlington Monument.			
Boone, 1933 (d. m.)	42 00 11.594	267 28 22.82	87 45 33.77	Split Rock	4.5499601	35,478.08	116,397.7
	105 49 23.666	334 04 40.61	154 18 35.37	King	4.8232974	66,572.89	218,414.6
		36 36 11.93	216 20 25.68	Arlington	4.7413907	55,130.34	180,873.5
		342 58 35		Reference mark no. 2.			
Rattlesnake (U. S. G. S.), 1933, r. 1934 (d. m.)	41 42 11.746	242 13 38.97	62 44 28.89	Boone	4.8580120	72,112.74	236,589.9
	106 35 36.214	289 15 45.09	109 30 44.32	Arlington	4.5209931	33,188.92	108,887.3
Shirley (U. S. G. S.), 1933, r. 1934 (d. m.)	42 09 59.810	286 25 11.01	106 54 38.89	Boone	4.8012889	63,283.26	207,621.8
	106 33 21.371	335 40 58.71	155 54 32.01	Arlington	4.8357143	68,503.75	224,749.4
		3 28 00.65	183 26 30.54	Rattlesnake (U. S. G. S.)	4.7122986	51,558.30	169,154.2
		84 47 45		Reference mark no. 3.			
Separation (U. S. G. S.), 1933 (d. m.)	41 38 16.013	229 34 24.32	50 08 02.05	Shirley (U. S. G. S.)	4.9595187	91,100.06	298,884.1
	107 23 42.505	263 31 01.99	84 03 00.94	Rattlesnake (U. S. G. S.)	4.8271328	67,163.42	220,352.0
		292 06 15		Reference mark no. 1.			
Seminoe (U. S. G. S.), 1933, r. 1934 (d. m.)	42 10 02.270	269 56 12.65	90 16 23.65	Shirley (U. S. G. S.)	4.6171007	41,409.57	135,857.9
	107 03 25.357	323 07 07.22	143 25 42.70	Rattlesnake (U. S. G. S.)	4.8082425	64,304.67	210,972.9
		25 36 54.24	205 23 21.34	Separation (U. S. G. S.)	4.8139932	65,161.82	213,785.1
		279 31 44		Reference mark no. 1.			
Divide, 1933 (d. m.)	41 51 57.518	103 42 48.33	283 37 08.64	Red Desert	4.0818996	12,075.35	39,617.2
	108 01 56.720	179 48 47.43	359 48 41.83	Green	4.7675347	58,551.05	192,096.2
		247 10 19.98	67 49 30.33	Seminoe (U. S. G. S.)	4.9417557	87,449.18	286,906.2
		295 20 34.04	115 46 01.77	Separation (U. S. G. S.)	4.7690301	58,753.01	192,758.8
		294 11 45		Reference mark no. 1.			
Bairoil, 1933 (d. m.)	42 17 51.473	286 27 15.92	106 50 54.70	Seminoe (U. S. G. S.)	4.7034755	50,521.42	165,752.4
	107 38 36.183	344 14 00.24	164 23 57.86	Separation (U. S. G. S.)	4.8815233	76,124.30	249,751.1
		34 00 32.22	213 44 53.59	Divide	4.7615501	57,749.75	189,467.3
		44 23 48.58	224 02 28.60	Red Desert	4.7987738	62,917.84	206,422.9
		108 20 08.61	288 04 19.59	Green	4.5308172	33,948.23	111,378.5
		198 57 26		Reference mark no. 1.			
Granite, 1933 (d. m.)	42 32 59.235	283 46 18.60	104 20 33.11	Green	4.8552314	71,652.51	235,079.9
	108 52 47.739	321 11 13.53	141 39 41.88	Red Desert	4.9708338	93,504.78	306,773.6
		6 17 10.82	186 13 42.53	Steamboat	4.8138267	65,136.84	213,703.1

GEOGRAPHIC POSITIONS—Continued

Forty-second parallel arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
B. M. T 19, 1933 (d. m.)	42 08 52.179	224 09 44.65	44 31 08.84	Granite	4.7953848	62,428.77	204,818.4
	109 24 34.055	298 33 06.69	118 50 56.21	Steamboat	4.6217359	41,853.89	137,315.6
		21 54 50		Reference mark no. 3.			
Prospect, 1933, r. 1936 (d. m.)	42 32 50.307	269 22 05.91	89 37 37.09	Granite	4.4972035	31,419.80	103,083.1
	109 15 44.781	339 07 14.70	159 19 12.43	Steamboat	4.8385893	68,958.73	226,242.1
		15 19 11.75	195 13 15.21	B. M. T 19	4.6627359	45,997.68	150,910.7
		143 51 55		Reference mark no. 2.			
Little, 1933 (d. m.)	42 19 22.711	236 57 43.45	57 16 41.41	Prospect	4.6618223	45,901.02	150,593.6
	109 43 51.255	301 46 12.44	122 17 00.27	Steamboat	4.8726527	74,585.21	244,701.6
		306 08 26.20	126 21 24.04	B. M. T 19	4.5172243	32,902.15	107,946.5
		16 28 32		Reference mark no. 3.			
Colorado, 1933 (d. m.)	42 24 44.819	254 36 08.83	75 03 22.32	Prospect	4.7577153	57,242.07	187,801.7
	109 56 03.559	300 36 17.38	120 44 30.87	Little	4.2896376	19,482.18	63,917.8
		148 32 35		Reference mark no. 3.			
Halfmoon (U. S. F. S.), 1933, r. 1936 (d. m.)	42 53 56.912	315 07 47.77	135 27 01.48	Prospect	4.7403213	54,994.76	180,428.6
	109 44 05.256	359 42 46.77	179 42 56.25	Little	4.8062042	64,003.57	209,985.0
		16 54 15.85	196 46 09.13	Colorado	4.7519356	56,485.32	185,318.9
		140 05 14		Reference mark no. 3.			
Cora (U. S. G. S.), 1933 (d. m.)	42 55 08.755	275 26 54.73	95 38 20.28	Halfmoon (U. S. F. S.)	4.3607512	22,948.34	75,289.7
	110 00 52.166	353 18 43.02	173 21 58.62	Colorado	4.7533032	56,663.47	185,903.4
		10 36 27		Reference mark no. 2.			
Mason, 1933 (d. m.)	42 42 49.276	228 20 25.27	48 33 15.44	Cora (U. S. G. S.)	4.5365732	34,401.17	112,864.5
	110 19 45.352	246 50 14.64	67 14 28.90	Half moon (U. S. F. S.)	4.7227242	52,810.98	173,264.0
		315 45 43.18	136 01 44.89	Colorado	4.6683862	46,600.03	152,886.9
		305 47 54		Reference mark no. 1.			
Tulsa, 1933 (d. m.)	42 19 32.973	178 52 53.54	358 52 28.56	Mason	4.6344039	43,092.72	141,380.0
	110 19 08.388	252 58 43.59	73 14 16.84	Colorado	4.5200288	33,115.31	108,645.8
		168 19 22		Reference mark no. 3.			
Wyoming Peak, 1933 (d. m.)	42 36 15.829	243 09 13.04	63 21 09.77	Mason	4.4309773	26,975.98	88,503.7
	110 37 23.042	290 24 22.56	110 52 17.96	Colorado	4.7816857	60,490.29	198,458.6
		320 57 07.59	141 09 26.64	Tulsa	4.5997356	39,786.49	130,532.8
		15 15 25		Peak south of station Wyoming Peak.			
Sheep, 1933 (d. m.)	42 07 15.854	175 33 39.11	355 31 35.91	Wyoming Peak	4.7311867	53,850.12	176,673.3
	110 34 20.202	222 30 43.70	42 40 56.46	Tulsa	4.4899006	30,895.88	101,364.2
		238 11 54.01	58 37 38.71	Colorado	4.7909162	61,789.71	202,721.7
		149 16 49		Reference mark no. 3.			
Sublette, 1933 (d. m.)	42 15 16.932	218 41 05.08	38 56 27.28	Wyoming Peak	4.6976750	49,851.13	163,553.2
	111 00 09.906	292 30 40.34	112 48 01.06	Sheep	4.5858482	38,534.36	126,424.8
Paris Peak (Idaho), 1933 (d. m.)	42 12 10.562	99 28 43.97	279 06 35.95	Oxford	4.6618396	45,902.84	150,599.6
	111 32 53.817	149 02 29.58	328 38 54.80	Putnam	4.9648999	92,235.87	302,610.5
		239 20 29.72	59 57 55.87	Wyoming Peak	4.9457818	88,263.63	289,578.3
		262 32 25.80	82 54 25.74	Sublette	4.6570761	45,402.12	148,956.8
		276 06 15.19	96 45 33.66	Sheep	4.9093952	81,169.94	266,305.0
		89 51 22		Reference mark no. 3.			
Dry Ridge (Idaho), 1933 (d. m.)	42 42 17.545	282 06 15.12	102 31 35.96	Wyoming Peak	4.7187354	52,328.16	171,680.0
	111 14 47.557	338 04 20.97	158 14 13.68	Sublette	4.7313784	53,873.90	176,751.3
		24 05 59.22	203 53 45.99	Paris Peak	4.7855516	61,031.15	200,233.0
		55 37 53.45	235 03 25.32	Oxford	4.9294746	85,010.90	278,906.6
		108 05 44.60	287 29 44.91	Putnam	4.8798744	75,835.82	248,804.7
Supplementary points							
Mitchell, sugar mill, tank (Nebr.), 1933 (n. d.)[1]	41 56 55.37	246 02 35	66 08 41	North	4.139088	13,774.9	45,193
	103 49 09.22	14 28 12	194 26 42	Roubedeau	4.093971	12,415.7	40,734
Mitchell, sugar mill, stack (Nebr.), 1933 (n. d.)[1]	41 56 51.37	245 36 49	65 42 56	North	4.141327	13,846.1	45,427
	103 49 10.20	14 30 42	194 29 13	Roubedeau	4.089567	12,290.4	40,323
Morril, tank (Nebr.), 1933 (n. d.)[1]	41 57 48.74	259 35 10	79 45 38	North	4.341549	21,955.8	72,033
	103 55 40.52	336 33 28	156 36 20	Roubedeau	4.173066	14,895.9	48,871
Lyman, tank, white top (Nebr.), 1933 (n. d.)[1]	41 55 04.08	299 51 02	119 58 15	Roubedeau	4.236130	17,223.8	56,508
	104 02 11.16	10 36 02	190 33 53	66 Mountain	4.387469	24,404.4	80,067
Lyman, tank, on tall structure (Nebr.), 1933 (n. d.)[1]	41 55 13.76	300 59 02	121 06 09	Roubedeau	4.236399	17,234.5	56,544
	104 02 04.08	10 50 46	190 48 32	66 Mountain	4.393197	24,728.5	81,130
Wyoming-Nebraska boundary monument no. 62 (Wyo.-Nebr.), 1933 (d. m.).	41 53 49.171	250 20 06.90	70 35 33.33	North	4.5298468	33,872.47	111,129.9
	104 03 08.181	291 03 37.24	111 11 27.44	Roubedeau	4.2409930	17,417.79	57,144.9
		8 19 20.11	188 17 48.71	66 Mountain	4.3406086	21,908.30	71,877.5
		240 06		Reference mark no. 1.			
G. L. O. corner (Wyo.-Nebr.), 1933 (d. m.)[1]	41 53 09.03	287 09 48	107 17 38	Roubedeau	4.230797	17,013.6	55,819
	104 03 08.25	8 48 51	188 47 20	66 Mountain	4.315622	20,683.4	67,859

[1]No check on this position.

GEOGRAPHIC POSITIONS—Continued

Forty-second parallel arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
Wyoming-Nebraska boundary monument no. 38 eccentric (Nebr.), 1933 (d. m.).	41 32 59.546 104 03 07.199	126 09 38.50 169 17 00.41 359 39 50	306 00 26.59 349 15 28.66	Bear 66 Mountain Reference mark no. 2.	4.3767593 4.2348989	23,809.99 17,175.09	78,116.6 56,348.6
Wyoming-Nebraska boundary monument no. 38 (Wyo.-Nebr.), 1933 (d. m.).[1]	41 32 55.697 104 03 07.579	184 14 26	4 14 27	Wyoming-Nebraska boundary monument no. 38 eccentric.	2.075770	119.061	390.62
Albin, water tank, 1933 (n. d.)	41 25 05.023 104 06 04.746	112 58 07.2 185 45 08.7 240 57 16.0	292 51 28.6 5 45 31.7 61 05 33.5	Hunter Albin Flower	4.181134 3.905705 4.299591	15,175.2 8,048.3 19,933.8	49,787 26,405 65,399
Lookout, 1933 (d. m.)	41 41 40.203 105 49 18.903	311 25 48.9 73 11 00.9 179 49 00.5 224 34 58.1 41 15 46	131 39 38.0 252 55 14.4 359 48 57.4 44 52 02.8	King Arlington Boone Split Rock Reference mark no. 2.	4.587345 4.537267 4.535159 4.701895	38,667.4 34,456.2 34,289.3 50,337.9	126,861 113,045 112,497 165,150
Laramie (U. S. G. S.), 1933 (d. m.)	41 20 07.721 105 35 09.983	153 48 10.7 213 07 49.5 332 52 02	333 38 48.0 33 12 14.2	Lookout King Reference mark no. 2.	4.648051 4.230409	44,468.3 16,998.4	145,893 55,769
County Road (U. S. G. S.), 1933 (d. m.)	41 21 00.368 105 42 23.452	165 54 10.7 236 51 55.3 279 06 54.0 275 06 22	345 49 35.3 57 01 06.8 99 11 40.4	Lookout King Laramie (U. S. G. S.) Reference mark no. 1.	4.595981 4.363753 4.008949	39,444.0 23,107.5 10,208.2	129,409 75,812 33,491
Salt Lake-Omaha Airway, site 38, beacon, 1933 (d.)	41 16 04.423 105 25 59.272	111 49 52.9 145 42 11.0 209 26 52.2	291 39 03.2 325 26 43.9 29 42 54.6	County Road (U. S. G. S.) Lookout Chugwater	4.391767 4.759208 4.833524	24,647.2 57,439.1 68,159.1	80,863 188,448 223,619
Laramie, University of Wyoming, stack, 1933 (n. d.)	41 18 53.852 105 34 57.450	110 39 49.0 154 43 10.7 208 35 23.0	290 34 54.4 334 33 39.8 28 39 39.4	County Road (U. S. G. S.) Lookout King	4.044590 4.668830 4.274309	11,081.3 46,647.7 18,806.5	36,356 153,043 61,701
Laramie, Third Street Church, steeple, 1933 (n. d.)	41 18 43.784 105 35 33.370	113 52 33.2 191 51 36.7 210 18 12.5	293 48 02.4 11 51 52.2 30 22 52.7	County Road (U. S. G. S.) Laramie (U. S. G. S.) King	4.018098 3.422576 4.289764	10,425.5 2,645.9 19,487.9	34,204 8,681 63,937
Laramie, power house, stack, 1933 (n. d.)	41 18 56.510 105 35 39.583	112 10 34.8 155 46 05.9 211 15 52.8	292 06 08.1 335 37 03.0 31 20 37.1	County Road (U. S. G. S.) Lookout King	4.005992 4.664292 4.233856	10,138.9 46,162.8 19,224.5	33,264 151,452 63,072
Laramie, Standard Oil Refinery, stack, right hand (westerly) of two, 1933 (n. d.).	41 19 19.393 105 35 57.842	109 11 35.8 213 28 41.3 216 44 13.0	289 07 21.0 33 33 37.6 36 44 44.6	County Road (U. S. G. S.) King Laramie (U. S. G. S.)	3.977361 4.275441 3.269627	9,492.1 18,855.6 1,860.5	31,142 61,862 6,104
Laramie, cement plant, stack, 1933 (n. d.)	41 16 08.507 105 36 10.155	136 04 16.7 190 44 08.0 206 18 25.4	316 00 10.3 10 44 47.8 26 23 29.8	County Road (U. S. G. S.) Laramie (U. S. G. S.) King	4.097219 3.875710 4.382269	12,508.9 7,511.2 24,114.0	41,040 24,643 79,114
Salt Lake-Omaha Airway, site 36, beacon, 1933 (d.)	41 26 44.350 105 38 23.228	27 45 39.1 151 15 52.7 261 42 49.9	207 43 00.3 331 08 37.7 81 49 22.9	County Road (U. S. G. S.) Lookout King	4.078809 4.498830 4.143651	11,989.7 31,537.7 13,920.4	39,336 103,470 45,671
Salt Lake-Omaha Airway, site 35, beacon, 1933 (d.)	41 34 24.412 105 42 29.270	301 59 46.9 359 41 15.4 144 50 44.3	122 09 03.4 179 41 19.2 324 46 12.1	King County Road (U. S. G. S.) Lookout	4.361262 4.394546 4.216210	22,975.3 24,805.4 16,451.7	75,378 81,382 53,975
Salt Lake-Omaha Airway, site 33, beacon, 1933 (d.)	41 42 24.212 105 54 48.475	231 10 32.2 280 04 21.0 306 17 41.6	51 31 16.9 100 08 00.2 126 35 09.5	Split Rock Lookout King	4.741054 3.888770 4.657626	55,087.6 7,740.5 45,459.6	180,733 25,395 149,145
Rock River, water tank, 1933 (n. d.)	41 44 31.221 105 58 46.129	204 02 08.5 291 52 02.0 52 23 07.0	24 08 24.0 111 58 19.5 232 13 37.2	Boone Lookout Arlington	4.502158 4.150257 4.398911	31,780.3 14,133.7 25,056.0	104,266 46,370 82,205
Como (U. S. G. S.), 1933 (d. m.)	41 53 05.650 106 03 32.975	22 57 13.8 65 44 41.4	202 50 54.1 245 23 19.6	Arlington Rattlesnake (U. S. G. S.)	4.529693 4.688181	33,860.5 48,773.2	111,091 160,017
Medicine Bow, tank (U. S. G. S.), 1933 (n. d.)[1]	41 53 50.57 106 11 55.38	249 11 20 276 46 39	69 26 23 96 52 14	Boone Como (U. S. G. S.)	4.522171 4.066890	33,279.1 11,665.1	109,183 38,271
Pine (U. S. G. S.), 1933 (d. m.)	41 47 30.144 106 10 12.132	10 45 52.3 74 33 16.2 221 37 24.8	190 43 58.5 254 16 21.4 41 41 51.1	Arlington Rattlesnake (U. S. G. S) Como (U. S. G. S.)	4.326594 4.562995 4.141611	21,212.6 36,559.1 13,855.1	69,595 119,944 45,456
Salt Lake-Omaha Airway, site 31, beacon, 1933 (d.)[1]	41 51 01.16 106 26 22.98	286 06 42 38 05 09	106 17 29 217 59 00	Pine (U. S. G. S.) Rattlesnake (U. S. G. S.)	4.367969 4.316750	23,332.9 20,737.2	76,551 68,035
Salt Lake-Omaha Airway, site 29, beacon, 1933 (d.)	41 49 01.650 106 40 34.263	331 24 24.1 141 04 15.5 194 21 21.9	151 27 42.6 320 48 58.2 14 26 11.5	Rattlesnake (U. S. G. S.) Seminoe (U. S. G. S.) Shirley (U. S. G. S.)	4.158338 4.699727 4.602892	14,399.2 50,087.2 40,076.7	47,241 164,328 131,485
St. Mary (U. S. G. S.), 1933 (d. m.)	41 47 42.474 106 50 26.635	156 37 35.4 209 40 35.2 296 17 51.3 85 38 36 85 39 54	336 28 54.5 29 52 01.0 116 27 44.2	Seminoe (U. S. G. S.) Shirley (U. S. G. S.) Rattlesnake (U. S. G. S.) Parco, Refinery stack. Parco, Refinery stack.	4.653762 4.677014 4.361056	45,057.0 47,535.1 22,964.4	147,825 155,955 75,342

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

Forty-second parallel arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
Salt Lake-Omaha Airway, site 27, beacon, 1933 (d.)	41 48 08.237	56 52 57.2	236 39 34.2	Separation (U. S. G. S.)	4.522995	33,342.3	109,391
	107 03 35.928	138 54 59.5	318 31 32.7	Bairoil	4.864576	73,210.9	240,193
		180 20 34.6	0 20 41.6	Seminoe (U. S. G. S.)	4.607914	40,542.8	133,014
Salt Lake-Omaha Airway, site 26 B, beacon, 1933 (d.)[1]	41 47 07.29	279 16 15	99 42 27	Rattlesnake (U. S. G. S.)	4.742788	55,308.0	181,456
	107 14 57.06	36 35 27	216 29 37	Separation (U. S. G. S.)	4.309662	20,401.5	66,934
Latham (U. S. G. S.), 1933 (d. m.)	41 44 40.380	128 40 40.3	308 32 32.7	Divide	4.334708	21,612.6	70,907
	107 49 45.138	194 00 10.3	14 07 38.1	Bairoil	4.801613	63,330.5	207,777
		288 01 21.8	108 18 41.2	Separation (U. S. G. S.)	4.580160	38,032.9	124,780
		249 25 50		Reference mark no. 2.			
Cherokee (U. S. G. S.), cairn, 1933 (n. d.)[1]	41 49 05.27	273 28 29	93 47 50	St. Mary (U. S. G. S.)	4.605075	40,278.7	132,148
	107 19 27.98	16 23 26	196 20 36	Separation (U. S. G. S.)	4.319661	20,876.7	68,493
Salt Lake-Omaha Airway, site 26 A, beacon, 1933 (d.)	41 46 14.641	276 08 50.7	96 40 50.9	Rattlesnake (U. S. G. S.)	4.826586	67,078.9	220,075
	107 23 40.738	0 09 31.2	180 09 30.0	Separation (U. S. G. S.)	4.169278	14,766.5	48,446
		85 32 39.3	265 15 17.3	Latham (U. S. G. S.)	4.559397	36,257.4	118,954
Salt Lake-Omaha Airway, site 24, beacon, 1933 (d.)	41 43 49.085	181 55 52.0	1 56 54.1	Bairoil	4.799689	63,050.6	206,859
	107 40 08.934	226 04 31.3	46 29 04.4	Seminoe (U. S. G. S.)	4.846509	70,227.8	230,406
		294 09 22.4	114 20 18.5	Separation (U. S. G. S.)	4.398317	25,021.7	82,092
Salt Lake-Omaha Airway, site 23, beacon, 1933 (d.)	41 42 06.307	142 36 52.1	322 30 09.1	Divide	4.361220	22,973.1	75,371
	107 51 51.911	211 38 22.9	31 39 47.3	Latham (U. S. G. S.)	3.746944	5,584.0	18,320
		280 08 51.3	100 27 34.6	Separation (U. S. G. S.)	4.599033	39,722.2	130,322
Salt Lake-Omaha Airway, site 22, beacon, 1933 (d.)	41 39 30.362	194 12 53.3	14 15 41.9	Divide	4.376244	23,781.8	78,024
	108 06 09.931	247 07 28.1	67 18 23.2	Latham (U. S. G. S.)	4.392653	24,697.5	81,028
		271 59 35.2	92 27 48.1	Separation (U. S. G. S.)	4.770813	58,994.7	193,552
Salt Lake-Omaha Airway, site 21, beacon, 1933 (d.)	41 39 32.981	69 56 12.2	249 24 10.6	Quaking Asp (U. S. G. S.)	4.854995	71,613.5	234,952
	108 18 42.866	122 22 50.8	301 56 41.0	Steamboat	4.807544	64,201.3	210,634
		195 38 00.5	15 49 08.5	Green	4.927838	84,691.1	277,857
Salt Lake-Omaha Airway, site 20, beacon, 1933 (d.)	41 39 26.836	135 50 10.6	315 34 02.0	Steamboat	4.681388	48,016.2	157,533
	108 33 44.665	207 57 46.7	28 18 58.3	Green	4.966905	92,662.7	304,011
		226 39 47.7	47 16 40.4	Bairoil	5.017868	104,200.1	341,863
Cone (conical bare butte) west of long flat butte, 1933 (n. d.).	42 26 03.005	67 11 55.7	246 57 35.2	Little	4.501247	31,713.7	104,047
	109 22 34.482	81 30 26.3	260 52 18.6	Tulsa	4.895257	78,570.0	257,775
		87 10 53.8	266 48 18.5	Colorado	4.662700	45,993.9	150,898
Beacon, west of station Tulsa, 1933 (n. d.)[1]	42 19 09.06	141 56 19	321 44 03	Wyoming Peak	4.605247	40,294.6	132,200
	110 19 13.28	188 38 11	8 38 14	Tulsa	2.872872	746.2	2,448
Border (Wyo.-Idaho), 1933 (d. m.)	42 11 41.675	91 24 01.9	271 03 48.7	Paris Peak	4.617555	41,452.9	136,000
	111 02 47.447	208 31 51.3	28 33 37.3	Sublette	3.878565	7,560.8	24,806
		122 33 13		Reference mark no. 3.			
Geneva, 1933 (d. m.)	42 24 31.562	349 45 42.8	169 47 13.6	Sublette	4.240284	17,389.4	57,052
	111 02 24.740	1 15 23.0	181 15 07.6	Border	4.375856	23,760.5	77,954
		61 32 51.1	241 12 20.0	Paris Peak	4.678757	47,726.2	156,582
Paris Peak cairn (U. S. G. S.) (Idaho), 1933 (d.)[1]	42 12 10.52	241 02	61 02	Paris Peak	0.477121	3.0	10
	111 32 53.93						

Hanna to Buffalo arc

Principal points							
Pedro (U. S. G. S.), 1934 (d. m.)	42 18 28.509	304 12 56.96	124 24 11.26	Shirley (U. S. G. S.)	4.4447596	27,845.79	91,357.4
	106 50 04.499	49 41 22.87	229 32 24.53	Seminoe (U. S. G. S.)	4.3821510	24,107.43	79,092.5
		248 25 38		Azimuth mark.			
Chalk, 1934 (d. m.)	42 20 40.143	18 52 37.42	198 49 19.54	Shirley (U. S. G. S.)	4.3196654	20,876.87	68,493.5
	106 28 27.118	67 56 29.43	247 32 58.47	Seminoe (U. S. G. S.)	4.7157309	51,967.39	170,496.3
		82 20 08.86	262 05 35.26	Pedro (U. S. G. S.)	4.4768644	29,982.26	98,366.8
		324 12 59		Azimuth mark.			
Alcova (U. S. G. S.), 1934 (d. m.)	42 38 46.364	323 50 23.79	144 02 25.74	Chalk	4.6176277	41,459.85	136,022.9
	106 46 15.831	7 56 05.16	187 53 30.73	Pedro (U. S. G. S.)	4.5790884	37,939.22	124,472.3
		99 08 46		Azimuth mark.			
Stinking, 1934 (d. m.)	42 31 54.638	12 05 17.70	192 03 06.31	Chalk	4.3280215	21,282.45	69,824.2
	106 25 12.410	54 02 33.14	233 45 46.63	Pedro (U. S. G. S.)	4.6255036	42,218.58	138,512.1
		113 54 59.72	293 40 44.72	Alcova (U. S. G. S.)	4.4980978	31,484.57	103,295.6
		127 37 55		Azimuth mark.			
Casper (U. S. G. S.), 1934 (d. m.)	42 44 25.485	11 36 03.26	191 33 42.10	Stinking	4.3738345	23,650.18	77,592.3
	106 21 44.021	72 47 35.42	252 30 57.42	Alcova (U. S. G. S.)	4.5452982	35,099.28	115,154.9
		293 06 55		Azimuth mark.			

[1] No check on this position.

GEOGRAPHIC POSITIONS—Continued

Hanna to Buffalo arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Reef (U. S. G. S.), 1934 (d. m.)	42 53 34.590	309 34 27.48	129 44 38.95	Casper (U. S. G. S.)	4.4240481	26,548.99	87,102.8
	106 36 43.693	338 31 16.56	158 39 05.47	Stinking	4.6343474	43,087.11	141,361.6
		25 26 33.31	205 20 04.80	Alcova (U. S. G. S.)	4.4819936	30,338.47	99,535.5
		240 55 40		Azimuth mark.			
Mesa (U. S. G. S.), 1934 (d. m.)	42 55 11.630	19 38 40.79	199 35 08.11	Casper (U. S. G. S.)	4.3256584	21,166.96	69,445.3
	106 16 31.175	83 54 05.80	263 40 20.31	Reef (U. S. G. S.)	4.4419900	27,668.78	90,776.7
		116 23 44		Azimuth mark.			
Natrona, 1934 (d. m.)	42 49 51.969	203 02 09.08	23 04 14.92	Mesa (U. S. G. S.)	4.0302039	10,720.22	35,171.3
	106 19 36.133	16 06 24.38	196 04 57.51	Casper (U. S. G. S.)	4.0205884	10,485.48	34,401.1
		106 30 22.50	286 18 43.51	Reef (U. S. G. S.)	4.3859219	24,317.66	79,782.2
		184 53 09		Azimuth mark.			
B. M. Q 32, 1934 (d. m.)	42 55 33.871	278 23 06.91	98 25 26.39	Mesa (U. S. G. S.)	3.6716787	4,695.47	15,405.1
	106 19 55.990	6 47 40.02	186 46 26.57	Casper (U. S. G. S.)	4.3174439	20,770.35	68,144.1
		80 56 52.55	260 45 26.46	Reef (U. S. G. S.)	4.3646127	23,153.29	75,962.1
		195 46 06		Azimuth mark.			
Teapot, 1934 (d. m.)	43 06 17.689	349 57 27.05	169 59 16.52	Mesa (U. S. G. S.)	4.3195765	20,872.60	68,479.5
	106 19 11.655	45 26 25.83	225 14 28.35	Reef (U. S. G. S.)	4.5250716	33,502.07	109,914.7
		246 58 35		Azimuth mark.			
Lakota, 1934 (d. m.)	43 10 20.982	283 24 21.90	103 40 05.37	Teapot	4.5061605	32,074.54	105,231.2
	106 42 11.462	346 31 51.80	166 35 35.47	Reef (U. S. G. S.)	4.5042032	31,930.32	104,758.1
		231 16 23		Azimuth mark.			
Ilico, 1934 (d. m.)	43 01 02.984	50 45 06.26	230 36 38.39	Reef (U. S. G. S.)	4.3391947	21,837.09	71,643.9
	106 24 18.398	125 27 32.30	305 15 19.17	Lakota	4.4735846	29,756.69	97,626.7
		215 31 31.80	35 35 01.24	Teapot	4.0768955	11,937.01	39,163.3
		315 38 04.18	135 43 22.64	Mesa (U. S. G. S.)	4.1805509	15,154.83	49,720.5
		344 16 48		Azimuth mark.			
Dugout, 1934 (d. m.)	43 26 06.389	336 10 42.23	156 18 52.91	Teapot	4.6029130	40,078.64	131,491.3
	106 31 07.517	27 13 02.38	207 05 27.00	Lakota	4.5157359	32,789.58	107,577.1
		297 38 25		Azimuth mark.			
Midwest, 1934 (d. m.)	43 21 55.429	11 16 00.88	191 13 06.25	Teapot	4.4698936	29,504.86	96,800.5
	106 14 56.722	59 59 09.45	239 40 28.95	Lakota	4.6298454	42,642.76	139,903.8
		109 36 46.57	289 25 39.54	Dugout	4.3650821	23,178.33	76,044.2
		11 37 41		Azimuth mark.			
Meadow, 1934 (d. m.)	43 33 05.990	0 20 10.81	180 20 07.10	Midwest	4.3158586	20,694.68	67,895.8
	106 14 51.327	59 32 10.64	239 20 58.75	Dugout	4.4060494	25,471.20	83,566.8
		76 53 34		Azimuth mark.			
Wall, 1934 (d. m.)	43 34 40.580	276 44 53.74	96 57 19.78	Meadow	4.3886152	24,468.94	80,278.5
	106 32 53.843	314 10 55.42	134 23 16.47	Midwest	4.5291629	33,819.16	110,955.0
		351 25 48.43	171 27 01.62	Dugout	4.2054061	16,047.45	52,649.0
		156 08 37		Azimuth mark.			
Salt, 1934 (d. m.)	43 46 12.015	344 04 15.80	164 07 48.70	Meadow	4.4018054	25,223.50	82,754.1
	106 19 59.715	39 10 26.48	219 01 31.90	Wall	4.4392913	27,497.38	90,214.3
		128 21 55		Azimuth mark.			
Sussex (U. S. G. S.), 1934 (d. m.)	43 47 06.650	275 11 03.33	95 20 29.66	Salt	4.2644191	18,383.11	60,311.9
	106 33 38.275	315 40 18.02	135 53 16.16	Meadow	4.5587330	36,202.03	118,772.8
		357 31 14.81	177 31 45.50	Wall	4.3626154	23,047.05	75,613.5
		187 45 36		Azimuth mark.			
Reno, 1934 (d. m.)	43 55 47.469	311 06 06.46	131 16 35.93	Salt	4.4308663	26,969.09	88,481.1
	106 35 08.342	352 51 30.83	172 52 33.23	Sussex (U. S. G. S.)	4.2095050	16,199.63	53,148.3
		256 18 36		Azimuth mark.			
Bonnidee, 1934 (d. m.)	43 58 23.068	10 22 56.77	190 20 48.68	Salt	4.3605392	22,937.14	75,252.9
	106 16 54.896	47 06 49.09	226 55 13.60	Sussex (U. S. G. S.)	4.4860149	30,620.68	100,461.3
		78 57 46.13	258 45 07.22	Reno	4.3953336	24,850.41	81,530.1
		112 31 33		Azimuth mark.			
Billy, 1934 (d. m.)	44 08 12.545	162 58 07.96	342 56 26.85	Buffalo	4.0411227	10,993.16	36,066.7
	106 39 41.499	300 45 04.17	121 00 54.44	Bonnidee	4.5495623	35,445.60	116,291.1
		345 09 28.97	165 12 38.83	Reno	4.3763419	23,787.12	78,041.6
		124 42 20		Azimuth mark.			
Powder, 1934 (d. m.)	44 08 38.586	1 40 51.21	181 40 33.82	Bonnidee	4.2788867	19,005.82	62,354.9
	106 16 29.885	46 24 23.09	226 11 25.62	Reno	4.5371601	34,447.69	113,017.1
		88 38 46.07	268 22 36.92	Billy	4.4905560	30,942.54	101,517.3
		106 01 28.31	285 43 37.22	Buffalo	4.5500203	35,483.00	116,413.8
		223 12 23.14	43 24 03.82	Barber	4.5116301	32,481.05	106,564.9
		105 38 25		Azimuth mark.			
Muir, 1934 (d. m.)	44 13 29.629	337 19 01.49	157 20 59.21	Powder	3.9883367	9,735.02	31,939.0
	106 19 18.791	70 18 06.08	250 03 53.94	Billy	4.4604281	28,868.76	94,713.6
		91 29 51.24	271 13 57.19	Buffalo	4.4823887	30,366.08	99,626.0
		240 29 10.60	60 42 49.73	Barber	4.4749683	29,851.65	97,938.3
		9 29 36		Azimuth mark.			

GEOGRAPHIC POSITIONS—Continued

Hanna to Buffalo arc—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points	° ′ ″	° ′ ″	° ′ ″				
Casper high school, stack, 1934 (n. d.)	42 50 30.552	207 03 05.8	27 05 18.7	Mesa (U. S. G. S.)	3.988586	9,740.6	31,957
	106 19 46.497	348 48 57.2	168 49 04.3	Natrona	3.084086	1,213.6	3,982
		13 21 00.2	193 19 40.4	Casper (U. S. G. S.)	4.063611	11,577.4	37,984
Casper, Mountain States Power and Light Co., stack, 1934 (n. d.).	42 51 18.352	209 27 20.6	29 29 22.6	Mesa (U. S. G. S.)	3.917430	8,268.6	27,128
	106 19 30.453	2 46 15.4	182 46 11.6	Natrona	3.426301	2,668.7	8,756
		13 24 49.2	193 23 18.5	Casper (U. S. G. S.)	4.117161	13,096.7	42,968
Casper, Chicago, Burlington & Quincy Railroad Co., stack, 1934 (n. d.).	42 51 20.602	208 57 20.2	28 59 18.5	Mesa (U. S. G. S.)	3.911097	8,148.9	26,735
	106 19 25.120	5 13 31.7	185 13 24.2	Natrona	3.438770	2,746.4	9,010
		13 51 22.3	193 49 47.9	Casper (U. S. G. S.)	4.120334	13,192.7	43,283
Casper, broadcasting station, top of radio mast, 1934 (n. d.).	42 51 03.479	46 25 19.7	226 24 10.3	Natrona	3.505222	3,200.5	10,500
	106 17 54.050	100 24 50.1	280 12 01.5	Reef (U. S. G. S.)	4.415992	26,061.1	85,502
		193 47 27.3	13 48 23.7	Mesa (U. S. G. S.)	3.896804	7,885.0	25,869
Casper, courthouse, finial, 1934 (n. d.) [1]	42 51 05.50	4 22 19	184 22 14	Natrona	3.357131	2,275.8	7,467
	106 19 28.49	14 01 23	193 59 51	Casper (U. S. G. S.)	4.104559	12,722.1	41,739
Oil refinery east of Casper, stack, 1934 (n. d.)	42 51 37.726	59 32 41.3	239 29 55.3	Natrona	3.808486	6,434.1	21,109
	106 15 31.939	140 35 52.9	320 32 53.2	B. M. Q 32	3.974686	9,433.8	30,951
		168 29 43.9	348 29 03.6	Mesa (U. S. G. S.)	3.828412	6,736.2	22,100
G. L. O. section corner, secs. 19, 30, 24 and 25, Tps. 34 N., Rs. 81 and 82 W., 1934 (d. m.).[1]	42 53 33.466	198 27 56	18 27 56	Reef (U. S. G. S.)	1.563244	36.58	120.0
	106 36 44.204						
G. L. O. mark, SW. 1/16, S 9, 1934 (d. m.) [1]	42 55 33.755	100 29 46	280 29 45	B. M. Q 32	1.294246	19.69	64.6
	106 19 55.136						
Water tank near station Midwest, 1934 (n. d.) [1]	43 21 53.96	11 14 57	191 12 03	Teapot	4.469186	29,456.8	96,643
	106 14 57.53	109 44 01	289 32 54	Dugout	4.365046	23,176.4	76,038

[1] No check on this position.

Shoshone Indian Reservation area

Principal points						
Bunion, 1936 (d. m.)	42 44 59.674	5 29 07.2	185 28 03.1	Prospect	4.354284	22,609.1	74,177
	109 14 10.059	112 17 34.7	291 57 14.4	Halfmoon (U. S. F. S.)	4.643643	44,019.3	144,420
		32 06 04		Azimuth mark.			
Bonneville, 1936 (d. m.)	42 51 35.800	324 29 41.1	144 34 01.5	Bunion	4.176343	15,008.7	49,241
	109 20 33.337	349 15 52.4	169 19 08.1	Prospect	4.548327	35,344.9	115,961
		97 52 19.1	277 36 18.3	Halfmoon (U. S. F. S.)	4.509715	32,338.1	106,096
		39 00 30		Azimuth mark.			
Jim, 1936 (d. m.)	42 44 56.777	198 59 13.8	19 01 20.6	Bonneville	4.114703	13,022.8	42,726
	109 23 39.972	269 33 04.5	89 39 31.4	Bunion	4.112662	12,961.7	42,525
		184 33 21		Azimuth mark.			
Divide Lake, 1936 (d. m.)	42 50 25.480	260 07 13.9	80 13 29.1	Bonneville	4.104265	12,713.5	41,711
	109 29 45.042	320 41 00.4	140 45 08.4	Jim	4.117403	13,104.0	42,992
		277 11 33		Azimuth mark.			
Pebble, 1936 (d. m.)	43 04 58.815	29 49 51.9	209 39 33.2	Lander	4.618362	41,530.0	136,253
	108 29 00.693	122 18 42.8	302 05 37.3	Pilot	4.486630	30,664.1	100,604
		254 18 23.5	74 37 56.9	Shoshone	4.604870	40,259.6	132,085
		23 07 53		Azimuth mark.			
Rawlins, 1936 (d. m.)	42 45 19.213	90 38 11.7	270 16 57.5	Lander	4.630226	42,680.2	140,027
	108 12 52.378	148 59 13.9	328 48 14.5	Pebble	4.628517	42,512.5	139,476
		320 00 05		Azimuth mark.			
Alkali, 1936 (d. m.)	42 54 30.933	9 51 32.8	189 50 04.3	Rawlins	4.237530	17,279.5	56,691
	108 10 42.272	128 00 43.2	307 48 14.1	Pebble	4.498808	31,536.1	103,465
		204 49 04.0	24 56 05.7	Shoshone	4.521652	33,239.3	109,053
		326 26 02.1	146 31 57.3	Sandraw	4.332361	21,496.2	70,525
		38 20 14		Azimuth mark.			
Sand, 1936 (d. m.)	43 02 04.712	218 23 57.5	38 30 25.2	Shoshone	4.314408	20,625.7	67,669
	108 09 51.785	341 24 23.8	161 29 45.1	Sandraw	4.527296	33,674.1	110,479
		4 40 32.3	184 39 57.9	Alkali	4.147665	14,049.6	46,094
		303 05 00		Azimuth mark.			
Wind, 1936 (d. m.)	43 08 19.702	4 12 45.6	184 11 12.3	Lander	4.627070	42,371.1	139,013
	108 41 52.318	140 02 19.2	319 58 01.3	Pilot	4.121862	13,239.2	43,436
		289 29 17.7	109 38 05.0	Pebble	4.267528	18,515.2	60,745
		208 53 38		Azimuth mark.			
Hudson, 1936 (d. m.)	42 54 27.651	46 54 14.3	226 45 25.2	Lander	4.384460	24,235.9	79,514
	108 31 10.930	188 36 03.3	8 37 32.1	Pebble	4.294446	19,699.1	64,629
		222 27 04		Azimuth mark.			

GEOGRAPHIC POSITIONS—Continued

Shoshone Indian Reservation area—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Erosion, 1936 (d. m.)	43 04 27.125	248 40 01.7	68 41 17.3	Pebble	3.429659	2,689.4	8,823
	108 30 51.440	1 22 08.8	181 21 55.5	Hudson	4.267272	18,504.3	60,710
S. C. S. No. 34, 1936 (d. m.)	42 55 37.895	60 32 35.0	240 16 06.5	Lander	4.579373	37,964.1	124,554
	108 19 55.491	144 32 52.5	324 26 40.7	Pebble	4.327613	21,262.4	69,758
		272 43 43		Azimuth mark.			
S. C. S. No. 1, 1936 (d. m.)	42 59 16.266	330 53 56.2	150 55 48.9	S. C. S. No. 34	3.887110	7,711.0	25,299
	108 22 40.863	49 02 46.2	228 48 09.7	Lander	4.588723	38,790.3	127,265
		217 21 29		Azimuth mark.			
Madden, 1936 (d. m.)	43 03 51.014	246 54 10.8	67 09 29.1	Shoshone	4.518311	32,984.6	108,217
	108 22 47.944	316 21 44.8	136 29 59.5	Alkali	4.377560	23,853.9	78,261
		0 13 04		Azimuth mark.			
S. C. S. no. 105, 1936 (d. m.)	43 01 34.528	265 37 16.8	85 43 27.8	Sand	4.091490	12,345.0	40,502
	108 18 55.510	319 25 03.8	139 30 40.0	Alkali	4.235512	17,199.3	56,428
		345 33 22		Azimuth mark.			
S. C. S. no. 45 eccentric, 1936 (d. m.)	42 55 08.875	218 42 41.5	38 47 51.4	Sand	4.216297	16,455.0	53,986
	108 17 26.368	277 14 28.1	97 19 03.3	Alkali	3.965691	9,240.4	30,316
		74 51 14		Azimuth mark.			
Muskrat, 1936 (d. m.)	42 59 49.473	114 34 23.9	294 29 48.4	Sand	4.002173	10,050.2	32,973
	108 03 08.046	190 17 51.2	10 19 42.9	Shoshone	4.315118	20,659.4	67,780
Muskrat azimuth mark, 1936 (d. m.)	43 00 26.384	69 44 16.8	249 42 43.9	Muskrat	3.516794	3,287.0	10,784
	108 00 51.918	181 50 48.9	1 51 07.6	Shoshone	4.283225	19,196.6	62,981
Conant, 1936 (d. m.)	42 53 51.904	354 38 00.9	174 38 47.8	Sandraw	4.225075	16,790.9	55,088
	108 03 08.744	96 43 09.5	276 38 00.8	Alkali	4.015326	10,359.2	33,987
Conant azimuth mark, 1936 (d. m.)	42 52 57.849	6 10 58.6	186 10 09.9	Sandraw	4.180050	15,137.4	49,663
	108 00 48.013	117 35 35.9	297 34 00.2	Conant	3.556634	3,602.7	11,820
		176 26 14		Poston Ranch water tank, most westerly of three.			
Greek, 1936 (d. m.)	42 44 02.283	156 41 19.8	336 32 56.6	Pebble	4.625756	42,243.1	138,593
	108 16 41.690	245 30 21.0	65 32 56.6	Rawlins	3.758184	5,730.4	18,800
Beaver, 1936 (d. m.)	42 44 58.108	179 00 05.1	358 59 45.6	Pebble	4.568875	37,057.4	121,579
	108 28 32.142	233 52 01.7	54 04 09.0	Alkali	4.477835	30,049.3	98,587
		276 01 04.2	96 09 06.4	Greek	4.210885	16,251.2	53,317
		206 46 23		Azimuth mark.			
Uncle, 1936 (d. m.)	42 48 02.782	297 40 15.9	117 47 17.5	Greek	4.202741	15,949.3	52,327
	108 27 02.619	19 39 42.9	199 38 42.1	Beaver	3.781833	6,051.1	19,853
		27 40 52		Azimuth mark.			
Greek azimuth mark, 1936 (d. m.)	42 45 17.139	346 34 45.8	166 35 02.3	Greek	3.375607	2,374.7	7,791
	108 17 05.918	87 54 35.1	267 46 49.3	Beaver	4.193597	15,617.0	51,237
Mt. Arter azimuth mark, 1936 (d. m.)	42 45 30.197	149 06 31.6	329 06 14.3	Mt. Arter (U. S. F. S.)	3.051570	1,126.1	3,695
	108 58 41.321	269 54 28.4	90 04 20.5	Lander	4.297359	19,831.7	65,065
White, 1936 (d. m.)	43 15 31.974	81 07 31.0	260 57 15.1	Pilot	4.312396	20,530.3	67,356
	108 33 10.237	161 50 26.0	341 44 11.2	Owl (U. S. G. S.)	4.593672	39,234.8	128,723
		189 59 38		Azimuth mark.			
Canyon (U. S. G. S.), 1936 (d. m.)	43 27 31.307	52 48 02.1	232 33 14.4	White	4.563644	36,613.7	120,123
	108 11 37.247	110 13 57.9	289 52 52.0	Owl (U. S. G. S.)	4.642887	43,942.7	144,169
		214 42 17.3	34 49 54.0	Kirby (U. S. G. S.)	4.416380	26,084.3	85,578
		275 33 56.4	95 40 36.7	Copper	4.118811	13,146.5	43,131
		89 39 36		Azimuth mark.			
Lost Well, 1936 (d. m.)	43 10 42.524	130 11 39.9	310 06 18.6	White	4.141552	13,853.3	45,450
	108 25 21.089	210 43 46.7	30 53 11.9	Canyon (U. S. G. S.)	4.559264	36,246.3	118,918
		226 34 30.3	46 50 34.6	Copper	4.638715	43,522.6	142,790
		269 33 52.1	89 50 56.2	Shoshone	4.528920	33,800.3	110,893
		354 52 46		Azimuth mark.			
Thermopolis, 1936 (d. m.)	43 39 42.036	273 43 47.5	93 52 28.7	Kirby (U. S. G. S.)	4.229253	16,953.2	55,621
	108 13 09.452	354 44 53.3	174 45 56.8	Canyon (U. S. G. S.)	4.354999	22,646.4	74,299
		327 53 22		Azimuth mark.			
Whitney, 1936 (d. m.)	43 37 54.968	261 01 39.2	81 12 30.4	Thermopolis	4.330438	21,401.2	70,214
	108 28 52.905	309 31 12.1	129 43 05.6	Canyon (U. S. G. S.)	4.479764	30,183.1	99,026
		261 10 12		Azimuth mark.			
Sears, 1936 (d. m.)	43 29 46.569	188 32 23.9	8 33 33.5	Whitney	4.183050	15,242.3	50,007
	108 30 33.874	279 10 19.4	99 23 21.5	Canyon (U. S. G. S.)	4.413035	25,884.2	84,922
		348 41 02.2	168 44 36.9	Lost Well	4.556328	36,002.1	118,117
		196 46 02		Azimuth mark.			
Bend, 1936 (d. m.)	43 11 09.124	87 14 11.2	267 05 48.6	Lost Well	4.220287	16,606.8	54,484
	108 13 06.647	207 27 55.4	27 35 35.9	Copper	4.514927	32,728.6	107,377
		50 11 07		Azimuth mark.			

GEOGRAPHIC POSITIONS—Continued

Shoshone Indian Reservation area—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Badwater, 1936 (d. m.)	43 18 28.660	51 30 21.1	231 21 44.4	Bend	4.337614	21,757.8	71,384
	108 00 32.560	138 17 05.1	318 09 28.5	Canyon (U. S. G. S.)	4.351345	22,456.7	73,677
		173 08 00.2	353 07 03.3	Copper	4.192308	15,570.7	51,085
		4 40 17		Azimuth mark.			
Camp, 1936 (d. m.)	43 14 44.914	297 33 59.8	117 40 25.9	Bend	4.157273	14,363.9	47,126
	108 22 30.501	27 15 17.4	207 13 20.6	Lost Well	3.924956	8,413.1	27,602
		0 34 02		Azimuth mark.			
Burgess, 1936 (d. m.)	43 23 31.290	255 19 53.5	75 31 52.9	Copper	4.386105	24,327.9	79,816
	108 19 22.003	312 27 16.6	132 40 16.5	Shoshone	4.541811	34,818.6	114,234
		353 56 02		Azimuth mark.			
Big Horn, 1936 (d. m.)	43 18 03.575	129 06 07.9	308 59 48.0	Burgess	4.205567	16,053.4	52,669
	108 10 08.481	214 19 18.0	34 24 56.7	Copper	4.293720	19,666.2	64,522
		305 27 39		Azimuth mark.			
Lucerne, 1936 (d. m.)	43 45 11.768	310 07 14.0	130 14 07.0	Kirby (U. S. G. S.)	4.243432	17,515.9	57,467
	108 10 32.239	19 05 41.9	199 03 53.3	Thermopolis	4.032132	10,767.9	35,328
		356 29 36		Azimuth mark.			
Gumbo, 1936 (d. m.)	43 44 52.240	331 57 24.7	152 00 20.3	Kirby (U. S. G. S.)	4.083440	12,118.3	39,758
	108 04 48.779	49 33 00.9	229 27 15.0	Thermopolis	4.168555	14,742.0	48,366
		339 17 38		Azimuth mark.			
Buffalo, 1936 (d. m.)	43 33 07.406	123 30 04.5	303 20 36.9	Thermopolis	4.344614	22,111.3	72,543
	107 59 26.558	172 09 07.3	352 08 20.4	Kirby (U. S. G. S.)	4.047647	11,159.6	36,613
		244 39 00		Azimuth mark.			
Red, 1936 (d. m.)	43 32 18.180	201 08 14.7	21 10 57.7	Thermopolis	4.166982	14,688.7	48,191
	108 17 05.850	240 25 03.6	60 36 27.2	Kirby (U. S. G. S.)	4.407304	25,544.9	83,809
		266 14 36.2	86 26 46.0	Buffalo	4.377109	23,829.2	78,180
		344 33 54		Azimuth mark.			
Club, 1936 (d. m.)	43 35 34.153	46 59 41.2	226 56 22.2	Red	3.947567	8,862.7	29,077
	108 12 17.181	171 17 45.8	351 17 09.7	Thermopolis	3.888709	7,739.4	25,392
		227 39 38		Azimuth mark.			
Sage, 1936 (d. m.)	43 38 24.552	251 37 41.1	71 41 23.3	Thermopolis	3.880782	7,599.4	24,932
	108 18 31.329	335 12 26.2	155 17 11.5	Canyon (U. S. G. S.)	4.346353	22,200.0	72,834
		217 42 47		Azimuth mark.			
Coal, 1936 (d. m.)	43 45 21.988	306 58 15.1	127 05 24.4	Thermopolis	4.241080	17,421.3	57,156
	108 23 30.641	27 38 43.3	207 35 00.7	Whitney	4.192282	15,569.8	51,082
		2 00 47		Azimuth mark.			
Copper azimuth mark, 1936 (d. m.)	43 27 07.110	83 05 36.9	263 03 20.7	Copper	3.651937	4,486.8	14,720
	107 58 37.260	173 14 23.1	353 13 02.2	Kirby (U. S. G. S.)	4.348886	22,329.9	73,261
Joker, 1936 (d. m.)	43 26 32.507	103 27 30.1	283 26 22.7	Copper	3.355124	2,265.3	7,432
	108 00 17.374	244 36 45.6	64 37 54.4	Copper azimuth mark	3.396478	2,491.6	8,175
Antelope, 1936 (d. m.)	43 20 38.077	154 23 47.2	334 16 58.1	Owl (U. S. G. S.)	4.489499	30,867.3	101,270
	108 32 20.705	245 22 48.5	65 37 02.9	Canyon (U. S. G. S.)	4.487852	30,750.5	100,887
		293 24 47		Azimuth mark.			
Merriam, 1936 (d. m.)	43 28 40.378	203 15 04.8	23 17 55.5	Owl (U. S. G. S.)	4.148760	14,085.1	46,211
	108 46 23.244	308 03 27.6	128 13 06.6	Antelope	4.382049	24,101.8	79,074
		347 39 51		Azimuth mark.			
Sheep, 1936 (d. m.)	43 26 05.005	109 58 52.4	289 52 07.7	Merriam	4.148302	14,070.3	46,162
	108 36 34.878	156 42 16.5	336 38 22.0	Owl (U. S. G. S.)	4.285840	19,312.6	63,361
		88 09 16		Azimuth mark.			
Ants, 1936 (d. m.)	43 20 47.169	193 04 50.5	13 08 06.8	Owl (U. S. G. S.)	4.451469	28,279.3	92,780
	108 47 00.690	297 22 48.5	117 32 18.0	White	4.324168	21,094.4	69,207
		270 29 39		Azimuth mark.			
Nome, 1936 (d. m.)	43 23 38.307	212 34 55.7	32 42 12.5	Owl (U. S. G. S.)	4.422208	26,436.7	86,734
	108 52 50.028	303 50 53.0	123 54 52.9	Ants	3.976528	9,473.9	31,082
		251 03 47		Azimuth mark.			
Crowheart (U. S. G. S.), 1936 (d. m.)	43 18 36.546	224 55 46.5	45 11 54.4	Owl (U. S. G. S.)	4.650323	44,701.6	146,658
	109 05 42.763	290 25 12.4	110 37 14.6	Pilot	4.404335	25,370.8	83,237
		144 49 11		Azimuth mark.			
Lawrence, 1936 (d. m.)	43 04 17.368	200 33 58.2	20 39 00.4	Crowheart (U. S. G. S.)	4.452195	28,326.6	92,935
	109 13 04.302	242 18 47.8	62 35 50.4	Pilot	4.580960	38,103.1	125,010
		311 18 10.7	131 37 52.2	Lander	4.720333	52,521.0	172,313
		269 26 17		Azimuth mark.			
Bold, 1936 (d. m.)	43 12 53.839	245 17 19.9	65 29 01.4	Crowheart (U. S. G. S.)	4.404708	25,392.6	83,309
	109 22 46.312	320 24 52.3	140 31 30.3	Lawrence	4.315217	20,664.1	67,795
		278 13 20		Azimuth mark.			
Coulee (U. S. G. S.), 1936 (d. m.)	43 33 29.862	327 25 49.5	147 34 46.3	Crowheart (U. S. G. S.)	4.514363	32,686.1	107,238
	109 18 43.519	8 10 34.6	188 07 47.8	Bold	4.585846	38,534.2	126,424
		257 40 54		Azimuth mark.			

GEOGRAPHIC POSITIONS—Continued

Shoshone Indian Reservation area—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Muddy (U. S. G. S.), 1936 (d. m.)	43 40 11.183	281 43 13.7	102 03 38.8	Owl (U. S. G. S.)	4.609318	40,674.1	133,445
	109 11 50.837	348 16 10.5	168 20 23.8	Crowheart (U. S. G. S.)	4.610674	40,801.3	133,862
		36 48 18.9	216 43 34.2	Coulee (U. S. G. S.)	4.189234	15,460.9	50,725
		146 55 15		Azimuth mark.			
Tatro, 1936 (d. m.)	42 50 37.872	185 42 37.7	5 44 47.5	Pilot	4.634722	43,124.3	141,484
	108 51 19.274	314 07 10.9	134 12 03.1	Lander	4.134273	13,623.0	44,695
		275 40 26		Azimuth mark			
Mesa, 1936 (d. m.)	43 10 03.764	138 32 54.4	318 25 49.1	Crowheart (U. S. G. S.)	4.324944	21,132.2	69,331
	108 55 22.031	234 37 03.4	54 41 59.7	Pilot	4.078530	11,982.0	39,311
		351 17 18.0	171 20 03.5	Tatro	4.561050	36,395.7	119,408
		138 59 42		Azimuth mark.			
Diversion, 1936 (d. m.)	43 14 20.391	346 57 23.0	166 58 18.6	Mesa	3.910036	8,129.0	26,670
	108 56 43.249	123 03 56.8	302 57 46.9	Crowheart (U. S. G. S.)	4.161625	14,508.6	47,600
		357 49 52		Azimuth mark.			
Bald Mountain, 1936 (d. m.)	42 52 31.347	145 22 28.0	325 14 54.4	Lawrence	4.423185	26,496.3	86,930
	109 01 58.856	195 25 39.7	15 30 10.5	Mesa	4.527584	33,696.4	110,552
		205 23 59.0	25 33 25.5	Pilot	4.640010	43,652.6	143,217
		295 17 49		Azimuth mark.			
Magnuson, 1936 (d. m.)	42 59 42.523	220 13 33.0	40 21 43.9	Mesa	4.400271	25,134.5	82,462
	109 07 20.599	224 48 58.9	45 02 05.9	Pilot	4.566624	36,865.8	120,951
		309 39 14.7	129 55 01.5	Lander	4.613792	41,095.3	134,827
		76 45 31		Azimuth mark.			
Park, 1936 (d. m.)	42 56 48.335	223 31 05.7	43 46 12.4	Pilot	4.638471	43,498.2	142,710
	109 10 16.428	305 02 43.1	125 08 21.8	Bald Mountain	4.139694	13,794.1	45,256
		320 10 26		Azimuth mark.			
Rawie, 1936 (d. m.)	43 09 47.753	268 12 44.7	88 21 03.5	Mesa	4.216884	16,477.2	54,059
	109 07 31.106	346 43 51.9	166 47 38.6	Bald Mountain	4.516605	32,855.3	107,793
		264 27 56		Azimuth mark.			
Tel, 1936 (d. m.)	42 56 37.760	193 44 22.9	13 47 26.8	Mesa	4.408376	25,608.0	84,016
	108 59 51.282	313 39 39.7	133 45 28.2	Tatro	4.206058	16,071.6	52,728
		281 35 35		Azimuth mark.			
Mill, 1936 (d. m.)	42 56 23.799	25 02 29.0	204 59 59.5	Tatro	4.071151	11,780.2	38,649
	108 47 39.696	91 33 25.5	271 25 07.1	Tel	4.219906	16,592.3	54,437
		127 21 29		Azimuth mark.			
Fort Washakie, 1936 (d. m.)	43 00 12.738	353 22 50.6	173 23 52.4	Tatro	4.251836	17,858.1	58,589
	108 52 49.925	55 14 56.4	235 10 09.2	Tel	4.065450	11,626.5	38,145
		30 55 04		Azimuth mark.			
Wise, 1936 (d. m.)	42 57 51.981	19 13 06.3	199 09 07.7	Lander	4.384396	24,232.4	79,502
	108 38 18.413	52 58 38.5	232 49 46.9	Tatro	4.345536	22,209.4	72,865
		320 23 38		Azimuth mark.			
Wyopo, 1936 (d. m.)	42 51 13.471	19 41 08.3	199 39 15.1	Lander	4.050975	11,245.4	36,894
	108 41 22.606	85 25 15.2	265 18 29.5	Tatro	4.133303	13,592.6	44,595
		206 47 18		Azimuth mark.			
Popo, 1936 (d. m.)	42 45 27.118	90 43 05.6	270 38 59.5	Lander	3.916192	8,245.0	27,050
	108 38 06.636	118 06 16.7	297 57 18.2	Tatro	4.309745	20,405.4	66,947
		321 15 56		Azimuth mark.			
Lander azimuth mark, 1936 (d. m.)	42 45 34.995	135 25 54.9	315 21 19.3	Tatro	4.118181	13,127.5	43,069
	108 44 33.593	284 36 33.4	104 36 50.0	Lander	2.758424	573.4	1,881
Willow, 1936 (d. m.)	43 08 57.780	201 43 08.1	21 44 36.1	Bold	3.894428	7,842.0	25,728
	109 24 54.878	298 14 22.0	118 22 27.6	Lawrence	4.261227	18,248.5	59,870
		303 17 38		Azimuth mark.			
Bull Lake, 1936 (d. m.)	43 07 11.520	326 30 20.2	146 32 07.5	Lawrence	3.809104	6,443.2	21,139
	109 15 41.464	104 44 34.4	284 38 16.0	Willow	4.111620	12,930.6	42,423
		137 47 09.1	317 42 18.4	Bold	4.154493	14,272.3	46,825
		32 00 08		Azimuth mark.			
Wilson (U. S. G. S.), 1936 (d. m.)	42 58 54.623	165 40 45.1	345 38 21.5	Willow	4.283561	19,211.5	63,030
	109 21 24.576	175 55 30.7	355 54 34.9	Bold	4.414362	25,963.4	85,182
		206 49 34.7	26 53 29.0	Bull Lake	4.235223	17,187.9	56,391
		228 37 39.9	48 43 21.3	Lawrence	4.178479	15,082.7	49,484
		165 32 04		Azimuth mark.			
Dennis, 1936 (d. m.)	43 00 32.885	207 34 12.6	27 38 18.6	Willow	4.245069	17,582.0	57,684
	109 30 55.011	239 09 22.2	59 19 46.1	Bull Lake	4.381196	24,054.5	78,919
		283 09 07.3	103 15 36.3	Wilson (U. S. G. S.)	4.122963	13,272.8	43,546
Dennis azimuth mark, 1936 (d. m.)	43 00 27.836	96 48 28.8	276 47 49.4	Dennis	3.119053	1,315.4	4,316
	109 29 57.340	203 28 15.8	23 31 42.4	Willow	4.234508	17,159.6	56,298
Bob, 1936 (d. m.)	43 10 17.714	240 22 36.5	60 26 53.7	Bold	3.989356	9,757.9	32,014
	109 29 02.112	293 48 15.1	113 51 04.2	Willow	3.785752	6,105.9	20,032
		333 48 15.0	153 53 27.4	Wilson (U. S. G. S.)	4.370767	23,483.7	77,046
		8 03 50.5	188 02 33.3	Dennis	4.260718	18,227.1	59,800

GEOGRAPHIC POSITIONS—Continued

Shoshone Indian Reservation area—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Principal points—Continued	° ′ ″	° ′ ″	° ′ ″				
Bob azimuth mark, 1936 (d. m.)	43 09 58.368	238 20 22.8	58 20 52.1	Bob	3.055965	1,137.5	3,732
	109 29 44.978	285 53 39.5	105 56 57.9	Willow	3.833508	6,815.7	22,361
Meadow, 1936 (d. m.)	43 16 05.315	352 09 08.9	172 10 39.9	Lawrence	4.343465	22,052.9	72,352
	109 15 17.389	59 47 01.6	239 41 54.0	Bold	4.069158	11,726.2	38,472
		72 54 08		Azimuth mark.			
Dinwoody (U. S. G. S.), 1936 (d. m.)	43 17 08.986	206 30 30.7	26 38 13.3	Coulee (U. S. G. S.)	4.529508	33,846.0	111,043
	109 29 56.572	309 00 32.4	129 05 27.2	Bold	4.096850	12,498.3	41,005
		42 03 09		Azimuth mark.			
Sacajawea, 1936 (d. m.)	43 24 07.743	184 38 10.5	4 38 53.6	Coulee (U. S. G. S.)	4.240670	17,404.8	57,102
	109 19 46.199	298 12 18.3	118 21 57.3	Crowheart (U. S. G. S.)	4.333836	21,569.3	70,765
		330 22 09		Azimuth mark.			
Pasup, 1936 (d. m.)	43 21 58.381	312 59 24.7	133 07 37.0	Pilot	4.345358	22,149.2	72,668
	109 00 07.081	50 33 10.0	230 29 19.6	Crowheart (U. S. G. S.)	3.991081	9,796.7	32,141
		305 52 52		Azimuth mark.			
Ega, 1936 (d. m.)	43 26 09.179	242 42 23.8	62 59 56.3	Owl (U. S. G. S.)	4.586404	38,583.7	126,587
	109 07 43.951	348 56 11.4	168 57 34.7	Crowheart (U. S. G. S.)	4.153283	14,232.6	46,695
		16 10 58		Azimuth mark.			
Maverick, 1936 (d. m.)	43 29 22.305	242 13 33.3	62 24 54.4	Owl (U. S. G. S.)	4.399125	25,068.3	82,245
	108 58 44.170	25 20 20.1	205 15 32.5	Crowheart (U. S. G. S.)	4.343267	22,042.8	72,319
		282 36 18		Azimuth mark.			
French, 1936 (d. m.)	43 32 39.422	0 39 51.8	180 39 42.6	Crowheart (U. S. G. S.)	4.415204	26,013.8	85,347
	109 05 29.379	148 30 13.2	328 25 50.1	Muddy (U. S. G. S.)	4.213720	16,357.6	53,667
		337 20 52		Azimuth mark.			
Crow, 1936 (d. m.)	43 44 21.755	289 30 33.8	109 53 40.6	Owl (U. S. G. S.)	4.679405	47,797.5	156,816
	109 15 43.869	325 58 12.0	146 00 53.0	Muddy (U. S. G. S.)	3.969830	9,328.9	30,607
		5 36 28		Azimuth mark.			
Contact, 1936 (d. m.)	43 27 25.945	233 18 28.4	53 26 11.4	Coulee (U. S. G. S.)	4.274725	18,824.6	61,760
	109 29 56.042	296 24 01.0	116 40 39.2	Crowheart (U. S. G. S.)	4.563070	36,565.4	119,965
Contact azimuth mark, 1936 (d. m.)	43 26 20.057	167 33 04.3	347 32 50.6	Contact	3.318557	2,082.4	6,832
	109 29 36.076	227 48 02.1	47 55 31.3	Coulee (U. S. G. S.)	4.296025	19,770.8	64,865
Dennison, 1936 (d. m.)	43 36 44.594	292 02 09.7	112 09 44.6	Coulee (U. S. G. S.)	4.203429	15,974.6	52,410
	109 29 43.254	0 57 19.2	180 57 10.4	Contact	4.236618	17,243.2	56,572
		349 40 14		Azimuth mark.			
Kent (U. S. G. S.), 1936 (d. m.)	43 44 59.339	327 08 24.8	147 15 27.3	Coulee (U. S. G. S.)	4.403381	25,315.2	83,055
	109 28 55.494	4 00 44.5	184 00 11.5	Dennison	4.184875	15,306.5	50,218
		224 58 12		Azimuth mark.			
Duncan, 1936 (d. m.)	43 37 27.805	81 32 23.7	261 27 49.1	Dennison	3.955406	9,024.1	29,607
	109 23 05.213	150 39 19.9	330 35 18.0	Kent (U. S. G. S.)	4.203903	15,992.0	52,467
		321 20 07.7	141 23 08.2	Coulee (U. S. G. S.)	3.973196	9,401.5	30,845
		29 02 56		Azimuth mark.			
Castle Rocks, 1936 (d. m.)	43 45 04.644	302 32 17.7	122 46 16.4	Owl (U. S. G. S.)	4.509436	32,317.4	106,028
	109 02 29.941	54 15 11.0	234 08 43.4	Muddy (U. S. G. S.)	4.189851	15,482.9	50,797
		310 52 22		Azimuth mark.			
Hamilton, 1936 (d. m.)	43 45 11.867	22 30 46.8	202 27 01.5	Owl (U. S. G. S.)	4.281333	19,113.2	62,707
	108 36 49.111	89 46 39.0	239 28 53.5	Castle Rocks	4.537480	34,473.1	113,100
		239 59 23		Azimuth mark.			
Morants, 1936 (d. m.)	43 44 26.047	265 10 06.7	85 18 51.7	Hamilton	4.231638	17,046.6	55,927
	108 49 28.358	329 07 00.3	149 11 59.3	Owl (U. S. G. S.)	4.276975	18,922.3	62,081
		171 26 38		Azimuth mark.			
Anchor, 1936 (d. m.)	43 37 43.968	133 29 57.6	313 22 34.6	Castle Rocks	4.296236	19,780.4	64,896
	108 51 48.615	235 27 21.4	55 37 42.7	Hamilton	4.387948	24,431.4	80,155
		303 18 02		Azimuth mark.			
Lime, 1936 (d. m.)	43 39 35.953	172 53 25.0	352 52 45.9	Castle Rocks	4.009578	10,223.0	33,540
	109 01 33.386	252 31 54.5	72 49 00.0	Hamilton	4.541727	34,811.8	114,212
		317 04 31		Azimuth mark.			
South Fork, 1936 (d. m.)	43 07 14.566	332 04 30.4	152 15 08.9	Lander	4.658143	45,513.8	149,323
	108 59 46.537	73 12 52.4	253 03 47.3	Lawrence	4.275366	18,852.4	61,852
		250 14 28		Azimuth mark.			
Supplementary points							
Shoshoni, Chicago & North Western Ry., redwood water tank, finial, 1936 (n. d.).	43 14 04.088	59 49 18.6	239 44 37.4	Bend	4.030534	10,728.4	35,198
	108 06 15.961	93 22 19.5	273 11 11.9	Camp	4.342898	22,024.1	72,257
		144 39 55.2	324 37 15.8	Big Horn	3.957222	9,062.0	29,731
Red and white flag near station Lost Well, 1936 (n. d.)[1]	43 10 44.62	56 46 00	236 45 57	Lost Well	2.072594	118.2	388
	108 25 16.71	206 49 17	26 51 11	Camp	3.919626	8,310.5	27,265
Thermopolis, public school, cupola, 1936 (n. d.)	43 38 44.410	85 17 36.0	265 13 48.3	Sage	3.870351	7,419.1	24,341
	108 13 01.448	174 14 31.4	354 14 25.9	Thermopolis	3.252248	1,787.5	5,864
		350 24 03.8	170 24 34.4	Club	3.774882	5,955.0	19,537

[1] No check on this position.

181850—38——5

GEOGRAPHIC POSITIONS—Continued

Shoshone Indian Reservation area—Continued

Station	Latitude and longitude	Azimuth	Back azimuth	To station	Distance		
					Logarithm (meters)	Meters	Feet
Supplementary points—Continued	° ′ ″	° ′ ″	° ′ ″				
Riverton, municipal water tank, finial, 1931 r. 1936 (n. d.).	43 01 27.555	266 24 12.8	86 33 34.9	Sand	4.271474	18,684.2	61,300
	108 23 35.499	316 11 02.9	136 25 44.8	Sandraw	4.629076	42,567.3	139,656
		324 22 06.0	144 26 17.6	S. C. S. no. 45 eccentric	4.157486	14,371.0	47,149
Wiggins Peak, cairn, 1936 (n. d.)	43 49 14.400	305 39 09.7	125 45 38.5	Crow	4.189639	15,475.3	50,772
	109 25 05.805	313 13 43.7	133 22 53.4	Muddy (U. S. G. S.)	4.388159	24,443.3	80,194
		33 08 38.3	213 05 59.3	Kent (U. S. G. S.)	3.973091	9,399.2	30,837
Washakie Needles, highest point, 1936 (n. d.)	43 44 51.162	330 33 56.7	150 50 24.6	Pilot	4.819017	65,920.0	216,273
	109 12 04.654	357 56 54.4	177 57 03.9	Muddy (U. S. G. S.)	3.936837	8,646.4	28,367
		79 32 17.8	259 29 46.2	Crow	3.697962	4,988.4	16,366
Warm Springs, fire lookout tower, 1936 (n. d.) [1]	43 33 25.90	229 11 10	49 23 56	Kent (U. S. G. S.)	4.516058	32,813.9	107,657
	109 47 25.50	257 01 17	77 18 04	Duncan	4.526315	33,598.1	110,230
Lander, Bishop-Randell Hospital, SW. corner, stack, 1936 (n. d.).[1]	42 49 26.75	102 14 20	282 09 16	Tatro	4.016512	10,387.5	34,080
	108 43 52.24	225 53 07	45 54 49	Wyopo	3.675036	4,731.9	15,525
Lander, Wyoming State Training School, new building, kitchen, cupola, 1936 (n. d.).[1]	42 50 30.98	12 55 40	192 54 36	Lander	3.978592	9,519.0	31,230
	108 42 35.54	91 04 25	270 58 29	Tatro	4.075368	11,895.1	39,026
Riverton, State Prison Farm, tank, 1936 (n. d.) [1]	43 03 33.50	124 49 55	304 49 32	Madden	2.975977	946.2	3,104
	108 22 13.62	279 11 52	99 20 19	Sand	4.230768	17,012.5	55,815
T. 32 N., R. 95 W., sec. 5, northeast corner, 1931, r. 1936 (d. m.).[1]	42 46 58.499	90 11	270 11	G. L. O. Station 22	0.783189	6.070	19.91
	108 12 21.053						
Cairn, near station Canyon (U. S. G. S.), 1936 (d.) [1]	43 27 28.519	155 19	335 19	Canyon (U. S. G. S.)	1.976350	94.70	310.7
	108 11 35.488						
Divide Lake reference mark no. 1 (U. S. F. S.), 1936 (d. m.).[1]	42 50 25.785	23 02	203 02	Divide Lake	1.009791	10.228	33.56
	109 29 44.866						
Station 2, T. 28 N., R. 105 W. (U. S. F. S.), 1936 (d. m.) [1]	42 44 56.781	303 45	123 45	Jim	9.376577	0.238	0.78
	109 23 39.981						
Post S., line SE ¼ Sec. 15, 1936 (d. m.) [1]	43 29 22.261	190 14	10 14	Maverick	0.136721	1.37	4.5
	108 58 44.181						
S. C. S. no. 45, 1936 (d. m.) [1]	42 55 08.828	137 18	317 18	S. C. S. no. 45 eccentric	0.296446	1.979	6.49
	108 17 26.309						
U. S. G. S. flag, 1936 (n. d.).[1]	43 01 34.322	251 02	71 02	S. C. S. no. 105	1.292256	19.600	64.30
	108 18 56.329						
Sho, 1936 (d. m.) [1]	42 45 00.94	234 40 44	54 42 03	Mt. Arter (U. S. F. S.)	3.509714	3,233.8	10,610
	109 01 02.80	254 18 43	74 20 19	Mt. Arter azimuth mark	3.523957	3,341.6	10,963

[1] No check on this position.

DESCRIPTIONS, ELEVATIONS, AND PLANE COORDINATES OF TRIANGULATION STATIONS

In all previous triangulation publications of this Bureau the elevations and plane coordinates of the triangulation stations have been listed in separate tables apart from the descriptions. In this publication, for the convenience of the engineer and others who use the information, the elevation and plane coordinates of a station are given with its description, where the data are readily available. Thus there appears in the description of each station all the information concerning the station except its geographic position, and this may be found in the list of geographic positions.

DESCRIPTIONS

The following descriptions of stations may be conveniently consulted by reference to the illustrations at the end of this publication or to the index. Azimuths given in the descriptions are geodetic azimuths, unless noted otherwise, and are reckoned continuously from true south around by west to 360°, south being 0°, west 90°, north 180°, and east 270°. Do not confuse these azimuths with plane-coordinate or "grid" azimuths. (See p. 69.) Where magnetic azimuths are given they are indicated as such. Wherever the name of a point is printed in *italics* in the body of the descriptions, its position may be found in the tables.

In general, except where the contrary is specifically stated, the surface and underground marks are not in contact, so that a disturbance of the surface mark will not necessarily affect the underground mark. The underground mark should be resorted to only where there is evidence that the surface mark has been disturbed.

The name and dates given in each description immediately after the county refer to the chief of party by whom the station was established, the date of the establishment of the station, and the date when the station was last recovered.

Any person who finds that one of the stations herein described has been disturbed or that the description no longer fits the facts is requested to send such information to the Director, Coast and Geodetic Survey, Washington, D. C.

MARKING OF STATIONS

The standard station and reference marks referred to in the following descriptions and notes consist of a disk and shank of bronze cast in one piece. The disk of the station mark (see fig. 3) is 90 millimeters in diameter, with a hole at the center surrounded by a 20-millimeter equilateral triangle, and has the following inscribed legend: "U. S. Coast and Geodetic Survey Triangulation Station. For information write to the Superintendent, Washington, D. C. $250 fine or imprisonment for disturbing this mark." On the marks made since March 1921 the word "Director" replaces the word "Superintendent" in the inscription. The shank is 25 millimeters in diameter and 80 millimeters long, with a slit at the lower end into which a wedge is inserted, so that when it is driven into a drill hole in the rock it will bulge at the bottom and hold the mark firmly in place. In recent years the slits in the stems of both station and reference disks have been enlarged so that the two prongs may be

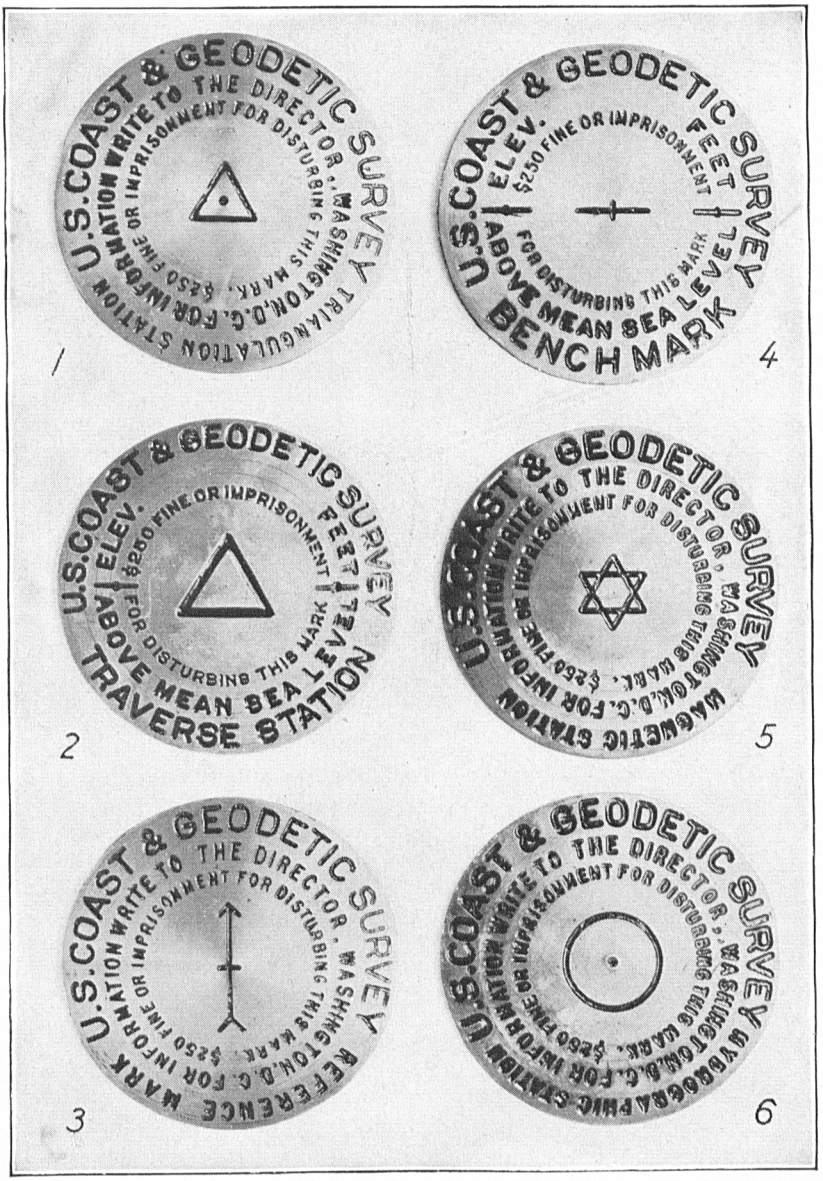

FIGURE 3.—STANDARD MARKS OF THE U. S. COAST AND GEODETIC SURVEY.

1. Triangulation station mark.
2. Traverse station mark.
3. Reference mark.
4. Bench mark.
5. Magnetic station mark.
6. Hydrographic station mark.

spread far apart and set in concrete without the use of a wedge. The marks used between about 1915 and 1920 have grooves cut around the shank instead of the slit.

The old type of station mark used in marking stations 20 or more years ago consists also of a disk and shank made of bronze and cast in one piece. The disk, which is somewhat smaller than the disk of the marks described above, has a polished center with an inscribed triangle. Around the polished part are the letters "U. S. C. & G. S." and a raised flange around the edge.

The standard disk reference mark shown in figure 3 is the same size and shape as the newer type of station mark, described above, but instead of a triangle it has an arrow at the center of the disk which, when the mark is properly set, points to the station. The legend is the same as for the station mark except that the words "reference mark" take the place of the words "triangulation station."

The standard disk azimuth mark, referred to on page 66, is not shown in figure 3. It is the same as the reference mark described above except that the words "azimuth mark" take the place of the words "reference mark" in the inscribed legend.

The standard notes on the marking of stations which are given below serve as a guide to the field observer in selecting the best type of mark for each particular station. They are also useful to the observer in writing his descriptions, as he need not describe the marking used at a station but simply give the numbers of the standard notes which describe the station, underground, reference, and witness marks. The notes were made as general as possible in order that it might not be necessary in the field to describe small and unimportant variations.

For the convenience of the reader a brief description of the marking is given in each of the following descriptions of stations. In addition, the number of the note describing the mark in detail is also given.

STANDARD NOTES ON THE MARKING OF STATIONS

Surface marks

Note 1.—A standard disk triangulation station mark set in the top of (*a*) a square block or post of concrete, (*b*) a concrete cylinder, (*c*) an irregular mass of concrete.

Note 2.—A standard disk triangulation station mark wedged in a drill hole in outcropping bedrock (*a*) and surrounded by a triangle chiseled in the rock, (*b*) and surrounded by a circle chiseled in the rock, (*c*) at the intersection of two lines chiseled in the rock.

Note 3.—A standard disk triangulation station mark set in concrete in a depression in outcropping bedrock.

Note 4.—A standard disk triangulation station mark wedged in a drill hole in a boulder.

Note 5.—A standard disk triangulation station mark set in concrete in a depression in a boulder.

Note 6.—A standard disk triangulation station mark set in concrete at the center of the top of a tile (*a*) which is embedded in the ground, (*b*) which is surrounded by a mass of concrete, (*c*) which is fastened by means of concrete to the upper end of a long wooden pile driven into the marsh, (*d*) which is set in a block of concrete and projects from 12 to 20 inches above the block.

Underground marks

Note 7.—A block of concrete 3 feet below the ground containing at the center of its upper surface (*a*) a standard disk triangulation station mark, (*b*) a copper bolt projecting slightly above the concrete, (*c*) an iron nail with the point pro-

jecting above the concrete, (*d*) a glass bottle with the neck projecting a little above the concrete, (*e*) an earthenware jug with the mouth projecting a little above the concrete.

Note 8.—In bedrock (*a*) a standard disk triangulation station mark wedged in a drill hole, (*b*) a standard disk triangulation station mark set in concrete in a depression, (*c*) a copper bolt set in cement in a drill hole or depression, (*d*) an iron spike set point up in cement in a drill hole or depression.

Note 9.—In a boulder 3 feet below the ground (*a*) a standard disk triangulation station mark wedged in a drill hole, (*b*) a standard disk triangulation station mark set in concrete in a depression, (*c*) a copper bolt set with cement in a drill hole or depression, (*d*) an iron spike set with cement in a drill hole or depression.

Note 10.—Embedded in earth 3 feet below the surface of the ground (*a*) a bottle in an upright position, (*b*) an earthenware jug in an upright position, (*c*) a brick in a horizontal position with a drill hole in its upper surface.

Reference marks[8]

Note 11.—A standard disk reference mark with the arrow pointing toward the station set at the center of the top of (*a*) a square block or post of concrete, (*b*) a concrete cylinder, (*c*) an irregular mass of concrete.

Note 12.—A standard disk reference mark with the arrow pointing toward the station (*a*) wedged in a drill hole in outcropping bedrock, (*b*) set in concrete in a depression in outcropping bedrock, (*c*) wedged in a drill hole in a boulder, (*d*) set in concrete in a depression in a boulder.

Note 13.—A standard disk reference mark with the arrow pointing toward the station, set in concrete at the center of the top of a tile (*a*) which is embedded in the ground, (*b*) which is surrounded by a mass of concrete, (*c*) which is fastened by means of concrete to the upper end of a long wooden pile driven into the marsh, (*d*) which is set in a block of concrete and projects from 12 to 20 inches above the block.

Witness marks

Note 14.—A conical mound of earth surrounded by a circular trench.

Note 15.—A tree marked with (*a*) a triangular blaze with a nail at the center and each apex of the triangle, (*b*) a square blaze with a nail at the center and each corner of the square, (*c*) a blaze with a standard disk reference mark set at its center into the tree.

ELEVATIONS

The elevations of some of the triangulation stations and bench marks included in this publication have been determined either by means of spirit levels or by means of vertical angle observations. Where the elevation of a station has been determined it is given at the end of the description of the station. The elevations are based on mean sea-level datum and are of varying accuracy.

Elevations determined by first- or second-order leveling are given to two decimal places in meters and one decimal place in feet, not because the absolute elevations are certain to this degree of refinement but because differences between adjacent marks are uncertain only in the last decimal place given.

In the cases where the elevations were determined by trigonometrical leveling, the elevations are given to one decimal place in meters and to the nearest whole foot since relatively inaccurate methods were used in the determination. An exception to the above is noted in the one-hundred-and-fourth meridian arc where elevations are given only to the nearest whole meter because the accuracy of the vertical angle observations in the arc did not warrant greater refinement.

[8] These notes also apply to methods of setting azimuth marks, for which standard reference disks suitably stamped were first used, but for which on later arcs disks were used on which an appropriate legend was cast. (See p. 65.)

Absolute elevations, determined by spirit levels, in Wyoming are probably correct to within 1 foot, while the elevations determined by trigonometrical methods may be in error by 2 meters or possibly more.

Unless otherwise specified, the point to which the elevation refers is the top of the surface mark.

EXPLANATION OF PLANE-COORDINATE SYSTEM

In order to meet the various demands imposed upon it by engineering and surveying operations (see p. 10), a plane-coordinate system must satisfy conditions which naturally accompany requirements for accurate computations and exact results. The preservation of angles is one important factor to be considered; another factor of utmost importance is the elimination of variations of scale. Since variations of scale are inevitable, it becomes necessary to select a projection which will give definite scale values in certain directions, so that scale values may be tabulated, and through their use, when utmost accuracy is desired, one can eliminate the distortions of scale which result from the projection of spheroidal coordinates onto a plane.

These various requirements pointed very definitely to the adoption of one of the conformal projections. After due consideration it was decided to employ the Lambert conformal projection with two standard parallels in States with greatest extent in an east-west direction and the transverse Mercator projection where the greatest extent was in a north-south direction. Such a rule, however, could be applied only in those States which were of such limited extent in one of these directions that the entire State could be included in a single zone. It therefore became necessary to divide the larger States into a number of zones, using the projection in each which would satisfy the requirements of accuracy indicated by the limiting scale error, and at the same time keep to a minimum the number of zones required.

For these reasons the transverse Mercator projection with four zones was adopted for Wyoming (see fig. 4). It will be noticed that the junction lines between zones follow the county boundary lines; so that all stations in any county will be included in the same zone. Since, however, some surveys will extend across these artificial boundaries, the coordinates of stations which lie within what may be termed the borderland of two contiguous zones are given on both zones. With these data the engineer will not have to go from one zone of coordinates to the other in extending a survey a short distance beyond a boundary. Care must always be taken, however, to use in direct combination only coordinates which are given on the same zone. Where it is necessary to go from one zone or system to another, suitable directions for so doing will be found in Special Publication No. 193.

The geodetic positions in this publication have been reduced to plane coordinates which are given at the end of the description of each station. These coordinates are based upon the transverse Mercator projection of Wyoming with four zones. The zone upon which a station has been computed is denoted in the description by the roman numeral directly preceding the plane coordinates in the second

paragraph of each description. Coordinate tables for the State have been prepared by this Bureau as a basis for computing the coordinates. The purpose in view in supplying these coordinates has been to provide for computations of surveys by the usual methods of plane surveying in which the convergence of the meridians is not considered. A State-wide application can now be made of principles ordinarily confined in common practice to very restricted areas.

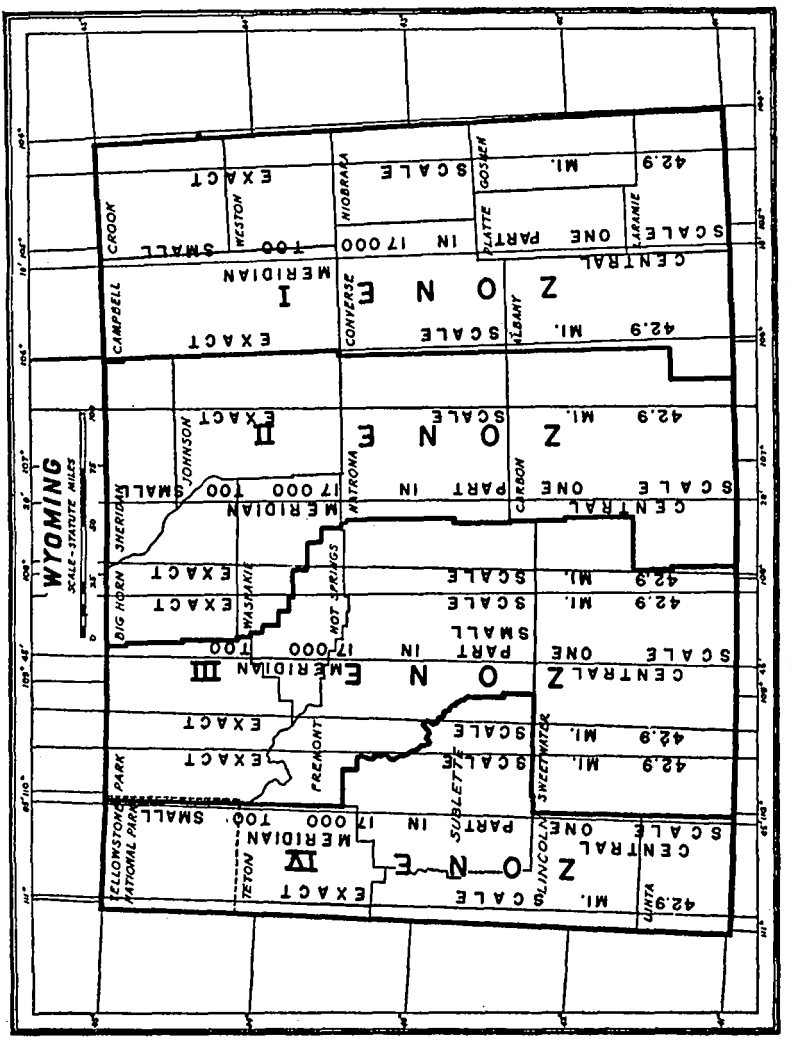

FIGURE 4.—Map of Wyoming with grid system outline.

The x and y coordinates are given in feet to two decimal places. This is one place farther than geodetic positions justify, but it was thought desirable to accept the positions as if they were correct to three decimal places, and carry two decimal places in the coordinates for use in adjusting traverses between fixed points.

The plane coordinates are in all essential features merely the plane representation of the spheroidal coordinates given in the tables of geodetic positions. For definite instructions regarding the use of plane coordinates, reference should be made to the following manuals of this Bureau: Special Publication No. 193, Manual of plane-coordinate computation, cost 35 cents; Special Publication No. 194, Manual of traverse computation on the Lambert grid, cost 20 cents; and Special Publication No. 195, Manual of traverse computation on the transverse Mercator grid, cost 25 cents. These manuals may be procured from the Superintendent of Documents, Washington, D. C. The State coordinate tables for the other States are available in lithographed form, but the tables for this State are contained in this publication. (See p. 196.)

A few stations, for which geodetic positions are given in this publication, lie so far outside the State that plane coordinates were not computed for them on the grid of this State. If it becomes necessary to use any of these as control for local surveys, their coordinates should be obtained from the Coast and Geodetic Survey on the grid of the State in which they lie. Computation of traverses tied to them would then have to be made by passing from one grid to the other. The method of accomplishing this is given in Special Publication No. 193. It is not thought that this necessity will arise very often, but when it does occur the method of handling it is not complicated and the necessary computations can easily be made.

Explanation of plane lengths

The length of line between any two stations can be computed from the differences of coordinates just as is done in ordinary plane surveying. The resulting length is affected by the distortion due to the reduction of the actual curved surface of the earth to a plane. It must be corrected for the scale of the grid at that point to reduce it to the sea-level length listed in the geographic-position tables. Should it be desired to obtain the actual ground-level length, a further correction must be applied, as described on page 16 for lines of triangulation.

Explanation of plane or grid azimuths

The plane or grid azimuths given in the descriptions of stations are based upon the central meridian of the proper zone, and they therefore differ from the geodetic azimuths which appear in the lists of geographic positions and in the descriptions. The back azimuth differs from the forward azimuth by exactly 180°, hence it is necessary to list the azimuth of each line in only one direction.

Many of the azimuths listed are to special azimuth marks located at comparatively short distances from the stations. These marks have been placed at such positions as to be visible from the ground at the stations, and thus are readily available as starting azimuths for local surveys such as traverses. Since 1927 it has been the custom to establish these azimuth marks at most of the first-order stations determined by this Bureau.

The plane azimuth from a triangulation station to an azimuth mark or other triangulation station may be computed in two ways: first, by means of the formula:[4]

$$\text{Geodetic azimuth} - \text{grid azimuth} = \Delta\alpha + \frac{(y_2 - y_1)\,(2x_1' + x_2')}{(6\rho_0^2 \sin 1'')_g}$$

In this formula, the sub-one coordinates are the coordinates of the origin of the line, and the sub-two coordinates are those of the azimuth mark or other triangulation station. The x''s are the x coordinates minus 500,000. The value of $\Delta\alpha$ is the convergence of the meridian through the origin of the line with reference to the central meridian (Y axis) of the projection; it is constant for a given triangulation station, and is computed at the same time as the coordinates for a station, and on the same form.[5]

The value of $\log \dfrac{1}{(6\rho_0^2 \sin 1'')_g}$ is given among the constants of the projection, page 201, for the zone in which the station is located. The second method of computing a plane azimuth is by means of the usual plane-surveying formula:

$$\text{Tangent grid azimuth} = \frac{\Delta x}{\Delta y}$$

in which Δx and Δy are the respective differences of the x and y coordinates of two stations.

Since the second term of the first formula is negligible for distances up to approximately one mile, the grid azimuth may be derived by applying the $\Delta\alpha$ term directly to the geodetic azimuth. For azimuths over short distances, more consistent results will be obtained in this way than can be had through using the second (or tangent) formula. This is due to the fact that there are not enough significant figures in the differences of the x and y coordinates to make the second formula sufficiently exact.

Inconsistencies between the plane azimuths as computed from the two formulas may also arise when the coordinates of the azimuth mark are derived from a "no check" (see p. 15) geodetic position. This results from discarding the third decimal place of the seconds of latitude and longitude, and thus using only hundredths of seconds for computing the plane-coordinate position.

Since these inconsistencies diminish as the distance between the station and azimuth mark increases, the second formula has been used to compute the plane azimuths of such lines as are of sufficient length to make the difference negligible. In other words, when the distance between the station and the azimuth mark is such that both formulas give practically the same result, and when the coordinates of both station and azimuth mark are known, the second (or tangent) formula is used.

The first formula (neglecting the second term) has been used in computing the plane azimuths to all azimuth marks whose coordinates were not known; this includes practically all special azimuth marks, the distances to such marks being nearly always less than one mile, and very rarely known with sufficient accuracy to permit

[4] See Special Publication No. 193, Manual of plane-coordinate computation, page 13.
[5] Idem, page 28.

the computation of the position of the mark. The first formula was also used for computing the plane azimuths to stations whose plane coordinates were derived from "no check" geodetic positions, and to other azimuth marks whose coordinates were known, but for which consistent results were not obtained through the use of the second formula. In the descriptions of stations, the plane azimuths computed by means of the first formula are marked by footnotes. The plane azimuths computed by the second formula are carried out to tenths of seconds, distinguishing them from the ones computed by the first formula which are carried to even seconds only.

A table of values of $\Delta\alpha$ may be found on page 202. The latitude of a station and its distance from the central meridian ($\Delta\lambda$) are the arguments for obtaining $\Delta\alpha$ from this table. Straight-line interpolation in the table will give $\Delta\alpha$ within a tenth of a second of the value computed by means of the rigid formula.[6]

All of the $\Delta\alpha$'s for plane azimuths listed in the following descriptions were computed by formula instead of by use of the table. For most practical purposes the value derived by interpolation in the table will be sufficiently exact, that is, within a tenth of a second and will furnish an excellent check on the value computed by formula. For ease in interpolation horizontally, the tabular differences for each latitude listed is given in the two right-hand columns of the table. The tabular differences in the vertical direction are small enough so that no special aids are necessary for interpolating in that direction.

The following computation should serve as an example in the use of the table for computing $\Delta\alpha$. The position of station Divide (p. 43) is: latitude (ϕ) 41°51′57″.518; longitude (λ) 108°01′56″.720. The geodetic azimuth to the reference mark no. 1 is 294°11′45″. The grid azimuth is to be computed on the 2nd zone of the plane-coordinate system. In this zone the central meridian is 107°20′00″.000 (see p. 201). This value minus λ equals −41′56″.720, the value of $\Delta\lambda$ with which to enter the table as one argument. The other argument is the latitude ϕ. In the column headed 0°40′ opposite latitude 41°50′ is the value 26′40″.8. To this value add 1×40″.02 (minutes of $\Delta\lambda$ and value of $\Delta\alpha$ for 1′ of $\Delta\lambda$) and 56.720×0″.667 (seconds of $\Delta\lambda$ and value of $\Delta\alpha$ for 1″ of $\Delta\lambda$). The 40″.02 and 0″.667 appear in the last two columns of the table opposite latitude 41°50′. The result of these multiplications and addition is 27′58″.65, the value of $\Delta\alpha$ for latitude 41°50′ and $\Delta\lambda$, 41′56″.720. In the column headed 0°40′ opposite latitude 42°00′ is the value 26′45″.9. To this quantity add 1×40″.15 and 56.720×0″.669 giving 28′04″.00, the value of $\Delta\alpha$ for latitude 42°00′ and $\Delta\lambda$, 41′56″.720. Latitude 41°51′57″.518 is 1′57″.518 or 1′.959 from 41°50′, the lower limit. The 1′.959 is 0.1959 of the whole tabular difference of 10′. The difference between 27′58″.65 and 28′04″.00 is 5″.35. This multiplied by 0.1959 gives 1″.05 which added to 27′58″.65 gives 27′59″.70 as the final interpolated value of $\Delta\alpha$. This value is negative to agree with the sign of $\Delta\lambda$. The grid azimuth equals the geodetic azimuth minus $\Delta\alpha$, so in this particular case the grid azimuth to reference mark no. 1 is equal to −27′59″.7 subtracted from 294°11′45″ which gives 294°39′45″.

[6] See Special Publication No 195, p. 10.

EXPLANATION OF PLANE-COORDINATE PROJECTION TABLES

The State tables of plane coordinates (see p. 196) are intended primarily for use in the reduction of geodetic positions to grid coordinates, and they were computed with this end in view. However, they serve another purpose, as they are needed for use in the computation of surveys on the grid coordinate system. The zone projection constants are frequently needed in the solution of special problems, while the scale factors are necessary if computations are to produce exact results through the elimination of variations in scale.

There are several ways in which the table of scale variations can be used on the transverse Mercator grid. The scale varies with the distance from the central meridian and the factors are tabulated for every 5,000 feet from this meridian. The factor is the same at a given distance out from the central meridian, whether in an east or a west direction. This distance is given by the x' value, which is the x coordinate minus the added constant (500,000 in this State).

The first method would be to make a preliminary computation of these x' values for the various stations of the survey and then obtain the mean value of the x' for each line. An interpolation in the table of scale factors using the x' of each line as an argument would give a scale factor for each of the lines of the survey. This is probably the most accurate method of computing the scale factors.

A second method would be to make an approximate plotting of the traverse on a Geological Survey quadrangle map by means of angles and distances and from this map scale off approximate distances of the traverse stations from the central meridian. If the traverse runs from one control station to another, the x''s of these two stations being known, two lines could be drawn through them with known x' values. By scaling out from one or the other of these lines approximate x' values for all of the traverse stations could be determined. These could then be used just as the computed x' values were used in the first method.

A third method that is probably accurate enough for most traverses consists in computing a mean scale factor for the whole traverse. If a general mean x' for an entire traverse is determined, the scale factor corresponding to this value can be adopted and applied to all the lines of the traverse. The x''s of the control points will be known and from these an acceptable mean x' for the whole traverse can be determined and from it the mean scale factor.

The scale factors are given in two forms in the table on page 200: First, as a correction to the logarithm of the length; and second as a factor for multiplying the length. The signs of the logarithmic corrections are adopted for algebraic addition to the logarithms of the measured lengths reduced to sea level. They are expressed in units of the seventh place of logarithms with tenths for the eighth place. The ratio form is used as a factor for multiplying the measured lengths to obtain the grid lengths. If the grid length is given, the process must be reversed to get the geodetic or sea-level length; that is, the logarithmic correction must be subtracted algebraically and the length must be divided by the factor. This gives

the geodetic or sea-level length. To get the ground-level length a correction for elevation must also be applied. (See p. 16.) Before applying the grid correction to the measured lengths, they should be reduced to sea level by applying a correction for elevation. Reference should be made to Special Publication No. 193, "Manual of plane coordinate computation" and to Special Publication No. 195, "Manual of traverse computation on the transverse Mercator grid." These publications give a full account of the use of the State tables and of the use of the coordinates in computations.

ONE-HUNDRED-AND-FOURTH MERIDIAN ARC

Principal points

Horsetooth (U. S. G. S.) (Larimer County, Colo., C. V. Hodgson, 1912).—Identical with U. S. Geological Survey station of the same name. About 8 miles southeast of Fort Collins, on high bare rocky point of divide, immediately east of Redstone Creek, and 1¼ miles north of point where Fort Collins-Estes Park road crosses divide. Deep vertical clefts divide cliff into three nearly equal parts, which have appearance of gigantic teeth when viewed from eastward. Station is on highest and most southern of these three divisions. Marked by U. S. Geological Survey triangulation tablet in solid rock. Reference mark is standard reference disk in solid rock, 4.74 meters (15.6 feet) from station in azimuth 171°25′. Elevation: 2,211 meters (7,254 feet).

Dewey (U. S. G. S.) (Weld County, Colo., C. V. Hodgson, 1912).—Identical with U. S. Geological Survey station of the same name. About 8 miles east and 1 mile south of Eaton on Union Pacific Railroad, 1½ miles east and 1 mile south of Galeton, on round-topped knoll in open prairie, near center of north side of sec. 9, T. 6 N., R. 64 W. Marked by U. S. Geological Survey iron pipe bench mark projecting about 20 inches above ground. Reference mark is standard reference disk in concrete, note 11b, 136.190 meters (446.82 feet) from station in azimuth 309°56′08″. Elevation: 1,498 meters (4,915 feet).

Twin (Laramie County, C. V. Hodgson, 1912).—On highest point of more eastern of two peaks known as Twin Mountain, about 20 miles a little west of south of Cheyenne, and 7 miles by road southwest of Granite Canon (station on Union Pacific Railroad). Mark is standard station disk in rock. Reference mark is standard reference disk in rock 3.494 meters (11.46 feet) from station in azimuth 159°59′. Station *East Twin* (*U. S. G. S.*) marked by bronze tablet, is 2.764 meters (9.07 feet) from station in azimuth 96°09′. Elevation: 2,483 meters (8,146 feet).

Plane coordinates: (I), x=472,216.16 feet: y=139,028.79 feet.

Warren (Laramie County, C. V. Hodgson, 1912).—About 10½ miles S. 17° W. from Cheyenne, at extreme western end of high ridge about 2 miles N. 57° E. from the old Terry ranch (now headquarters of the Warren Live Stock Co.), and ½ mile northeast of the section house at Gleason (a station on the Union Pacific Railroad). Surface mark is standard station disk in concrete-filled, galvanized-iron pipe 7 inches in diameter. Underground mark is ¼-inch brass bolt in concrete block. Reference mark is standard reference disk in concrete-filled, galvanized-iron pipe 5½ inches in diameter, 10.728 meters (35.20 feet) from station in azimuth 127°54′. Elevation: 1,971 meters (6,467 feet).

Plane coordinates: (I), x=582,172.59 feet; y=128,799.92 feet.

Wadill (Laramie County, C. V. Hodgson, 1912).—Thirteen miles by road northwest of Cheyenne, 2 miles west of Cheyenne-Chugwater road, and 1¼ miles west of the Cheyenne-Whitaker ranch road and telephone line, on ridge in open prairie at highest point of divide between Lodge Pole Creek and Crow Creek, and about 300 meters (984 feet) S. 31° W. from the center of sec. 24, T. 15 N., R. 68 W., on homestead land belonging to James Wadill, who lives about ⅜ mile south of station. Surface mark is standard station disk in concrete-filled, galvanized-iron pipe 7 inches in diameter. Underground mark is ¼-inch brass bolt in concrete block. Reference mark is standard reference disk in concrete-filled, galvanized-iron pipe 5½ inches in diameter, on quarter section line, 88.778 meters (291.27 feet) from station in azimuth 274°38′. Following azimuths are

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from station: *Kipp's house, chimney*, 197°22′46″; *Ritzke's windmill*, 248°59′48″; Mr. Hollingwood's house, west gable, 145°54′15″. Elevation: 2,007 meters (6,585 feet).

Plane coordinates: (I), x=558,159.07 feet; y=213,828.03 feet; grid azimuth to *Ritzke's windmill*=248°51′26″.[7]

Russell (Albany County, C. V. Hodgson, 1912).—Near eastern edge of Fort D. A. Russell target and maneuver reserve, on south side of bare rocky peak about 3½ miles east of Pole Mountain (peak is highest in immediate vicinity and has rocky, partially-wooded ridge leading off toward west), slightly below high boulder to north, with Greentop Mountain showing through small notch in summit. Marked by standard station disk in bedrock. Reference mark is standard reference disk in bedrock, 10.27 meters (33.7 feet) from station in azimuth 168°41′. Elevation: 2,508 meters (8,228 feet).

Plane coordinates: (I), x=458,402.58 feet; y=207,675.90 feet.

Greentop (Albany County, C. V. Hodgson, 1912).—On timbered and rocky summit of Greentop Mountain, 8 miles west and 4 miles south of station Horse Creek on Colorado and Southern Railway, and about ⅛ mile south of south fork of Horse Creek. Marked by standard station disk in bedrock. Reference mark is standard reference disk in bedrock, and 3.13 meters (10.3 feet) from station in azimuth 59°04′. Cairn is 6 meters (20 feet) from station in azimuth 90°. Elevation: 2,472 meters (8,110 feet).

Plane coordinates: (I), x=455,075.97 feet; y=249,077.39 feet.

Whitaker (Laramie County, C. V. Hodgson, 1912; 1933).—About 18 miles north and 8½ miles west of Cheyenne, 3 miles south and ¾-mile east of D. R. Whitaker ranch buildings on Horse Creek, on rolling prairie land at highest point of divide between Pole Creek and Horse Creek, about ¾-mile northeast of Cheyenne-Whitaker ranch road at point where road passes quarter-section corner and bench mark referred to below, and 8 meters (26 feet) from rock cairn, on line with Ragged Top Mountain. To reach from Cheyenne, follow U. S. Highway 87 north 15 miles to graded road leading west at left curve in highway. Follow graded road west 4.0 miles, and continue 4.0 miles on trail which bears to northwest, take right-hand fork, go northwest 3.1 miles to ranch house and corrals on right-hand side of road. Station is on summit of high ground, 0.8 mile east from ranch, on swell on north edge of table and overlooking Horse Creek (reached by old wagon trail along ridge), near edge of breaks, 20 yards south of old wagon trail, and near scattered group of rocks which once formed cairn near station and are only rocks in vicinity. Surface mark is standard station disk in concrete-filled, galvanized-iron pipe 7 inches in diameter, surrounded by mass of concrete. Underground mark is ¼-inch brass bolt in concrete block. Original reference mark, standard reference disk in concrete-filled, galvanized-iron pipe 5½ inches in diameter, was 91.038 meters (298.68 feet) from station in azimuth 270°57′. This mark was reported lost in 1933 and two new reference marks were set, standard reference disks in concrete, note 11a. Reference mark no. 1 is 85.65 feet from station in azimuth 176°49′. Reference mark no. 3 is 35.50 feet from station in azimuth 91°47′. *T. 17 N., R. 68 W., sec. 33, southwest corner, stone post* is 800.12 meters (2,625.1 feet) from station in azimuth 45°37′19″. *B. M. Denver 6702* (*U. S. G. S.*) iron pipe, is 1,110.82 meters (3,644.4 feet) from station in azimuth 59°55′29″. Azimuth to center of *Ritzke's windmill* wheel, is 345°12′44″. Elevation: 2,042.0 meters (6,699 feet).

Plane coordinates: (I), x=547,331.56 feet; y=266,811.44 feet; grid azimuth to *T. 17 N., R. 68 W., sec. 33, southwest corner, stone post*=45°30′28″.[7]

Ragged (U. S. G. S.) (Albany County, C. V. Hodgson, 1912; 1933).—Northeast of Laramie, in the Laramie Mountains, about 10 miles west of Horse Creek, post office on Colorado and Southern Railway, 8 miles west of McLaughlin's ranch, and ½ mile south of North Fork of Horse Creek, on highest rock of group of pinnacles known as Ragged Top Mountain. Rock referred to is middle one of 3 prominent peaks on most western ridge, and is about 300 meters (984 feet) west of old woods road in canyon opening to south. To reach from Laramie, go north on Ninth Street and main graded road 6.6 miles, take right fork (main road) up narrow canyon, turn east, and continue 7.4 miles to old road leading to left, follow old road north 0.5 mile, keeping to right fork east down edge of meadow. Follow main trail east 3.0 miles to point south of

[7] This azimuth has been computed by the first formula (p. 70), using both terms.

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Ragged Top Mountain which is conspicuous because of its bare rock pinnacles. Turn north on trail just east of gate and follow old dim trail north 0.7 mile through rocks and up valley. Truck can be driven to this point. Station reached by packing north on trail through quaking aspen thicket, about 0.4 mile to base of main peak. Peak proper is best ascended from north side. About 15-minute climb from base to top. Marked by U. S. Geological Survey bench mark tablet set in solid rock. Tablet has triangle cut in top and is stamped "Elevation above sea level 8,230 feet." Reference mark is standard reference disk in solid rock, 3.12 meters (10.2 feet) from station in azimuth 185°03′. Elevation: 2,509 meters (8,232 feet).

Plane coordinates: (I), x=451,307.75 feet; y=281,434.58 feet.

Cheyenne west base (Laramie County, C. V. Hodgson, 1913).—About 17 miles by road northwest of Cheyenne, and ½ mile south of house of William Pellis, on highest part of east and west ridge, and about 15 meters (49 feet) south of the quarter corner between sections 5 and 6, T. 15 N., R. 68 W. Surface mark is standard station disk in concrete cylinder 16 inches in diameter and 24 inches long, top flush with the ground. Underground mark is standard station disk in cylinder of concrete 10 inches in diameter and 10 inches long, 30 inches below surface of ground and 6 inches below bottom of surface mark. Reference mark is standard reference disk in cylinder of concrete 12 inches in diameter and 24 inches long, on section line, 18.80 meters (61.7 feet) from station in azimuth 7°28′. Elevation: 2,074 meters (6,804 feet).

Plane coordinates: (I), x=535,335.26 feet; y=230,365.64 feet.

Cheyenne east base (Laramie County, C. V. Hodgson, 1913).—About 14 miles by road northwest of Cheyenne, on highest point of ridge extending east and west, and about 25 meters (82 feet) south of quarter corner on line between secs. 11 and 12, T. 15 N., R. 68 W. Section 11 is owned by Clarence Sorenson, who lives ⅝ mile north of station. Surface mark is standard station disk in cylinder of concrete 16 inches in diameter and 24 inches long, top flush with surface of ground. Underground mark is 20-penny nail in cylinder of concrete 10 inches in diameter and 10 inches long, about 30 inches below surface of ground. Reference mark is standard reference disk in cylinder of concrete 12 inches in diameter and 24 inches long, 16.47 meters (54.0 feet) from station in azimuth 180°51′. Elevation: 2,011 meters (6,598 feet).

Plane coordinates: (I), x=556,072.99 feet; y=223,586.29 feet.

Chugwater (Platte County, C. V. Hodgson, 1912; 1933).—About 9 miles west of Chugwater, and 18 miles S. 12° W. of Wheatland, towns on Colorado and Southern Railway, about 5 miles east of the Hugh Ferguson ranch, 2 miles west of Reshaw Creek, and ½ mile north of Maxwell, on extreme northeastern round-topped hill of Reshaw Range (summit about 300 feet in diameter), covered with large ragged boulders and almost surrounded by small cliff 4 to 10 feet high. To reach from Conoco Service Station at intersection in Chugwater of U. S. Highway 87 and gravel road leading east to railroad station, go west 2 blocks, to left one block, to right one block, then to left 0.3 mile, then take right fork, and go west 7.4 miles on Diamond Ranch road, then to left 0.2 mile and to right 1.6 miles. Follow main-traveled road 0.8 mile through cattle guard and across Diamond Ranch, and leave main-traveled road and follow right fork 1.2 miles to place where road comes in from left. Continue 1.1 miles to the Hill Ranch, enter farmyard and follow road past front of house and up creek 0.4 mile, take left fork (main road) and go 0.1 mile to gate, go through gate, and turn left along fence 0.8 mile to two small buildings. Leave main-traveled road here, turn right onto dim trail, and follow it in northwesterly direction about 1 mile to sheep corral. From here station is on hill to east about ½ hour's pack with load. Marked by standard station disk in solid rock. Old reference mark is horizontal drill hole 0.56 meter (1.8 feet) above ground in west face of largest boulder on peak, and 1.78 meters (5.8 feet) from station in azimuth 259°36′. Reference mark established in 1933 is standard reference disk in boulder, 111.54 feet from station in azimuth 188°03′. Chimney of large stone house on Rainsford's "Hill Ranch" on Maxwell Creek is 1 mile from station in azimuth 359°19′43″. Elevation: 2,034 meters (6,673 feet).

Plane coordinates: (I), x=537,277.75 feet; y=413,529.92 feet; grid azimuth to chimney of large stone house on Rainsford's "Hill Ranch" on Maxwell Creek= 359°14′15″.[8]

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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Notch (Albany County, C. V. Hodgson, 1912; 1933).—About 21 miles west of Wheatland, 2 miles southwest of Wheatland-Owen wagon road, near center of highest part of Collins Peak, which is also called Notch Peak because of deep notch in top as seen from east. To reach from Wheatland go north 2½ miles on U. S. Highway 87, thence west on graded road for 8.8 miles, here take left fork (Palmer Canyon road) and go west 15¼ miles to gate on south side of road at Paulson's mail box. Follow trail south 0.8 mile to fork, take left fork and go 0.8 mile to fork near ranch house, keep left fork 0.2 mile, then another left fork and follow valley 0.5 mile to west base of mountain. Station best reached by packing up west face, thence through notch and to right up east side of rock to summit. Another route is to follow around south base of rock peak and up east side to station. Marked by standard station disk in solid rock. Reference mark is standard reference disk in large boulder, 3.088 meters (10.13 feet) from station in azimuth 240°23′. Azimuth from station to *Wheatland, standpipe* is 268°35′48″. Elevation: 2,416 meters (7,926 feet).

Plane coordinates: (I), x=455,749.77 feet; y=500,119.70 feet; grid azimuth to *Wheatland, standpipe*=268°42′20″.3.

Coleman (Platte County, C. V. Hodgson, 1912; 1933).—About 24 miles north-northwest of Wheatland, 14 miles northwest of Hartville Junction, 10 miles west-southwest of Cassa, 7½ miles west of north from M. F. Coleman's ranch, which is on Wheatland-Douglas wagon road where it crosses Cottonwood Creek, 1½ miles north of old Wheatland-Douglas wagon road (now abandoned as a public route), just west of large table-topped ridge nearly devoid of trees, and on top of and near western slope of round-topped knoll on which are 3 trees, two near top and one near bottom. In 1933 several small pines were also on slope. To reach from Wheatland go north 22½ miles on U. S. Highway 87 to point opposite chalk bluff on east. Turn west on ungraded trail and follow main trail west along ridge south of Little Bear Creek 4¼ miles, thence north across pasture 1¼ miles to station site. Truck can be driven to within 50 yards of station. Marked by standard station disk stamped "Coleman 1912", in bedrock. Reference mark is standard reference disk stamped "Coleman 1912" in top of large rounded boulder at top of western slope of knoll, 0.26 meter (0.9 foot) below and 20.887 meters (68.53 feet) from station in azimuth 122°36′. Cairn about 6 feet in diameter at bottom and about 4 feet high is 11.8 meters (39 feet) from station in azimuth 107°48′. Triangular blaze on nearest pine tree is 13 meters (43 feet) from station in azimuth 62°02′. Azimuth from station to Orin water tank is 161°03′09″; and to *Wheatland, standpipe* is 339°19′29″. Elevation: 1,693 meters (5,554 feet).

Plane coordinates: (I), x=512,459.85 feet; y=619,728.30 feet; grid azimuth to *Wheatland, standpipe*=339°17′37.″8.

Haystack (Goshen County, C. V. Hodgson, 1912).—About 7½ miles northeast of Guernsey, 1½ miles N. 79° E. (magnetic) from Chicago Iron Mines, 1½ miles east of Guernsey-Lusk wagon road, near highest point at western end of middle one of three peaks of Haystack Hills, and about ¼ mile south of slightly lower ridge, known locally as Haystack Hill, which has abrupt descent at northwest end and natural cairn at southeast end. Marked by standard station disk in solid rock. Reference mark is standard reference disk in top of large boulder, 3.293 meters (10.80 feet) from station in azimuth 121°52′. Triangular blaze on pine tree is 19 meters (62 feet) from station in azimuth 122°15′. Elevation: 1,725 meters (5,659 feet).

Plane coordinates: (I), x=643,800.30 feet; y=610,661.92 feet.

Willow (Niobrara County, C. V. Hodgson, 1912).—About 5 miles north of Willow post office, and 7 miles S. 21° W. from Manville, on most northern and western high hill in vicinity. Hill is bare-topped ridge about 350 meters (1,148 feet) in length north and south, with rim of rock along east side and gentle slopes to west. Station is near south end of highest part of ridge, about 190 meters (623 feet) from north end of hill. Marked by standard station disk in bedrock. Reference mark is standard reference disk in bedrock, 11.218 meters (36.80 feet) from station in azimuth 286°42′. Elevation: 1,855 meters (6,086 feet).

Plane coordinates: (I), x=635,162.74 feet; y=736,279.17 feet.

Hobbs (Goshen County, C. V. Hodgson, 1912).—About 15 miles direct and 20 miles by road S. 30° W. from Lusk, 6½ miles N. 55° W. from Rawhide Ranch, 4 miles south of Hobbs Ranch, on most easterly of group of hills, on only

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wooded hill in vicinity, at intersection of three lines cut through timber to other triangulation stations. Marked by standard station disk in solid rock. Reference mark is standard reference disk in solid rock, 19.172 meters (62.90 feet) from station in azimuth 111°12′. Elevation: 1,858 meters (6,096 feet).

Plane coordinates: (I), x=656,606.90 feet; y=697,923.65 feet.

Rawhide (Goshen County, C. V. Hodgson, 1912).—About 12 miles south of Lusk, 2½ miles north of Rawhide Ranch, and 2 miles east of Guernsey-Lusk wagon road, on highest point of Rawhide Butte, on crest of narrow rocky ridge extending north and south. Marked by standard station disk in solid rock. Reference mark is standard reference disk in solid rock, 2.810 meters (9.22 feet) from station in azimuth 302°13′. Elevation: 1,847 meters (6,060 feet).

Plane coordinates: (I), x=681,693.44 feet; y=700,283.87 feet.

Manville (Niobrara County, C. V. Hodgson, 1912).—About 4¾ miles direct and 6 miles by road N. 20° E. from town of Manville, on small round-topped knob, about 8 meters (26 feet) in diameter, which marks highest point of ridge in vicinity. Surface mark is standard station disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground. Underground mark is brass bolt in concrete block. Reference mark is standard reference disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground, on an adjacent conical mound 274.38 meters (900.2 feet) from station in azimuth 83°13′33″. Elevation: 1,716 meters (5,630 feet).

Plane coordinates: (I), x=657,622.08 feet; y=795,885.95 feet; grid azimuth to reference mark =82°49′34″.[8]

Kirtley (Niobrara County, C. V. Hodgson, 1912; 1913).—About 3⅛ miles north and 1⅛ miles east of Kirtley post office, on highest knob in SE ¼ sec. 5, T. 33 N., R. 60 W., ¼ mile south of some conspicuous high chalky bluffs, and 375 meters (1,230 feet) N. 43° E. from southwest corner of above section. Surface mark is standard station disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground. Underground mark is brass bolt in concrete block. Reference mark is standard reference disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground, 125.713 meters (412.44 feet) from station in azimuth 158°50′32″. Elevation: 1,578 meters (5,177 feet).

Plane coordinates: (I), x=785,898.27 feet; y=801,837.31 feet; grid azimuth to reference mark =158°07′01″.[8]

Alkali (Weston County, C. V. Hodgson, 1912; 1913).—On Alkali Butte (best known butte within 30 miles), at head of Muskrat, Robbers Roost, and Alkali Creeks, about 22 miles west of south from Newcastle, and 29 meters (95 feet) from south end of butte. Station is marked by standard station disk in solid rock. Reference mark is 1-inch drill hole in solid rock 0.92 meter (3.0 feet) below station, and 17.180 meters (56.36 feet) from station in azimuth 177°48′. Station *Alkali* (*U. S. G. S.*), marked by 1-inch copper bolt in bedrock, is 0.17 meter (0.6 foot) below station, and 28.640 meters (93.96 feet) from station in azimuth 20°14′. Elevation: 1,369 meters (4,491 feet).

Plane coordinates: (I), x=680,046.20 feet; y=1,083,046.10 feet.

Parker (Fall River County, S. Dak., C. V. Hodgson, 1912).—About 2¾ miles south of Minnekahta, about ¾ mile northeast of Arnold's ranch house, on highest point and about 55 yards from north end of Parker's (or Arnold's) Peak, top of which is about 160 yards long north and south, and about 44 yards wide. Surface mark is standard station disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground. Underground mark is brass bolt in concrete block. Reference mark no. 1 is standard reference disk in solid rock, 0.34 meter (1.1 feet) above station, and 25.471 meters (83.57 feet) from station in azimuth 206°15′. Reference mark no. 2 is 1-inch drill hole in solid rock, 1.42 meters (4.7 feet) below station, and 11.450 meters (37.57 feet) from station in azimuth 124°48′. Elevation: 1,475 meters (4,839 feet).

Plane coordinates: (I), x=892,283.39 feet; y=999,062.08 feet.

Cottonwood (Niobrara County, C. V. Hodgson, 1912).—About 14½ miles S. 76° W., direct, and 18 miles by road from Edgemont, S. Dak., 2 miles north of east of Valentine Phester ranch, and 2½ miles west of South Dakota-Wyoming boundary line, on highest part of the bald Cottonwood divide in that vicinity,

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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within a few feet of location of U. S. Geological Survey station Cottonwood, which could not be found. Surface mark is standard station disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground. Underground mark is brass bolt in concrete block. Reference mark is standard reference disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground, 41.228 meters (135.26 feet) from station in azimuth 347°21′. Elevation: 1,314 meters (4,311 feet).

Plane coordinates: (I), x=783,976.59 feet; y=944,540.81 feet.

Sullivan (Custer County, S. Dak., C. V. Hodgson, 1912).—About 4½ miles northwest of Dewey, and 3 miles by road northwest of Sullivan ranch, at south end of Elk Mountains, on highest point of sparsely timbered peak known locally as Sullivan Peak. Marked by standard station disk in solid rock. Reference mark is 1-inch drill hole in solid rock 0.72 meter (2.4 feet) below station, and 4.595 meters (15.08 feet) from station in azimuth 152°30′. Station *Sullivan* (*U. S. G. S.*), marked by copper bolt, is 0.4 meter (1.3 feet) above station, and 4.53 meters (14.9 feet) from station in azimuth 30°30′. Elevation: 1,514 meters (4,967 feet).

Plane coordinates: (I), x=808,538.59 feet; y=1,068,336.92 feet.

Provo east base (Fall River County, S. Dak., C. V. Hodgson, 1912).—About 4½ miles east of town of Provo, in SE ¼ sec. 3, T. 10 S., R. 3 E., 200 meters (656 feet) west of east section line, 155 meters (509 feet) north of south section line, 270 meters (886 feet) N. 55° W. of southeast corner of above section, on homestead of A. G. Riley, who lives in southwest corner of above quarter section. Surface mark is standard station disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground. Underground mark is brass bolt in concrete block. Reference mark is standard reference disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground, in fence line, 4.01 meters (13.2 feet) below station, and 151.348 meters (496.55 feet) from station in azimuth 358°13′37″. Elevation: 1,123.0 meters (3,684 feet).

Plane coordinates: (I), x=879,701.63 feet; y=927,764.63 feet; grid azimuth to reference mark=357°15′07″.[8]

Provo astronomic (Fall River County, S. Dak., C. V. Hodgson, 1912; 1913).—About 650 yards northeast of railroad station at Provo, on highest point of low hill in open prairie, near center of sec. 12, T. 10 S., R. 2 E. Surface mark is standard station disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground. Underground mark is brass bolt in concrete block. Reference mark is standard reference disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground, 0.16 meter (0.5 foot) below station, and 29.294 meters (96.11 feet) from station in azimuth 355°07′. Center of sec. 12, T. 10 S., R. 2 E., is 4.56 meters (15.0 feet) from station in azimuth 201°33′. Elevation: 1,148 meters (3,766 feet).

Plane coordinates: (I), x=856,935.82 feet; y=924,311.50 feet.

Provo west base (Fall River County, S. Dak., C. V. Hodgson, 1912).—About 4¼ miles west, and 1½ miles south of town of Provo, and about 65 yards southeast of southeast corner of log schoolhouse. Surface mark is standard disk station mark in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground. Underground mark is brass bolt in concrete block. Reference mark is standard reference disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground, ½ meter (1.6 feet) east of west section-line fence, 0.11 meter (.04 foot) below station, and 58.860 meters (193.11 feet) from station in azimuth 359°35′. Elevation: 1,177.2 meters (3,862 feet).

Plane coordinates: (I), x=833,460.25 feet; y=915,774.22 feet.

Elk (Custer County, S. Dak., C. V. Hodgson, 1912).—About 15 miles north of Dewey, and 15 miles southeast of Newcastle, ¼ mile east of State boundary, at extreme north end of Elk Mountains, and on timbered peak which has abrupt slopes to west and north. Marked by standard station disk in solid rock. Reference mark is standard reference disk in solid rock, 0.2 meter (0.7 foot) above station, and 4,497 meters (14.75 feet) from station in azimuth 333°20′. Station *Elk* (*U. S. G. S.*) marked by copper bolt, is 1.035 meters (3.40 feet) from station in azimuth 190°20′. Elevation: 1,728 meters (5,669 feet).

Plane coordinates: (I), x=795,332.05 feet; y=1,117,595.84 feet.

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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Cambria (Weston County, C. V. Hodgson, 1912; 1913).—About 7 miles north of town of Cambria, and 1½ miles west of Cambria-Horton wagon road, on flat-topped ridge extending east and west, locally known as Sweetwater Mountain, on highest part of ridge, a few meters from abrupt slope to north, and about 150 yards east of small cultivated field. Surface mark is standard station disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground. Underground mark is brass bolt in concrete block. Reference mark is standard reference disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground, 1.4 meters (5 feet) below station, and 27.67 meters (90.8 feet) from station in azimuth 52°38′. Elevation: 1,962 meters (6,437 feet).

Plane coordinates: (I), x=755,834.21 feet; y=1,232,759.17 feet.

Crow (Pennington County, S. Dak., C. V. Hodgson, 1912).—About ¾ mile east of road from Newcastle to Deadwood, 2½ miles south of where branch of that road turns down Castle Creek, in SE¼ sec. 10, T. 1 N., R. 1 E., on flat-topped ridge sloping gently in all directions and covered with growth of cottonwoods and small pines. Surface mark is standard disk station mark in concrete-filled galvanized-iron cylinder projecting about 3 inches above ground. Underground mark is brass bolt in concrete block. Reference mark is standard reference disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground, 1.26 meters (4.1 feet) below station, and 33.488 meters (109.87 feet) from station in azimuth 285°39′. Station *Crows Nest* (*U. S. G. S.*) marked by 1-inch copper bolt, is 2.016 meters (6.61 feet) from station in azimuth 77°56′. Elevation: 2,150 meters (7,054 feet).

Plane coordinates: (I), x=816,714.64 feet; y=1,237,136.84 feet.

Laird (Lawrence County, S. Dak., E. H. Pagenhart, 1912).—About 3 miles northwest of Laird water tank on McLaughlin tie and timber road, 2 miles west of Ham ranch (old McQuaig homestead), and about 2 miles east of State boundary line, on highest hill in vicinity. Hill has considerable area cleared of trees. To reach from Ham's ranch take road leading to railroad, and at place where road goes up steep incline onto divide between Spearfish and Grand canyons turn up draw to right and continue along faint road through trees for ½ mile, then turn north for ¼ mile up hill to station site. Surface mark is standard disk station mark in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground. Underground mark is brass bolt in solid rock 2 feet below surface. Reference mark is standard reference disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground, in clearing on west slope of hill, 14.62 meters (48.0 feet) from station in azimuth 73°35′. Elevation: 2,106 meters (6,909 feet).

Plane coordinates: (I), x=803,834.99 feet; y=1,293,220.12 feet.

Inyankara (Crook County, E. H. Pagenhart, 1912; 1925).—On top of Inyankara Mountain, about 14 miles south of Sundance and 2 miles west of ranch belonging to F. M. Clark in 1912, in slight depression, about 3 feet lower than highest point of peak. To reach from town of Sundance take road leading southeast to Livingston's ranch, go westward on ranch road past ranch house to top of ridge, thence south along ridge into canyon on northeast side of mountain. (Truck can be driven a short distance up this canyon to rude bridge across small stream.) Continue up canyon, thence up wooded slope, and finally up small ravine in rock cap of peak (keeping on north side) to station site. Marked by standard station disk in solid rock. Reference mark is standard reference disk in solid rock, about 1 foot higher than station, and 6.38 meters (20.9 feet) from station in azimuth 236°54′. Elevation: 1,942 meters (6,371 feet).

Plane coordinates: (I), x=714,200.99 feet; y=1,293,442.22 feet.

Terry (*Lawrence County, S. Dak., E. H. Pagenhart, 1912; 1928*).—About 1½ miles southwest of town of Terry, on top of Terry Peak, well-known peak of Black Hills, and on south end, about 3 feet below highest point, which is at north end. To reach from Lead, go to town of Terry, thence to town of Trojan, take road through town about ½ mile to clearing on north side of peak, go due south on cleared trail to top of ridge where summit is plainly visible about ¼ mile to east. Marked by standard station disk in solid rock. Reference mark is standard reference disk in solid rock on north end of peak at edge of pile of rocks marking highest point, and 17.51 meters (57.4 feet) from station in azimuth 156°28′. Following distances and azimuths are from station; rock at highest point of peak, 18.5 meters (61 feet), 158°30′; Terry

For notes in regard to marking of stations see p. 65.

Catholic Church, 1 mile, 246°34′00″; north gable of house on peak, 319°04′18″. In 1925 reference mark was not recovered, but stout flagpole was at north end of peak, 18.90 meters (62.0 feet) from station in azimuth 156°32′. Elevation: 2,155 meters (7,070 feet).

Plane coordinates: (I), x=848,450.92 feet; y=1,336,955.74 feet; grid azimuth to Terry, Catholic Church=245°38′10″.[8]

Sundance (Crook County, E. H. Pagenhart, 1912; 1928).—About 6 miles northwest of town of Sundance, on most westerly of Warren Peaks, the highest peaks of Bear Lodge Mountains. Peak is sharp, and station is about 3 meters (10 feet) from highest point, on which there is a cairn 8 feet high. To reach from town of Sundance take road leading north up steep canyon to saddle between two highest Warren Peaks. Road is badly washed in places, but truck can be driven to within about 110 yards of station site. Surface mark is standard station disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground. Underground mark is brass bolt in concrete block. Reference mark is standard reference disk in solid rock, on north slope of hill about 11 feet below station, and 23.01 meters (75.5 feet) (slope) from station in azimuth 149°38′. Cairn on peak is 3 meters (10 feet) from station in azimuth 119°. Elevation: 2,031 meters (6,663 feet).

Plane coordinates: (I), x=686,832.14 feet; y=1,390,101.58 feet.

Wymonkota (U S. G. S.) (Carter County, Mont., E. H. Pagenhart, 1912).—Two and one-half miles west-northwest of southeast corner of State, at edge of "breaks", just south of wagon road leading into Badlands, and on small conical-shaped hill, highest in vicinity. Marked by U. S. Geological Survey bronze tablet in large rock in ground. Reference mark is 1-inch hole in solid rock 4 meters (13 feet) from station in azimuth 260°31′. Following azimuth is from station: Haystack Butte, highest peak, 263°03′22″. Elevation: 1,095 meters (3,593 feet).

Plane coordinates: (I), x=779,598.95 feet; y=1,584,652.27 feet; grid azimuth to Haystack Butte, highest peak=262°17′28″.[7]

Castle (Butte County, S. Dak., E. H. Pagenhart, 1912; 1925).—About 28 miles east of Belle Fourche on west spur of Castle Rock Buttes, a well-known peak, about 4 yards west of highest part of butte. To reach from Sturgis or Newell, go north on State Highway 79, past Castle Rock post office ½ mile to first road west; go west 1 mile and north 1 mile to schoolhouse; follow fairly well-defined road northwestward past school, through gate, across pasture. Road leads around to westward of station. Bear northeast toward butte and station site. Truck can be driven into hollow on west side of butte about 220 yards from station site. Surface mark is standard station disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground. Underground mark is brass bolt in concrete block. Station Castle Rock (U. S. G. S.) is 3.92 meters (12.9 feet) in azimuth 291°10′ from station. Following distances and azimuths are from station: Haystack Butte, highest peak, 3.6 miles, 181°59′53″; East Deer Ear Butte, 13.4 miles, 272°46′53″; West Deer Ear Butte, 13.2 miles, 273°22′12″. In 1925 station Castle Rock (U. S. G. S.) was reported loose in its position. Elevation: 1,150 meters (3,773 feet).

Plane coordinates: (I), x=942,919.65 feet; y=1,587,599.00 feet; grid azimuth to Haystack Butte, highest peak=180°47′10″.[7]

Supplementary points

Dover B. M. eccentric (Weld County, Colo., C. V. Hodgson, 1912).—An unmarked point near the section house of the Union Pacific Railroad at Dover. *Dover B. M. E 3* (see description thereof) is 10.440 meters (34.25 feet) from station in azimuth 60°38′. Elevation: 1,648.0 meters (5,407 feet).

Plane coordinates: (I), x=598,301.50 feet; y=41,233.12 feet.

Dover B. M. E 3 (Weld County, Colo., C. V. Hodgson, 1912).—Station identical with first-order B. M. E 3. Mark was in southeast corner of the Union Pacific Railroad section house at Dover, and 25 meters (82 feet) west of center of track. Mark was granite post 6 inches square on top, and 4½ feet long, projecting 6 inches above ground; and inscribed on top with a square and letters

[7] This azimuth has been computed by the first formula (p. 70), using both terms.
[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

"U. S. B. M." *Dover B. M. eccentric* (see description thereof) is 10.440 meters (34.25 feet) from station in azimuth 240°38′. *Dover B. M. reference mark*, standard reference disk, note 11b, with arrow pointing towards the eccentric point, is on railroad right-of-way, on east side of the Denver-Cheyenne wagon road, and south of wagon road which crosses track, 16 meters (52 feet) west of center of track, 36 meters (118 feet) north of east gable of section house and 53.2 meters (175 feet) (computed) from station in azimuth 162°01′. It was reported in 1934 that this station could not be located. Elevation: 1,648.17 meters (5,407.4 feet).

Plane coordinates:[9] (I), x=598,271.72 feet; y=41,216.19 feet.

Dover B. M. reference mark (Weld County, Colo., C. V. Hodgson, 1912).—Elevation: 1,648 meters (5,407 feet).

Plane coordinates:[9] (I), x=598,217.13 feet; y=41,382.04 feet.

Terry (U. S. G. S.) (Laramie County, C. V. Hodgson, 1912).—Identical with the U. S. Geological Survey station of same name. About 10 miles S. 17° W. of Cheyenne, about 2 miles northeast of house on old Terry ranch (now headquarters of Warren Livestock Co.), on bare conical hill. Marked by U. S. Geological Survey iron, bench-mark post set 3 feet in ground. Reference mark is standard reference disk in concrete, note 11b, projecting 3 inches, and 10.87 meters (35.7 feet) from station in azimuth 202°55′. Elevation: 1,971 meters (6,467 feet).

Plane coordinates: (I), x=581,137.52 feet; y=130,994.93 feet.

Colorado-Wyoming boundary, milepost 44 (Weld County, Colo., and Laramie County, Wyo., C. V. Hodgson, 1912).—About 11 miles west by south of Cheyenne, on ranch of Warren Livestock Co., about ½ mile southeast of their ranch house. Monument is dressed, red-sandstone post standing about 4 feet above surface of ground and surrounded by mound of loose rock, and sides inscribed as follows: "44 M" on east, "Colorado" on south, "41 N. L. 1873" on west, and "Wyoming" on north. It is the only permanent boundary monument for several miles in either direction. A standard station disk was set in top of monument. Reference mark, standard reference disk in concrete, note 11b, is in fence line, near angle in fence 3.92 meters (12.9 feet) below station, and 110.184 meters (361.50 feet) therefrom in azimuth 75°17′36″. Elevation: 1,860 meters (6,102 feet).

Plane coordinates: (I), x=575,627.18 feet; y=120,926.03 feet; grid azimuth to reference mark=75°06′49″.[8]

East Twin (U. S. G. S.) (Laramie County, C. V. Hodgson, 1912).—A bronze tablet 2.764 meters (9.07 feet) from station *Twin* (see description thereof) in azimuth 96°09′. Elevation: 2,481 meters (8,140 feet).

Plane coordinates:[9] (I), x=472,207.11 feet; y=139,029.81 feet.

Otto, Union Pacific Railroad Co., water tank (Albany County, C. V. Hodgson, 1912).—Elevation of top of tank: 2,132 meters (6,995 feet).

Plane coordinates: (I), x=525,283.94 feet; y=154,572.78 feet.

Cheyenne, State Capitol, dome (Laramie County, C. V. Hodgson, 1912).—Elevation of top of small dome: 1,900 meters (6,234 feet).

Plane coordinates: (I), x=595,570.27 feet; y=172,731.04 feet.

Fort D. A. Russell, water tank (Laramie County, C. V. Hodgson, 1912).—Elevation of eaves: 1,908 meters (6,260 feet).

Plane coordinates: (I), x=581,622.01 feet; y=178,577.73 feet.

Ritzke's windmill (Laramie County, C. V. Hodgson, 1912).—Elevation of center of wheel: 2,002 meters (6,568 feet).

Plane coordinates: (I), x=561,125.86 feet; y=214,975.32 feet.

Tall new house, west gable (Laramie County, C. V. Hodgson, 1912).—Elevation of west gable: 2,084 meters (6,837 feet).

Plane coordinates: (I), x=533,984.11 feet; y=217,179.19 feet.

Kipp's house, chimney (Laramie County, C. V. Hodgson, 1912).—Elevation of top of chimney: 2,000 meters (6,562 feet).

Plane coordinates: (I), x=560,925.48 feet; y=222,742.88 feet.

Hollingswood's barn (Laramie County, C. V. Hodgson, 1912).—Elevation of west gable: 2,029 meters (6,657 feet).

Plane coordinates: (I), x=550,527.78 feet; y=225,042.10 feet.

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

T. 17 N., R. 68 W., sec. 33, southwest corner, stone post (Laramie County, C. V. Hodgson, 1912).—Elevation of top of stone: 2,035 meters (6,676 feet).

Plane coordinates:[9] (I), x=545,459.10 feet; y=264,971.87 feet.

B. M. Denver 6702 (U. S. G. S.) (Laramie County, C. V. Hodgson, 1912; 1933).—Station is 900 feet east of quarter corner on township line between sections 4 and 33, Tps. 16 and 17 N., R. 68 W., 2.5 feet northeast of wire gate post of wire gate in east-and-west fence. Marked by iron post stamped "6702 Denver." Elevation: 2,042.14 meters (6,699.9 feet).

Plane coordinates:[9] (I), x=544,181.64 feet; y=264,978.87 feet.

Wheatland, standpipe (Platte County, C. V. Hodgson, 1912).—At Wheatland, on ridge on open prairie about 1,100 meters (3,609 feet) S. 29° W. from railroad and telegraph office and 400 meters (1,312 feet) east of railroad. Station is center of conical top of tall red steel water tank. Elevation of top: 1,501 meters (4,925 feet).

Plane coordinates: (I), x=556,807.81 feet; y=502,403.08 feet.

Laramie Peak (Albany County, W. Mussetter, 1933).—About 30 miles northwest of Wheatland, in T. 27 N., R. 72 W., on highest rock of Laramie Peak, which is very prominent and well known in vicinity, and very difficult of access. Approach made via Palmer Canyon road to Garrett post office, then north 7 miles to Pragler's Ranch, then northeast 3.6 miles to south rim of Bear Creek Canyon (in sec. 28, T. 26 N., R. 72 W.). From here, station reached by packing across Bear Creek Canyon to Frank Lawrence's ranch. Then north over steep, rocky, brushy slopes and canyons to summit. Also reached from Cottonwood Creek valley, near Fletcher park. Top of peak is precipitous rock about 40 feet high and about 300 yards north of another peak slightly lower. Station is 5 feet northwest and 1 foot lower than extreme highest point. Station mark is standard disk station mark in drill hole in topmost, ridgelike boulder. Elevation: 3,131 meters (10,272 feet).

Plane coordinates: (I), x=425,475.25 feet; y=583,613.09 feet.

Jireh College, cupola (Converse County, C. V. Hodgson, 1912).—The cupola of Jireh College, which is east of the town of Keeline. Elevation of top of cupola: 1,656 meters (5,433 feet).

Plane coordinates:[9] (I), x=622,712.91 feet; y=768,485.00 feet.

Manville, Chicago and North Western Railway Co., water tank (Niobrara County, C. V. Hodgson, 1912).—Elevation of top of tank: 1,613 meters (5,292 feet).

Plane coordinates:[9] (I), x=648,223.70 feet; y=771,175.59 feet.

Manville, Congregational Church, steeple (Niobrara County, C. V. Hodgson, 1912).—Elevation of ground: 1,603 meters (5,259 feet).

Plane coordinates:[9] (I), x=648,204.84 feet; y=770,183.34 feet.

Nebraska-Wyoming boundary monument 123 eccentric (Niobrara County, Wyo., C. V. Hodgson, 1912).—About 3½ miles east and 2½ miles south of Kirtley, on open prairie land at center of east side of sec. 3, T. 32 N., R. 60 W., at northeast corner of farm of H. Z. Bayles, ½ mile north of his home, and 19.052 meters (62.51 feet) from *Nebraska-Wyoming boundary monument 123* (see description thereof) in azimuth 142°36′. Marked by nail in top of stake 3 inches square. Elevation: 1,559 meters (5,115 feet).

Plane coordinates: (I), x=799,070.31 feet; y=772,051.93 feet.

Nebraska-Wyoming boundary monument 123 (Niobrara County, Wyo., Sioux County, Nebr., C. V. Hodgson, 1912).—About 3½ miles east and 2½ miles south of Kirtley, on open prairie land at center of east side of sec. 3, T. 32 N., R. 60 W., at northeast corner of farm of H. Z. Bayles and one-half mile north of his home. Monument is granite post 10 inches square and 3½ feet high, sides inscribed as follows: "Neb." on east, "123 M" on south, and "Wyo" on west. *Nebraska-Wyoming boundary monument 123 eccentric*, (see description thereof) is 19.052 meters (62.51 feet) from monument in azimuth 142°36′.

Plane coordinates:[9] (I), x=799,108.93 feet; y=772,002.83 feet.

Bluff (Niobrara County, C. V. Hodgson, 1912).—About 30 miles west of Ardmore, 12 miles north-of-west of Hermann ranch, and 9 miles N. 78° W. from boundary monument common to northwest corner of Nebraska, southwest corner of South Dakota, and east line of Wyoming, on most northeasterly of high flat-topped buttes in vicinity, on northeast edge of highest knob along north bluff and 10 meters (33 feet) back from edge of bluff. Surface mark is stand-

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

ard station disk in concrete-filled, galvanized-iron pipe 7 inches in diameter. Underground mark is copper bolt in concrete. Reference mark is standard reference disk in concrete, 204.667 meters (671.48 feet) from station in azimuth 51°40′29″. Elevation: 1,459 meters (4,787 feet).

Plane coordinates: (I), x=756,110.60 feet; y=862,209.75 feet; grid azimuth to reference mark=51°01′16″.[8]

South Dakota-Nebraska boundary monument eccentric (Sioux County, Nebr., C. V. Hodgson, 1912).—About 2¾ miles east of point common to northwest corner of Nebraska, southwest corner of South Dakota, and east line of Wyoming, 1 mile northwest of Hermann ranch and ¾ mile northwest of Kirtley-Eckard wagon road in pasture about 500 meters (1,640 feet) east of Indian Creek. *South Dakota-Nebraska boundary monument* (see description thereof) is 2.572 meters (8.44 feet) from station in azimuth 185°57′.

Plane coordinates: (I), x=811,888.93 feet; y=852,988.47 feet.

South Dakota-Nebraska boundary monument (Fall River County, S. Dak., and Sioux County, Nebr., C. V. Hodgson, 1912).—About 2¾ miles east of point common to northwest corner of Nebraska, southwest corner of South Dakota, and east line of Wyoming, 1 mile northwest of Hermann ranch and ¾ mile northwest of Kirtley-Eckard wagon road, in pasture about 500 meters (1,640 feet) east of Indian Creek. Monument is granite post 10 inches square on top, projecting 2½ feet above ground, with sides inscribed as follows: "222½ M" on east, "N" on south, and "S. D." on north side. *South Dakota-Nebraska boundary monument eccentric* (see description thereof) is 2.572 meters (8.44 feet) from station in azimuth 5°57′. Elevation: 1,191 meters (3,907 feet).

Plane coordinates:[9] (I), x=811,889.70 feet; y=852,996.90 feet.

South Dakota-Wyoming boundary monument (Niobrara County, Wyo., Fall River County, S. Dak., C. V. Hodgson, 1912).—About 4½ miles north and 2½ miles west of Hermann ranch, and 4 miles north of point common to northwest corner of Nebraska, southwest corner of South Dakota, and east line of Wyoming. Monument is granite post 10 inches square, projecting 2½ feet above ground, with sides inscribed as follows: "1904" on north, "S. D." on east, "4 M" on south, and "Wy." on west. Elevation: 1,252 meters (4,108 feet).

Plane coordinates: (I), x=797,690.74 feet; y=873,505.96 feet.

Sullivan (U. S. G. S.) (Custer County, S. Dak., C. V. Hodgson, 1912).—A copper bolt, established by the U. S. Geological Survey in 1898, 4.53 meters (14.9 feet) from station *Sullivan* (see description thereof) in azimuth 30°30′. Elevation: 1,514 meters (4,967 feet).

Plane coordinates:[9] (I), x=808,531.27 feet; y=1,068,324.06 feet.

Alkali (U. S. G. S.) (Weston County, C. V. Hodgson, 1912).—A 1-inch copper bolt, established by the U. S. Geological Survey in 1898, in bedrock 28.640 meters (93.96 feet) in azimuth 20°14′ from station *Alkali* (see description thereof). Elevation: 1,369 meters (4,491 feet).

Plane coordinates:[9] (I), x=680,014.42 feet; y=1,082,957.64 feet.

Elk (U. S. G. S.) (Custer County, S. Dak., C. V. Hodgson, 1912).—A copper bolt, established by the U. S. Geological Survey in 1898, 1.035 meters (3.40 feet) from station *Elk* (see description thereof), in azimuth 190°20′. Elevation: 1,728 meters (5,669 feet).

Plane coordinates:[9] (I), x=795,332.59 feet; y=1,117,599.19 feet.

Crows Nest (U. S. G. S.) (Pennington County, S. Dak., C. V. Hodgson, 1912).—A copper bolt, established by the U. S. Geological Survey in 1897, 2.016 meters (6.61 feet) from station *Crow* (see description thereof), in azimuth 77°56′. Elevation: 2,150 meters (7,054 feet).

Plane coordinates:[9] (I), x=816,708.16 feet; y=1,237,135.32 feet.

Peak south of station Terry (Lawrence County, S. Dak., C. V. Hodgson, 1912).—Elevation of highest peak: 2,074 meters (6,804 feet).

Plane coordinates:[9] (I), x=875,287.81 feet; y=1,307,001.39 feet.

Bear Lodge Mountains, highest peak (Crook County, C. V. Hodgson, 1912).—Elevation of highest peak; 2,032 meters (6,667 feet).

Plane coordinates: (I), x=688,787.21 feet; y=1,389,072.25 feet.

Northeast corner Wyoming, boundary monument eccentric (Carter County, Mont., E. H. Pagenhart, 1912; 1913).—About 2 yards east of center of Hash

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

Knife wagon road, and short distance north of Montana-South Dakota State line, on first knoll (covered with red rock) seen on approaching along road from south. Surface mark is standard station disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground. Underground mark is brass bolt in concrete block. *Northeast corner Wyoming, boundary monument* (see description thereof) is 269.41 meters (883.9 feet) from station in azimuth 35°18′16″. Elevation: 1,053 meters (3,455 feet).

Plane coordinates: (I), x=787,502.86 feet; y=1,581,068.80 feet; grid azimuth to *Northeast corner Wyoming, boundary monument*=34°31′07″.[8]

Northeast corner Wyoming, boundary monument (Montana-South Dakota-Wyoming boundary, E. H. Pagenhart, 1912; 1913).—A red granite post 12 inches square, projecting 3 feet above ground, 269.41 meters (883.9 feet) in azimuth 35°18′16″ from station *Northeast corner Wyoming, boundary monument eccentric* (see description thereof). About 3 feet west is block of soft white sandstone 18 by 22 inches on top and projecting about 2 feet above ground. Thirty-seven paces east is 2-inch iron pipe with bronze cap projecting 1 foot above surface of ground and marked "U. S. General Land Office Survey, 1910. $250 fine for removal. Mont-Wyo-S.D., T. 9, R., 62–63, sec. 36–sec. 31."

Plane coordinates:[9] (I), x=787,001.99 feet; y=1,580,340.53 feet.

Southeast corner Montana, boundary monument eccentric (Butte County, S. Dak., E. H. Pagenhart, 1912).—On northeastern gentle slope of ridge ½ mile east of point on Hash Knife wagon road where it crosses Montana-South Dakota State line. Surface mark is standard station disk in concrete-filled, galvanized-iron cylinder projecting about 3 inches above ground. Underground mark is brass bolt in concrete block. *Southeast corner Montana, boundary monument,* marked by granite post 11 inches square, projecting about 2½ feet, is 271.66 meters (891.3 feet) from station in azimuth 243°40′42″.

Plane coordinates: (I), x=790,872.61 feet; y=1,580,175.41 feet; grid azimuth to *Southeast corner Montana, boundary monument*=242°53′00″.[8]

Southeast corner Montana, boundary monument (South Dakota-Montana boundary, E. H. Pagenhart, 1912).—Granite post 11 inches square, projecting about 2½ feet above ground, 271.66 meters (891.3 feet) in azimuth 243°40′42″ from station *Southeast corner Montana, boundary monument eccentric* (see description thereof). Elevation: 1,028 meters (3,373 feet).

Plane coordinates:[9] (I), x=791,665.94 feet; y=1,580,581.68 feet.

ONE-HUNDRED-AND-ELEVENTH MERIDIAN ARC

Principal points

Oxford (Bannock County, Idaho, P. A. Welker, 1897; 1933).—On the peak of the same name about 6 miles west of Oxford and about 15 miles east of Malad City. To reach from Oxford, go west and north of town 3 miles, then up mountain on old log road. From post office go north 1 block then to left 0.2 mile to end of road, then to right 2.3 miles. Take left fork leaving main road and go 0.6 mile to where road turns right (this is as far as trucks can go, but road continues about ⅔ way up mountain), pack up this road to first bench then turn left up creek to top. Station marked by ⅝-inch copper bolt set with lead in rock. Four reference marks consisting of holes drilled in rock are 2.5 feet from the center mark and approximately north, east, south, and west therefrom. In 1933 it was reported that east drill hole was gone. Reference marks established in 1933 are standard reference disks in rock, note 12c. No. 1 is downhill, 16.12 feet (slope distance) from station in azimuth 264°45′. No. 2 is along ridge, 81.07 feet from station in azimuth 359°54′ Elevation: 2,828.8 meters (9,281 feet).

Putnam (Bannock County, Idaho, C. V. Hodgson, 1915; 1936).—About 16 miles (air line) north-northeast of Pocatello, 22 miles south-southeast of Blackfoot, 17 miles (air line) southeast of Fort Hall, 12 miles west-northwest of Chesterfield, in sec. 9, T. 6 S., R. 37 E., just north of south boundary of Fort Hall Indian Reservation, on southernmost of 2 highest peaks of Putnam Mountains. To reach from Fort Hall, go south 0.4 mile on gravel road along east side of railroad tracks; turn left just before crossing bridge, and go east 8.25 miles;

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

leave main road, take right fork (south) and go 1.85 miles; turn left (east) and go 0.5 mile; turn right (south) at arrow sign "Mill Creek Canyon 8 Mi." and go 0.5 mile; turn left and go 0.5 mile, then right (south) and keep straight south for 1.75 miles; turn left (east) on T-road and continue 0.25 mile, then right (south) for 1.9 miles; take left fork following arrow sign "Mill Creek Canyon 2.8 Mi.", and continue on Mill Creek Road 6.25 miles to forks, right fork angles sharply to right; continue on main road 0.2 mile to arrow sign on right "Camp No. 2", where 4 roads angle off. This is near top of divide. Take extreme right-hand road which leads towards woods and go 2.05 miles to end of truck travel at triangle-blazed tree on right. This blazed tree can be seen 200 feet before reaching it and may last for many years. From end of truck travel go north along road about 100 feet, then go westerly up east slope of hill to summit, turn left (southerly) along summit for about 200 yards, thence west up slope of mountain to its summit at south end and station. Station is a 2-hour drive from Fort Hall and ¾-hour pack. Station mark is standard disk in concrete, note 1a. Reference marks established in 1933 are standard disks in boulders, note 12c. No. 1 is 110.5 feet east of station in azimuth 272°58′. No. 2 is 10.662 meters (34.98 feet) southwest of station in azimuth 38°52′. Azimuth mark established in 1936 is probably standard disk on rocky rise about 400 yards southeast of station in azimuth 307°15′17″. Following azimuths are from station: Chinks Peak (U. S. G. S.), cairn, 69°25′06″; Buckskin (U. S. G. S.), cairn, 110°00′24″. *Putnam (U. S. G. S.), cairn* is 5.50 meters (18.0 feet) from station in azimuth 326°47′. Elevation: 2,724.8 meters (8,940 feet).

Big Butte (Butte County, Idaho, C. V. Hodgson, 1915; 1936).—About 37 miles air line west-northwest of Blackfoot, 23 miles air line southeast of Arco, 6 miles air line southwest of Cerro Grande, near boundary line between Bingham and Blain Counties, on southerly and highest point of large butte rising abruptly above lava plains and known as Big Butte. To reach from Blackfoot, go northwest 31.6 miles on State Highway 27, or 10.9 miles past water tank on left in Taber, to Midway Service Station (Shell) on right. Continue on highway 4.75 miles and turn left onto dirt crossroad at 2-foot square sign with only faint traces of lettering left; this point is along large left curve and there is volcanic formation to left of highway. Go 2.0 miles; take right fork, go 2.2 miles and follow road to left; go 2.0 miles and cross two railroad tracks to west of Cerro Grande railroad station and boarded-up buildings. Continue 0.2 mile, take left fork (south) at section marker in angle and go 0.05 mile; keep straight ahead at right fork and go 0.75 mile to crossroads; turn right (west) and follow main road 1.75 miles to point where road makes easy left turn at ditch; go 0.45 mile to forks, take right fork and follow main road 1.25 miles; take extreme left fork (southeast) at log corral and shack about 400 feet to northwest, and go 0.7 mile; turn right off road and drive about 0.3 mile or as far as possible through sagebrush toward deep draw on north side of butte. This draw is brushy at bottom and wooded near top. From foot of draw go up steep slope of ridge to left of draw and follow to highest point and station. Steep 1¾-hour pack. Marked by standard disk in drill hole in boulder, note 4. Reference mark is 1-inch drill hole 3 inches deep in top of large boulder projecting 6 inches above ground, 2.72 meters (8.9 feet) from station in azimuth 287°05′. Big Butte (U. S. G. S.), cairn is 3.35 meters (11.0 feet) from station in azimuth 76°41′. Cross in boulder is 9.74 feet from station in azimuth 124°09′. Elevation: 2,309.3 meters (7,576 feet).

Middle Butte (Bingham County, Idaho, C. V. Hodgson, 1915; 1936).—About 30 miles northwest of Blackfoot, 9 miles north of Taber, on highest point of Middle Butte, on prominent loaf-shaped butte which is central one of 3 buttes that rise up out of desert and lie in northeast-southwest direction. Station is on northwest end and highest point of butte, 6 feet south of U. S. Geological Survey cairn. To reach from junction of U. S. Highway 91 and State Highway 27, in Blackfoot go northwest 31.35 miles on State Highway, or 10.8 miles after passing railroad station at Taber, to Midway Service Station. Turn right and follow road around service station, pass around corrals and turn right for 0.5 mile; take desert road and follow it east 5.15 miles; take dim left fork and go 0.35 mile; take dim left fork and follow along base of butte 0.4 mile or to saddle at base of well-defined trail up south side of mountain. Follow trail to top of ridge, then work to northwest and highest point of mountain. One-hour pack.

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Mark is standard disk in boulder, note 4. Reference mark (1915) is standard disk in boulder, note 12c, and is 4.163 meters (13.66 feet) west of station in azimuth 81°44′. Reference mark no. 2 (1936) is probably standard disk in boulder, 6.166 meters (20.23 feet) southeast of station in azimuth 316°16′. Middle Butte (U. S. G. S.), cairn is 2.12 meters (7.0 feet) north of station in azimuth 183°41′. Elevation: 1,949.0 meters (6,394 feet).

Caribou (Bonneville County, Idaho, C. V. Hodgson, 1915; 1922).—About 35 miles air line N. 25° E. of Soda Springs, 7 miles by trail northeast of Gray post office, on highest point of Caribou Mountain, a bare round-topped peak, easily reached by pack animals from all directions. Mark is standard station disk in boulder, note 5. Reference mark is standard reference disk in boulder, note 12d, on south slope of peak and 9.43 meters (30.9 feet) from station in azimuth 12°37′. Station *Caribou* (*U. S. G. S.*), *cairn* is 2.55 meters (8.4 feet) from station in azimuth 187°37′. Elevation: 2,983.3 meters (9,788 feet).

Plane coordinates: (IV), x=172,120.83 feet; y=886,673.51 feet.

Sawtelle (Idaho-Montana Boundary, W. M. Scaife, 1922).—About 9 miles air line southwest of Lake, Idaho, about 14 miles east by south of Lakeview, Montana, about 50 miles (by road) east of Monida, Montana, between Monida-Henry Lake road on north and Hell Roaring Creek on south and west, and on a prominent rocky peak known locally as Mt. Jefferson which is highest peak on Continental Divide between Monida and Yellowstone National Park. This peak should not be confused with Sawtelle Mountain, a flat topped mountain about 3 miles east. Trucks can be driven from Monida, Lakeview, or Henry's Lake to point where Hell Roaring Canyon emerges from mountains on south through a deep and narrow canyon, prominent from road. From there reached with pack animals. Cross low pass about ½ mile west of Hell Roaring Canyon, cross creek, follow about 5 miles along bench land on north side of creek until within about a mile of head of creek, climb ridge to north, and when peak is sighted, head for gap just east of it. To reach on foot follow canyon emerging near Edward's ranch between Lake and mouth of Hell Roaring Canyon. Surface mark is standard station disk in bedrock, note 2. Reference marks are standard reference disks in boulders, note 12c. No. 1 is 8.638 meters (28.34 feet) from station in azimuth 30°55′. No. 2 is 24.22 meters (79.5 feet) from station in azimuth 68°49′. *G. L. O. Station 16* identical with Idaho-Montana boundary post no. 683.006 (see description thereof) is 4.4 meters (14 feet) from station in azimuth 98°47′. Elevation: 3,112.3 meters (10,211 feet).

Plane coordinates: (IV), x=129,692.35 feet; y=1,422,808.96 feet.

Garfield (Beaverhead County, Mont., W. M. Scaife, 1922).—About 15 miles air line W.12°S. of Monida, 10 miles south of Lima, 4 miles northwest of old abandoned saw mill on Saw Mill Creek, 3½ miles north of Idaho-Montana boundary line, and on highest and most westerly of 3 round-topped peaks in vicinity and known locally as Lima Peaks. To reach from Snowline leave Monida-Dillon road crossing railroad on south, follow side road about 300 meters (984 feet) to ranch headquarters (consisting of about 12 low buildings), and follow fair road between several buildings and then along Saw Mill Creek for about 10 miles to old saw mill. From here pack animals can be taken within about ½ mile of station. Go northwest to summit of first ridge, the next valley is heavily wooded, follow where sheep trail enters timber a short distance below highest point of timber on north side of Continental Divide and hold same approximate level in general westerly direction to a flat grassy saddle about 280° magnetic and 1½ miles from peak, and keep along left side of valley to station on northwest side of mountain. Surface mark is standard station disk in bedrock, note 2. Reference marks are standard reference disks in bedrock, note 12a. No. 1 is 15.65 meters (51.3 feet) from station in azimuth 353°55′. No. 2 is 12.135 meters (39.81 feet) from station in azimuth 109°14′. Garfield (U. S. G. S.) cairn is 12.6 meters (41 feet) from station in azimuth 166°55′. Elevation: 3,340.9 meters (10,961 feet).

Black Butte (Madison County, Mont., W. M. Scaife, 1922).—About 35 miles south-southeast of Alder, about 25 miles air line south of Virginia City, about 8 miles air line east of Three Forks Ranger Station, about 10 miles air line southeast of Ruby Ranger Station, about 13 miles air line west of Lyon, and about 1 meter (3 feet) below highest point of prominent and well-known Black Butte. To reach from Ruby River, truck can be driven as far as Three Forks Ranger Station, from here by wagon to foot of Butte on Black Butte road for about 15 miles, or with pack animals from ranger station by cutting

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across comparatively low ridges to east. Also reached with pack animals from Ruby River at Cottonwood Creek and follow this creek about 10 miles and up left side of butte (Cottonwood Creek joins Ruby River about half way between Ruby Ranger Station and Three Forks Ranger Station). In 1922 a trail was being built into this locality from Lyon which will make station easily accessible. Surface mark is standard station disk in bedrock, note 2. Reference marks are standard reference disks in drill holes in boulders, note 12c. No. 1 is 6.44 meters (21.1 feet) from station in azimuth 166°21′. No. 2 is 8.305 meters (27.25 feet) from station in azimuth 318°23′. Station *Black Butte* (*U. S. G. S.*), *cairn* (see position thereof) is 7.59 meters (24.9 feet) from station in azimuth 159°18′. Elevation: 3,214.5 meters (10,546 feet).

Plane coordinates: (IV), x=41,163.36 feet; y=1,549,352.51 feet.

Taylor (Madison County, Mont., W. M. Scaife, 1922).—About 65 miles by road west of south from Bozeman, about 12 miles air line southwest of Eldridge post office, about 8 miles air line west of Cunningham ranch, about 6 miles south of trail leading from Madison Valley on west up Indian Creek, crossing Madison Divide and descending to Gallatin River down Cash Creek and Taylor's Creek, and on highest peak of Taylor's Peak, a prominent dark-colored rocky peak, near head of Taylor's Creek. To reach from Cunningham ranch follow pack trail up Taylor's Creek, about 8 miles above ranch creek fork (largest branch continuing straight and other from thickly wooded canyon on right), at this point prominent, sparsely timbered part way up, light-colored rocky mountain is visible a short distance ahead on right side of main branch, leave main branch and follow pack trail to top of ridge between two branches mentioned above, work around right side of prominent mountain mentioned above keeping fair distance away from mountain to avoid rough going, at point about 3 miles, mostly through heavy timber, a sparsely wooded valley containing several small lakes will be reached. Taylor's Peak is prominent dark-colored rocky peak at head of this valley. Trucks can be driven to the Cunningham Ranch, which is about 5 miles west of the Salesville-Yellowstone road, and can be reached by truck from this road only. From the ranch, pack animals can be taken to a saddle on southeast side of peak, within a ½-hour climb of station site. Reached from Madison Valley by following trail up Indian Creek, from which a way can be found to station. Surface mark is standard station disk in bedrock, note 2. Reference mark is standard reference disk in drill hole in boulder, note 12c, and 6.07 meters (19.9 feet) from station in azimuth 57°37′. Elevation: 3,442.1 meters (11,293 feet).

Plane coordinates: (IV), x=144,558.87 feet; y=1,595,822.31 feet.

Ruby (Madison County, Mont., W. M. Scaife, 1922).—About 14 miles west by north of Virginia City, about 7 miles west of Laurin, about 6 miles west of Ruby, and on highest peak of Ruby Range. To reach from Alder go up Hench Creek about 10 miles to saw mill, from this point continue about 2 miles with pack animals up creek to top of ridge to right. Surface mark is standard station disk in bedrock, note 3. Reference marks are standard reference disks in boulders, note 12d. No. 1 is in azimuth 313°15′57″. No. 2 is in azimuth 36°27′53″. Elevation: 2,865.0 meters (9,400 feet).

Gallatin (Madison County, Mont., W. M. Scaife, 1922).—About 35 miles air line southwest of Bozeman, 15 miles south and 8 miles west of Salesville, and on highest point of Gallatin Peak, highest of which are known locally as Spanish Peaks. Trucks can be driven to Clarence Lytle's cabin by way of Yellowstone-Salesville road and road along North Fork of Middle Fork of West Fork, at 42 miles south of Bozeman on Yellowstone-Salesville road turn west at Harry Collet's place on north side of West Fork, follow road to A. F. Crail's place, then to Lytle's cabin, a distance of about 6 miles from Gallatin River. From here, by pack animals, foot of peak can be reached by going to point about 1 mile below head of North Fork, crossing divide to northeast, then down into basin at head of Hell Roaring Creek, a distance of about 8 miles from Lytle's cabin, trail for about 5 miles is mostly on east side of stream, but soon after reaching abandoned cabin and sheer rock bluff almost 1,000 feet high on left, trail crosses stream and follows west side for some distance, then crosses back to east side. From point where valley is left to cross divide, a rock cairn on right will be seen on hump in saddle of divide to northeast, cairn was built to mark place to cross divide, later a better crossing place was found about ¼ mile northwest of rock cairn. From basin at head of Hell Roaring Creek

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station can be reached by back packing, from place where North Fork is left to cross divide, country is very dangerous for pack animals. Surface mark is standard station disk in bedrock, note 2. Reference mark no. 2 is standard reference disk in drill hole in boulder, note 12c, and 9.98 meters (32.7 feet) from station in azimuth 206°40′. Elevation: 3,357.3 meters (11,015 feet).

Jefferson (Madison County, Mont., W. M. Scaife, 1922).—About 6 miles southwest of Pony and on southernmost and lower summit of prominent double peaked mountain of Tobacco Root Range known locally as Hollow Top. From Pony the left summit of mountain (station site) can be seen in line with Main Street and is about ½ mile south of main summit. To reach from Pony go to foot of mountain with pack animals by following trail up North Willow Creek to Upper Lake. From here it can be reached by back packing. Surface mark is standard station disk in bedrock, note 2. Reference marks are standard reference disks in boulders, note 12c. No. 1 is 6.22 meters (20.4 feet) from station in azimuth 322°41′. No. 2 is 5.44 meters (17.8 feet) from station in azimuth 46°14′. Elevation: 3,204.5 meters (10,513 feet).

Salesville (Gallatin County, Mont., W. M. Scaife, 1922; 1925).—About 16 miles southwest of Bozeman, 4 miles south and 4½ miles west (air line) of Salesville, 3 miles west of the Gallatin River, 2 miles north of Spanish Creek, on the single flat-topped mountain in this vicinity. Reached from Salesville by following main road south about 7 miles, then take road leading west from this point and follow 5.1 miles to right-angle turn to south about 200 yards northwest of ranch house. Here turn north off road and go through gate on north side of road and follow dim trail which leads northeasterly up hill, and then takes westerly direction. Follow this trail 2 miles to creek and ¼ mile on to rancher's cabin. From cabin truck can be driven across country to station by driving along west and south side of range of hills on which station is located. Station mark is standard station disk in drill hole in boulder, note 4. Reference marks are standard reference disks in boulders, note 12c. No. 1 is 15.72 meters (51.6 feet) from station in azimuth 209°26′. No. 2 is 29.37 meters (96.4 feet) from station in azimuth 122°18′. Elevation: 2,209.2 meters (7,248 feet).

London (Madison County, Mont., W. M. Scaife, 1922; 1923).—About 4½ miles air line southeast of Jefferson Island, 10½ miles north of Pony, 12 miles west of Willow Creek, 1½ miles southwest of Jefferson River, 1 mile east by north of Jefferson Island-Pony road where it crosses South Boulder Creek at Ben Koestlin's ranch, and on highest point of group of low mountains known locally as London Mountains. Reached from Ben Koestlin's ranch easily by back-packing or with pack animals. Surface mark is standard station disk in bedrock, note 2. Reference mark is standard reference disk in drill hole in bedrock, note 12a, and 15.98 meters (52.4 feet) from station in azimuth 336°57′. *Mt. Jefferson* (*U. S. G. S.*) *cairn* (see position thereof) is in azimuth 20°37′04″. Elevation: 1,928.3 meters (6,326 feet).

Bozeman northwest base (Gallatin County, Mont., W. M. Scaife, 1922; 1925).—About 22 miles northwest of Bozeman, 0.6 mile northwest of bell tower in town of Manhattan near southeast corner on farm owned by James Scollard, about 155 meters (509 feet) northwest of road intersection just southeast of Scollard house, about 71 meters (233 feet) north of north corner of house, about 6 meters (20) feet southwest of fence on southwest side of Manhattan-Three Forks road at point between telephone posts (on southwest side of road) nos. 6561 and 6562, and distant about 35 meters (115 feet) and 20 meters (66 feet) from these, respectively. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 41.547 meters (136.31 feet) from station in azimuth 137°20′. No. 2 is 47.497 meters (155.83 feet) from station in azimuth 213°03′. Elevation: 1,290.9 meters (4,235 feet).

Bozeman southeast base (Gallatin County, Mont., W. M. Scaife, 1922; 1925).—About 7 miles southeast of Belgrade, 1½ miles northwest of Bozeman, about 200 meters (656 feet) southeast of only curve on railroad between Bozeman and Belgrade, on small knoll in cultivated field belonging to George Crittenden, about 35 meters (115 feet) southeast of fence along Bozeman-Manhattan road at point where it parallels Northern Pacific, and about 2 meters (7 feet) northwest of division fence. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 65.675 meters (215.47 feet) from station in

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azimuth 199°44′. No. 2 is 31.583 meters (103.62 feet) from station in azimuth 275°00′. Elevation: 1,435.1 meters (4,708 feet).

Ross (Gallatin County, Mont., W. Mussetter, 1922; 1923).—About 16 miles east of north from Bozeman, 12 miles northeast from Belgrade, 6 miles by road and trail from the Andy Corbley ranch, on highest point of Sakagawia Peak, the highest peak of Bridger Range, a sharp, bald, rocky peak, well known in vicinity. Station is about 6 miles by road and trail from Andy Corbley ranch. Reached from west from Corbley's ranch by following up Corbley Creek about 5 miles to divide, then 1 mile southeast along high ridge to station. Best reached by going to Flathead Forest Ranger's Station on Sakagawia Peak, where pack animals may be obtained through the Ranger, who will also act as guide. From this point station is easily reached by trail about 6½ miles. Station mark is standard disk station mark in small rock. Reference mark no. 1 is standard reference disk in top of boulder about 14 inches thick, 20 inches wide, and 25 inches long, placed in hole 16 inches wide, 22 inches long, and 21 inches deep, filled all around with concrete. Boulder projects 4 inches above surface of ground. Reference mark no. 1 is 3.112 meters (10.21 feet) from station in azimuth 331°36′. Reference mark no. 2 is standard disk in ½-inch pipe about 3 feet high, insecurely set, 1.622 meters (5.32 feet) from station in azimuth 120°44′. Elevation: 2,947.0 meters (9,669 feet). In 1925 reference mark no. 1 was recovered but station had been destroyed. A new station, *Ross 2* (see description thereof), was established nearby.

Supplementary points

Henry (Caribou County, Idaho, C. V. Hodgson, 1915).—About 6½ miles east of Henry post office, on a bald-topped hill with pine trees on north slope. Marked by wooden stake. Station *Henry* (*U. S. G. S.*) is 4.40 meters (14.4 feet) distant in azimuth 150°52′. Elevation: 2,530.1 meters (8,301 feet).

Plane coordinates: (IV), x=146,415.66 feet; y=824,139.88 feet.

Henry (U. S. G. S.) (Caribou County, Idaho, C. V. Hodgson, 1915).

Plane coordinates:[9] (IV), x=146,408.86 feet; y=824,152.65 feet.

Stump (U. S. G. S.) (Caribou County, Idaho, C. V. Hodgson, 1915; 1922).—About 8 miles northeast of Williamsburg post office and 5 miles east of "Upper Dairy Ranch" (owned by Mr. Kuntz), on Stump Mountain, on a bald peak at head of Stump and Lanes Creeks, the former flowing into Salt River and the latter into Black River. To reach follow pack trail up Lanes Creek to pass at head of Lanes Creek and North Creek, station is about 1 mile south of pass. Original mark was U. S. Geological Survey disk set 8 inches below surface of ground over which was set a cairn. In 1922 station mark was found lying loose, and was reset in an irregular mass of concrete in a depression in loose shale rock. Two standard reference disks were also set in irregular masses of concrete in depression in shale rock and are the following distances and magnetic bearings from station. No. 1, 3.46 meters (11.4 feet), 288½°; and no. 2, 4.53 meters (14.9 feet), 189½°.

Plane coordinates: (IV), x=203,719.56 feet; y=816,287.55 feet.

Lower Black (Bonneville County, Idaho, W. M. Scaife, 1922).—About 12 miles north-northwest of Freedom, on highest point of the southern summit of Black Mountain (there are 3 summits to Black Mountain, the 2 to the north are slightly higher and partly wooded, the southern summit is rounded and bare). Marked by standard station disk wedged into top of 1½-inch iron pipe, 18 inches long, flush with surface of ground and covered by a small cairn of rocks. There are no reference marks. Elevation: 2,711.0 meters (8,894 feet).

Plane coordinates: (IV), x=222,666.30 feet; y=890,282.64 feet.

Little Star (Caribou County, Idaho, W. M. Scaife, 1922).—About 4 miles southwest of Freedom, on highest point of low, rounded, bare-topped hill. To reach follow up Deer Creek, which runs out across the county road about 2 miles south of Freedom. The hill is highest one on south side of creek and about 4 miles up from the county road. Marked by standard station disk in outcropping bedrock, note 3. Reference marks are standard reference disks in outcropping bedrock, note 12b. No. 1 is 44.20 feet from station in azimuth 242°40′. No. 2 is 42.10 feet from station in azimuth 316°28′. Elevation: 2,141.5 meters (7,026 feet).

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[9] No check on this position.

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Plane coordinates: (IV), x=231,036.80 feet; y=833,339.49 feet.

Star Peak (U. S. G. S.) (Lincoln County, W. M. Scaife, 1922).

Plane coordinates: (IV), x=277,790.59 feet; y=854,237.71 feet.

Putnam (U. S. G. S.) (Bannock County, Idaho, C. V. Hodgson, 1919).—No description for this station available.

Caribou (U. S. G. S.) (Bonneville County, Idaho, C. V. Hodgson, 1915).

Plane coordinates:[9] (IV), x=172,122.06 feet; y=886,681.79 feet.

Poker Peak (Bonneville County, Idaho, W. M. Scaife, 1922).—On west side of Snake River, in approximately section 16, T. 2 S., R. 45 E., Boise meridian, at head of Spring Creek, Edward's Creek, Landslide Creek and Pine Creek, on highest point of Poker Peak. Marked by standard station disk. There are no reference disks.

Plane coordinates:[9] (IV), x=204,468.34 feet; y=940,718.32 feet.

Etna, Mormon Church, spire (Lincoln County, W. M. Scaife, 1922).

Plane coordinates:[9] (IV), x=252,009.84 feet; y=863,886.40 feet.

Bedford, Mormon Church, spire (Lincoln County, W. M. Scaife, 1922).

Plane coordinates:[9] (IV), x=271,418.88 feet; y=814,591.72 feet.

G. L. O. Station 1 (Lincoln County, Wyo., Caribou County, Idaho, W. M. Scaife, 1922; 1923).—About ¼ mile south of Freedom post office, on north-south county road (Idaho-Wyoming boundary line), about 200 meters (656 feet) north of point where road turns east at foot of small hill, at closing corner of sections 15 and 22, T. 5 S., R. 46 E., Boise meridian. Original mark was highest point of large blue slate rock, projecting about 3 or 4 inches above ground, in middle of road (this rock has been worn to a rather thin edge due to wagons, etc., passing over it). In 1923 station was marked with General Land Office brass disk cemented in a conglomerate boulder set 4 inches below surface of ground. Reference mark is General Land Office brass reference disk in conglomerate stone, projecting 6 inches above surface of ground, 13.93 meters (45.7 feet) to east of station. Elevation: 1,757.2 meters (5,765 feet).

Plane coordinates: (IV), x=243,085.66 feet; y=842,972.09 feet.

G. L. O. Station 2 (Lincoln County, Wyo., Caribou County, Idaho, W. M. Scaife, 1922; 1923).—About 1½ miles north (on county road) from Freedom post office, at point where road swings to west around a bend in a small creek, and on the Idaho-Wyoming boundary, at closing corner sections 34 and 3, Tps. 4 and 5 S., R. 46 E., Boise meridian. Original mark was an eight-penny nail cemented into drill hole in large sandstone rock, top of which projects about 6 inches above ground. In 1923 station was re-marked with General Land Office brass disk. Reference mark is standard General Land Office brass disk reference mark, 14.255 meters (46.80 feet) to the west of station. Elevation: 1,741.6 meters (5,714 feet).

Plane coordinates: (IV), x=243,288.37 feet; y=858,799.30 feet.

Garns (Teton County, Idaho, W. M. Scaife, 1922).—About 13 miles northwest of Victor, 13 miles southwest of Driggs, at head of Pine and Mahogany Creeks, and on highest part of Garns Mountain. To reach from Victor go to Pine Creek Ranger station and then proceed up Pine Creek Canyon. Station is about 28 feet west of center of Forest Service lookout tower on peak. Surface mark is standard station disk in bedrock, note 3. Reference marks are standard reference disks in boulders, note 12d. Reference mark no. 1 is 10.71 meters (35.1 feet) from station in azimuth 84°22′. *Garns reference mark no. 2* (see description thereof) is 61.29 meters (201.1 feet) from station in azimuth 302°44′. Elevation: 2,743 meters (8,999 feet).

Plane coordinates: (IV), x=169,593.44 feet; y=1,094,488.57 feet.

Garns reference mark no. 2 (Teton County, Idaho, W. M. Scaife, 1922).—About 13 miles northwest of Victor, 13 miles southwest of Driggs, at head of Pine and Mahogany Creeks, and on highest part of Garns Mountain. Marked by standard reference disk in boulder, note 12d. Station *Garns* (see description thereof) is distant 61.29 meters (201.1 feet) from mark in azimuth 122°44′15″; Station *Garns Mountain south base* (see description thereof) is distant 1,254.9 meters (4,117 feet) in azimuth 326°23′37″; and *G. L. O. Station 6* (see description thereof) is distant 1,120.4 meters (3,676 feet) in azimuth 298°23′18″. Elevation: 2,739 meters (8,986 feet).

Plane coordinates:[9] (IV), x=169,760.96 feet; y=1,094,377.29 feet.

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[9] No check on this position.

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Garns Mountain south base (Teton County, Idaho, W. M. Scaife, 1922).—On southwestern end of small flat space on southern slope of eastern ridge leading to Garns Mountain. About ¾ mile southeast of station *Garns* (see description thereof) and about ½ mile down from eastern ridge. Marked by standard station disk in boulder, note 5, over which a small rock cairn was built. *Garns reference mark no. 2* (see description thereof) is 1,254.94 meters (4,117 feet) distant in azimuth 146°23′58″, and *G. L. O. Station 6* (see description thereof) is 589.350 meters (1,933.56 feet) distant in azimuth 209°36′23″. There are no reference marks. Elevation: 2,608.9 meters (8,559 feet).

Plane coordinates:[9] (IV), x=171,987.99 feet; y=1,090,914.32 feet; grid azimuth to *Garns reference mark no. 2*=147°15′18″.[7]

G. L. O. Station 6 (Teton County, Idaho, W. M. Scaife, 1922).—About 13 miles northwest of Victor, 13 miles southwest of Driggs, on southern slope of eastern ridge leading to the top of Garns Mountain, about ½ mile down ridge from top of mountain and about 100 yards down southern slope from top of ridge. Station is quarter corner of sections 19 and 24, Tps. 4 N., Rs. 43 and 44 E. Marked by standard General Land Office 3-inch iron post, projecting 6 inches above surface of ground, and stamped with township, range, and section data and dated 1922. *Garns Mountain south base* (see description thereof) is distant 589.350 meters (1,933.56 feet) in azimuth 29°36′32″; and *Garns reference mark no. 2* (see description thereof) is distant 1,120.4 meters (3,676 feet) in azimuth 118°23′49″. There are no reference marks. Elevation: 2,678.0 meters (8,786 feet).

Plane coordinates: (IV), x=172,968.25 feet; y=1,092,581.12 feet; grid azimuth to *Garns Mountain south base*=30°27′43″.[7]

Teton Peak (Teton County, C. V. Hodgson, 1915).—Elevation of ground: 4,201 meters (13,783 feet).

Plane coordinates:[9] (IV), x=310,303.22 feet; y=1,121,464.08 feet.

Road (Fremont County, Idaho, W. M. Scaife, 1922).—About 15 miles southeast of Dubois, 1 mile west and 1 mile south of Karlson's ranch house, and on small rise on north side of road. Surface mark is standard station disk in cement in large lava rock. Reference mark no. 1 is standard General Land Office 3-inch iron post in concrete cylinder, at northeast corner of fence at road intersection, and 130.19 meters (427.1 feet) from station in azimuth 271°13′54″. Reference mark no. 2, identical with *G. L. O. Station 8* (see description thereof) is distant 123.82 meters (406.2 feet) from station in azimuth 274°09′08″. Elevation: 1,719 meters (5,640 feet).

Plane coordinates: (IV), x=8,096.60 feet; y=1,241,234.63 feet; grid azimuth to *G. L. O. Station 8* (Idaho)=275°27′13″.[8]

G. L. O. Station 8 (Fremont County, Idaho, W. M. Scaife, 1922).—About 15 miles southeast of Dubois, 1 mile west and 1 mile south of Karlson's ranch, at intersection of an east and west road and a road running north. Station is corner of sections 34 and 35, T. 9 N., R. 38 E., second standard parallel north. Surface mark is cross on top of large volcanic rock, buried 12 inches in ground, top projecting 3 inches above surface, and marked "S. C." on north face, 4 notches on west face, and 2 notches on east face. Underground mark is standard General Land Office 3-inch iron post, set in concrete, top 18″ below surface of ground, and stamped with township, range, and section data, and dated 1922. Reference mark identical with reference mark no. 2 of station *Road*, is standard General Land Office iron reference post in concrete, at fence corner northeast of station and 9.07 meters (29.8 feet) from station in azimuth 227°08′. Station *Road* (see description thereof) is distant 123.82 meters (406.2 feet) in azimuth 94°09′12″. Elevation: 1,716 meters (5,630 feet).

Plane coordinates:[9] (IV), x=8,501.07 feet; y=1,241,196.06 feet.

G. L. O. Station 16 (Idaho-Montana Boundary, W. M. Scaife, 1922; 1923).—Identical with boundary post no. 683.006 of Idaho-Montana boundary line. Station marked by 3-inch iron pipe in cairn of rocks. In 1923 re-marked with brass disk stamped with Montana above, Idaho below, 683.006 M, and dated 1923. Station *Sawtelle* (see description thereof) is 4.4 meters (14 feet) from station in azimuth 278°47′.

Plane coordinates:[9] (IV), x=129,678.13 feet; y=1,422,811.43 feet.

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[7] This azimuth has been computed by the first formula (p. 70), using both terms.

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

G. L. O. Station 11 eccentric (Beaverhead County, Mont., W. M. Scaife, 1922).—Identical with reference mark of *G. L. O. Station 11* (see description thereof) which is 114.82 meters (376.7 feet) distant in azimuth 19°01′51″. Elevation: 2,525 meters (8,284 feet).

G. L. O. Station 11 (Beaverhead County, Mont., W. M. Scaife, 1922).—About 20 miles east-northeast of Monida, 3 miles west by north of John Brundage's ranch house, in corner of secs. 24, 25, 19, and 30, Tps. 13 S., Rs. 3 and 4 W., 115 meters (377 feet) down western slope from top of peak, known locally as Big Antelope Peak or Battle Mountain, and at junction of fences from west and south. Surface mark is standard General Land Office 3-inch iron post in large block of concrete, stamped with township, range, and dated 1922, and projecting 6 inches above surface. Reference mark, identical with *G. L. O. Station 11 eccentric* (see description thereof) is standard General Land Office disk in drill hole in large rock, stamped same as station, on highest point of peak, and 114.82 meters (376.7 feet) from station in azimuth 199°01′50″.

G. L. O. Station 10 (Clark-Beaverhead Counties, Idaho-Montana Boundary, W. M. Scaife, 1922).—*About 10 miles southeast of Lakeview, on Idaho-Montana boundary*, and near top of divide. To reach from Lakeview follow up small creek to southeast, then on up to top of divide, turning east along divide for 2½ miles to station site. Surface mark is standard General Land Office disk in drill hole in boulder, and stamped *Montana above, Idaho below*, 667.115M, and dated 1922. Old 3-inch post was set on top of mark and surrounded by rock cairn. Reference mark is standard General Land Office disk in boulder, 21.79 meters (71.5 feet) from station in magnetic azimuth S. 10¾° E. A 7-foot rock cairn is 2.16 meters (7.1 feet) from station in magnetic azimuth S. 37½° W. Elevation of ground: 3,009 meters (9,872 feet).

Plane coordinates: (IV), x=83,280.35 feet; y=1,423,524.66 feet.

Black Butte (U. S. G. S.), cairn (Madison County, Mont., W. M. Scaife, 1922).

Plane coordinates:[9] (IV), x=41,155.10 feet; y=1,549,376.00 feet.

G. L. O. Station 18 eccentric (Madison County, Mont., W. M. Scaife, 1922).—Identical with reference mark of *G. L. O. Station 18* (see description thereof). Station marked by standard General Land Office disk in large quartzite boulder. *G. L. O. station 18* is 90.21 meters (296.0 feet) from station in azimuth 304°57′. Elevation: 2,062.3 meters (6,766 feet).

G. L. O. Station 18 (Madison County, Mont., W. M. Scaife, 1922).—About 7 miles due west of Ennis at quarter corner sec. 32, T. 5 S., R. 2 W., first standard parallel south, and on southeastern slope of small hill near top of continental divide. To reach from Ennis Hotel in Ennis with speedometer at 0.0 mile, go 3.9 miles on road due west up through gap past rifle range to fork in road, take left road to 4.0 miles to very dim road to right, follow this road to speedometer reading 8.0 miles to small creek, cross creek and make sharp right turn to 8.5 miles to road to right, and follow this road to 8.8 miles to large gate. Corner is about 150 meters (492 feet) east of gate along fence line at junction of this east-and-west fence and fence running north. Surface mark is standard General Land Office 3-inch iron post in large block of concrete, projecting about 6 inches above surface, and stamped with section number and dated 1922. Reference mark identical with *G. L. O. Station 18 eccentric* (see description thereof) is standard General Land Office disk in cement in large quartzite boulder, and 90.21 meters (296.0 feet) from station in azimuth 124°57′. Elevation: 2,047 meters (6,716 feet).

Mt. Blackmore (Gallatin County, Mont., W. M. Scaife, 1922).—Elevation of ground: 3,095 meters (10,154 feet).

Mt. Jefferson (U. S. G. S.), cairn (Madison County, Mont., W. M. Scaife, 1922).—Elevation of top of cairn: 3,232 meters (10,604 feet).

Bozeman, Montana State College, main hall, north chimney (Gallatin County, Mont., W. M. Scaife, 1922).—No further description of this station available.

Bozeman, Irving School, spire (Gallatin County, Mont., W. M. Scaife, 1922).—No further description of this station available.

Amsterdam, Holland Church, spire (Gallatin County, Mont., W. M. Scaife, 1922).—Elevation of top of spire: 1,412 meters (4,633 feet).

Belgrade, Presbyterian Church, spire (Gallatin County, Mont., W. M. Scaife, 1922).—No further description of this station available.

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[9] No check on this position.

For notes in regard to marking of stations see p. 65.

G. L. O. Station 19 (Gallatin County, Mont., W. M. Scaife, 1922).—About 3 miles south of town of Willow Creek, on eastern end of first high ridge south of town, and on west side of Yellowstone Trail Highway. Reached from highway south of station in 15-minute climb. Station is initial point of all General Land Office Surveys in Montana. Surface mark is standard General Land Office disk in drill hole in large limestone outcrop, and stamped with range and township and dated 1922. Reference marks are standard General Land Office reference disks in drill holes in outcropping limestone. No. 1 is 3.045 meters (9.99 feet) from station in azimuth 180°21′. No. 2 is 6.390 meters (20.96 feet) from station in azimuth 269°51′. A 5-foot rock cairn is 3.9 meters (12.8 feet) from station in azimuth 90°09′. Elevation: 1,460.5 meters (4,792 feet).

G. L. O. Station 20 (Gallatin County, Mont., W. M. Scaife, 1922).—About 7 miles due north of Bozeman, 1 mile northeast of E. S. Cloninger's ranch house, at intersection of 2 county roads, on General Land Office base line, T. 1 N., R. 5 E. Surface mark is standard General Land Office 3-inch iron post in large block of concrete, top is about 6 inches below surface of road, and stamped with range and township and dated 1922. County surveyor's stake, a 2-inch iron rod, was set in concrete alongside station post and is level with surface of road. Reference mark is standard General Land Office 3-inch reference disk in large block of concrete, at fence corner, and 13.15 meters (43.1 feet) from station in azimuth 316°35′. Elevation: 1,422.1 meters (4,666 feet).

Bridger Peak (Gallatin County, Mont., W. M. Scaife, 1922).—No further description of this station available.

Ross Peak (Gallatin County, Mont., W. M. Scaife, 1922).—Elevation of top of peak: 2,745 meters (9,006 feet).

SUNDANCE, WYO., TO BOZEMAN, MONT., ARC

Principal points

Oshoto (Crook County, H. Odessey, 1925).—About 18 miles north and 3 miles west of Moorcroft, on high prominent peak known as Flag Butte (highest point in vicinity), and about 10 meters (33 feet) southwest of rock cairn. To reach from Moorcroft, go north about 18 miles on Rocky Point road to house on left with several outbuildings, turn west onto ranch road leading across pastures, and follow to Flag Butte. Marked by standard cap on iron pipe. Reference mark is standard reference disk cemented in rock, note 12a, 19.60 meters (64.3 feet) from station in azimuth 346°19′. Azimuth from station to Devils Tower National Monument is 257°42′14″. Elevation: 1,459.1 meters (4,787 feet).

Plane coordinates: (I), x=534,193.29 feet; y=1,412,240.09 feet; grid azimuth to Devils Tower National Monument=257°36′43″.[8]

Moorecroft (Crook County, H. Odessey, 1925).—About 3 miles south of Moorcroft, ½ mile west of road leading south from Moorcroft, on highest point of divide between Moorcroft and Buffalo Creek, and 6 feet south of 5-foot high cairn. To reach from Moorcroft, cross railroad and follow county road ¼ mile to gate on south, follow road through pasture 2½ miles to point ½ mile north of ranch house, turn west along divide toward highest point, and continue to station site. Marked by standard cap on iron pipe which projects a few inches above ground. Reference marks are standard reference disks in rock outcrops, note 12a. No. 1 is 82.27 meters (269.9 feet) from station in azimuth 279°21′. No. 2 is 10.67 meters (35.0 feet) from station in azimuth 223°47′. Azimuth from station to Devils Tower National Monument is 204°29′57″. Elevation: 1,399.5 meters (4,592 feet).

Plane coordinates: (I), x=557,494.27 feet; y=1,297,058.43 feet; grid azimuth to Devils Tower National Monument=204°20′46″.[8]

Rozet (Campbell County, H. Odessey, 1925).—About 4 miles north and 1¾ miles west of Rozet railroad station on Chicago, Burlington & Quincy Railroad, and on highest point of highest butte in vicinity. Top of butte is covered with grass, is fairly level, lies in north-and-south direction, slopes abruptly to east, and east side is partly covered with small pine trees. Only tops of few trees project above horizon. From Rozet railroad station, butte bears 315° magnetic. To reach, follow Custer Highway to Rozet railroad station, pro-

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

ceed north 3.2 miles to gate at southeast corner of pasture, follow dim road west along north side of fence about 0.4 mile to small draw where road bears to right and leads up draw, follow road to draw at southeast base of butte which is about ⅓ mile from station, and follow good trail which leads up point of ridge to station site. Truck can be driven to end of road at draw mentioned above. Type of station mark is not described. Reference mark (not described) is 12.200 meters (40.03 feet) from station in azimuth 74°11′. Azimuth to center of 10-inch triangle-blazed lone pine tree, about 12 feet distant, is 183°54′. Elevation: 1,476.3 meters (4,843 feet).

Plane coordinates: (I), x=479,389.23 feet; y=1,337,494.33 feet.

Cow (Campbell County, H. Odessey, 1925).—About 12 miles northeast of Gillette, on highest point of timbered ridge, just south of drainage to Cow Creek, and about 15 feet east of old wagon road along top of ridge. Ridge extends in northwest-and-southeast direction and has small scattered pine trees on top. Abandoned sawmill site on southwest side of ridge is about 250 meters (820 feet) south of west of station. To reach from Gillette, follow Casper-Buffalo highway to north keeping to right of lake, continue to top of hill land, take first right-hand road, follow this main-traveled road to top of divide at Cow Creek (first divide at which view is given of badlands ahead), pass over divide for ½ mile, take left-hand road, follow to second gate, take left-hand road, follow to creek (road is washed out at creek but in dry weather may be traveled), turn to right in creek, follow up creek about 50 meters (164 feet) and out on the left side, and follow old road to sawmill mentioned above about 1 mile to station site. In any except very dry weather truck should be left on high bank just before reaching creek. In any case truck cannot be taken further than site of old sawmill. (Type of station mark was not described.) There are no reference marks. Elevation: 1,427.2 meters (4,682 feet).

Plane coordinates: (I), x=448,841.58 feet; y=1,381,655.41 feet.

Sharp (Campbell County, H. Odessey, 1925).—About 12 miles southeast of Gillette, in NW¼ sec. 35, T. 49 N., R. 71 W., and on top of prominent butte which is highest point in immediate vicinity. Butte is round, sharp pointed, and is easily recognized by its symmetrical shape. To reach, go to southeast part of Gillette, follow road leading south about 6 miles to road leading east, go east about 2½ miles to well-traveled road to south through pasture, follow about 4½ miles to point on road opposite butte, and go east ½ mile to base of butte which is 150 meters (492 feet) from station site. Surface mark is iron pipe. Underground mark is tablet. There are no reference marks. Elevation: 1,505.0 meters (4,938 feet).

Plane coordinates: (I), x=448,640.77 feet; y=1,282,635.84 feet.

Gillette (Campbell County, H. Odessey, 1925).—About 3½ miles north of west of Gillette, about ¾ mile north of Chicago, Burlington & Quincy Railroad track, on west end and highest point of most southerly of several grassy buttes. Butte has abrupt slope on west end and is made up of red shell rock. From Gillette, butte bears 265° magnetic. To reach from Gillette, follow road along south side of Chicago, Burlington & Quincy Railroad track about 3 miles to first road leading north, cross railroad track, go through first gate on right into pasture just north of track. From this point butte bears 35° magnetic, distant about 1 mile. Follow old wagon road which leads to gate in draw west of station, proceed up draw to ridge, turn south, and approach station up northeast slope. Truck can be driven within 50 meters (164 feet) of station. Station and reference marks are concrete posts. Reference mark no. 1 is on first knoll north of station, and 261.175 meters (856.87 feet) from station in azimuth 201°45′13″. No. 2 is 170.710 meters (560.07 feet) from station in azimuth 276°51′39″. Elevation: 1,494.3 meters (4,903 feet).

Plane coordinates: (I), x=395,767.98 feet; y=1,326,045.90 feet; grid azimuth to reference mark no. 1=202°01′54″.[8]

Felix (Campbell County, H. Odessey, 1925; 1934).—About 20 miles by road northwest of Gillette, 5 miles east of north from Felix siding on Chicago, Burlington & Quincy Railroad, and on Twenty Mile Butte, just east of highest mass of rocks. To reach from Gillette, take road westward along Chicago, Burlington & Quincy Railroad to Oriva, cross track just west of station, and follow old country road 10.0 miles northwest to butte. Road passes about ¼

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

mile north of station along north slope of butte. Truck can be driven to within 150 meters (492 feet) of station. Marked by bronze cap riveted to an iron pipe, projecting 1 inch above surface of ground. Reference mark, probably standard reference disk (not stamped), is in stone outcrop 3.468 meters (11.38 feet) from station in azimuth 125°21′. Reference mark no. 1 (1934) is probably standard reference disk in large boulder, 25.344 meters (83.15 feet) (slope) from station in azimuth 4°18′. Azimuth mark, probably standard reference disk in outcropping bedrock, is approximately ¼ mile from station in azimuth 118°40′27″. Azimuth from station to Echeta railroad water tank is 97°58′54″. Elevation: 1,452.1 meters (4,764 feet).

Plane coordinates: (I), x=335,318.03 feet; y=1,379,603.11 feet; grid azimuth to azimuth mark=119°06′57″.[8] (II), x=901,112.66 feet; y=1,382,734.53 feet; grid azimuth to azimuth mark=117°35′54″.[8]

Jay (Campbell County, H. Odessey, 1925).—About 21 miles by road southwest of Gillette, 1¼ miles south of "4–J" (or "J–4") ranch headquarters on Twenty One Mile Butte, about ¾ mile west of county road from Gillette to Savageton via "4–J" ranch and about 20 ft. north of highest point of mass of hard rocks. To reach from Gillette, take road to "4–J" ranch and ask directions through pasture to butte. Truck can be driven within about 75 meters (246 feet) of station. Surface mark is iron pipe with screw cap. Underground mark is tablet. Reference mark is tablet in rock, 20.562 meters (67.46 feet) from station in azimuth 162°09′. Elevation: 1,588.0 meters (5,210 feet).

Plane coordinates: (I), x=353,716.48 feet; y=1,256,164.00 feet. (II), x=922,767.32 feet; y=1,259,803.86 feet.

Barber (Campbell County, H. Odessey, 1925; 1934).—About 24 miles north of west from Gillette, 7 miles east of Powder River, 9 miles southeast of Echeta (a siding on the Chicago, Burlington & Quincy Railroad), ¾ mile northeast of old Fort McKinney road, on west end of highest point of flat butte with abrupt rocky slope on west, and about 60 feet north of south edge of rim (there is round-topped butte, slightly lower, a short distance eastward). To reach from Gillette, go 1.3 miles on U. S. Highway 16 to point about 100 feet north of an underpass under the Chicago, Burlington & Quincy Railroad tracks, here turn left onto graded dirt road and proceed 5.6 miles to Y fork, take left fork and follow main graded road 14.25 miles to cattle guard at end of graded road, cross guard and continue west on unimproved road 0.65 mile to forks, take right fork and go 0.4 mile to gate, pass through gate and continue 3.65 miles to small house on right side of road, from here continue 0.55 mile to gate, pass through gate and go 0.7 mile to a rail corral on left, continue 0.25 mile to forks, take right fork and go 1.25 miles to wire fence and end of truck travel. From this point pack north up south slope of butte to top and station site. Marked by standard station disk in iron pipe projecting 3 inches above surface of ground. Reference and azimuth marks (1934) are standard reference disks in bedrock, note 12a. Reference mark no. 1 is on northeast rim of butte, 156.82 feet from station in azimuth 245°05′. Reference mark no. 2 is on south rim of butte, 70.83 feet from station in azimuth 358°52′. Azimuth mark is in a saddle at southeast foot of small hump on ridge that extends northwest from butte on which station is located, and is 0.6 mile from station in azimuth 164°20′29″. Elevation: 1,429.4 meters (4,690 feet).

Plane coordinates: (I), x=283,072.95 feet; y=1,345,846.90 feet; grid azimuth to azimuth mark=164°55′17″.[8] (II), x=849,772.92 feet; y=1,347,603.40 feet; grid azimuth to azimuth mark=163°24′23″.[8]

Robinson (Sheridan County, H. Odessey, 1925; 1934).—About 8 miles southeast of Clearmont, about 2 miles northeast of Ralph Robinson's Ranch, in T. 53 N., R. 78 W., on northeast end of prominent range of hills, on ridge which slopes sharply to south and southeast, more gently to north, and is approached by a saddle to its immediate west. To reach from Clearmont post office, follow U. S. Highway 16 west 0.1 mile to lumber company, turn left one block, then right around schoolhouse, then left and go 0.25 mile to bridge over Clear Creek, from here follow main road south 8.1 miles to top of grade, turn left (northeast) onto unimproved road at oil drum (used for mail box) and go 0.6 mile, passing to right of schoolhouse, continue 0.1 mile, then take left fork and go 0.55 mile to gate and forks, take left fork straight

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

ahead 0.7 mile and pass through the Goodwater farmyard through gate to southeast of house, continue 0.55 mile to gate, take left fork through gate and go 1.2 miles to the Robinson Ranch, pass through gate to east of barn, then go northeast, passing around southeast end of garden 0.9 mile to crossroads at top of ridge, then turn right and go 0.75 mile, turn right and southeast onto dim road just over top of ridge, then go 0.5 mile around north slope of ridge to saddle, turn left and go east 0.2 mile up saddle to end of truck travel, continue 200 yards to east up steep rocky slope to top of ridge and station site. Marked by standard station disk in iron pipe, projecting 3 inches above surface of ground. Reference marks (established in 1934) are standard reference disks in outcropping bedrock, note 12a. No. 1 is on down slope of hill, 12.295 meters (40.34 feet) (slope) from station in azimuth 177°14′. No. 2 is on edge of hill, 219.34 feet from station in azimuth 263°32′. Azimuth mark (established 1934) is standard reference disk in concrete, note 11a, projecting 4 inches above surface of ground, and is 20 feet south of dim road, on down-slope of saddle, approximately ½ mile from station in azimuth 143°18′59″. Azimuth from station to following objects are: Tripod on cone-shaped peak, approximately 2 miles distant, 267°47′12″; rock cairn, approximately ½ mile distant, 284°49′; and west gable of tin-roofed ranch barn in valley, 59°07′. Elevation: 1,413.5 meters (4,637 feet).

Plane coordinates: (I), x=214,555.70 feet; y=1,423,699.39 feet; grid azimuth to azimuth mark=144°05′06″.[8] (II), x=779,214.81 feet; y=1,423,616.71 feet; grid azimuth to azimuth mark=142°33′52″.[8]

Buffalo (Johnson County, H. Odessey, 1925; 1934).—About 8 miles south of Buffalo, 300 meters (984 feet) east of Casper-Buffalo highway (U. S. Highway 87) in T. 49 N., R. 82 W., on high graveled grassy round-topped butte which is highest point in immediate vicinity. To reach from Buffalo post office, follow U. S. Highway 87 south 7.9 miles to point where graded dirt road turns off to left just before top of ridge, continue south on highway 0.45 mile to dirt road leading off to left, turn left (east) onto this road through gate, then bear left and northeast 0.25 mile on dim road to top of saddle, leave road here and bear left up hill about 150 meters (492 feet) to top and station site. Surface mark is standard station disk set in 3-inch iron pipe. Underground mark is tablet. Reference marks and azimuth mark are standard reference disks in concrete, note 11a. Reference mark no. 1 is 99.55 feet (slope) from station in azimuth 293°08′. Reference mark no. 2 is 22.16 meters (72.7 feet) (slope) from station in azimuth 178°52′. Distance between reference marks no. 1 and no. 2 is 144.14 feet. Azimuth mark is 40 feet east of center line of highway, 2 feet east of north-and-south fence line marking right-of-way, 6 feet south of wire gate in fence, and 0.3 mile from station in azimuth 21°31′30″. Elevation: 1,635.4 meters (5,365 feet).

Plane coordinates: (I), x=97,617.06 feet; y=1,302,808.01 feet; grid azimuth to azimuth mark=22°35′45″.[8] (II), x=665,524.43 feet; y=1,299,683.17 feet; grid azimuth to azimuth mark=21°05′04″.[8]

Whitmeyer (Sheridan County, H. Odessey, 1925).—About 12 miles by road northwest of Clearmont, 1¼ miles south of east of Barrel Springs (noted spring on ranch leased by R. M. Fadden), on butte ¼ mile north of road, 1 mile southeast of ranch house, and 60 feet east of 12-foot high cairn. To reach from Clearmont, go north about 1 mile on Custer Battlefield Highway to road leading up Whitmeyer draw, follow this road to head of draw at crest of divide, and continue to butte about ¼ mile north of road. To reach from Sheridan, follow old Custer Battlefield Highway 14.5 miles, take left-hand road, follow to Barrel Springs, and continue southeast 1 mile to station site. Truck can be driven to point about 100 meters (328 feet) from station. Station mark (not described) is set in rock. Reference mark no. 1 (not described) is set in rock 9.585 meters (31.45 feet) from station in azimuth 343°03′. Station *Leiter, reference mark* (*U. S. G. S.*) (see description thereof) is 15.790 meters (51.80 feet) from station in azimuth 92°57′. Elevation: 1,453.0 meters (4,767 feet).

Plane coordinates: (II), x=711,191.18 feet; y=1,491,126.33 feet.

Banner (Sheridan County, H. Odessey, 1925).—About 3 miles direct and 4 miles by road and trail west of Banner post office, 15 miles directly south of Sheridan, on east end of spur of Big Horn Mountains, about 150 meters (492 feet) west of eastern end of point, on highest part of ridge, and just east of

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

depression cut out by effects of wind. Point is plainly visible from Banner in magnetic bearing 256°. Southern slope of ridge is partly covered with timber, and there is no timber on top. To reach, follow Sheridan-Casper highway to Banner post office, proceed north about ½ mile to house on right and large barn on left, follow right-hand road to Eldred's place about 2 miles distant, and follow old wood road which leads to top of ridge a short distance from station. Truck can be driven about ½ mile beyond the Eldred's place and pack carried about ½ mile to station site. Surface mark is iron pipe. Underground mark is tablet. There are no reference marks. Elevation: 1,941.5 meters (6,370 feet).

Plane coordinates: (II), x=604,669.21 feet; y=1,434,533.12 feet.

Badger (Sheridan County, H. Odessey, 1925).—About 18 miles air line northeast of Sheridan, 2½ miles north of Badger Creek and about 2 miles south of Wyoming-Montana State line, on one of high points of Badger Hills, about ½ mile north of old stone quarry which is on bluff at south end of ridge on which station is located. To reach from Sheridan take mail-route road to Badger Creek bridge, then take road leading eastward up north side of creek 8 miles to schoolhouse on right and large stone sheep shed on left. At point of ridge making down from north just east of schoolhouse take road leading north to house ¼ mile distant, pass through lots and follow plain road north and west up to stone quarry mentioned above. From there follow ridge north to station. Wire fence crosses ridge 200 meters south of station. Truck can be driven to base of ridge on which station is located. Type of station and reference marks established not recorded but probably standard disks in concrete or rock. Reference mark no. 1 is 6.120 meters (20.08 feet) from station in azimuth 51°53′. Elevation: 1,427.3 meters (4,683 feet).

Plane coordinates: (II), x=668,648.81 feet; y=1,568,787.28 feet.

Columbus (Sheridan County, H. Odessey, 1925).—About 3½ miles air line southwest of Parkman, ¾ mile south of Charley Paulus' house, on sharp-peaked ridge on divide between Columbus Creek and Twins Creek, ½ mile east of road from Parkman which makes around western end of ridge, on highest point in vicinity. Station is about 10 feet north of west from iron pipe marking station *Columbus* (*U. S. G. S.*) To reach station go to Parkman, take road leading south across viaduct over Chicago, Burlington & Quincy Railroad tracks, follow road south and west to Charley Paulus' house. From there truck can be driven through pasture to point ½ mile from station. Surface mark is tablet on iron pipe. Underground mark is tablet. Station *Columbus* (*U. S. G. S.*) (see description thereof), marked by iron pipe projecting 2 feet above surface of ground, is 3.703 meters (12.15 feet) from station in azimuth 307°46′. Elevation: 1,652.2 meters (5,421 feet).

Plane coordinates: (II), x=484,254.25 feet; y=1,552,298.62 feet.

Red (Big Horn County, Mont., H. Odessey, 1925).—About 2½ miles north of Wyoming-Montana State line, 2 miles east of Owl Creek, on highest point on extreme western edge of Wolf Mountains, on hill which has an abrupt red bluff and some small pine trees on the northeast side, top of hill covered with grass. Station is on highest point seen from southwest or west, easily recognized. To reach from Ranchester go to elevator at Ohlman, then north to Owl Creek. Old dim road from Owl Creek leads up through hills to pass about 1¼ miles north of station. Old road can be traveled only with saddle and pack animals. Station is 12 feet from west bluff, and is marked with iron pipe. Station *Red Bluff* (*U. S. G. S.*) (see description thereof), marked with iron pipe bench mark, is 34.210 meters (112.24 feet) from station in azimuth 200°14′. Elevation: 1,660.4 meters (5,447 feet).

Plane coordinates: (II), x=536,462.14 feet; y=1,592,478.83 feet.

Rosebud (Big Horn County, Mont., H. Odessey, 1925; 1934).—About 10 miles west of Kirby post office, 10 miles east of Lodge Grass, and about 4½ miles northwest of Lodge Grass-Sioux Pass-Kirby Road at Jim Brown's place, 2 miles west of Philip Miles' Ranch, on grassy hill highest in vicinity, covered with small pine trees on north slope, on west side of Rosebud Mountains. The top, east, south, and west sides are covered with grass, and very top has appearance of reddish clay. The slopes are steep on north, west, and south sides, but there is a long slope to southeast. To reach from Lodge Grass, go south 0.85 mile on U. S. Highway 87, leave highway, turn left (east) and go 1.0 mile on graded road to where it turns south, continue straight east and follow main road up Gray Blanket Creek 6.1 miles to cattle guard, continue 2.35 miles to forks, take left fork and go 0.2 mile to another forks, take right fork, leaving main graded road and go 0.85 mile to top of divide, from here station can be seen about ½

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mile to north. A truck with compound low gear can be driven to station by leaving road and going northeast to saddle and thence left through fence up onto top of hill. Marked by standard 3-inch pipe-capped mark projecting 10 inches above ground. Reference marks and azimuth marks are standard reference disks in outcropping bedrock, note 12a. Reference mark no. 1 is 18.79 meters (61.6 feet) (slope) from station in azimuth 34°30′. Reference mark no. 2 is 23.42 meters (76.8 feet) (slope) from station in azimuth 98°04′. Distance between reference mark no. 1 and no. 2 is 22.5 meters (74 feet). Azimuth mark is 4 paces northwest of well-used dirt-track road, close to several large boulders, and 0.5 mile from station in azimuth 18°23′50″. Elevation: 1,590.2 meters (5,217 feet).

Plane coordinates: (II), x=541,598.50 feet; y=1,693,230.26 feet; grid azimuth to azimuth mark=18°16′55″.[8]

Wyola (Big Horn County, Mont., H. Odessey, 1925).—About 9 miles air line, 13.7 miles by road southeast of Wyola, a small town on Chicago, Burlington & Quincy Railroad, about 2 miles south of road from Wyola to Stevens ranch on Lodge Grass Creek, on south side of mesa overlooking reed branches of Little Horn River and extending southwest and west 1 mile or more. Station is about 35 meters (115 feet) north of south end of mesa, about ½ mile west of southeast point of mesa, and 200 meters (656 feet) east of head of draw. To reach from Wyola take road up east side of Little Horn to first bridge 3 miles distant, at west end of bridge take road north ½ mile to end of lane, go through gate at left, and follow road to top of mesa, then southwest about 5 miles to west side of mesa overlooking Lodge Grass Creek, then turn south and follow dim road about 2 miles to southeast corner of wire fence. From there go about due east $\frac{3}{10}$ mile to station. Truck can be driven to station. Mesa is smooth and level. Station mark is iron pipe with screw cap tablet. Reference marks are tablets in concrete posts. No. 1 is 11.298 meters (37.07 feet) from station in azimuth 285°33′. No. 2 is 23.979 meters (78.67 feet) from station in azimuth 61°02′. Elevation: 1,525.9 meters (5,006 feet).

Plane coordinates: (II) x=433,198.80 feet; y=1,605,836.40 feet.

Wolf (Sheridan County, H. Odessey, 1925).—About 6½ miles northwest of town of Ranchester, very near the Wyoming-Montana State line, on most southwest knob of Wolf Mountains. To reach from Ranchester, go to elevator at Ohlman, then north to Owl Creek, where old road leads up hills about 1¼ miles to north of station, which is on west end of hill. Old road can be traveled only with saddle and pack animals. Another road leads to old coal mine, which is about 2 miles from station. This can be traveled by truck with light load only. Type of mark established was not recorded, but is probably standard station mark mounted on iron pipe. Station *Wolf Mountain* (*U. S. G. S.*) (see description thereof), marked by iron pipe and screw cap tablet, is about 25 feet west of north-and-south fence crossing field, and 48.759 meters (159.97 feet) from station in azimuth 307°59′. Elevation 1,556.9 meters (5,108 feet).

Plane coordinates: (II), x=530,703.93 feet; y=1,578,837.24 feet.

Ranchester northwest base (Sheridan County, H. Odessey, 1925).—About 6 miles northwest of Ranchester, about 1.6 miles northwest of end of first tangent west of Ranchester along Chicago, Burlington & Quincy Railroad, on prolongation of northeast rail, about 1 mile north of grain elevator at Ohlman, in SW¼ sec. 32, T. 58 N., R. 86 W., about 150 meters (492 feet) west of county road, on highest point of ridge in formerly cultivated field, and on land owned by Perry Cooper who lives at base of ridge about 250 meters (820 feet) south from station. To reach follow Custer Battlefield Highway to Ohlman, and proceed north to Mr. Cooper's place which is first house on west side of road after crossing Chicago, Burlington & Quincy Railroad tracks. Station and reference marks are tablets in concrete posts. Reference mark no. 1 is 148.669 meters (487.76 feet) from station in azimuth 242°03′01″. No. 2 is 161.251 meters (529.04 feet) from station in azimuth 289°45′16″. Elevation: 1,247.1 meters (4,092 feet).

Plane coordinates: (II), x=515,546.07 feet; y=1,562,642.11 feet; grid azimuth to reference mark no. 2=289°42′43″.[8]

Ranchester southeast base (Sheridan County, H. Odessey, 1925).—About ½ mile northwest of depot at Ranchester, 170 meters (558 feet) northwest of

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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Chicago, Burlington & Quincy Railroad track, 18 meters (59 feet) east of east fence line along Custer Battlefield Highway, and 9 meters (30 feet) southeast of upper irrigation ditch on southeast slope of ridge. Station and reference marks are tablets in concrete posts. Reference mark no. 1 is 341.087 meters (1,119.05 feet) from station in azimuth 325°55′38″. No. 2 is 168.160 meters (551.70 feet) from station in azimuth 4°41′23″. Elevation: 1,167.2 meters (3,829 feet).

Plane coordinates: (II), x=541,519.08 feet; y=1,548,214.01 feet; grid azimuth to reference mark no. 1=325°48′51″.[8]

Fort Smith (Big Horn County, Mont., H. Odessey, 1925; 1934).—About 3 miles south of old Fort Smith, about 3 miles from the Fort Smith farmhouse on bearing 175° (magnetic), and just to west of sheepherders wind break of stone, on highest point of high, bare ridge (just north of Lime Kiln Creek), extending in northwest and southeast direction with rather steep slope on northwest side and gently sloping to southeast. To reach from Hardin, go west from depot on north side of railroad tracks 0.9 mile, turn left, cross tracks and go 7.75 miles on graveled road in southerly direction to Big Horn River bridge, continue south and west 14.3 miles to Saint Xavier. Turn south at store, on graded gravel road and go south and west 14.9 miles to crossroads on north bank of irrigation ditch (this point is 0.35 mile south of an old Mission), cross ditch and continue southwest and south on main-traveled unimproved road 0.9 mile to top of mesa, continue south 0.55 mile to fork (Fort Smith Ranch Road on left), take right fork and go 1.55 miles, then take left fork and go 0.45 mile, then straight ahead on right fork 0.25 mile to gate, continue 0.55 mile to Lime Kiln Creek, cross creek and continue 50 yards to gate, pass through gate and continue (crossing creek again at 0.05 mile) south and southwest 3.85 miles (climbing steep grade on switch-back graded road to an iron gate nearly at top of ridge). Proceed 3.25 miles to fork, take left fork and go east on dim road 1.3 miles, leave main road, turn right, keeping to right of grove of trees, then left toward southeast end of ridge for 1.0 mile, turn left up ridge and go 1.0 mile to station site (after turning up ridge, traveling is quite rocky and steep, but easily made by keeping to the left of highest part of ridge). Marked by standard station disk in bedrock, note 3. Reference marks and azimuth mark are standard reference disks in outcropping bedrock, note 12a. Reference mark no. 1 is on same knoll, 16.038 meters (52.62 feet) from station in azimuth 205°15′. Reference mark no. 2 is on same knoll, 8.385 meters (27.51 feet) from station in azimuth 117°57′. Distance between reference marks no. 1 and no. 2 is 58.2 feet. Azimuth mark is on west ledge, along west edge of second and highest knoll to east-southeast, and 0.25 mile from station in azimuth 306°43′36″. Elevation: 1,583.5 meters (5,195 feet).

Plane coordinates: (II), x=355,092.14 feet; y=1,671,245.62 feet; grid azimuth to azimuth mark=307°07′34″.[8]

Pine (Big Horn County, Mont., H. Odessey, 1925; 1934).—About 14 miles northwest of Hardin, on extreme south end of mesa on south end of Pine Ridge. About 1¼ miles north of station ridge is timbered. Between timber and station is broad level mesa. To west and south country is broken. Two draws make up from the westward, one heads just north and other just south of station. Abrupt slope to east. Station Mesa (U. S. G. S.) was probably near same point. Pieces of wire and lumber were found nearby. Station is best reached from Hardin. Take road which crosses south end of Pine Ridge just south of timber. Just at the top of ridge the road forks; take left fork and follow dim road to eastern side of mesa and along eastern rim to station. Truck can be driven to station over fairly good roads. Surface mark is an iron pipe. Reference marks are in concrete. Reference mark no. 1 is 12.775 meters (41.91 feet) from station in azimuth 14°40′. No. 2 is 18.345 meters (60.19 feet) from station in azimuth 158°08′. Elevation: 1,212.1 meters (3,977 feet).

Haley (Yellowstone County, Mont., H. Odessey, 1925).—About 27 miles air line west of Hardin, 17 miles air line south of east from Billings, 5 miles south of the Custer Battlefield Highway, 5.8 miles by road south of Haley Farm house, which is one of first buildings on south side of highway east of schoolhouse. Station is on the highest point in vicinity, on southeast corner

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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of mesa, about 75 meters (246 feet) east of road south from Haley Farm buildings. Just west of station, road descends and leads eastward to badlands. Mesa forms divide between drainage to Big Horn River and Pryors Creek, and extends 10 or more miles south and from 1 to 5 miles east and west. About three-fourths of mesa is under cultivation. To reach station go to Custer Highway and follow it to Haley Farm, which is about 21 miles from Billings, about 29 miles from Hardin by road, and about 1 mile east of "Indian Arrow School" which is on Custer Highway and is same school from which road leads to Huntley also. From the Haley place follow road south through fields and pasture 5.7 miles to station. About 2½ miles south of Haley's at saddle in mesa the road forks, follow road to south. Truck can be driven to station. Character of station and reference marks not recorded. Reference mark no. 1 is 52.58 meters (172.5 feet) from station in azimuth 5°13′. No. 2 is 57.925 meters (190.04 feet) from station in azimuth 120°33′. Elevation: 1,276.0 meters (4,186 feet).

Huntley (Yellowstone County, Mont., H. Odessey, 1925).—About 14 miles air line north of east of Billings, 6 miles air line southeast of Huntley, 3 miles east of Pryors Creek, 4 miles west of north from schoolhouse on Custer Highway, ½ mile west of road leading north and west from schoolhouse to Squaw Creek, on highest point in vicinity, in cultivated field, westward of 2 grain sheds in same field, one about 300 meters (984 feet) and other about 500 meters (1,640 feet) distant, 75 meters (246 feet) south of draw heading up to westward, and 250 meters (820 feet) north of another draw. Between these two draws is a level ridge extending ½ mile to west. Station is just west of old rotted straw stack which has been partly burned. To reach station follow Custer Battlefield Highway to schoolhouse (1 mile west of Haley's Farm house) on mesa just east of descent to Pryor Creek. From schoolhouse go north about 1 mile to end of lane, then west ¾ mile to angling road running northwest across field. Follow road north and west to gate at south end of lane, turn west along south side of wire fence having iron fence posts. Go west about 300 meters (984 feet) to gate, through gate and around left side of cultivated field about ⅓ mile to station. Truck can be driven to station. Character of station and reference marks not recorded. Reference mark no. 1 is 338.3 meters (1,110 feet) from station in azimuth 318°38′42″. No. 2 is 89.62 meters (294.0 feet) from station in azimuth 22°13′. In 1925 new road was being built north and south about ¼ mile east of station. Elevation: 1,183.0 meters (3,881 feet).

Pryor (Yellowstone County, Mont., H. Odessey, 1925).—About 18 miles northeast of Pryor post office, 5 miles east of Pryor Creek, 1 mile east of head of Birdseye Creek, 8 miles southeast of the Marin schoolhouse, District No. 17, on the south side of mesa overlooking east fork of Pryor Creek. General Land Office map shows railroad up Pryor Creek. Old grade is there, but track has been taken up, and road abandoned. Best reached by Custer Highway to Pryor Creek, up Pryor Creek to Birdseye Creek, then ford Pryor Creek about 2½ miles above Marin schoolhouse. On east bank of creek take dim road on right leading up flat short distance, bearing to right and up point of ridge to southeast. Follow this road southeast up mesa to south side overlooking badlands, and East Fork, where road descends to badlands. Leave road at this point and go eastward along south side of rim of mesa to extreme southeast point. This is as far as truck can be driven. Station is on second high point eastward and bears 90° magnetic, about 1½ miles distant, near south edge of mesa. Station mark is iron pipe. Elevation: 1,413.4 meters (4,637 feet).

Blue (Yellowstone County, Mont., H. Odessey, 1925; 1931).—About 18 miles air line and 25 miles by road west of south of Billings, 9 miles west of north of Pryor post office, on highest point in vicinity, on extreme south end of mesa west of Pryor Creek, and near head of Blue Creek, 100 meters (328 feet) west of west boundary of Crow Indian Reservation. Mesa drops abruptly to south of station. Land to northward and westward of reservation line is under cultivation and there is shell outcrop near station covering several acres. To reach from Billings, take Billings-Pryor road crossing mesa, at point where road leaves mesa at head of draw, take road on right leading west on left of reservation fence, to gate on boundary fence line where road leads west through cultivated field. Follow road west about ⅓ mile, then head south to station, on highest point on south side of field, about 20 meters (66 feet) northeast of wire fence, which joins reservation fence 100 meters (328 feet) southeast at head

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of draw. Station may be reached from Marin schoolhouse on Pryor Creek, south about 1 mile to road leading west up draw, to Billings-Pryor road mentioned above. Station marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is in fence line, 132.658 meters (435.22 feet) from station in azimuth 301°09′14″. No. 2 is in fence line, 26.520 meters (87.00 feet) from station in azimuth 64°51′. Elevation: 1,509.4 meters (4,952 feet).

Reid (Yellowstone County, Mont., H. Odessey, 1925; 1931).—About 15 miles by road northwest of Billings, ½ mile north of Buffalo Highway, ¼ mile north of Sam Reid's house, 70 meters (230 feet) east of graded road, on highest point of ridge. To reach from Billings, take Buffalo Highway westward over hogsback. This road leads onto high tableland about 14 miles from Billings, from top of hill at east edge of tableland follow highway westward about ½ mile to first road north, then north about ½ mile to crest of ridge and station, 70 meters (230 feet) east. Mark is standard station disk in concrete, note 1a. Character of reference marks not recorded, but probably standard reference disks in concrete or rock. Reference mark no. 1 is 83.43 meters (273.7 feet) from station in azimuth 90°23′. No. 2 is 51.91 meters (170.3 feet) from station in azimuth 179°14′. Elevation: 1,289.0 meters (4,229 feet).

Shayne (Carbon County, Mont., H. Odessey, 1925; 1931).—About 10 miles air line southeast of Columbus, 9 miles air line and 11 miles by road west of Joliet, 6 miles north of west from Pine Tree schoolhouse, on highest point of Shayne Ridge, a high tableland partly under cultivation. Station is in cultivated field, 170 paces south of road, and 120 paces east of wire fence. This is most easterly field on top of ridge, now in cultivation. Best reached from Joliet, taking Columbus road 5 miles, then south ½ mile to Pine Tree schoolhouse. From there keep right-hand road to top of ridge. Station is reached from Columbus by Joliet road to signboard 5 miles from Joliet, then south ½ mile to Pine Tree schoolhouse, then to Shayne Ridge. Truck can be driven to station over fairly good roads. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 123.437 meters (404.98 feet) from station in azimuth 69°44′58″. No. 2 is 160.503 meters (526.58 feet) from station in azimuth 183°30′17″. Elevation: 1,507.9 meters (4,947 feet).

Beaver (Stillwater County, Mont., H. Odessey, 1925).—About 18 miles from town of Columbus, 10 miles south and 2 miles west of Rapelje, 3 miles east of White Beaver Creek, ¼ mile west of the Columbus-Busteed stage line road, in the SE¼ sec. 13, T. 1 N., R. 19 E., on highest point of east-and-west ridge, the divide between drainage to Yellowstone River and Lake Basin, in cultivated field, on land owned by J. B. Newcomer. To reach from Rapelje go south 3½ miles, then west 1 mile, then southeast 1½ miles to road leading onto ridge, follow public road southward to crest of ridge. From Columbus take Busteed road to top of divide. Station is ¼ mile west on highest point of ridge, about 300 meters (984 feet) northwest of Newcomer farmhouse. Station marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 337.94 meters (1,108.7 feet) from station in azimuth 303°52′43″. No. 2 is 287.48 meters (943.2 feet) from station in azimuth 258°30′50″. Elevation: 1,513.4 meters (4,965 feet).

Weamer (Sweet Grass County, Mont., H. Odessey, 1925).—About 15 miles air line north of east from Big Timber, 5 miles east of Sweet Grass Creek, 4½ miles north of State Highway, on prominent round butte in SE ¼ sec. 6, T. 1 N., R. 17 E., about ½ mile southwest of Frank Weamer's house. This is same butte on which station Wilson (U. S. G. S.) probably was established, marked by stone monument 7 feet high. Monument answering this description is on butte. No other mark found. Station is 5 feet southwest of stone monument. Road leads from highway, about 5 miles south of station, into Frank Weamer's place, and road from the west up Sweet Grass Creek, then to Weamer's place. Station mark is iron pipe. Elevation: 1,579.5 meters (5,182 feet).

Elk (Sweet Grass County, Mont., H. Odessey, 1925).—About 22 miles air line south of Big Timber, about 7 miles east of Boulder River, on high spur ridge at head of drainage of Elk Creek, and about ¾ mile southwest of Lodge Pole trail at point where the trail crosses top of ridge. Ridge extends to northeast and southwest, one branch of Elk Creek heads to south of station and one to north, trail going up latter. Western side of ridge consists of bare rocks and is very steep, eastern side is partly covered with timber and grass and is

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easily traveled. Station is on highest knob, about 25 feet north of highest point, which is a mass of rough projecting rock. To reach station go to Big Timber, and take road up Boulder River. About 3 miles above McLeod Hot Springs, take road to left which leads up East Boulder River, go up East Boulder to Elk Creek, then up Elk Creek to end of road, from which point station can be seen, bearing 75° magnetic, about 3¾ miles distant. From end of road take Lodge Pole Trail up left branch of Elk Creek to summit, which point is about ¾ mile northward of station at north end of ridge. Go around north end of ridge, then to station up eastern slope. Surface mark is iron pipe. Underground mark is standard station disk wedged in drill hole, note 8a. Reference mark is a standard reference disk in drill hole, note 12a, 15.17 meters (49.8 feet) from station in azimuth 54°08′. Elevation: 2,550.4 meters (8,367 feet).

Duck (Sweet Grass County, Mont., H. Odessey, 1925).—About 12 miles air line north of Hunters Hotsprings, on most southern spur of Crazy Mountains at head of Duck Creek, on most prominent hump of spur, about half way up from its base and top of mountain. From the east, southeast and south hump is very prominent and is easily recognized. To reach, follow Yellowstone trail to Hunters Hotsprings, just east thereof turn north and take road to Duck Creek. About 5 miles from Hunters and just above Payne's ranch, take right-hand road crossing divide between Duck Creek and East Duck Creek, and at top of divide, at northwest corner of cultivated field (about ⅓ mile beyond farmhouse on east side of road), and about 9 miles from Hunters Hotsprings, take dim road leading north up divide to station. Surface mark is iron pipe with screw cap tablet. Underground mark is standard station disk in drill hole, note 8a. Elevation: 2,773.6 meters (9,100 feet).

Livingston (Park County, Mont., H. Odessey, 1925).—About 7 miles southeast of town of Livingston, on highest point, on bare top of Baldy Peak, a well known peak plainly visible from Livingston. There is some timber lower down on peak and in all canyons below. To reach from Livingston go south across bridge and follow road in southeasterly direction over to creek and then up creek to ranch at base of mountain. Ranch house is about 3½ miles air line from station. Pack animals can be taken to station over circuitous route in about 3 hours. Mark is standard disk station mark in outcropping bedrock, note 2a. Reference mark is standard reference disk in outcropping bedrock, note 12a, 5.630 meters (18.47 feet) from station in azimuth 41°37′. Elevation: 2,838.6 meters (9,313 feet).

Mount Ellis (Gallatin County, Mont., H. Odessey, 1925).—About 8 miles air line southeast of Bozeman, 5 miles south of State highway, on highest point of Mt. Ellis, well-known mountain and highest point as seen from highway at Mt. Ellis Advent Settlement just west of Bear Creek. Another and lower point on north end of range about 3 miles south of highway is also sometimes called Mt. Ellis. To reach from Bozeman or Livingston, follow State Highway to Advent Settlement, then take Bear Creek Canyon road south about 2½ miles. From this point station can be reached with pack animals by following up spur to main ridge, then south to station, about 2-mile pack. Station is 17.5 meters (57 feet) south of triangular blazed 8-inch pine tree, 12.8 meters (42 feet) southeast of blazed 7-inch pine, and 5.18 meters (17 feet) east of 10-inch pine similarly blazed. Surface mark is an iron pipe. Underground mark is standard station disk in bedrock, note 8a. Elevation: 2,539.4 meters (8,331 feet).

Ross 2 (Gallatin County, Mont., H. Odessey, 1925).—Station site is the same as for station *Ross (1923)* (see description thereof) which had been destroyed. New station is marked by standard disk station mark, stamped "Ross 1925", set in same rock used for *Ross (1923)*. Old reference mark established for *Ross (1923)* is 2.775 meters (9.10 feet) from station in azimuth 323°56′.

Supplementary points

Cement Ridge lookout (Crook County, H. Odessey, 1925).

Plane coordinates:[9] (I), x=785,537.63 feet; y=1,345,933.64 feet.

G. L. O. Station 1 eccentric (Lawrence County, S. Dak., H. Odessey, 1925).—Identical with reference mark no. 1 of *G. L. O. Station 1* (see description thereof). Elevation: 1,991 meters (6,532 feet).

[9] No check on this position.

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Plane coordinates: (I), x=791,696.11 feet; y=1,289,710.07 feet; grid azimuth to *G. L. O. Station 1*=359°19′38″.[8]

G. L. O. Station 1 (Crook County, Wyo., Lawrence County, S. Dak., H. Odessey, 1925).—Station is identical with milepost 83 and is on Wyoming-South Dakota boundary in T. 49 N., R. 60 W., sixth principal meridian, or T. 3 N., R. 1 E., Black Hills meridian. Marked by 3-inch iron post. Reference mark no. 1 (identical with *G. L. O. Station 1 eccentric*) is 166.587 meters (546.54 feet) from station in azimuth 180°06′10″. Reference mark no. 2 is 10.285 meters (33.74 feet) from station in azimuth 264°50′. Elevation: 1,904 meters (6,247 feet).

Plane coordinates:[9] (I), x=791,702.56 feet; y=1,289,163.56 feet.

G. L. O. Station 2 eccentric (Crook County, H. Odessey, 1925; 1928).—Identical with reference mark no. 2 of *G. L. O. Station 2* (see description thereof). Elevation: 1,549 meters (5,082 feet).

Plane coordinates: (I), x=716,352.95 feet; y=1,409,715.67 feet; grid azimuth to *G. L. O. Station 2*=302°35′00″.[8]

G. L. O. Station 2, reference mark no. 3 (Crook County, H. Odessey, 1925; 1928).

Plane coordinates:[9] (I), x=716,475.55 feet; y=1,409,868.43 feet; grid azimuth to *G. L. O. Station 2*=333°52′30″.[8]

G. L. O. Station 2, reference mark no. 1 (Crook County, H. Odessey, 1925; 1928).

Plane coordinates:[9] (I), x=716,477.01 feet; y=1,409,875.23 feet; grid azimuth to *G. L. O. Station 2*=334°31′21″.[8]

G. L. O. Station 2 (Crook County, General Land Office, 1928).—The standard corner of secs. 31 and 32, T. 53 N., R. 62 W., at the corner of fences bearing south and west, on the southeast slope of a heavily-timbered and brushy hill. To reach from Sundance, Wyo., follow Custer Battlefield Highway east about 1½ miles, turn left and go about 10 miles on road to Farrall, then take another road to a large ranch house, which is at end of truck travel. Station site is about 1 mile north and west. Marked by 2-inch iron post with brass cap bearing inscription to identify sections, etc., and the date, 1928. Station is witnessed by two bearing-trees and three reference marks. *G. L. O. Station 2, reference mark no. 1* is a brass disk marked "Reference No. 1 1925" with arrow pointing toward station, cemented in sandstone ledge 5½ feet by 2½ feet projecting 1 foot above ground, and 115.974 meters (380.49 feet) from station in azimuth 155°06′19″. Reference mark no. 2 (identical with *G. L. O. Station 2 eccentric*) is a brass disk marked "Reference No. 2 1925" with arrow pointing toward station, cemented in a sandstone boulder on top of a spur which slopes southeast, and 104.096 meters (341.52 feet) from station in azimuth 123°09′58″. *G. L. O. Station 2, reference mark no. 3* is a 3-inch iron post 3 feet long with brass cap marked "Reference No. 3 1925" with arrow pointing toward station, 2.113 meters (6.93 feet) in azimuth 12°47′ from reference mark no. 1, and 114.309 meters (375.03 feet) in azimuth 154°27′28″ from station. Elevation: 1,541 meters (5,056 feet).

Plane coordinates:[9] (I), x=716,640.68 feet; y=1,409,531.74 feet.

G. L. O. Station 3 eccentric (Weston County, H. Odessey, 1925).—Identical with reference mark of *G. L. O. Station 3* (see description thereof). Type of mark not reported. Elevation: 1,454 meters (4,770 feet).

Plane coordinates: (I) x=680,956.75 feet; y=1,281,103.44 feet; grid azimuth to *G. L. O. Station 3*=229°46′59″.[8]

G. L. O. Station 3 (Crook-Weston Counties, H. Odessey, 1925).—Public Land Survey monument which marks standard corner of secs. 31 and 36, Tps. 49 N., Rs. 63 and 64 W., sixth principal meridian. Marked by brass disk in granite boulder. Reference mark (identical with *G. L. O. Station 3 eccentric*) is 110.913 meters (363.89 feet) from station in azimuth 50°15′53″. *Tps. 48 N., Rs. 63 and 64 W., secs. 1 and 6, closing corner* (see description thereof) 53.967 meters (177.06 feet) distant, is in azimuth 89°40′. Elevation: 1,440 meters (4,724 feet).

Plane coordinates:[9] (I), x=681,234.62 feet; y=1,281,338.37 feet.

Tps. 48 N., Rs. 63 and 64 W., secs. 1 and 6, closing corner (Crook-Weston Counties, H. Odessey, 1925).—Public Land Survey monument. Type of mark

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

not reported. *G. L. O. Station 3* (see description thereof) is 53.967 meters (177.06 feet) from station in azimuth 269°40′. Elevation: 1,431 meters (4,695 feet).

Plane coordinates:[9] (I), x=681,057.55 feet; y=1,281,335.88 feet.

G. L. O. Station 4 eccentric (Crook County, H. Odessey, 1925, 1931).—Identical with reference mark no. 1 of *G. L. O. Station 4* (see description thereof). Elevation: 1,514 meters (4,967 feet).

Plane coordinates: (I), x=648,626.17 feet; y=1,368,822.75 feet; grid azimuth to *G. L. O. Station 4*=20°40′15″.[8]

G. L. O. Station 4 (Crook County, H. Odessey, 1925).—Public Land Survey monument, which is quarter-section corner of secs. 7 and 12, Tps. 51 N., Rs. 64 and 65 W., sixth principal meridian. Marked by brass disk in granite boulder. Reference mark no. 1 is identical with *G. L. O. Station 4 eccentric* (see description thereof) and is 134.615 meters (441.65 feet) from station in azimuth 201°04′06″. Reference mark no. 2 is 27.699 meters (90.88 feet) from station in azimuth 58°33′. In 1931 station was obliterated by construction work of Wyoming Highway Department. Mark was left in place but buried under roadbed, and position has been perpetuated by four concrete posts set two on each side of Sundance-Charlie road near right-of-way fences. No. 1 is 62.5 feet; no. 2, 58.0 feet; no. 3, 77.5 feet; and no. 4, 73.0 feet from station. Elevation: 1,483 meters (4,865 feet).

Plane coordinates:[9] (I), x=648,470.32 feet; y=1,368,409.51 feet.

B. M. H 7 (Weston County, H. Odessey, 1925).—At Thornton, 65 meters (213 feet) northwest of railroad station and 18 meters (59 feet) northeast of main track of Chicago, Burlington & Quincy Railroad, on northwest side of road crossing, and just within right-of-way fence. Marked by standard bench mark cap on iron pipe. Elevation: 1,317.82 meters (4,323.5 feet).

Plane coordinates: (I), x=611,123.97 feet; y=1,273,902.63 feet.

G. L. O. Station 5 eccentric (Campbell-Crook Counties, H. Odessey, 1925).—Identical with reference mark no. 2 of *G. L. O. Station 5* (see description thereof). Elevation: 1,344 meters (4,409 feet).

Plane coordinates: (I), x=521,150.79 feet; y=1,332,757.49 feet; grid azimuth to *G. L. O. Station 5*=325°32′49″.[8]

G. L. O. Station 5 (Campbell-Crook Counties, H. Odessey, 1925).—Public land Survey monument, which is corner of secs. 7, 12, 13, and 18, Tps. 50 N., Rs. 68 and 69 W., sixth principal meridian. Marked by brass disk in concrete. Reference mark no. 1 is 22.26 meters (73.0 feet) from station in azimuth 54°17′. Reference mark no. 2 is identical with *G. L. O. Station 5 eccentric* (see description thereof), which is 187,380 meters (614.76 feet) from station in azimuth 145°36′16″. Elevation: 1,280 meters (4,199 feet).

Plane coordinates:[9] (I), x=521,498.56 feet; y=1,332,250.62 feet.

G. L. O. Station 6 eccentric (Campbell County, H. Odessey, 1925).—Identical with reference mark no. 1 of *G. L. O. Station 6* (see description thereof). Elevation: 1,312 meters (4,304 feet).

Plane coordinates: (I), x=404,386.73 feet; y=1,410,777.64 feet; grid azimuth to *G. L. O. Station 6*=144°19′32″.[8]

G. L. O. Station 6 (Campbell County, H. Odessey, 1925).—Public Land Survey monument, which is corner of secs. 28, 29, 32, and 33, T. 53 N., R. 72 W., sixth principal meridian. Marked by brass disk in concrete. Reference mark no. 1 is identical with *G. L. O. Station 6 eccentric* (see description thereof) and is 243.416 meters (798.61 feet) from station in azimuth 324°04′02″. Reference mark no. 2 is 17.962 meters (58.93 feet) from station in azimuth 51°17′. Elevation: 1,259 meters (4,131 feet).

Plane coordinates:[9] (I), x=403,921.01 feet; y=1,411,426.32 feet.

G. L. O. Station 7 eccentric (Campbell County, H. Odessey, 1925).—Identical with reference mark no. 1 of *G. L. O. Station 7* (see description thereof). Elevation: 1,512 meters (4,961 feet).

Plane coordinates: (I), x=362,200.48 feet; y=1,277,920.01 feet. (II), x=930,676.84 feet; y=1,281,779.88 feet.

G. L. O. Station 7 (Campbell County, H. Odessey, 1925).—Public Land Survey monument which is corner of secs. 31 and 36, Tps. 49 N., Rs. 73 and 74 W., sixth

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No check on this position.

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principal meridian. Marked by brass disk in concrete. Reference mark no. 1 is identical with *G. L. O. Station 7 eccentric* (see description thereof) and is 47.979 meters (157.41 feet) from station in azimuth 196°42′. Reference mark no. 2 is 16.074 meters (52.74 feet) from station in azimuth 137°45′. Elevation: 1,502 meters (4,928 feet).

Plane coordinates:[9] (I), x=362,154.26 feet; y=1,277,769.52 feet. (II), x=930,634.59 feet; y=1,281,628.19 feet.

G. L. O. Station 8 A eccentric (Johnson County, H. Odessey, 1925).—Identical with reference mark no. 1 of *G. L. O. Station 8 A* (see description thereof). Elevation: 1,396 meters (4,580 feet).

Plane coordinates: (I), x=268,985.66 feet; y=1,340,510.71 feet; grid azimuth to *G. L. O. Station 8 A*=110°10′34″.[8] (II), x=835,830.50 feet; y=1,341,896.21 feet; grid azimuth to *G. L. O. Station 8 A*=108°39′42″.[8]

G. L. O. Station 8 A (Johnson County, H. Odessey, 1925).—Public Land Survey monument which is closing corner of secs. 1 and 36, Tps. 50 and 51 N., R. 77 W., sixth principal meridian. Marked by 3-inch iron post in concrete. Reference mark no. 1 is identical with *G. L. O. Station 8 A eccentric* (see description thereof) and is 655.8 meters (2,152 feet) from station in azimuth 289°33′13″. Reference mark no. 2 is 265.8 meters (872 feet) from station in azimuth 327°40′48″. Corner of secs. 31 and 6, Tps. 50 and 51 N., R. 76 W., is identical with *G. L. O. Station 8 B* (see description thereof) and is 39.942 meters (131.04 feet) from station in azimuth 359°36′.

Plane coordinates:[9] (I), x=266,966.21 feet; y=1,341,252.81 feet; grid azimuth to reference mark no. 2=328°18′09″.[8] (II), x=833,792.03 feet; y=1,342,584.73 feet; grid azimuth to reference mark no. 2=326°47′17″.[8]

G. L. O. Station 8 B (Johnson County, H. Odessey, 1925).—Public Land Survey monument which is corner of secs. 31 and 6, Tps. 50 and 51 N., R. 76 W., sixth principal meridian. Marked by 3-inch iron post in concrete. Azimuth from station to *G. L. O. Station 8 A* (see description thereof), 39.942 meters (131.04 feet) distant, is 179°36′.

Plane coordinates:[9] (I), x=266,965.66 feet; y=1,341,121.77 feet. (II), x=833,794.94 feet; y=1,342,453.70 feet.

G. L. O. Station 9 eccentric (Sheridan County, H. Odessey, 1925).—Identical with reference mark no. 1 of *G. L. O. Station 9* (see description thereof). Elevation: 1,296 meters (4,252 feet).

Plane coordinates: (II), x=700,422.20 feet; y=1,528,827.88 feet; grid azimuth to *G. L. O. Station 9*=140°38′44″.[8]

G. L. O. Station 9 (Sheridan County, H. Odessey, 1925).—Public Land Survey monument which is standard corner of secs. 31 and 36, Tps. 57 N., Rs. 80 and 81 W., sixth principal meridian. Marked by 3-inch iron post set 26 inches in ground. Reference mark no. 1 is identical with *G. L. O. Station 9 eccentric* (see description thereof) and is 234.792 meters (770.31 feet) from station in azimuth 321°11′22″. Reference mark no. 2 is 15.517 meters (50.91 feet) from station in azimuth 79°08′. Elevation: 1,244 meters (4,081 feet).

Plane coordinates:[9] (II), x=699,933.75 feet; y=1,529,423.51 feet.

G. L. O. Station 10 eccentric (Sheridan-Johnson Counties, H. Odessey, 1925).—Identical with reference mark no. 1 of *G. L. O. Station 10* (see description thereof).

Plane coordinates: (II), x=678,461.68 feet; y=1,418,417.19 feet.

G. L. O. Station 10 (Sheridan-Johnson Counties, H. Odessey, 1925).—Public Land Survey monument which is corner of secs. 17, 18, 19, and 20, T. 53 N., R. 81 W., sixth principal meridian. Marked by brass disk in boulder surmounted by 2-inch iron post in mound of stone. Reference mark no. 1 is identical with *G. L. O. Station 10 eccentric* (see description thereof) and is 62.175 meters (203.99 feet) from station in azimuth 289°43′. Reference mark no. 2 is in azimuth 160°21′15″.

Plane coordinates:[9] (II), x=678,269.09 feet; y=1,418,484.44 feet.

G. L. O. Station 11 eccentric (Sheridan County, H. Odessey, 1925).—Identical with reference mark no. 1 of *G. L. O. Station 11* (see description thereof). Elevation: 1,231 meters (4,039 feet).

Plane coordinates: (II), x=577,827.09 feet; y=1,529,873.97 feet.

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

G. L. O. Station 11 (Sheridan County, H. Odessey, 1925).—Public Land Survey monument which is standard corner of secs. 31 and 32, T. 57 N., R. 84 W., sixth principal meridian. Marked by brass disk in concrete. Reference mark no. 1 is identical with *G. L. O. Station 11 eccentric* (see description thereof) and is 88.826 meters (291.42 feet) from station in azimuth 94°05′. Elevation: 1,205 meters (3,953 feet).

Plane coordinates:[9] (II), x=578,117.85 feet; y=1,529,854.29 feet.

Leiter, reference mark (U. S. G. S.) (Sheridan County, H. Odessey, 1925).—About 12 miles by road northwest of Clearmont, 1¼ miles south of east of Barrel Springs, on prominent butte at head of Whitmeyer Draw, and 7 feet east of 12-foot high rock cairn. Marked by U. S. Geological Survey aluminum tablet in rock. Station *Whitmeyer* (see description thereof) is 15.790 meters (51.80 feet) from station in azimuth 272°57′.

Plane coordinates:[9] (II), x=711,139.40 feet; y=1,491,128.44 feet.

Ranchester, water tower (Sheridan County, H. Odessey, 1925).

Plane coordinates:[9] (II), x=544,168.16 feet; y=1,546,134.64 feet.

Columbus (U. S. G. S.) (Sheridan County, H. Odessey, 1925).—About 3½ miles air line southwest of Parkman, ¾ mile south of Charley Paulus' house, on sharp peaked ridge on divide between Columbus Creek and Twins Creek, ½ mile east of road from Parkman which makes around western end of ridge, on highest point in vicinity. Station is about 10 feet south of east of station *Columbus*. Mark is iron pipe projecting 2 feet above surface of ground. Azimuth from station to station *Columbus* (see description thereof) 3.703 meters (12.15 feet) distant, is 127°46′.

Plane coordinates:[9] (II), x=484,263.81 feet; y=1,552,291.21 feet.

Red Bluff (U. S. G. S.) (Big Horn County, Mont., H. Odessey, 1925).—About 2½ miles north of Wyoming-Montana State line, 2 miles east of Owl Creek, on highest point on extreme western edge of Wolf Mountain, on hill which has an abrupt red bluff and some small pine trees on the northeast side, top of hill covered with grass. Marked by iron-pipe, bench mark of the U. S. Geological Survey. Station *Red* (see description thereof) is 34.210 meters (112.24 feet) from station in azimuth 20°14′.

Plane coordinates:[9] (II), x=536,500.81 feet; y=1,592,584.22 feet.

Wolf Mountain (U. S. G. S.) (Sheridan County, H. Odessey, 1925).—About 6½ miles northwest of town of Ranchester, very near the Montana-Wyoming State line, on most southwest knob of Wolf Mountain. Marked by iron pipe and screw cap tablet of the U. S. Geological Survey. Mark is about 25 feet west of north-and-south fence crossing field, and station *Wolf* (see description thereof) is 48.759 meters (159.97 feet) from station in azimuth 127°59′.

Plane coordinates:[9] (II), x=530,830.18 feet; y=1,578,738.99 feet.

G. L. O. Station 12 eccentric (Big Horn County, Mont., H. Odessey, 1925).—Identical with reference mark no. 1 of *G. L. O. Station 12* (see description thereof). Elevation: 1,398 meters (4,587 feet).

Plane coordinates: (II), x=484,866.11 feet; y=1,579,855.42 feet.

G. L. O. Station 12 (Big Horn County, Mont., H. Odessey, 1925).—A Public Land Survey monument, the closing corner of sections 34 and 35, T. 9 S., R. 35 E., principal meridian. Mark is brass disk in concrete, witnessed by two reference marks. No. 1, identical with *G. L. O. Station 12 eccentric* (see description thereof), is 83.572 meters (274.19 feet) from station in azimuth 236°12′. No. 2 is 39.214 meters (128.65 feet) from station in azimuth 138°40′. Elevation: 1,374 meters (4,508 feet).

Plane coordinates:[9] (II), x=484,638.15 feet; y=1,579,703.07 feet.

G. L. O. Station 11 (Big Horn County, Mont., H. Odessey, 1925).—A Public Land Survey monument, the quarter-section corner of section 31, T. 8 S., R. 34 E., principal meridian. Mark is brass disk in concrete, witnessed by one reference mark and the quarter-section corner of section 6, T. 9 S., R. 34 E. Reference mark is 12.821 meters (42.06 feet) from station in azimuth 146°01′. T. 9 S., R. 34 E., sec. 6, quarter-section corner (see description thereof) is 11.388 meters (37.36 feet) from station in azimuth 90°45′. Elevation: 1,509 meters (4,951 feet).

Plane coordinates: (II), x=434,004.32 feet; y=1,610,759.85 feet.

T. 9 S., R. 34 E., sec. 6, quarter-section corner (Big Horn County, Mont., H. Odessey, 1925).—A Public Land Survey mark, the quarter-section corner of

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

sec. 6, T. 9 S., R. 34 E., principal meridian. *G. L. O. Station 11* (see description thereof) 11.388 meters (37.36 feet) distant is in azimuth 270°45′.

Plane coordinates:[9] (II), x=433,966.94 feet; y=1,610,760.47 feet.

G. L. O. Station 10 eccentric (Big Horn County, Mont., H. Odessey, 1925).—Identical with reference mark no. 1 of *G. L. O. Station 10* (see description thereof). Elevation: 1,061 meters (3,481 feet).

G. L. O. Station 10 (Big Horn County, Mont., H. Odessey, 1925).—A Public Land Survey monument, the standard corner of sections 33 and 34, T. 5 S., R. 35 E., principal meridian. Mark is brass disk in concrete, witnessed by two reference marks. No. 1 is 18.132 meters (59.49 feet) from station in azimuth 315°43′. No. 2 identical with *G. L. O. Station 10 eccentric* (see description thereof) is 213.644 meters (700.93 feet) from station in azimuth 67°33′47″. Elevation: 1,004 meters (3,294 feet).

G. L. O. Station 9 (Big Horn County, Mont., H. Odessey, 1925).—A Public Land Survey monument, the corner of sections 19, 24, 25, and 30, Tps. 4 S., Rs. 32 and 33 E., principal meridian. Mark is brass disk in concrete, witnessed by two reference marks. No. 1 is 16.782 meters (55.06 feet) from station in azimuth 315°39′. No. 2 is 18.677 meters (61.28 feet) from station in azimuth 47°08′. Elevation: 953 meters (3,127 feet).

G. L. O. Station 6 eccentric (Yellowstone County, Mont., H. Odessey, 1925).—Identical with reference mark no. 1 of *G. L. O. Station 6* (see description thereof). Elevation: 1,120 meters (3,675 feet).

G. L. O. Station 6 (Yellowstone County, Mont., H. Odessey, 1925).—A Public Land Survey monument, the corner of sections 1, 6, 31, and 36, Tps. 2 and 3 N., Rs. 25 and 26 E., principal meridian. Mark is brass disk in concrete, witnessed by two reference marks. No. 1, identical with *G. L. O. Station 6 eccentric* (see description thereof), is 17.292 meters (56.73 feet) from station in azimuth 45°07′. No. 2 is 12.857 meters (42.18 feet), approximately northwest from station.

G. L. O. Station 5 eccentric (Stillwater County, Mont., H. Odessey, 1925).—Identical with reference mark no. 1 of *G. L. O. Station 5* (see description thereof). Elevation: 1,469 meters (4,820 feet).

G. L. O. Station 5 (Stillwater County, Mont., H. Odessey, 1925).—A Public Land Survey monument, the closing corner of sections 1 and 6, Tps. 1 S., Rs. 20 and 21 E., principal meridian. Mark is brass disk in concrete, witnessed by two reference marks. No. 1, identical with *G. L. O. Station 5 eccentric* (see description thereof), is 242,473 meters (795.51 feet) from station in azimuth 164°00′09″. No. 2 is 17.565 meters (57.63 feet) from station in azimuth 59°26′. Elevation: 1,411 meters (4,629 feet).

B. M. O 5 (Sweet Grass County, Mont., H. Odessey, 1925).—About 3 miles by road west of main street, Big Timber, and about 2.1 miles east of Dehart, 44 meters (144 feet) south of Northern Pacific Railroad milepost BGS 84, 2 feet south of railroad south right-of-way fence, 50 yards west of gate at private road crossing, about 30 yards south of main-line track, and 82 yards north of center line of State Highway. Mark is 3-inch brass tablet screwed on top of iron pipe. Elevation: 1,256.00 meters (4,120.7 feet).

G. L. O. Station 2 eccentric (Park-Sweet Grass Counties, Mont., H. Odessey, 1925).—Identical with reference mark no. 1 of *G. L. O. Station 2* (see description thereof). Elevation: 1,370 meters (4,495 feet).

G. L. O. Station 2 (Park-Sweet Grass Counties, Mont., H. Odessey, 1925).—A Public Land Survey monument, the closing corner of sections 2 and 3, T. 1 S., R. 12 E., principal meridian. Mark is brass disk in concrete, witnessed by two reference marks. No. 1, identical with *G. L. O. Station 2 eccentric* (see description thereof), is 87.442 meters (286.88 feet) from station in azimuth 343°40′. No. 2 is 16.923 meters (55.52 feet) from station in azimuth 89°41′. Elevation: 1,332 meters (4,370 feet).

G. L. O. Station 1 eccentric (Park County, Mont., H. Odessey, 1925; 1933).—Identical with reference mark no. 1 of *G. L. O. Station 1* (see description thereof). Elevation: 1,690 meters (5,545 feet).

G. L. O. Station 1 (Park County, Mont., H. Odessey, 1925; 1933).—A Public Land Survey monument, the standard corner of sections 31 and 36, Tps. 1 N., Rs. 8 and 9 E., principal meridian. Mark is brass disk in concrete, witnessed by two reference marks. No. 1, identical with *G. L. O. Station 1 eccentric*

[9] No check on this position.

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(see description thereof), is 108.339 meters (355.44 feet) from station in azimuth 244 34′16″. No. 2 is 27.681 meters (90.82 feet) from station in azimuth 152 48′. Elevation: 1,668 meters (5,472 feet).

ONE-HUNDRED-AND-EIGHTH MERIDIAN ARC

Principal points

Red Lodge (Carbon County, Mont., C. I. Aslakson, 1931).—About 2½ miles air line, east of town of Red Lodge, in pasture on highest point in immediate vicinity, on land owned by mining company. To reach from Red Lodge, go south on Main Street from post office. Turn left at end of street across Rock Creek; go up Bear Creek Hill 2¼ miles to point where main road starts down hill and dirt road leads off to left. Turn left on dirt road and follow it 1¾ miles to point about 100 yards west of where road turns north. Station is on highest point of this ridge about 100 yards north of road. Trucks can be driven to station. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is on bare ridge overlooking Bear Creek, 1.5 feet south of wire fence and opposite post no. 68 from corner at road, and approximately 0.5 mile from station in azimuth 307°14′56″. No. 2 is on range with circular patch of timber on east slope of first wooded ridge to west and 26.070 meters (85.53 feet) (slope distance) from station in azimuth 72°31′. Azimuth from station to highest point of Heart Mountain is 353°50′. Elevation: 1,773.4 meters (5,818 feet).

Plane coordinates: (II), x=19,363.12 feet; y=1,653,280.03 feet; grid azimuth to reference mark no. 1=308°34′18″.[8] (III), x=384,620.62 feet; y=1,648,050.79 feet; grid azimuth to reference mark no. 1=307°33′59″.[8]

Shriver (Carbon County, Mont., C. I. Aslakson, 1931).—About 3½ miles southeast of Shriver post office, in NE ¼ sec. 1, T. 8 S., R. 26 E., in Beartooth National Forest, on second highest point of Pryor Mountain, about 1 mile northwest of U. S. Forest Service triangulation station Ice Cave, in most easterly of 3 outstanding groups of rock outcrop near high ground. To reach from Bridger on U. S. Highway 310, go south from Model Garage 3.1 miles to crossroad at schoolhouse. Turn left here and go 1.8 miles to fork. Take left fork 2.7 miles to another fork. Take right fork 8.0 miles to Boulder store. Turn left here on road posted to Sage Creek Ranger Station and go 1.0 mile to four forks. Take main-traveled road to northeast 8.5 miles to gate onto forest reserve. Pass through gate and go 0.7 mile to gate into ranger station. Take left fork at this gate and go 2.8 miles to another fork. Take right fork and go 3.4 miles to Palmer Ranch. Here follow wagon road up bare ridge to southward and along ridge into woods. Just after entering woods the road forks. Take right fork and continue along road past two springs. In draw road degenerates to a trail. Follow up draw to fence. Turn right along fence to gate. Pass through gate and follow along edge of woods to sign on tree "Salt Ground 5." From here follow blazed trail to top of mountain. When rim of mountain is reached bear to right and follow rim around to east and north for about ½ mile and then bear left to station on high ground. Marked by standard disk station mark in outcropping bedrock, note 2. Reference marks are standard reference disks in outcropping bedrock, note 12a. No. 1 is 191.58 feet from station in azimuth 107°08′. No. 2 is 114.70 feet from station in azimuth 212°18′. Elevation: 2,671.9 meters (8,766 feet).

Plane coordinates: (II), x=203,214.19 feet; y=1,643,371.84 feet. (III), x=568,585.51 feet; y=1,641,370.78 feet.

Heart (Park County, C. I. Aslakson, 1931).—About 10 miles air line north by west of Cody, on very prominent isolated peak known as Heart Mountain. To reach from Cody, go north from Irma Hotel 1½ miles to railroad station. Keep straight ahead at railroad station up over bench to northward on main road 5¼ miles to point where dim wagon road leads off to right. This dim road is about 100 yards south of wooden bridge on main road. Follow wagon road to right 1.4 miles to fork. Take left fork about 4½ miles to shack in draw. Truck can be driven no farther. From shack go up draw directly toward peak until well-marked trail is encountered in patch of timber. Turn sharply to right on

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

trail and follow to crest of saddle east of mountain. At this point turn sharply to left and up hogback to station on peak. A 1½-hour back-pack. A plentiful supply of brackish water is at spring near shack. Marked by standard station disk in outcropping bedrock, note 2. Reference marks are standard reference disks in outcropping bedrock, note 12a. No. 1 is 21.94 meters (72.0 feet) (slope distance) from station in azimuth 282°51′. No. 2 is 16.85 meters (55.3 feet) (slope distance) from station in azimuth 90°08′. Elevation: 2,472.7 meters (8,113 feet).

Plane coordinates: (II), x=35,541.45 feet; y=1,462,339.41 feet. (III), x=404,126.33 feet; y=1,457,468.18 feet.

Sage (Park County, C. I. Aslakson, 1931).—About 9 miles air line southwest of Frannie, 9 miles air line north of Powell, 7 miles air line west of Deaver, in sec. 31, T. 57 N., R. 98 W., on eastern end of long, barren, high mesa, about 1 mile west of Frannie Canal. To reach from Deaver, go west on U. S. Highway 14 about 6.5 miles to dirt road to right shortly after getting on macadam. Turn right on this road and go 0.6 mile to forks just after crossing canal. Take right fork 0.6 mile. Take left fork 0.2 mile to bridge across canal. Cross bridge and go 0.6 mile to fork. Take left fork 0.5 mile to pipe line and road along it on ridge. Make right turn along pipe line toward rock cross and follow road along pipe line 1.4 miles to where it swings to left up along draw and dim road forks to right and crosses draw near its mouth just below exposed section of pipe in draw. Cross small draw to right here and follow along larger draw about 100 feet. Here a very dim wagon road can be seen crossing large draw to right. Turn right on this dim road and follow it as it winds up onto mesa and along top of mesa. Continue along it until rock cairn can be seen to right. Then bear right to cairn and station. It is about 1½ miles from pipe line in draw to station. Truck can be driven along road up onto mesa only in dry weather. Be very careful of high centers. Marked by standard disk station mark surrounded by triangle chiseled in outcropping bedrock, note 2a. Reference marks are standard disk reference marks in outcropping bedrock, note 12a. No. 1 is 33.394 meters (109.56 feet) from station in azimuth 283°27′. No. 2 is 8.070 meters (26.48 feet) from station in azimuth 51°40′. *U. S. G. S. cairn near station Sage* is 9.22 meters (30.2 feet) from station in azimuth 96°56′. Elevation: 1,550.9 meters (5,088 feet).

Plane coordinates: (II), x=138,999.09 feet; y=1,536,520.30 feet. (III), x=506,256.77 feet; y=1,533,425.42 feet.

Lovell (Big Horn County, C. I. Aslakson, 1931).—About 8 miles south of Lovell, in T. 55 N., R. 96 W., on low rocky-topped butte fringed with juniper. To reach from Lovell, follow U. S. Highway 310 to westward for 1.1 miles to where road turns south on east side of large white house. Turn south on this road 0.8 mile to crossroad. Keep straight ahead and go 1.1 miles to another crossroad. Keep straight ahead again and go 0.8 mile to fork. Take left fork and go 0.65 mile to pole and wire gate on left side of road. Turn in this gate and go 0.3 mile to farmhouse. Continue along road through three gates in farmyard and follow road 5.0 miles from house to station on right side of road. Mark is standard disk station mark in outcropping bedrock, note 2. Reference marks are standard reference disks in outcropping bedrock, note 12a. No. 1 is 12.76 meters (41.9 feet) from station in azimuth 338°24′. No. 2 is 3.21 meters (10.5 feet) from station in azimuth 84°52′. Following azimuths are from station: Powell, municipal tank, 94°16′15″; and Lovell, Great Western Sugar Co. tank, 171°20′35″. Elevation: 1,436.2 meters (4,712 feet).

Plane coordinates: (II), x=227,934.13 feet; y=1,481,846.32 feet; grid azimuth to Powell, municipal tank=95°00′27″.[8] (III), x=596,120.89 feet; y=1,480,315.39 feet; grid azimuth to Powell, municipal tank=94°00′38″.[8]

Tatman (U. S. G. S.) (Big Horn County, C. I. Aslakson, 1931).—About 10 miles southwest of Burlington, 7 miles south of Greybull River, and on eastern part of Tatman Mountain. To reach from Burlington go south, cross Burlington bridge over Greybull River, continue south about ¼ mile to road fork where left fork goes south over small bridge across wash and right fork goes west on north side of wash, take right fork, go 1.6 miles to right turn, continue 1.2 miles to fork, take right fork, go 0.1 mile to point where main road goes straight ahead and dimmer road turns left just after crossing bridge over irrigation

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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ditch, take dim road, follow north of ditch ¼ mile to forks, take left fork, go 0.3 mile to lane, turn left into lane, go 0.8 mile to two houses (one a log house); from this point follow dim wagon road (too rough for trucks) up and over Burlington Gap to crest, continue over to shelf on south side of mountain, turn eastward along shelf toward east end of mountain, working up toward last small draw near east end of mountain. Wagon and team can be driven only to within ¼ mile of station. Station is near northern edge of small tableland on top of mountain, about 500 yards northeast of head of small draw mentioned above, and near east end of mountain. Surface mark is standard station disk in concrete, note 1a; underground mark is in drill hole in cross of U. S. G. S. mark on boulder. Reference mark no. 1 is standard reference disk in concrete, note 11a, about on range with Burlington Gap, and 16.99 meters (55.7 feet) from station in azimuth 102°24′. Reference mark no. 2 is identical with *B. M. (U. S. G. S.) near station Tatman (U. S. G. S.)* and is iron pipe with brass cap projecting 2 feet above ground, 2.580 meters (8.46 feet) from station in azimuth 349°49′. Azimuth from station to Squaw Teat, western butte, highest point is 21°53′21″. Elevation: 1,822.0 meters (5,978 feet).

Plane coordinates: (II), x=203,524.17 feet; y=1,328,534.46 feet; grid azimuth to Squaw Teat, western butte, highest point=22°40′49″.[8] (III), x=574,374.17 feet; y=1,326,616.28 feet; grid azimuth to Squaw Teat, western butte, highest point=21°41′27″.[8]

Squaw (Park County, C. I. Aslakson, 1931).—About 15 miles (air line) east by south of Meeteetse, 31 miles (air line) west by north of Worland, about 6 miles (air line) north of Gooseberry Creek, in badlands near head of Fifteen Mile Creek, and on larger and westernmost of two buttes known locally as Squaw Teats. To reach from Worland go south from bridge across Big Horn River 8.4 miles on U. S. Highway 20 to point where road turns right on north side of Gooseberry Creek, turn right, follow main road west 26¼ miles up north side of creek to point where main road bears slightly to left (just before crossing small irrigation ditch) and dimmer road leads right along telephone and pipe lines, take road leading right, go 1.0 mile to gate, pass through gate, go 0.7 mile to another fork (left fork leads to Gillis Ranch, small hewn log house and small red tin barn), take right fork here, pass through another gate, go north 2.9 miles up over ridge to fork, take left fork, go 1.3 miles to another fork, take right fork, go 2.0 miles to another fork, take left fork, go 0.7 mile to foot of butte. Truck can be driven only this far, and to station is 15-minute hard back-pack. After passing through last gate, road consists of two well-worn wheel tracks, at each fork; follow most well-worn trail. Last fork is about 1 mile from station with flat ground between. Marked by standard station disk in boulder, note 4, with 5-foot rock cairn around observing stand. Reference marks are standard reference disks in rock outcrop, note 12a. No. 1 is 26.00 meters (85.3 feet) (slope distance) from station in azimuth 183°32′. No. 2 is 3.95 meters (13.0 feet) from station in azimuth 21°53′. *Squaw (U. S. G. S.)*, marked by copper bolt is distant 0.085 meter (0.28 foot) in azimuth 118°23′. Elevation: 1,882.6 meters (6,176 feet).

Plane coordinates: (II), x=173,647.14 feet; y=1,257,037.59 feet. (III), x=545,737.30 feet; y=1,254,622.56 feet.

Spence (Big Horn County, C. I. Aslakson, 1931).—About 2 miles (air line) south of west of Spence siding on Chicago, Burlington & Quincy Railroad, about 10 miles (air line) north-northwest of Greybull, in southern part of T. 54 N., R. 94 W., on western part of long, high, sharp hogback extending northwest and southeast across Big Horn River and locally known as Sheeps Mountain, and about 6 feet south of rock cairn on high point. To reach from First National Bank at Greybull go 1.7 miles on highway toward Lovell to where road just beyond viaduct turns to right, turn right, follow river and railroad 2.3 miles to fork, take right fork, go 4.4 miles to crossroad (keeping main road to right all the way), keep straight ahead at crossroad past Stucco siding, over railroad, through an underpass and across gulch to fork (1.7 miles from crossroad and 0.8 mile from underpass); at fork high point of mountain can be seen up hogback, follow up left fork until abreast of hogback, then go up hogback to station on high point (about an hour's climb from foot). Marked by standard station disk in drill hole in bedrock, note 2. Reference marks are standard reference disks in drill holes in bedrock, note 12a. No. 1 is 36.35

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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feet from station in azimuth 15°15′. No. 2 is 33.8 feet from station in azimuth 0°41′. Following azimuths are from station: Greybull, tall tank, 330°19′06″; Greybull, low tank, 330°00′08″. Elevation: 1,548.5 meters (5,080 feet).

Plane coordinates: (II), x=283,989.18 feet: y=1,444,967.70 feet; grid azimuth to Greybull, tall tank=330°54′04″.[8] (III), x=652,805.74 feet; y=1,444,418.71 feet; grid azimuth to Greybull, tall tank=329°54′22″.[8]

Worland (Washakie County, C. I. Aslakson, 1931).—About 7 miles (air line) northeast of Worland, 5 miles (air line) east of Big Horn River, about 1 mile southeast of some white buttes on western rim of badlands, in eastern part of T. 47 N., R. 92 W. To reach from Worland post office go east 7.4 miles on U. S. Highway 16 to top of long grade where dim road goes to right and another to left around a "Winding Road" sign and up steep pitch, turn left, follow road (which curves back to northeast and leads up along ridge) 1.6 miles to fork, take left fork, go 0.3 mile to another fork, take left fork, go 0.7 mile, take left turn and pull about 75 yards up pitch to station on highest point. Marked by standard station disk in concrete, note 1a. Reference marks are standard reference disks in bedrock, note 12b. No. 1 is 9.53 meters (31.3 feet) from station in azimuth 209°40′. No. 2 is 9.90 meters (32.5 feet) from station in azimuth 115°48′. Azimuth from station to *Worland, Holly Sugar Co. stack* is 63°53′44″. Elevation: 1,448.1 meters (4,751 feet).

Plane coordinates: (II), x=364,534.49 feet; y=1,234,358.55 feet; grid azimuth to *Worland, Holly Sugar Co. stack*=64°15′13″.[7] (III), x=736,979.21 feet; y=1,235,231.26 feet; grid azimuth to *Worland, Holly Sugar Co. stack*=63°16′08″.[7]

Owl (U. S. G. S.) (Hot Springs County, C. I. Aslakson, 1931; 1936).—About 25 miles air line west by south of Thermopolis, in Shoshone Indian Reservation, on most prominent point of Owl Creek Mountains, on divide between Muddy and Owl Creeks, and at head of Red Creek, tributary of Owl Creek. To reach from main intersection in Thermopolis, follow Owl Creek Highway west about 18 miles to end of pavement (first 5 miles was gravel in 1936); continue west on main graded road up valley 6.2 miles to wooden gate on left about 100 yards beyond creek bridge; gate bears sign "Keep Gate Closed, Brooks and Sawmill." Turn left through gate and go generally south on meandering and steep road 5.5 miles to Brooks Ranch; continue southeast and south up steep rough road 4.6 miles to sawmill. Continue 0.3 mile to forks; take right fork, cross creek, go up steep slope to top of ridge, then turn left and go south up slope on logging road to end of truck travel, about 0.6 mile from forks at creek crossing. From end of truck travel, follow logging trails and game trails to top of ridge, then go west to highest point and station. U. S. Geological Survey mark was removed and standard disk set in drill hole in small depression in bedrock. Depression may fill up, but point will be indicated by remains of cairn nearby. Reference marks are standard disks in bedrock, note 12a. No. 1 is 12.298 meters (40.35 feet) northwest of station in azimuth 145°23′; no. 2 is 6.570 meters (21.56 feet) east in azimuth 261°30′. Azimuth mark (1936) is standard disk in outcropping bedrock, note 12a, on first prominent point east of station, at rock cairn, and about 0.4 mile from station in azimuth 297°27′00″. Elevation: 2,957.1 meters (9,702 feet).

Plane coordinates: (II), x=136,808.40 feet; y=1,069,826.68 feet; grid azimuth to azimuth mark=298°23′44″.[8] (III), x=512,115.44 feet; y=1,066,833.29 feet; grid azimuth to azimuth mark=297°25′07″.[8]

Copper (Fremont County, C. I. Aslakson, 1931; 1936).—About 17 miles southeast by south of Thermopolis, about 15 miles north by east of Shoshoni, about 7 miles east of Wind River Canyon, about 2 miles southeast of head of Grass Creek, in northwest part of T. 40 N., R. 93 W., probably near line between sections 8 and 17, 2½ miles east of Gold Nugget Mine, about 1½ miles west-southwest of Jones Creek cow camp, at south edge of west end of local summit, about 100 yards west of local high point, 20 feet north of south edge of highest level of summit, on broad flat ledge. Station ridge is slightly wooded, and rises gradually from west, but is rough to east. To reach from main street in Thermopolis, follow U. S. Highway 20 south 4.1 miles or 0.1 mile beyond large steel bridge; bear left (east) on graded dirt road and go 4.6 miles; take right fork and go south on road to Gold Nugget Mine 8.9 miles to fork 0.1 mile south of lone shack

[7] This azimuth has been computed by the first formula (p. 70), using both terms.
[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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on creek; keep right fork (south) for 0.5 mile, pass to right of sheep camp, and go southwest 0.9 mile to gate at top of grade. Turn left through gate and go about 100 yards, then bear left onto dim road and go south along fence 0.8 mile; turn left through gate at southwest corner of fence and go east 0.1 mile; pass through corral, keep to left of old log cabin, and go east up draw and follow old road along south side of draw and up bare rocky slope 2.3 miles to summit and station. Station mark is standard disk in outcropping bedrock, note 3. Reference marks are standard disks in outcropping bedrock, note 12a. No. 1 is in range from station with prominent rocky-topped hill about 3 miles distant, in small rock outcrop, 12.190 meters (39.99 feet) northwest of station in azimuth 159°05′. No. 2 is on crest of summit, 7.496 meters (24.59 feet) southwest of station in azimuth 53°14′. *Copper azimuth mark* (see description and geographic position thereof) is marked by standard disk in outcropping bedrock, note 12a, and is about 3.0 miles east of station in azimuth 263°03′21″. *Worland, Holly Sugar Co., stack* (see geographic position thereof) may also be used as azimuth mark. Elevation: 2,457.8 meters (8,064 feet).

Plane coordinates: (II), x=314,446.31 feet; y=1,013,942.63 feet; grid azimuth to *Worland, Holly Sugar Co., stack*=185°07′22″.[7] (III), x=690,665.87 feet; y=1,013,986.09 feet; grid azimuth to *Worland, Holly Sugar Co., stack*=184°08′55″.[7]

Pilot (Fremont County, C. I. Aslakson, 1931; 1936).—About 4 miles east and 15 miles north of Fort Washakie, 3 miles northwest of Morton (small town on U. S. Highway 287), 7 miles east of Diversion Dam on Wind River, on south end of small rocky and very prominent butte, locally known as Pilot Butte, which is about 1 mile north of northwest end of Pilot Butte Reservoir, and 2½ miles north of Wind River. To reach from east end of Diversion Dam which is on Wind River and on U. S. Highway 287 about 34 miles via U. S. Highway 287 northwest of Riverton and 32 miles via State Highway 287 north of Lander, follow U. S. Highway 287 east 6.9 miles to crossroad 2.9 miles northwest of Morton. At this point there are two mail boxes on south side of highway; one of these is marked "M. Scott." Leave highway, turn left and go north on track road 0.4 mile to steel truss bridge over main canal; cross bridge and continue north 0.2 mile to fork; take right fork and go 0.3 mile to fork; take right fork and go 0.9 mile to top of road grade; leave road, turn right and go southeast and south across country along ridge 1.3 miles to end of truck travel at northwest toe of butte. From this point pack up steep butte to summit and station. About 3-minute pack. Mark is standard disk in outcropping bedrock, note 2. Reference marks are standard disks in outcropping bedrock, note 12a, flush with ground. No. 1 is 28.174 meters (92.43 feet) north of station in azimuth 187°18′; no. 2 is 3,573 meters (11.72 feet) southeast in azimuth 306°13′. Distance between reference marks is 30.066 meters (98.64 feet). Azimuth mark is standard disk in outcropping bedrock, note 12a, on north end of large sandstone outcrop about 12 feet wide, 7 feet high, and 60 feet long, on north slope of ridge extending west from station butte, and approximately 0.5 mile from station in azimuth 122°48′02″. *Washakie Needles, highest point* (see geographic position thereof), may also be used as azimuth mark. Azimuth from station to center of truss bridge over Wyoming Canal, distant about 1½ miles, is 71°18′. Elevation: 1,788.9 meters (5,869 feet).

Plane coordinates: (III), x=485,998.63 feet; y=934,076.21 feet; grid azimuth to azimuth mark=122°50′11″.[8]

Shoshone (Fremont County, C. I. Aslakson, 1931; 1936).—About 6½ miles air line southeast of Shoshoni, 9 miles east of Big Horn River, 3 miles south of Poison Creek, in southeast part of northwest quarter of T. 37 N., R. 93 W., on highest of group of low hills, top of which is rocky. To reach from intersection of U. S. Highways 20 and 320 in Shoshoni, follow Highway 320 west 1.5 miles to dirt road leading south just west of Poison Creek; turn left and at 1.7 miles take left fork; at 2.6 miles cross railroad track and go southeasterly on main-traveled road; at 3.7 miles enter north-south road from west and turn right (south); at 5.7 miles, "Y", bear left (southeast); at 6.8 miles, "Y", bear left; at 9.2 miles, "Y", bear left; at 10.6 miles, azimuth mark; at 10.9 miles, station is on highest point, 100 yards to left (north). Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference marks are standard

[7] This azimuth has been computed by the first formula (p. 70), using both terms.
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disks in outcropping bedrock, note 12c. No. 1 is 3.548 meters (11.64 feet) west of station in azimuth 108°09′; no. 2 is 12.960 meters (42.52 feet) north in azimuth 165°59′. Distance between reference marks is 11.466 meters (37.62 feet). Azimuth mark is standard disk in concrete, note 11a, flush with ground, about 4 yards south of center line of road at mileage 10.6 (see above), about 8 yards north of lone railroad tie post, and about 0.3 mile west of station in azimuth 88°22′06″. Azimuth from station to Shoshoni, water tank, is 127°21′48″. Elevation: 1,676.3 meters (5,500 feet).

Plane coordinates: (III), x=698,232.17 feet; y=916,705.42 feet; grid azimuth to azimuth mark=87°51′35″.[8]

Sandraw (Fremont County, C. I. Aslakson, 1931; 1936).—About 27 miles air line southeast of Riverton, about 8 miles air line east of south of mining village of Sandraw, about 2 miles north of Longs Creek, and on round-topped hill fringed on south slope with rimrock, on long high range of hills known locally as Rimrock Hills. To reach from junction of U. S. Highways 287 and 320 in Riverton, follow Highway 287 south, and at 1.1 miles, just after crossing river, turn left (south) onto gravel road leading to Rawlins and Sandraw; at 9.1 miles, "Y", take right fork; at 21.6 miles, "Y", take right fork (left fork leads to Sandraw, visible to east); at 28.4 miles turn left (south) onto trail-road at top of grade up rimrock; at 30.0 miles, road intersection, turn left; at 33 miles travel in wash for about ¼ mile; at 35.0 miles, dry pond and number of dim roads, turn left (northward) on dim road at northeast corner of pond and about 25 yards past another dim road; at 37.0 miles, small pond on south side of road, bear left; at 38.7 miles, water hole on south side of road at grassy flat in ravine; continue on 0.1 mile, take right fork up draw, and go easterly; at 39.5 miles, acute road intersection. From here station site is visible ¾ mile to north, near south end of ridge, and may be reached by going around south edge of rimrock to first saddle east of crest, or by turning left onto dim wagon road to top of grade, then bearing right along crest of slope to station. Trucks may be driven over either route. Station mark is standard disk in boulder, note 4. Reference marks are standard disks in boulders, note 12c. No. 1 is 35.550 meters (116.63 feet) east of station in azimuth 259°58′; no. 2 is 5.075 meters (16.65 feet) southeast in azimuth 323°19′. Azimuth mark is about 80 yards south of road to station at mileage 39.5, and is probably standard disk set in rock outcrop on north slope of knoll, about 2 feet above surface of ground, and about 0.7 mile from station in azimuth 19°52′57″. *Riverton, municipal water tank, finial* (see geographic position thereof) may also be used as azimuth mark. Following azimuths are from station; cairn on first ridge to west, distant about 3 miles, 113°47′32″; tip of more westerly and lower of two oil derricks, 223°53′06″. Elevation: 2,241.5 meters (7,354 feet).

Plane coordinates: (III), x=692,525.35 feet; y=758,918.98 feet; grid azimuth to azimuth mark=19°23′46″.[8]

Lander (Fremont County, C. I. Aslakson, 1931; 1936).—About 4½ miles air line south of Lander, near southern part of sec. 1, T. 32 N., R. 100 W., on top of Table Mountain. This mountain is long, flat-topped ridge, thickly covered with boulders. Long axis of ridge is about 1 mile in length, and width is ½ mile. It runs northeast and southwest. Station is about midway of long axis, 80 yards southwest of northeast edge of summit, 370 yards northeast of drift fence along southwest edge of summit, and almost directly above (west of) large boulder (which bears faint resemblance to barrel lying on its side) about 50 yards down southeast slope of mountain. To reach from Lander, go south to road intersection at the Wigwam; turn right and follow U. S. Highway 287 southeasterly 3.1 miles to side road right about 100 yards past small white schoolhouse. Turn right and follow winding ranch road to Roy Williams' ranch and end of truck travel. Pack horses or wagon may be obtained at ranch. From ranch follow wagon road about 1 mile to top of ridge. Station is visible from here on highest point of hill about 2½ miles southwest. Station mark is standard disk in boulder, note 4. Reference marks are standard disks in boulders, note 12d. No. 1 is in north side of large split boulder in range with small lake in valley, and 19.861 meters (65.16 feet) east of station in azimuth 282°50′. No. 2 is in boulder about 3 feet high,

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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22.408 meters (73.52 feet) southwest of station in azimuth 49°05′. *Lander azimuth mark* (see geographic position and description thereof) is standard disk in boulder, note 12d, about 0.4 mile west of station in azimuth 104°36′50″. *Mt. Arter azimuth mark* (see description and geographic position thereof) may also be used as azimuth mark. Azimuth from station to Proposer Coal Mine, tallest stack, is 238°13′39″. Elevation: 2,226.2 meters (7,304 feet).

Plane coordinates: (III), x=503,790.12 feet; y=762,167.87 feet; grid azimuth to Proposer Coal Mine, tallest stack=238°13′04″.[8]

Limestone (Fremont County, C. I. Aslakson, 1931).—About 17 miles (air line) south of Lander, in extreme eastern part of Washakie National Forest, and on small rim-rocked butte which is highest part of Limestone Mountain. To reach from "The Wigwam" at eastern edge of Lander, go southeast 9.1 miles on U. S. Highway 287 to road leading right posted "To Rock Springs", turn right, go 16.2 miles to bridge over small stream, continue 0.1 mile farther to Washakie National Forest sign on right side of road and Game Preserve sign on left, continue about 100 yards farther to top of grade, turn right onto dim wagon road up steep slope into woods (trucks can be driven up to first group of large trees), from this point follow trail up to top of ridge, and bear left to rocky butte and station, an easy 15-minute pack. Station mark is set in drill hole in south edge of rock ledge, about 8 feet north of south edge and little nearer west end. Reference marks are set in drill holes in same ledge. No. 1 is 6.06 meters (19.9 feet) (slope) from station in azimuth 250°31′. No. 2 is 18.08 meters (59.3 feet) (slope) from station in azimuth 130°06′. Following azimuths are from station: symmetrical cone-shaped peak on first high ridge, 100°12′01″; penthouse on roof of highest building in Lander, 180°01′26″. Elevation: 2,750.5 meters (9,024 feet).

Plane coordinates: (III), x=510,086.01 feet; y=696,612.85 feet; grid azimuth to symmetrical cone-shaped peak on first high ridge=100°10′30″.[8]

Green (Fremont County, C. I. Aslakson, 1931; 1933).—About 48 miles (air line) southeast of Lander, about 16 miles (air line) south of Sweetwater River, about 15 miles (air line) south-southwest of Meyer's Ranch on Sweetwater River, about 1 mile west of Haypress Creek, on bare-topped mesa near western end of Green Mountains and believed to be in south central part T. 28 N., R. 94 W. Mountains to east of station are higher and partly wooded. To reach from "The Wigwam" at edge of Lander go southeast 42 miles on U. S. Highway 287 to where road from Riverton via Sandraw comes in from north, continue on U. S. Highway 287 12.0 miles to where road turns left to large white house on river (Meyer's place), continue on Highway 287 2.8 miles, crossing slough and passing filling station on right, then up and along hill about 300 yards to point where dim road makes sharp turn to right around southeast end of small gravel pit, turn right through end of pit, go 0.6 mile to fork, take left fork, go 3.0 miles to where road runs into well-worn trail, turn right, go 0.15 mile to where trail leads to pond and very dim road forks to left, take road to left, go 0.8 mile to crossroad (crossing draw at 0.3 mile), turn left at crossroad, go 1.3 miles to another crossroad, turn right, go 0.9 mile to fork, take right fork, go 2.2 miles to clump of trees on west side of road, continue on road 0.1 mile keeping straight ahead at fork, and go 1.8 miles up draw (truck can be driven only 1 mile farther south to point about due east of station), go 1 mile south bearing to right across creek, and up sage brush slope to west to station, a 45-minute walk. Marked by standard station disk in bedrock, note 3. Reference marks are standard disks in bedrock, note 12b. No. 1 is 13.45 feet from station in azimuth 213°35′. No. 2 is 34.0 feet from station in azimuth 1°40′. Following azimuths are from station: highest mountain peak due west, 107°40′32″; Meyer's ranch house, west gable, 199°17′17″. Elevation: 2,361.9 meters (7,749 feet).

Plane coordinates: (III), x=693,214.67 feet; y=629,853.02 feet; grid azimuth to highest mountain peak due west=107°11′36″.[8]

Steamboat (Sweetwater County, C. I. Aslakson, 1931; 1933).—From Farson, brick hotel building with general store and filling station, on U. S. Highway 187 follow main South Pass and Lander road 17 miles to road leading eastward. An unused portion of this road leads to west at almost right angles with main road. Turn to right on this road and go 2.8 miles to Hay's Middle

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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Ranch, turn sharp to right on road leading south just before reaching gate and go 1.7 miles to fork, go 3.0 miles on right fork to wooden bridge across Morrow Creek, cross creek and go to left up creek on main-traveled road (passing fork to right at 2.1 miles and another fork to left at 4.7 miles) 9.4 miles to Fourteen Hundred Dollar Spring on left edge of road, continue 0.4 mile to fork, take right fork and go 0.5 mile, then 0.6 mile on another right fork to wash in road. Swing to right to cross wash and take right fork just after crossing. Go 1.1 miles to point where more-used road comes in from left, and continue 2.5 miles to fork. Follow left fork down into draw and go 4.2 miles to another fork. Mountain is in plain view most of the way. From this point mountain appears to be high, flat table-land with one high point flanked to left by some scattered trees. Turn left along side of fence and continue on road up over hill 1.4 miles to open glade in sage brush, turn left into this glade and work way up over shelf toward west end of mountain. After reaching top of shelf the best route lies along edge of rim southwest, southeast, and south to small narrow shelf at west end of mountain. After reaching this narrow shelf turn northeast along side slope into clump of aspen trees in draw. Pass through trees and continue up draw on north side to top of mountain. From this point station can be seen on rise about ½ mile to eastward. Station mark is standard disk station mark in bedrock, note 3. Reference marks no. 1 and no. 2 are standard reference disks in bedrock, note 12a. No. 1 is on tip of knoll approximately ¼ mile from station in azimuth 66°53′32″. No. 2 is on same knoll as station, and 12.205 meters (40.04 feet) from station in azimuth 152°17′. Reference mark no. 3 (1933) is standard reference disk in bedrock, note 12c, and 19.71 meters (64.7 feet) (slope distance) from station in azimuth 314°43′. Elevation: 2,652.2 meters (8,701 feet).

Plane coordinates: (III), x=441,267.79 feet; y=473,792.88 feet; grid azimuth to reference mark no. 1=67°02′12″.[8] (IV), x=803,872.53 feet; y=475,700.47 feet; grid azimuth to reference mark no. 1=66°08′42″.[8]

Red Desert (Sweetwater County, C. I. Aslakson, 1931; 1933).—About 19 miles (air line) northwest of Wamsutter, on Union Pacific Railroad, about 9 miles south of Lost Creek Lake, about 5 miles southeast by south of Red Desert Wells, in northwest part of T. 22 N., R. 95 W., and on long ridge on the Red Desert. To reach from Wamsutter go to road intersection at big electric sign "Broadway Hotel and Cafe" along Lincoln highway, thence north 0.1 mile on Red Desert Wells road to fork, take left fork, go 3.6 miles to Three Mile Ditch, cross ditch, take most traveled right road, go 3.0 miles to where road comes in from left, keep straight ahead here, go 4¼ miles to fork, turn right, on main road go 1.5 miles to fork, turn right on main road, go 2¾ miles to another fork, take right fork, go 5.7 miles to high point of ridge along road, here swing east, and go ¼ mile to station. In 1933 reported station best reached from Wamsutter by going north 7.9 miles on Red Desert Wells road to fork, continue straight ahead 1.7 miles to end of improved road, then straight ahead 0.1 mile to fork, take left fork, go 3.2 miles to crossroads, continue straight ahead 1.3 miles to point where there is gray mound of earth about 75 yards to right, continue 1.6 miles to fork, take left fork, go 0.5 mile to fork (where there is tin building 150 yards to left), take right main fork, go 5.0 miles, leave road and go to left in northwesterly direction 0.2 mile to station. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 26.485 meters (86.89 feet) from station in azimuth 225°47′. No. 2 is 25.208 meters (82.70 feet) from station in azimuth 352°14′. Following azimuths are from station: Wamsutter, beacon, 349°36′20″; edge of prominent high flat-topped mountain, 91°43′48″; edge of large long flat-topped mountain 97°10′38″. Elevation: 2,082.4 meters (6,832 feet).

Plane coordinates: (III), x=656,890.73 feet; y=446,842.31 feet; grid azimuth to edge of prominent high flat-topped mountain=91°20′43″.[8]

Table (Sweetwater County, C. I. Aslakson, 1931).—About 3½ miles (air line) east of Bitter Creek (town on Union Pacific Railroad), in northwest part of T. 18 N., R. 98 W., on west end of flat-topped butte known locally as Table Rock. To reach from Bitter Creek go south 0.35 mile on road along double row of telephone poles to fork just beyond first bridge south of town, turn

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

left, go 0.1 mile, cross Bitter Creek, go 0.2 mile to fork, take left fork, go 3.0 miles, then turn right and follow very dim road 0.6 mile up draw. Truck can be driven only this far, and station is about a 45-minute climb from this point (the east side of butte being easiest climb). Marked by standard station disk in bedrock, note 3. Reference marks are standard reference disks in bedrock, note 12b. No. 1 is 2.625 meters (8.61 feet) from station in azimuth 53°12′. No. 2 is 4.422 meters (14.51 feet) from station in azimuth 131°04′. Following azimuths are from station: high tip at north end of Black Butte 92°40′38″; Bitter Creek, airport beacon, 151°11′02″; Bitter Creek, Union Pacific Railroad, north water tank, 95°03′20″. Elevation: 2,286.0 meters (7,500 feet).

Plane coordinates: (III), x=573,337.72 feet; y=321,200.58 feet; grid azimuth to high tip at north end of Black Butte=92°29′58″.[8]

Quaking Asp (U. S. G. S.) (Sweetwater County, C. I. Aslakson, 1931).—About 12 miles (air line) southeast by south from Rock Springs, on summit of Quaking Asp Mountain, on sharpest point and third of about same elevation counting from west end of highest part of mountain. To reach from Rock Springs turn left (east) onto Pine Street from C Street (5½ blocks south of railroad crossing), go 1 block, turn right, go 1 block, turn left, follow main road out of town 0.3 mile beyond mine trestle over road to fork, keep left on main road 3.1 miles to right-angle turn to left, keep straight ahead on dirt road go 3.0 miles to fork, take right fork, go 3.9 miles to fork, take left fork up side of mountain, go 4.9 miles to Mountain Fuel Supply Co., sign at fork on top, take left fork, go 1.0 mile to fork, turn left, and go to camp of Mountain Fuel Supply Co., which is in plain view to north, pass through buildings to northward, go about 0.4 mile to fork, take left fork toward oil derrick, go 0.1 mile to point just across draw, turn right off road to oil derrick onto dim road leading up to top of mountain, follow dim road to top and bear right to high point and station. Marked by standard U. S. Geological Survey station disk in small partially buried boulder. Reference marks are standard reference disks in concrete, note 11a, projecting about 8 inches above ground. No. 1 is 25.20 meters (82.7 feet) from station in azimuth 303°03′. No. 2 is 15.82 meters (51.9 feet) from station in azimuth 32°36′. Following azimuths are from station: Rock Springs, water tank, 153°25′00″; *Boar's Tusk*, 173°28′12″; cairn on Aspen Mountain, 223°54′24″. Elevation: 2,645.0 meters (8,678 feet).

Plane coordinates: (III), x=399,440.27 feet; y=280,176.04 feet; grid azimuth to cairn on Aspen Mountain=224°08′58″.[8]

Kinney (Sweetwater County, C. I. Aslakson, 1931).—About 47 miles (air line) southeast of Rock Springs, about 30 miles (air line) south of Bitter Creek, about 7 miles north of Colorado State line, about 1½ miles east of Alkali Creek, in northwest corner of T. 13 N., R. 99 W., and on prominent butte on east end of high part of Kinney Ridge. To reach from Rock Springs, go south 4 miles on Browns Park road to fork, take left fork and follow main-traveled road 41.6 miles to another fork (posted by the Mountain Fuel and Supply Co.), take left fork and go 0.2 mile to another fork, take left fork (posted "Alkali Creek") and go 12.8 miles to fork with road sign "Wilson Dome", take right fork and continue 4.7 miles to point where road turns to right (wagon road comes in from back on left, and single wagon tracks lead toward ridge), station bears 75° magnetic from this point. Follow single wagon tracks about 100 feet to old road, turn right on this road, and go about 2 miles to foot of ridge, which is end of truck travel. Go up draw to top of ridge, turn right up slope to station site (about a 45-minute pack). To reach from Bitter Creek, go south 22 miles on main-traveled road to fork (from which the Kinney Ranch can be seen), turn right and go to the Kinney Ranch, from here go 0.5 mile east on main-traveled road to fork, take left fork, and go about 12 miles up and over Kinney Ridge to fork with sign (posted Wilson Dome), turn left and proceed as above. Marked by standard station disk in 4-inch pipe. Reference marks are standard reference disks in bedrock, note 12a. No. 1 is 59.179 meters (194.16 feet) from station in azimuth 70°36′. No. 2 is 90.70 meters (297.6 feet) from station in azimuth 152°49′51″. Azimuth from station to following points are: Steel oil derrick, 23°36′34″; *W. W. Wilson Lease, well no. 1*, 23°38′41″; and J. W. Tucker Lease, well no. 1, 66°38′35″. Elevation: 2,485.0 meters (8,153 feet).

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

Plane coordinates: (III), x=557,852.16 feet; y=163,851.76 feet; grid azimuth to J. W. Tucker Lease, well no. 1=66°30′18″.[8]

Brown (U. S. G. S.) (Sweetwater County, C. I. Aslakson, 1931).—About 33 miles south of Rock Springs, about 4.0 miles southwest of Maxon (Maxton) Ranch (owned by W. H. Gottche), in sec. 16, T. 13 N., R. 105 W., on divide between Red Creek and Front Creek (tributary to Sage Creek), on point bare of timber (second highest prominent point from east end of mountain), known locally as Little Mountain. To reach from Rock Springs go south on C Street about 5 blocks from arch at railroad, turn left onto Pine Street, go 1 block, turn right, go 1 block, turn left, and follow main-traveled road out of town 0.3 mile beyond mine trestle over road to fork. Take left fork, go 3.1 miles to another fork, take right fork, go 3.0 miles to another fork, take right fork, go 3.9 miles to another fork, take left fork, up mountain and follow main road toward Brown's Park, keep straight ahead 4.9 miles where road to left goes to South Baxter Camp, keep straight ahead at 12.3 miles where road posted "Brooks" turns to left, and at 14.9 miles where dim road turns to left toward pipe line and more used road to right ascends onto tableland; turn right, go 1¼ miles to fork. Take left fork, go 0.5 mile to another fork, take left fork, go 1.3 miles to another fork, take left fork, go 1.5 miles to another fork, take right fork, go 1.8 miles to another fork, take left fork, go 3.3 miles to where several roads come together at brow of hill, turn left, go 4.0 miles down hill onto Maxon ranch, which is visible all along descent into valley. From ranch building go southward about ½ mile along road to first fork to right at point above small meadow, turn right and follow road over ridge to corrals and dipping pen, go around northeast corner of corral, then go left on north side of corral, and follow log road up canyon to top of mountain and station site. Truck can be driven only ¾ mile beyond corral, and station is about an hour's walk from this point. There is a spring ½ mile beyond corral. Marked by standard U. S. Geological Survey disk in partially buried boulder. Reference marks are standard reference disks in outcropping boulders, note 12c. No. 1 is 113.97 meters (373.9 feet) (slope) from station in azimuth 212°14′49″. No. 2 is 10.59 meters (34.7 feet) (slope) from station in azimuth 286°21′. Azimuth from station to cairn on point, distant about 1 mile is 40°27′23″. Elevation: 2,732.2 meters (8,964 feet).

Plane coordinates: (III), x=362,431.53 feet; y=160,333.60 feet; grid azimuth to cairn on point=40°47′05″.[8]

Middle (Moffat County, Colo., C. I. Aslakson, 1931).—About 45 miles south-southeast of Rock Springs, about 45 miles southwest-by-south of Bitter Creek, about 1 mile south of the Wyoming State line, about 5 miles east of the Utah State line, in the southeast part of T. 12 N., R. 103 W., on round-topped mountain (that is wooded on all sides but bare on the top) known as Middle Mountain. To reach from Rock Springs, go 4.0 miles southeast on Browns Park road to fork, take left fork and go 41.6 miles to fork posted by the Mountain Fuel and Supply Co., take right fork posted "Canyon Creek Camp" and go 9.8 miles to road to right at J. W. Graham's mail box, turn right and go 1.6 miles to gate, take left fork just after passing through gate and go left on well-traveled road to another fork just beyond and follow 1.5 miles to Kershisnik's Ranch, there take road straight up Canyon Creek and go 2.5 miles to fork at third fence above ranch, take left fork and cross bridge and continue 0.1 mile to gate, pass through gate and go 0.2 mile to fork, take left fork and go 0.8 mile to spring, continue 1.3 miles to crossroads and keep straight ahead for 0.25 mile (as far as truck can be driven). From here station bears 198° magnetic (1½ hours' pack). Marked by standard station disk in outcropping bedrock, note 3. Reference marks are standard reference disks in bedrock, note 12a. No. 1 is 12.130 meters (39.80 feet) from station in azimuth 232°16′. No. 2 is 11.200 meters (36.75 feet) from station in azimuth 133°52′. Azimuths from station to following points are: *W. W. Wilson Lease, well no. 1*, 264°36′51″; and to first steel derrick north of W. W. Wilson Lease, well no. 1, 264°12′17″. Elevation: 2,913.7 meters (9,559 feet).

Plane coordinates: (III), x=446,125.85 feet; y=113,219.94 feet.

Zenobia (Moffat County, Colo., C. I. Aslakson, 1931).—About 65 miles south by east of Rock Springs, 18 miles west of Greystone post office, about 6 miles east of the Utah State line, 6 miles north of the Yampa River, 4 miles west of

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

the Maddox Ranch and sawmill, and 3 miles east of Green River, in sec. 29, T. 8 N., R. 102 W., on highest point of Zenobia Park. To reach from Greystone post office, go south 1 mile on main road to fork, take right fork (leaving main road) and go 0.4 mile to another fork, take right fork and follow it to farm in valley, follow road through farmyard up ridge to junction with another road, turn right on this road and go 4.0 miles to fork, take right fork and go 4.1 miles to gate in Maddox pasture, go through gate and continue 0.4 mile, turn left and go up draw on dim road (making sharp turn just after passing through second gate), follow road to bottom of steep hill, and continue to brush and pole fence, take right trail and go to crest of saddle, turn left and climb to station site. To reach from Rock Springs or station Kinney, follow lower Browns Park road through Irish Canyon to fork (19.7 miles beyond sign into Sparks Ranch), take left fork and go 15.2 miles to Greystone post office, then proceed as above. Marked by standard station disk in boulder, note 4. Reference marks are standard reference disks in bedrock, note 12a. No. 1 is 20.10 meters (65.9 feet) from station in azimuth 252°25′. No. 2 is 32.25 meters (105.8 feet) from station in azimuth 314°10′. Azimuth from station to following points are: Low sharp peak, 1 mile westerly, 120°24′38″; base of sharp bluff on edge of Irish Canyon, 210°28′29″; and sharp peak to east (almost directly over reference mark no. 1), 253°24′51″. Elevation: 2,748.6 meters (9,018 feet).

Lena (U. S. G. S.) (Daggett-Uintah Counties, Utah, C. I. Aslakson, 1931).—About 29 miles (air line) north-northeast of Vernal, on highest point of Mt. Lena, in the Ashley National Forest. To reach from the north, leave U. S. Highway 30 at Green River, cross bridge over Green River, and continue to southward on the Manila-Vernal main road to village of Manila; here take road posted to Vernal and continue 43 miles to combination store, filling-station, camp on left (east) side of road, go 0.1 mile north of this store to where a dim road leads right up over ridge, turn right and follow this road 0.35 mile to top of ridge (Mt. Lena is in plain view to eastward, being highest point on north end of range south of meadows). Continue through sage and meadows on dim roads to edge of timber on south side of meadows and follow along south side of meadows eastward to small stream, turn up into timber and proceed about 0.2 mile to small glade on west side of stream and on to station site. To reach from Vernal, go straight north from the monument for 2.6 miles to T-road, turn left and go 1.1 miles to fork, take right fork and go 0.4 mile to fork, take left fork and go 27.6 miles to filling station mentioned above. Marked by copper bolt set in drill-hole in sandstone boulder. Top of bolt has small triangle in center with letters "U. S. G. S." and the elevation "9719" stamped on its surface. Reference marks are standard reference disks in boulders, note 12c. No. 1 is 6.09 meters (20.0 feet) from station in azimuth 238°51′. No. 2 is 5.87 meters (19.3 feet) from station in azimuth 128°21′. Azimuth from station to cairn on north end of first ridge east of station is 325°01′38″; and to north gable of red-topped house in valley is 86°42′40″. Elevation: 2,977.3 meters (9,768 feet).

Plane coordinates: (III), x=316,038.31 feet; y=44,480.86 feet; grid azimuth to cairn on north end of first ridge east of station=325°27′40″.[8]

Supplementary points

G. L. O. Station A (Carbon County, Mont., C. I. Aslakson, 1931).—A short distance east of corner of secs. 31 and 32, T. 5 S., R. 20 E., principal meridian, and on top of ridge. To reach from Red Lodge, follow mail route toward Absarokee and down Red Lodge Creek to signs "Luther 8 mi., Red Lodge 13 mi., Billings 56 mi., Roberts 8 mi." Turn east and follow road towards Roberts for 1.5 miles to top of ridge. Turn north through gate and follow old road northwest through fields for about 1 mile to station, which is on round hill, highest point in near vicinity, on divide between Red Lodge and Willow Creeks. This station was called "G. L. O. A. (U. S. G. S.)" by the General Land Office. A base line, G. L. O. Station A-Red Lodge was used by the U. S. Geological Survey for a scheme of third-order triangulation. Station marked by standard station disk in concrete, note 1a. *G. L. O. Station 13* (see description thereof), marked by a standard reference disk in concrete, note 11a, is 78.702 meters (258.21 feet) from station in azimuth 89°56′. Elevation: 1,531.7 meters (5,025 feet).

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

G. L. O. Station 13 (Carbon County, Mont., C. I. Aslakson, 1931).—Identical with reference mark of *G. L. O. Station A* (see description thereof), which is 78.702 meters (258.21 feet) from station in azimuth 269°55′.

G. L. O. Station 14 A (Carbon County, Mont., C. I. Aslakson, 1931).—Corner of sections 25, 36, 30, and 31, Tps. 9 S., Rs. 20 and 21 E., principal meridian. To reach from Belfry, follow mail route up Clark Fork of Yellowstone River 11 miles to Chance Mercantile Co. store. Cross river and go 1 mile west to foot of hills. Turn right and follow road north 0.6 mile. Take left fork and follow west up draw 1.2 miles to John McClellan's ranch. Follow road west up draw 1.1 miles. Take left fork up hill to top of bench, and continue west. At 1.9 miles from ranch take left fork, at 3 miles take right fork, at 3.2 miles cross old north-and-south road, at 4.1 miles cross another old north-and-south road and continue west 0.1 mile to small rock cairn on north side of road. From this point station is about 85 yards north. Marked by General Land Office disk station mark in concrete, note 1a. Reference mark is General Land Office reference disk in outcropping bedrock, note 12a, 17.734 meters (58.18 feet) from station in azimuth 34°33′. *G. L. O. Station 14 B* (see description thereof), standard disk in concrete, is 160.094 meters (525.24 feet) from station in azimuth 14°21′59″.

Plane coordinates: (II), x=19,375.53 feet; y=1,587,370.92 feet; grid azimuth to *G. L. O. Station 14 B*=15°40′51″.[8] (III), x=385,787.21 feet; y=1,582,168.44 feet; grid azimuth to *G. L. O. Station 14 B*=14°40′43″.[8]

G. L. O. Station 14 B (Carbon County, Mont., C. I. Aslakson, 1931).—Marked by standard disk in concrete. Reference mark (not described) is 11.478 meters (37.66 feet) from station in azimuth 250°50′. *G. L. O. Station 14 A* (see description thereof) is 160.094 meters (525.24 feet) from station in azimuth 194°21′58″.

Plane coordinates:[9] (II), x=19,233.52 feet; y=1,586,865.15 feet. (III), x=385,654.11 feet; y=1,581,660.35 feet.

G. L. O. Station 14 eccentric (Park-Big Horn Counties, C. I. Aslakson, 1931).—Identical with reference mark no. 1 of *G. L. O. Station 14* (see description thereof) which is 51.865 meters (170.16 feet) from station in azimuth 306°31′. Elevation: 1,305.8 meters (4,284 feet).

Plane coordinates: (II), x=166,313.10 feet; y=1,535,139.28 feet. (III), x=533,586.96 feet; y=1,532,521.31 feet.

G. L. O. Station 14 (Park-Big Horn Counties, C. I. Aslakson, 1931).—Standard corner of secs. 31 and 36, Tps. 57 N., Rs. 97 and 98 W., sixth principal meridian. To reach from Deaver Public School at Deaver, Wyoming, follow road south 0.7 mile, west 0.7 mile, and turn left around small white house. Go south 0.1 mile, cross bridge over canal, turn sharp to right, go west-southwest 0.1 mile to west end of triangular-shaped field. Go southwest (cross-country) 0.25 mile to station, which is in small draw draining to north, in line with north-and-south road about 2 miles to north. Marked by standard General Land Office disk station mark in concrete, note 1a. Reference marks are standard General Land Office reference disks in concrete, note 11a. No. 1, identical with *G. L. O. Station 14 eccentric* (see description thereof), is 51.865 meters (170.16 feet) from station in azimuth 126°31′. No. 2 is 102.16 meters (335.2 feet) from station in azimuth 226°36′18″.

Plane coordinates:[9] (II), x=166,448.24 feet; y=1,535,035.84 feet; grid azimuth to reference mark no. 2=227°30′46″.[8] (III), x=533,723.88 feet; y=1,532,420.27 feet; grid azimuth to reference mark no. 2=226°30′48″.[8]

G. L. O. Station 15 A eccentric (Carbon County, Mont., C. I. Aslakson, 1931).—Identical with reference mark of *G. L. O. Station 15 A (Mont.); G. L. O. Station 13 (Wyo.); Wyoming-Montana boundary milepost 122* (see description thereof) which is 35.784 meters (117.40 feet) from station in azimuth 133°35′.

Plane coordinates: (II), x=173,722.74 feet; y=1,581,873.10 feet. (III), x=540,178.49 feet; y=1,579,371.68 feet.

G. L. O. Station 15 A, (Mont.); G. L. O. Station 13 (Wyo.); Wyoming—Montana boundary milepost 122 (Carbon County, Mont., Big Horn County, Wyo., State boundary, C. I. Aslakson, 1931).—Milepost 122 of Montana-Wyoming State highway boundary, about 70 yards east of *G. L. O. Station 15 B*, the closing corner of sections 31 and 36, Tps. 9 S., Rs. 26 and 25 E., principal meridian.

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

To reach from Frannie, Wyo., follow highway north 2 miles to State boundary sign. Continue north 0.4 mile. Immediately after crossing bridge over canal turn southeast and drive cross-country about 1.1 miles to top of first low ridge, which bears north-and-south. Range is on State line, with short east-and-west road in valley to west, thence due east 0.25 mile to station, which is on east side of small wash draining southwest. Marked by standard General Land Office disk in concrete, note 1a. Reference mark identical with *G. L. O. Station 15 A eccentric* (see description thereof) and is standard reference disk in concrete, note 11a, 35.784 meters (117.40 feet) from station in azimuth 313°35′. *G. L. O. Station 15 B* (see description thereof), standard disk in concrete, note 11a, is 64.1 meters (210 feet) from station in azimuth 89°37′. Elevation: 1,327.1 meters (4,354 feet).

Plane coordinates:[9] (II), x=173,639.01 feet; y=1,581,955.34 feet. (III), x=540,093.33 feet; y=1,579,452.42 feet.

G. L. O. Station 15 B (Carbon County, Mont., Big Horn County, Wyo., C. I. Aslakson, 1931).—Closing corner of secs. 31 and 36, Tps. 9 S., Rs. 25 and 26 E., principal meridian. *G. L. O. Station 15 A (Mont.); G. L. O. Station 13 (Wyo.); Wyoming-Montana boundary milepost 122* (see description thereof), is 64.1 meters (210 feet) from station in azimuth 269°37′.

Plane coordinates:[9] (II), x=173,428.67 feet; y=1,581,957.20 feet. (III), x=539,883.02 feet; y=1,579,450.61 feet.

U. S. G. S. cairn near station Sage (Park County, C. I. Aslakson, 1931).

Plane coordinates:[9] (II), x=138,969.12 feet; y=1,536,524.45 feet. (III), x=506,226.74 feet; y=1,533,429.06 feet.

G. L. O. Station 15 A (Big Horn County, C. I. Aslakson, 1931).—Angle point 1, Tract 109, angle point 4, tract 110, T. 52 N., R. 96 W., sixth principal meridian. To reach from Greybull, go 17 miles west on U. S. Highway 20 to schoolhouse on north side of road, thence north 1 mile to station site. Marked by standard General Land Office disk in concrete. Reference mark is standard General Land Office reference disk in concrete, 45.812 meters (150.30 feet) from station in azimuth 51°46′. *G. L. O. Station 15 B* (see description thereof) is 58.426 meters (191.69 feet) from station in azimuth 107°03′. *B. M. (U. S. G. S.)* (see geographic position thereof) is 50.422 meters (165.43 feet) from station in azimuth 350°59′. Elevation: 1,357.6 meters (4,454 feet).

Plane coordinates: (II), x=224,092.92 feet; y=1,406,191.94 feet. (III), x=593,594.45 feet; y=1,404,611.40 feet.

G. L. O. Station 15 B (Big Horn County, C. I. Aslakson, 1931).—The closing corner of sections 3 and 4, T. 52 N., R. 96 W., on the thirteenth standard parallel north, sixth principal meridian. *G. L. O. Station 15 A* (see description thereof) is distant 58.426 meters (191.69 feet) from station in azimuth 287°03′.

Plane coordinates:[9] (II), x=223,910.43 feet; y=1,406,250.51 feet. (III), x=593,410.98 feet; y=1,404,666.80 feet.

B. M. (U. S. G. S.) (Big Horn County, C. I. Aslakson, 1931).—Plane coordinates:[9] (II), x=224,116.74 feet; y=1,406,028.27 feet. (III), x=593,621.11 feet; y=1,404,448.17 feet.

B. M. RDLG 3895 (U. S. G. S.) (Big Horn County, C. I. Aslakson, 1931).—About 2½ miles (air line) southeast of Basin, on north side of Basin-Ten Sleep road, in golf course in badlands, and in southeast part of T. 51 N., R. 93 W. To reach from Basin go north 2 blocks from post office, turn east across Big Horn River, keep straight ahead after crossing bridge, go 0.4 mile to crossroad, continue straight ahead, go ¼ mile to fork, take right fork and go 2.1 miles to station, on left side of road, southwest of telephone line and about 15 feet northeast of road. Marked by standard iron pipe bench mark projecting about 1 foot above surface, marked RDLG—3895. Elevation: 1,189.79 meters (3,903.5 feet).

Plane coordinates: (II), x=324,905.91 feet; y=1,347,928.27 feet. (III), x=695,397.50 feet; y=1,348,103.80 feet.

B. M. (U. S. G. S.), near station Tatman (U. S. G. S.) (Big Horn County, C. I. Aslakson, 1931).—Plane coordinates:[9] (II), x=203,525.58 feet; y=1,328,526.14 feet. (III), x=574,375.72 feet; y=1,326,607.99 feet.

G. L. O. Station 16 (Big Horn County, C. I. Aslakson, 1931).—About ¾ mile southwest of Manderson, at corner common to secs. 6, 1, 31, and 36, Tps. 49 and

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

50 N., Rs. 92 and 93 W., sixth principal meridian, and at intersection of road and lane. To reach from Manderson depot follow highway 0.5 mile, turn sharp left, go up hill and south 0.8 mile to station. Marked by standard General Land Office station disk in concrete, 8 inches below surface of ground. Reference marks are standard General Land Office reference disks in concrete. No. 1 is 14.48 meters (47.5 feet) from station in azimuth 224°34′. No. 2 is 14.494 meters (47.55 feet) from station in azimuth 44°25′.

Plane coordinates: (II), x=333,388.88 feet; y=1,308,339.39 feet. (III), x=704,563.08 feet; y=1,308,666.84 feet.

G. L. O. Station 17 (Park County, C. I. Aslakson, 1931).—Standard quarter-section corner sec. 36, T. 49 N., R. 100 W., sixth principal meridian. To reach from Meeteetse go northeast on road 9 miles down Grey Bull River Valley, turn south, cross red bridge over river, turn left, follow road southeast about ¼ mile to Sleeper Ranch, go south through 3 gates and continue on this little-used road; at 3 miles from bridge take right fork, at 4.7 miles take left fork, at 5.1 miles pass through gate, at 6.9 miles turn right, at 7.0 miles take left fork, at 7.7 miles pass through gate, at 7.9 miles pass through another gate, at 8.0 miles take left fork, cross north-and-south road, continue southwest along dim road up steep pitch to top of ridge, turn left and follow dim rocky road southwest along top of ridge to station, 10 miles from bridge and 8 yards west of high gate post in east-and-west fence. Marked by standard General Land Office station disk in concrete. Reference marks are standard General Land Office reference disks in concrete. No. 1 is 33.297 meters (109.24 feet) from station in azimuth 229°15′. No. 2 is 34.846 meters (114.32 feet) from station in azimuth 130°12′. Elevation: 1,989.7 meters (6,528 feet).

Plane coordinates: (II), x=108,694.26 feet; y=1,279,811.54 feet. (III), x=480,411.82 feet; y=1,276,271.28 feet.

Squaw (U. S. G. S.) (Park County, C. I. Aslakson, 1931).

Plane coordinates:[9] (II), x=173,646.92 feet; y=1,257,037.69 feet. (III), x=545,737.08 feet; y=1,254,622.66 feet.

Worland, Holly Sugar Co., stack (Washakie County, C. I. Aslakson, 1931).

Plane coordinates:[9] (II), x=332,834.68 feet; y=1,219,070.73 feet. (III), x=705,545.88 feet; y=1,219,400.43 feet.

Kirby (U. S. G. S.) (Hot Springs County, C. I. Aslakson, 1931; 1936).—About 10 miles air line east of Thermopolis, about 5 miles south of Kirby Creek, about 4 miles north of Buffalo Creek, in southern part of T. 43 N., R. 93 W., and on prominent rocky peak, locally known as Wild Horse Butte, near head of small stream which empties into Big Horn River at Thermopolis. To reach from main intersection in Thermopolis, follow U. S. Highway 20 south 4.0 miles to bridge over Big Horn River; cross bridge and go 0.1 mile to road to left. Turn left off Highway 20 and follow graded road east up valley 9.5 miles to end of grade; continue on main-traveled road 0.5 mile to forks; take left fork and go 0.1 mile to gate; pass through gate and follow main road northeast up canyon 2.7 miles to pole corral about ¼ mile north of camp shack. From this corral station is visible about 2 miles north-northwest. Follow only road around corral and east up ridge to divide; turn left and follow main road up ridge northwest to top of main divide, about 2.8 miles from pole corral. At divide turn right off road and go 0.2 mile north to rocky butte and station. Mark is U. S. Geological Survey disk set in rock. Reference marks are standard disks in outcropping bedrock, note 12a. No. 1 is 7.781 meters (25.53 feet) northwest of station in azimuth 145°36′; no. 2 is 8.873 meters (29.11 feet) east in azimuth 290°33′. Azimuth mark (1936) is probably standard disk in outcrop of bedrock on low peak approximately 0.2 mile west of station in azimuth 82°56′00″. Elevation: 1,843.8 meters (6,049 feet).

Plane coordinates: (II), x=321,012.62 feet; y=1,088,414.00 feet; grid azimuth to azimuth mark=83°24′00″.[8] (III), x=695,962.66 feet; y=1,088,558.87 feet; grid azimuth to azimuth mark=82°25′20″.[8]

G. L. O. Station 18 (Hot Springs County, C. I. Aslakson, 1931).—Standard corner secs. 35 and 36, T. 45 N., R. 98 W., sixth principal meridian, about 21 miles northwest of Thermopolis, about 0.3 mile west of small schoolhouse, under east-and-west fence on south side of dirt road going west from school. To reach from Thermopolis go west on main road, at 5 miles (where there is brown school-

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No. check on this position.

For notes in regard to marking of stations see p. 65.

house north) take right road, at 12 miles turn north, follow road to Hamilton Dome, at 17.6 miles (where there is intersection of five roads), go straight ahead on road up hill, at 22 miles follow road to northeast, through oil field and down into Cottonwood Creek, at 25.6 miles (north end of lane), turn west, and go 0.1 mile to station. Marked by standard General Land Office station disk in concrete. Reference marks are standard General Land Office reference disks in concrete. No. 1 is 35.642 meters (116.94 feet) from station in azimuth 229°58′. No. 2 is 33.652 meters (110.41 feet) from station in azimuth 132°30′. Azimuth from station to schoolhouse chimney, distant about ½ mile, is 266°49′24″. Elevation: 1,604.1 meters (5,263 feet).

Plane coordinates: (II), x=173,651.24 feet; y=1,150,131.39 feet; grid azimuth to schoolhouse chimney=267°40′46″.[8] (III), x=547,576.16 feet; y=1,147,744.93 feet; grid azimuth to schoolhouse chimney=266°41′55″.[8]

G. L. O. Station 19 eccentric (Hot Springs-Fremont County line, C. I. Aslakson, 1931).—Identical with reference mark no. 1 of *G. L. O. Station 19* (see description thereof). *G. L. O. Station 19* is distant 202.597 meters (664.69 feet) from station in azimuth 171°18′47″. Elevation: 2,427 meters (7,963 feet).

Plane coordinates: (II), x=329,609.79 feet; y=1,021,827.18 feet; grid azimuth to *G. L. O. Station 19*=171°45′17″.[8] (III), x=705,693.19 feet; y=1,022,127.46 feet; grid azimuth to *G. L. O. Station 19*=170°46′48″.[8]

G. L. O. Station 19 (Hot Springs-Fremont County line, C. I. Aslakson, 1931).—Standard corner of secs. 35 and 36, T. 41 N., R. 93 W., sixth principal meridian. To reach from Thermopolis, follow highway south, at 4 miles turn left and follow up Buffalo Creek, at 13.5 miles cross cattle guard, turn south, and pass small black house, at 17.9 miles cross top of ridge, at 18.5 miles take left fork passing just south of old cabin, at 19 miles take right fork, and go south along west side of fence, at 20.4 miles pass through gate, at 20.8 miles pass through another gate, at 21.7 miles cross Antelope Creek, at 21.9 miles take right fork, at 22.1 miles turn right at crossroads just north of 2 small shacks and follow old tracks west, at 22.5 miles leave tracks, turn left, and go south about 1 mile up spur on west side of small draw to top of ridge and timber. Marked by standard General Land Office station disk in drill hole in boulder. Reference mark no. 1, identical with *G. L. O. Station 19 eccentric* (see description thereof) is standard General Land Office reference disk in drill hole in boulder, 202.597 meters (664.69 feet) from station in azimuth 351°18′46″. Reference mark no. 2 is standard General Land Office station disk in bedrock, 9.348 meters (30.67 feet) from station in azimuth 84°52′.

Plane coordinates:[9] (II), x=329,544.49 feet; y=1,022,484.92 feet. (III), x=705,586.72 feet; y=1,022,783.51 feet.

G. L. O. Station 20 eccentric (Fremont County, C. I. Aslakson, 1931).—Identical with reference mark no. 1 of *G. L. O. Station 20*. (See description thereof.) *G. L. O. Station 20* is 106.382 meters (349.02 feet) distant in azimuth 291°01′29″. Elevation: 1,728.0 meters (5,669 feet).

Plane coordinates: (II), x=392,357.65 feet; y=896,023.49 feet; grid azimuth to *G. L. O. Station 20*=291°18′01″.[8] (III), x=770,567.93 feet; y=897,400.55 feet; grid azimuth to *G. L. O. Station 20*=290°19′55″.[8]

G. L. O. Station 20 (Fremont County, C. I. Aslakson, 1931).—Standard corner of secs. 34 and 35, T. 37 N., R. 91 W., sixth principal meridian, about 6 miles south by west of Moneta, in low sand hills. To reach from Moneta go east on highway, at 0.3 mile turn south on graded road, at 0.9 mile (after crossing bridge over Poison Creek) take right fork and follow past fence corner, at 1.2 miles turn right at crossroads and follow old road southwest into low sand hills, at 3.2 miles leave road and drive across country southeast 0.4 mile along top of ridge to station. Marked by standard General Land Office station disk in concrete. Reference marks are standard General Land Office reference disks in concrete. No. 1, identical with *G. L. O. Station 20 eccentric* (see description thereof) is 106.382 meters (349.02 feet) from station in azimuth 111°01′32″. No. 2 is 35.993 meters (118.09 feet) from station in azimuth 250°00′.

Plane coordinates:[9] (II), x=392,682.83 feet; y=895,896.70 feet. (III), x=770,895.24 feet; y=897,279.25 feet.

Ethete (Fremont County, C. I. Aslakson, 1931).—In the Shoshone Indian Reservation. To reach from Ethete (post office at St. Michaels Mission), go west

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

1 mile on main road toward Fort Washakie and Wind River, turn left between 2 log cabins and go 0.8 mile south, turn right after crossing bridge over canal and go west 1 mile on old road along foot of hills to *G. L. O. Station 21* (see description thereof), and then about 140 yards southeast to station on top of low hill. Marked by standard station disk in concrete, note 1a. Reference marks are standard General Land Office reference disks in concrete. No. 1, identical with *G. L. O. Station 21, reference mark no. 1*, is 297.4 meters (976 feet) from station in azimuth 111°35′33″. No. 2, identical with *G. L. O. Station 21, reference mark no. 2*, is 353.5 meters (1,160 feet) from station in azimuth 77°09′48″. Elevation: 1,691.9 meters (5,551 feet).

Plane coordinates: (III), x=483,339.20 feet; y=854,197.54 feet; grid azimuth to *G. L. O. Station 21, reference mark no. 2*=77°12′21″.[8]

G. L. O. Station 21, reference mark no. 2 (Fremont County, C. I. Aslakson, 1931).

Plane coordinates:[9] (III), x=482,208.28 feet; y=853,940.77 feet; grid azimuth to *G. L. O. Station 21*=240°01′35″.[8]

G. L. O. Station 21, reference mark no. 1 (Fremont County, C. I. Aslakson, 1931).

Plane coordinates:[9] (III), x=482,432.40 feet; y=854,557.23 feet; grid azimuth to *G. L. O. Station 21*=289°04′20″.[8]

G. L. O. Station 21 (Fremont County, C. I. Aslakson, 1931).—Station is located in the Shoshone Indian Reservation, and is the standard corner of sections 1, 6, 36, and 31, Tps. 1 S. and 1 N., Rs. 1 W. and 1 E., initial monument, Wind River principal meridian. To reach from Ethete (post office at St. Michaels Mission), go west 1 mile on main road toward Fort Washakie and Wind River, turn left between two small log cabins, and go south 0.8 mile. Just after crossing bridge over canal, turn right and follow old road west along foot of hills to station site. Marked by standard General Land Office disk in concrete. Reference marks are standard General Land Office reference disks in concrete. *G. L. O. Station 21, reference mark no. 1*, is 170.3 meters (559 feet) from station in azimuth 109°01′44″. *G. L. O. Station 21, reference mark no. 2*, is 264.7 meters (868 feet) from station in azimuth 59°58′59″. These reference marks are identical with reference marks for station *Ethete*. (See description thereof.)

Plane coordinates:[9] (III), x=482,960.57 feet; y=854,374.58 feet.

Mount Black (U. S. F. S.) (Fremont County, C. I. Aslakson, 1931).—In Washakie National Forest, on northwest slope of Mount Black, between 120 and 150 feet from summit in approximate bearing N. 20° W. (true), and about 40 feet lower than summit. Probably marked by standard U. S. Forest Service station disk in bedrock. Reference marks are brass bolts, ½ inch in diameter, projecting 1 inch. No. 1 is 10 inches lower than station and 44 feet 7 inches (slope distance) from station in bearing N. 75° W. (true). No. 2 is 8 feet 4 inches lower than station and 18 feet 5 inches (slope) distant from station in bearing N. 76° E. (true). Information regarding station may be obtained from Forest Supervisor at Lander.

Plane coordinates:[9] (III), x=422,368.35 feet; y=791,439.92 feet. (IV), x=779,988.52 feet; y=793,041.02 feet.

G. L. O. Station 22 (Fremont County, C. I. Aslakson, 1931; 1936).—Standard corner of secs. 33 and 34, T. 33 N., R. 95 W., sixth principal meridian. To reach from Riverton, go east to end of main street, then south on U. S. Highway 287. At 0.9 mile, just after crossing river, take left fork, leave highway, and follow road towards Rawlins via Sandraw; at 19.7 miles turn east across country and go about 150 yards to station. Mark is General Land Office disk in concrete. Disk inscribed with identification data and date 1931. Reference mark no. 1 is standard General Land Office reference disk in concrete, projecting 2 inches above ground, and 33.236 meters (109.04 feet) northeast of station in azimuth 231°25′. Reference mark no. 2 is standard disk in concrete, note 11a, 32.730 meters (107.38 feet) northwest of station in azimuth 126°50′. Azimuth mark (1936) is standard disk in concrete, note 11a, projecting 6 inches, on small rise, 36 feet west of center line of Riverton-Sandraw road, and ¼ mile northwest of station in azimuth 153°40′40″. *T. 32 N., R. 95 W., sec. 5, northeast corner* (see

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

description and geographic position thereof) is 6.070 meters (19.91 feet east of station in azimuth 270°11′07″. Elevation: 1,761.8 meters (5,780 feet).

Plane coordinates: (III), x=646,059.99 feet; y=771,566.48 feet; grid azimuth to azimuth mark=153°18′30″.[8]

Mt. Arter (U. S. F. S.) (Fremont County, C. I. Aslakson, 1931; 1936).—On highest point of Mt. Arter, in Washakie National Forest, on site of old fire lookout. It is about 14 miles air line southwest of Lander, about 2 miles southeast of north end of Shoshone Lake, and 1 mile south of Coney Basin, on highest point of bare rocky ridge, on middle one of 3 rocky mounds. To reach from Fort Washakie, follow State Highway 287 south 1.15 miles to Ethete-Wind River road, and turn right (west); at 1.8 miles, jog right about 100 feet at Wind River village; continue westerly and southwesterly on gravel road, at 4.5 miles, take left fork (gravel road) at 6.3 miles, end of gravel and road forks, take right fork; at 7.3 miles, cattle guard in fence line; at 11.2 miles, take right-hand or short-cut road leading up hill to right; at 11.6 miles, re-enter main road; at 19.1 miles, Bald Mountain lies to left of road; at 19.7 miles, take left fork, leave graded road; at 20.5 miles, Dickinson Park and end of truck travel at Gustin's place, where horses may be secured. Truck can be driven about 2 miles farther to south and east. From mileage 19.7 graded road continues on 0.6 mile to Mosquito Park Ranger Station. From Dickinson Park horse trail (Shoshone Trail) leads south across North Fork of Popo Agie River to Shoshone Lake (3-hour pack). At north end of Shoshone Lake take Coney Basin trail which leads southerly over divide, at top of which station is visible to south. Continue down into Coney Basin, thence south part way up Basin, thence east up north side of ridge to small summit. Here leave main trail and go south up small depression to point east of Mt. Arter, thence west to base of rocky ridge at top of mountain (2-hour pack from Shoshone Lake). From this point is about 20-minute back pack to station. Station may also be reached by going south from Coney Basin, and horses may also be ridden up from near south end of Shoshone Lake; this last route not recommended for pack animals as trail is not cut out. Station mark is standard disk in outcropping bedrock, note 2. Reference marks are ½-inch copper or brass bolts, set in bedrock, and protruding about 1½ inches. No. 1 is 2.827 meters (9.27 feet) south of station in azimuth 356°58′; no. 2 is 2.195 meters (7.20 feet) west in azimuth 111°34′. *Mt. Arter azimuth mark* is probably standard disk in boulder, on top of and near northeast side of prominent group of boulders, on southeast end of ridge running southerly and southeasterly from station, and approximately 0.8 mile southeast of station in azimuth 329°06′14″. Horses may be ridden to azimuth mark, but from station it is easier to back pack to it, about 25-minute pack.

Plane coordinates: (III), x=436,841.38 feet; y=765,414.54 feet; grid azimuth to *Mt. Arter azimuth mark*=329°15′49″.[7] (IV), x=794,872.56 feet; y=767,245.47 feet; grid azimuth to *Mt. Arter azimuth mark*=328°21′30″.[7]

G. L. O. Station 23 (Fremont County, C. I. Aslakson, 1931).—The quarter-section corner secs. 19 and 24, Tps. 29 N., Rs. 100 and 101 W., sixth principal meridian. To reach from town of South Pass (37 miles from Lander) go south 0.2 mile on main road to top of hill, just before reaching cemetery turn right, follow main-traveled road 2 miles west and northwest to corner of fence (bearing north and west), which is end of truck travel. Station is about ⅜ mile northeast, on top of ridge, and about 70 yards east of highest point. Marked by standard General Land Office station disk in drill hole in boulder. Reference marks are standard General Land Office reference disks in bedrock. No. 1 is 11.242 meters (36.88 feet) from station in azimuth 205°34′. No. 2 is 57.497 meters (188.64 feet) from station in azimuth 57°47′. Elevation: 2,555.8 meters (8,385 feet).

Plane coordinates:[9] (III), x=477,127.19 feet; y=657,455.27 feet. (IV), x=836,859.27 feet; y=659,922.50 feet.

G. L. O. Station 24 eccentric (Sweetwater County, C. I. Aslakson, 1931).—To reach from South Pass City go about 30 miles on main road toward Rock Springs to top of small rise where main road intersects road at almost right angles, part of road leading westward is unused, part bearing eastward leads to Hay's Middle Ranch; just before reaching this road several parts of old road

[7] This azimuth has been computed by the first formula (p. 70), using both terms.

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

abandoned by new location can be seen to west of main road and at point of intersection portion of abandoned road can be seen leading up over rise to southwest. Follow Hay's Middle Ranch road 2.8 miles to ranch, pass through gates between red buildings, then through another gate, at 0.1 mile pass through another red gate, turn right, continue eastward (keeping to main-traveled road) 7.2 miles to fork, take right fork, go 4.3 miles to small rock shack and corral on west side of road, continue on main road (which is dim at this point) south across wash, then east and northeast 8.0 miles to edge of rim overlooking some trees and tumbled-down shack known as Bush Ranch (about ½ mile farther on), turn right, follow along rim southeast then southwest 1.8 miles to station, on edge of rim. *G. L. O. Station 24* (see description thereof), marked by standard General Land Office disk in square block of concrete, is 179.482 meters (588.85 feet) from station in azimuth 112°55′47″. Azimuth from station to *Salt Lake-Omaha Airway, site 23, beacon* is 297°57′23″. Elevation: 2,315.8 meters (7,598 feet).

Plane coordinates: (III), x=473,779.79 feet; y=521,017.54 feet; grid azimuth to *G. L. O. Station 24*=112°59′40″.[8] (IV), x=835,648.40 feet; y=523,431.53 feet; grid azimuth to *G. L. O. Station 24*=112°06′02″.[8]

G. L. O. Station 24 (Sweetwater County, C. I. Aslakson, 1931).—About 40 miles (air line) north-northeast of Rock Springs, about 25 miles (air line) south of South Pass City. To reach from South Pass City, go about 30 miles on main road toward Rock Springs to top of small rise where main road intersects road at almost right angles. (Road leading westward is unused, road to east goes to Hay's Middle Ranch. Just before reaching this road several parts of old road abandoned by new location can be seen to west on main road and at point of intersection portion of abandoned road can be seen leading up over rise to southwest.) Follow Hay's Middle Ranch road 2.8 miles to ranch, pass through gates between red buildings, then through another gate. At 0.1 mile pass through another red gate, turn right and continue eastward (keeping to main-traveled road) 7.2 miles to fork, take right fork and go 4.3 miles to small oak shack and corral on west side of road, continue on main road (dim at this point) south across wash, then go east and northeast 8.0 miles to edge of rim overlooking some trees and tumble-down shacks known as Bush Ranch (about ½ mile farther on), turn right and follow along rim southeast then southwest 1.8 miles to *G. L. O. Station 24 eccentric* (see description thereof), from here go about ⅙ mile east-southeast to station site. Marked by standard General Land Office station disk in concrete. *G. L. O. Station 24 eccentric*, marked by General Land Office reference disk in concrete, is 179.482 meters (588.85 feet) from station in azimuth 292°55′42″.

Plane coordinates:[9] (III), x=473,237.79 feet; y=521,247.52 feet. (IV), x=835,102.79 feet; y=523,653.05 feet.

G. L. O. Station 25 (Sweetwater County, C. I. Aslakson, 1931).—Standard corner secs. 31 and 36, Tps. 25 N., Rs. 100 and 101 W., sixth principal meridian, on twelfth auxiliary meridian and sixth standard parallel north. To reach from Farson store and service station (on U. S. Highway 187) follow main road 16 miles toward South Pass to point where old unused road comes in from west and well-traveled road turns east, follow road east 3.2 miles to Hay's Middle Ranch, go through gate between red buildings and through another just north of ranch house, then 0.1 mile northeast through another gate, follow right fork go eastward keeping on main-traveled road, at 7.0 miles from ranch take right fork, at 10.4 miles there is small rock house and corrals on west side of road, at 19 miles there is Bush Ranch on left side of road; from this point go southeast 1.0 mile on main-traveled road to where road forks 3 ways, take right fork, go southward 0.7 mile, take left fork, go eastward 0.7 mile, and then go 0.4 mile north-northeast across country to station. Marked by standard General Land Office station disk in concrete. Reference marks are standard General Land Office reference disks in concrete. No. 1 is 40.595 meters (133.19 feet) from station in azimuth 220°27′. No. 2 is 39.640 meters (130.05 feet) from station in azimuth 135°42′. Elevation: 2,217.4 meters (7,275 feet).

Plane coordinates: (III), x=483,791.32 feet; y=518,586.99 feet. (IV), x=845,697.95 feet; y=521,157.18 feet.

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

Pole in 7-foot cairn (U. S. G. S.) (Sweetwater County, C. I. Aslakson, 1931).

Plane coordinates:[9] (III), x=441,269.72 feet; y=473,807.34 feet. (IV), x=803,874.24 feet; y=475,714.77 feet.

Pilot (U. S. G. S.) (Sweetwater County, C. I. Aslakson, 1931).—On highest point of summit of prominent elevated table-land (with precipitous sides) known as Pilot Butte. To reach from Rock Springs go northwest 12.2 miles (1.2 miles beyond end of pavement) on U. S. Highway 187 to point where very dim road turns left from main road just east of guard-rail, follow dim road 1.7 miles up onto table-land to point where road comes in from right, keep to left, go 3.3 miles to fork, keep to left on main road, go 4.4 miles, take right fork, go 1.4 miles to point where very dim road turns to left toward butte just after crossing draw, turn left and drive to foot of butte. Station is easy 30-minute pack up northeast corner of butte. Marked by standard U. S. Geological Survey station disk in drill hole in rock outcrop. Reference marks are standard reference disks in drill holes in outcropping bedrock, note 12a. No. 1 is near north edge of butte, 10.925 meters (35.84 feet) from station in azimuth 208°43′. No. 2 is 7.10 meters (23.3 feet) from station in azimuth 321°47′. Following azimuths are from station: *Salt Lake-Omaha Airway, site 15, beacon*, 340°20′38″; *Boar's Tusk*, 199°45′35″. Elevation: 2,417.8 meters (7,932 feet.)

Plane coordinates: (III), x=335,634.71 feet; y=356,457.67 feet; grid azimuth to *Boar's Tusk*=200°09′37.9″.

Boar's Tusk (Sweetwater County, C. I. Aslakson, 1931).

Plane coordinates: (III), x=378,251.34 feet; y=472,532.99 feet. (IV), x=740,878.55 feet; y=473,459.91 feet.

G. L. O. Station 26 eccentric (Sweetwater County, C. I. Aslakson, 1931).—Identical with reference mark no. 1 of *G. L. O. Station 26*. *G. L. O. Station 26* (see description thereof) is 40.040 meters (131.36 feet) distant in azimuth 149°46′. Elevation: 2,151.1 meters (7,057 feet).

Plane coordinates: (III), x=383,630.25 feet; y=392,482.55 feet.

G. L. O. Station 26 (Sweetwater County, C. I. Aslakson, 1931).—Standard quarter-section corner sec. 34, T. 21 N., R. 104 W., sixth principal meridian, fifth standard parallel north. To reach from Park Hotel in Rock Springs, follow U. S. Highway 187 north 2.4 miles, and just after crossing railroad take right fork; at 5.0 miles take left fork; at 10.6 miles take left fork; at 12.7 miles turn west in mining town of Winton just north of house number 72; cross railroad; turn south in front of house number 129; go south about 0.1 mile; turn west between houses numbers 119 and 118; follow road southwest about 0.1 mile up hill to point between mine entrance trestle on south and general issue house on north; take right fork; go 0.3 mile northwest up hill to point about 100 yards west of north end of line of white power poles and on top of spur which slopes to south; turn left here; go about 0.1 mile southwest toward 2 white power-line poles to station; station is just south of low saddle and about 65 yards north of the 2 white poles. Marked by standard General Land Office station disk in concrete. Reference marks are standard reference disks in concrete. Reference mark no. 1, identical with *G. L. O. Station 26 eccentric*, is 40.040 meters (131.36 feet) from station in azimuth 329°46′. No. 2 is 30.766 meters (100.94 feet) from station in azimuth 149°48′.

Plane coordinates: (III), x=383,564.71 feet; y=392,596.44 feet.

B. M. J 3 (Sweetwater County, C. I. Aslakson, 1931).—About 2 miles east of Salt Wells station on Union Pacific Railroad, about in central part of first curve in railroad east of Salt Wells, about 30 feet south of south right-of-way fence, about 30 feet east of sixth telegraph pole east of mile pole no. 787, and in southwest corner of T. 20 N., R. 102 W. To reach from water purification plant on east edge of Rock Springs go east 15.1 miles on Lincoln Highway (U. S. Highway 30) to point where road crosses railroad right-of-way. Station is south of this crossing. Marked by small square chiseled in top of stone post about 8 inches square projecting about 4 inches above surface of ground. Elevation: 1,948.86 meters (6,393.9 feet).

Plane coordinates: (III), x=443,879.07 feet; y=364,756.84 feet.

Salt Lake-Omaha Airway, site 17, beacon (Sweetwater County, C. I. Aslakson, 1931).—Airway beacon on 51-foot tower, approximately 2 miles west of Thayer Junction. To reach from Thayer, go west about 1½ miles on Superior High-

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[9] No check on this position.

For notes in regard to marking of stations see p. 65.

way to intersection of Lincoln Highway, turn right off highway and go ¼ mile to trail, turn left and go approximately 1 mile to site.

Plane coordinates: (III), x=447,915.00 feet; y=366,217.99 feet.

Rock Springs, municipal airport, beacon (Sweetwater County, C. I. Aslakson, 1931).—Airway beacon at the Rock Springs Municipal Airport, about 4 miles north of city, and about 2½ miles east of base of White Mountain.

Plane coordinates: (III), x=366,140.41 feet; y=355,282.54 feet.

Salt Lake-Omaha Airway, site 16, beacon (Sweetwater County, C. I. Aslakson, 1931).—Airway beacon on 15-foot wooden tower, approximately 5 miles from Rock Springs via Superior Highway. To reach, go north on old Reliance Highway, cross creek and follow road approximately 4 miles to site.

Plane coordinates: (III), x=386,657.43 feet; y=354,610.58 feet.

Salt Lake-Omaha Airway, site 15, beacon (Sweetwater County, C. I. Aslakson, 1931).—Airway beacon on 51-foot tower, about 1 mile south of Green River. To reach from Green River, go in southerly direction to Green River Bridge, turn southwest and go about 2 miles along trail to site.

Plane coordinates: (III), x=343,931.09 feet; y=332,709.21 feet.

G. L. O. Station 27 (Sweetwater County, C. I. Aslakson, 1931).—Standard quarter-section corner sec. 32, T. 17 N., R. 107 W., sixth principal meridian, fourth standard parallel north. To reach from Green River cross railroad on first street west of depot, go south 0.1 mile, east 0.2 mile, cross river, take left fork, go 9.5 miles southward on main-traveled road to where road starts down hill, turn left here, follow old road southeast 1.5 miles along top of hill to where piles of white limestone are on each side of road and small rock cairn is about 100 feet farther south on east side of road, and station is about 250 yards east. Marked by standard General Land Office station disk in concrete. Reference marks are standard General Land Office reference disks in concrete. No. 1 is 22.016 meters (72.23 feet) from station in azimuth 223°31′. No. 2 is 21.850 meters (71.69 feet) from station in azimuth 126°32′. Elevation: 2,113.6 meters (6,934 feet).

Plane coordinates: (III), x=285,873.33 feet; y=268,855.35 feet.

G. L. O. Station 29 eccentric (Sweetwater County, C. I. Aslakson, 1931).—Elevation: 2,195 meters (7,201 feet).

Plane coordinates: (III), x=539,604.44 feet; y=121,826.54 feet; grid azimuth to *G. L. O. Station 29*=303°47′05″.[8]

G. L. O. Station 29 (Wyo.); G. L. O. Station 2 (Colo.); Wyoming-Colorado boundary milepost 239 (Wyoming-Colorado boundary, C. I. Aslakson, 1931).—About 50 yards east of closing corner of secs. 14 and 19, Tps. 12 N., Rs. 99 and 100 W., about 1 mile north of the Hiawatha Dome oil camp, about 195 yards southeast of W. W. Wilson permit oil well rig, on range line. To reach from gasoline pump at the Hiawatha Dome oil camp, go north 0.7 mile to fork, take right fork and go ¼ mile to another fork, take left fork and go ¼ mile to rig of W. W. Wilson permit oil well, and then go southeast about 195 yards to west edge of draw and station site. Marked by standard General Land Office disk in concrete post cast around old disk which was probably set in iron pipe. Reference mark no. 2, standard General Land Office disk in concrete post, marking closing corner of secs. 14 and 19, Tps. 12 N., Rs. 99 and 100 W., is 46.851 meters (153.71 feet) from station in azimuth 123°53′. *G. L. O. Station 29 eccentric* is 182.450 meters (598.59 feet) from station in azimuth 123°53′. A light on oil rig used as reference mark no. 1 point was marked by nail in stake (no permanent mark was set).

Plane coordinates:[9] (III), x=540,101.91 feet; y=121,493.70 feet.

W. W. Wilson Lease, well no. 1 (Moffat County, Colo., C. I. Aslakson, 1931).

Plane coordinates:[9] (III), x=539,569.87 feet; y=121,818.79 feet.

Ucolwy; G. L. O. Station 28, Wyo.; G. L. O. Station 1, Colo.; G. L. O. Station 1, Utah (Wyoming-Colorado-Utah boundary, C. I. Aslakson, 1931).—In northwest corner of Colorado, northeast corner of Utah, and south boundary line of Wyoming. To reach from railroad in Rock Springs, go south 5 blocks on C Street to Pine Street, then east 1 block, then south 1 block and turn left and follow main-traveled road east and southeast to mine trestle over road, continue southeast 0.3 mile, take left fork over bridge and go 3.1 miles, continue straight ahead and go 6.9 miles to fork, take left fork up hill and go 5 miles

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

to a Mountain Fuel Company sign, here take right fork and follow main-traveled road south 25.4 miles, take right fork towards Red Creek and go 3 miles, take left fork and go 1.6 miles, take right fork towards Frank Meyer's place and go 0.9 mile, take left fork and go 2.6 miles to cabin and corrals on west side of road, turn right up hill and go 2 miles, take right fork and go 0.1 mile to cabins, pass between cabins, cross wash and follow road southwest up hill and go 1.5 miles, leave road and go north-northwest about 0.2 mile to station site. Original mark was irregular shaped rock, with land description chiseled on it. In 1931 this rock was found lying loose and station re-marked by standard General Land Office disk in concrete. Reference marks are standard reference disks in bedrock. No. 1 is 48.968 meters (160.66 feet) from station in azimuth 198°26′. No. 2 is 11.268 meters (36.97 feet) from station in azimuth 329°43′. Elevation: 2,565.2 meters (8,416 feet).

Plane coordinates: (III), x=417,374.93 feet; y=121,843.51 feet.

FORTY-SECOND PARALLEL ARC

Principal points

North (Scotts Bluff County, Nebr., W. Mussetter, 1933; 1934).—About 10 miles due north of Scottsbluff, in NE ¼ sec. 2, T. 23 N., R. 55 W., on prominent detached butte in pasture, with unobstructed view to south and with badland formations to north. To reach from intersection of Broadway and East Overland Street in Scottsbluff, follow U. S. Highway 26 north 1.0 mile, thence west 0.6 mile, turn off highway and go north on gravel road 8.0 miles; cross bridge over canal and continue north 0.4 mile to gate on east side of road, pass through gate, go through enclosure, and drive northeast 0.4 mile around east side of prominent lone hill to top of ridge, turn east and follow ridge 0.5 mile to east-west fence, let down fence and continue along ridge about 150 yards to top of hill and station. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 173.7 feet from station in azimuth 218°24′. No. 2 is in north-south fence line at west side of small enclosure about 15 feet east of center line of road, and about ½ mile from station in azimuth 63°33′00″. No. 3 is 85.85 feet from station in azimuth 130°19′.

Plane coordinates: (I), x=907,557.27 feet; y=488,985.93 feet; grid azimuth to reference mark no. 2=62°32′47″.[8]

Wildcat (Banner County, Nebr., W. Mussetter, 1933; 1934).—About 12 miles south-southwest of Gering, near northwest corner of level summit of high prominent three-cornered flat-topped timbered butte known as Wildcat Mountain, on land owned by Bar Diamond Ranch, 71 feet southeast of point that drops off sharp to northwest and approximately in sec. 36, T. 20 N., R. 56 W. To reach from Courthouse in Gering, small town about 2 miles south of Scottsbluff, go southerly 13 miles on State Highway 29, at U. T. Snook's mail box (mounted on iron bracket on west side of highway), leave graded road, turn west on private road and go 1.0 mile to U. T. Snook's ranch, pass through wire fence just south of barn and follow trail west 0.1 mile to northwest fence corner, turn left and follow along west side of fence for 0.6 mile to another fence corner, from here follow dim road, which goes in south and westerly direction up main canyon 1.0 mile to north-south fence on south slope of high ridge. It will be necessary to leave trail in several places to avoid bad washes, but by picking way carefully truck can be driven up this canyon without trouble. At this point there is gate in fence, but due to bad wash it will be necessary to cross fence above gate. After crossing fence, follow along ridge north and west 0.2 mile to where road turns to right around base of butte, leave road and pick way around left side of small knoll 0.1 mile to east base of most prominent butte and end of truck travel. From here pack up northeast point of butte to west, about 150 yards to approximate center of butte and station site. Surface mark is standard station disk in 6-inch cast-iron pipe filled with concrete, projecting 6 inches above ground. Underground mark is standard station disk in concrete, note 7a. Reference and azimuth marks are standard disks in outcropping bedrock, note 12a. No. 1 is on edge of summit, midway

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

between 2 pine trees, and 107.08 feet (slope distance) from station in azimuth 259°30′. No. 2 is at south point of summit, 177.15 feet (slope distance) from station in azimuth 337°58′. No. 3, azimuth mark, is on small white sandstone-covered hill, in outcropping rock on ridge near old wagon trail, and about 0.5 mile from station in azimuth 140°50′05″.

Plane coordinates: (I), x=896,712.72 feet; y=364,681.44 feet; grid azimuth to reference mark no. 3=139°52′10″.[8]

Roubedeau (Scotts Bluff County, Nebr., W. Mussetter, 1933).—About 10 miles west of Scottsbluff and 2 miles north of Roubadeau Pass, in NE ¼ sec. 31, T. 22 N., R. 56 W. To reach from Gering (which is just across river from Scottsbluff) follow State Highway N-29 west and south 2.1 miles to road leading west at Roubadeau Pass sign. Follow this road 4.0 miles, jog north 0.1 mile, then west 5.5 miles to point where graded road bears to left just west of Pass, and ungraded road leads west. Follow ungraded road west 0.8 mile to old house, turn north, and go 1.0 mile to gate. Follow trail straight ahead, west of north, 0.5 mile to well-beaten cow trail leading northeast towards fence corner. Follow trail 0.3 mile to this fence and pass through gate 50 yards north of corner, then follow wagon tracks northeast and bear left to top of ridge, 0.55 mile, then east 300 yards along top of ridge to end of truck travel. This point is at foot of steep slope, about 100 yards east of small telephone pole. Station is on second hump, south of east of this point, about ¼ mile distant, near western extremity of bluff. There is higher ground to east. Surface mark is standard station disk in top of 4-inch cast-iron pipe, 4 feet long, projecting 4 inches above ground. Underground mark is standard disk station mark in concrete, note 7a. Reference mark no. 1 is standard disk in top of 4-inch cast-iron pipe 4 feet long, projecting 4 inches above ground, and 13.515 meters (44.34 feet) from station in azimuth 237°29′. Reference mark no. 2 is standard disk in top of 4-inch cast-iron pipe 4 feet long, projecting 4 inches above ground, and is 101.2 feet from station in azimuth 318°33′. Reference mark no. 3 is standard reference disk in concrete, note 11a, on summit of small bluff, and about ½ mile from station in azimuth 99°06′.

Plane coordinates: (I), x=856,988.10 feet; y=430,385.37 feet; grid azimuth to reference mark no. 3=98°13′48″.[8]

66 Mountain (Goshen County, W. Mussetter, 1933).—About 6 miles northeast of Lagrange and about 3 miles west of Wyoming-Nebraska boundary line, in T. 20 N., R. 60 W., on highest part of large rounded hill known as 66 Mountain. To reach from Lagrange, go west 0.2 mile from Lagrange Lumber Co. to T-fork, turn right and go 0.3 mile, turn left along railroad tracks and go 0.1 mile, turn right, cross tracks and go north 2.6 miles on gravel road to wire gate on east side of road. (This gate is about ¼ mile north of yellow house.) Turn right, go through wire gate and take right fork which goes straight east, follow road 2.2 miles, turn left and go 2.0 miles, turn right, pass farm house, go through gate and follow main road 0.5 mile to top of hill, turn right and follow main road 1.2 miles, go through gate, turn left and go 0.2 mile to top of hill and station. Station is on top of hill about 25 feet east of drop-off to west. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard disks in concrete, note 11a. No. 1 is on rocky ridge, 112.6 feet (slope) from station in azimuth 219°07′. No. 2 is on grassy knoll, 137.4 feet (slope) from station in azimuth 293°56′. No. 3 is 20 feet south of fence corner, and about ⅜ mile from station in azimuth 97°47′32″.

Plane coordinates: (I), x=793,913.70 feet; y=378,975.03 feet; grid azimuth to reference mark no. 3=97°04′34″.[8]

Flower (Banner County, Nebr., W. Mussetter, 1933).—About 9 miles southwest of Harrisburg and 2 miles northeast of small village of Flowerfield, in NE ¼ sec. 28, T. 18 N., R. 57 W. To reach from Harrisburg, follow State Highway N-29 south 5.9 miles to graded dirt road leading west towards Flowerfield. Follow this road 8.0 miles to crossroads, then go north on little-used section-line road 1.5 miles to fence corner on west. Station is about ½ mile northwest of this point, on highest point of flat knoll in open pasture. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a; upper mark projects 4 inches. Reference and azimuth marks are standard

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

disks in concrete, note 11a; marks project 4 inches. No. 1 is on same knoll as and 53.62 feet from station in azimuth 254°37′. No 2, azimuth mark, is on knoll west of road, in fence line, and about ½ mile from station in azimuth 333°43′33″. No. 3 is on same knoll as and 116.92 feet from station in azimuth 120°17′.

Plane coordinates: (I), x=848,981.38 feet; y=308,004.71 feet; grid azimuth to reference mark no. 2=332°52′53″.[8]

Albin (Laramie County, W. Mussetter, 1933).—About 5 miles north of Albin, on prominent knoll in pasture, at west edge of tableland overlooking Horse Creek Valley, on land owned by Arvid Anderson, in northwest corner of sec. 33, T. 18 N., R. 60 W. To reach from Albin, follow main road east ¼ mile, then north 4.0 miles to T-road, then east 1.0 mile, north 1.0 mile, then west 0.4 mile to Anderson's house. From house follow pasture trail west 0.5 mile, thence to right, across pasture, about 200 yards to station. Station is on extreme northerly end of bare, ridge-like knoll, slightly west of highest point, 100 yards east and 100 yards south of northwest corner of sec. 33. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a; upper mark projects 4 inches. Reference and azimuth marks are standard disks in concrete, note 11a; all project 4 inches. No. 1 is on same knoll as and 65.70 feet from station in azimuth 253°36′. No. 2, azimuth mark, is at northwest corner of Anderson's yard, and about ½ mile from station in azimuth 265°14′41″. No. 3 is on crest of same knoll as and 137.74 feet from station in azimuth 336°16′. Elevation: 1,638.1 meters (5,374 feet).

Plane coordinates: (I), x=794,521.80 feet; y=301,853.19 feet; grid azimuth to reference mark no. 2=264°31′57″.[8]

Bear (Goshen County, W. Mussetter, 1933).—About 7 miles northwest of Lagrange and 8 miles south of Hawk Springs, in sec. 29, T. 20 N., R. 62 W., on highest point of Bear Creek Mountain, in Charles Kessler's pasture. To reach from Lagrange follow main road west 4.4 miles to junction with U. S. Highway 85, turn north on highway and go 0.1 mile, thence west on dirt road leading along on south side of Bear Creek Mountain. Follow this road 4.2 miles to road leading north to ranch, opposite mail box. Follow road north 0.3 mile to Kessler's house, then continue north through lane 0.15 mile to gate. Keep right-hand straight ahead fork through gate, and cut across pasture to canyon on west side of mountain. From here pack up side of mountain to east about 1.0 mile to station; about 1-hour pack with load. Station is on highest point of hill, about 175 yards east of north-south wire fence across mountain. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 112.06 feet from station in azimuth 327°53′. No. 2 is on summit of small knoll, about 0.4 mile from station in azimuth 56°30′30″. Elevation: 1,616.3 meters (5,303 feet).

Plane coordinates: (I), x=741,446.30 feet; y=369,022.26 feet; grid azimuth to reference mark no. 2=55°55′15″.[8]

Hunter (Laramie County, W. Mussetter, 1933).—About 37 miles northeast of Cheyenne, and 10 miles northwest of Albin, in sec. 2, T. 17 N., R. 62 W., on flat-topped mesa fringed with small pines, in Hunter Ranch pasture. To reach from Cheyenne, follow U. S. Highway 85 northeast about 30 miles to gravel road leading east to Albin. Follow gravel road east 8.2 miles to crossroads at stucco schoolhouse, thence north 1.0 mile to east-west road. Enter gate directly to north and follow old wagon trail northwest 2.7 miles to north side of mesa, then proceed northwest across pasture 0.5 mile to station. Only approach is up southeast end of mesa. Station is near west end of southwestern of series of flat-topped mesas, and about 200 yards east of extreme southwest point of mesa, which is few feet higher than station. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a; upper mark projects 4 inches. Reference and azimuth marks are standard disks in concrete, note 11a; all project 4 inches. No. 1, azimuth mark, is near east point of mesa and about 0.2 mile from station in azimuth 275°02′58″. No. 2 is on same mesa as and 73.44 feet from station in azimuth 20°51′. No. 3 is on same mesa as and 133.10 feet from station in azimuth 112°17′. Elevation: 1,687.8 meters (5,537 feet).

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

Plane coordinates: (I), x=746,121.99 feet; y=294,412.49 feet; grid azimuth to reference mark no. 1=274°27′17″.[8]

Wauneta (Laramie County, W. Mussetter, 1933).—About 29 miles northeast of Cheyenne, and 20 miles west of Albin, in sec. 17, T. 17 N., R. 63 W., on open pasture land on rim south of Horse Creek. To reach from Cheyenne, follow U. S. Highway 85 northeast about 27 miles to graded road leading north towards Glenys. Follow this road north 2.0 miles to auto gate, then continue northeast on main trail 0.5 mile to station, 25 yards west of road, on fairly level ridge which slopes downward to north of station. From station, southwest corner of sec. 17 bears 189° magnetic, distance about ½ mile. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a; upper mark projects 4 inches. Reference and azimuth marks are standard disks in concrete, note 11a; all project 4 inches. No. 1 is in same pasture as and 93.11 feet from station in azimuth 177°04′. No. 2, azimuth mark, is in fence line, 25 feet west of auto gate noted above, east of section corner, and about ½ mile from station in azimuth 21°33′15″. No. 3 is in same pasture as and 104.33 feet from station in azimuth 80°38′. Elevation: 1,744.0 meters (5,722 feet).

Plane coordinates: (I), x=694,828.83 feet; y=282,363.98 feet; grid azimuth to reference mark no. 2=21°05′02″.[8]

Wilkins (Goshen County, W. Mussetter, 1933).—About 16 miles east of Chugwater, near half-section line and west edge of sec. 36, T. 21 N., R. 64 W., on land owned by Bertha Wilkins. To reach from Chugwater go east on gravel road, first street south of railroad depot. Follow main road to T-fork on top of mesa, distant 1.8 miles. Turn left and go 0.3 mile, then turn right and go east 15.0 miles to crossroads with farm buildings on northeast corner. Turn right and go ½ mile to top of hill and station. Station is on low rounded hill, 23.5 feet east of center line of road, and 7.5 feet east of north-south fence line. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 2 feet east of north-south fence line, and about ½ mile from station in azimuth 0°27′12″. No. 2 is in east-west fence line, 22 feet west of center line of road, 13.5 feet west of north-south fence line on west side of road, and 115.32 feet from station in azimuth 25°25′. No. 3 is 13 feet west of center line of road and 14.50 meters (47.6 feet) from station in azimuth 118°42′. Elevation: 1,624.2 meters (5,329 feet).

Plane coordinates: (I), x=682,599.64 feet; y=394,823.08 feet; grid azimuth to reference mark no. 1=0°00′28″.[8]

Kirkbride (Laramie County, W. Mussetter, 1933).—About 23 miles northeast of Cheyenne, in NE¼ sec. 30, T. 17 N., R. 64 W., in open pasture owned by Barney Kirkbride, at edge of tableland overlooking Horse Creek. To reach from Cheyenne follow U. S. Highway 85 northeast 21 miles to road leading north. (Frank Lang's garage is on highway, ½ mile east of this road.) Follow this road north 2.8 miles to ranch on west, and continue north on trail along section-line fence 0.45 mile to station. Station is about 100 yards south of Horse Creek bluffs, 100 yards north of east-west fence, and 10 yards west of north-south fence, apparently in west line of road allowance, on slight swell in fairly level open pasture. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a; upper mark projects 4 inches. Reference and azimuth marks are standard disks in concrete, note 11a; all project 4 inches. No. 1 is in west jog corner of fence, and 107.41 feet from station in azimuth 359°06′. No. 2, azimuth mark, is in east-west fence line, probably on half-section line, and about ¼ mile from station in azimuth 69°32′48″. No. 3 is in same pasture as and 133.76 feet from station in azimuth 83°28′. Elevation: 1,794.3 meters (5,887 feet).

Plane coordinates: (I), x=662,145.69 feet; y=272,223.87 feet; grid azimuth to reference mark no. 2=69°09′20″.[8]

King (Albany County, W. Mussetter, 1933).—About 12 miles northeast of Laramie, 1 mile southwest of King's ranch house, about 50 feet west of east edge of level summit fringed with piñon trees (highest point in immediate vicinity). To reach from Laramie, follow Ninth Street north and northeast 6.6 miles to fork just beyond small bridge, follow left fork (old Sybille road) northeast 5.4 miles up steep grade to point just beyond main summit of Laramie Mountains, turn and go north along main ridge 1.4 miles to station. Marked by standard station disk in concrete, note 1a. Reference marks are standard

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

reference disks in bedrock, note 12a. No. 1 is on knoll or ridge, and 287.92 feet from station in azimuth 238°27′. No. 2 is on same summit, near east edge of steep slope, and 77.10 feet from station in azimuth 310°13′. No. 3 is west of ravine (tributary to main ravine leading southwest from station), in rock ledge, and approximately ½ mile from station in azimuth 35°01′45″. Elevation: 2,627.4 meters (8,620 feet).

Plane coordinates: (I), x=415,517.77 feet; y=290,493.68 feet; grid azimuth to reference mark no. 3=35°14′00″.[8] (II), x=1,009,372.64 feet; y=295,815.03 feet; grid azimuth to reference mark no. 3=33°47′54″.[8]

Split Rock (Albany County, W. Mussetter, 1933).—About 22 miles west of Wheatland, on highest point of prominent mountain known locally as Pine Mountain, in T. 24 N., R. 72 W., on highest point of rock (towering about 50 feet above ground at base). Top of mountain is rather pointed and has notch at its center, part to north of notch being higher point. To reach from courthouse in Wheatland, go north 4½ blocks on highway to Oak Street, turn left onto Oak Street and go 4.6 miles, turn right and go 2.0 miles to T-intersection, turn left and go 4.4 miles, turn left onto Palmer Canyon road (main-traveled road) and go 17.3 miles, turn left and go 0.2 mile to Hall's ranch, follow left fork (main-traveled road) down canyon 2.8 miles to house and end of road, and pack up mountain to the north to station. Marked by standard station disk in bedrock, note 2. Reference marks are standard reference disks in concrete, note 12a. No. 1 is at edge of cliff, and 16.74 meters (54.9 feet) from station in azimuth 301°36′. No. 2 is at edge of cliff, and 9.71 meters (31.9 feet) from station in azimuth 180°57′. Elevation: 2,532.7 meters (8,309 feet).

Plane coordinates: (I), x=437,860.19 feet; y=491,889.06 feet.

Arlington (Carbon County, W. Mussetter, 1933).—About 15 miles southwest of Rock River, ½ mile northwest of post office at Arlington, 5 miles southwest of McFadden, on rounded summit at southwest end of long level mesa extending northeast along northwest side of Rock Creek. To reach from Rock River, go southwest about 20 miles (via McFadden) to fork ¼ mile north of Arlington, follow Elk Mountain road west 0.75 mile to top of grade, go northeast through gate at point where telephone line crosses fence, continue northeast 300 yards up slope to end of truck travel and go northeast about ¼ mile to station. Marked by standard station disk in boulder, note 4. Reference marks are standard reference disks in boulders, note 12c. No. 1 is 77.32 feet from station in azimuth 9°09′. No. 2 is 44.10 feet from station in azimuth 92°15′. Granite monument about 4 feet high and 1 foot square is in ungraded street near ranger station in Arlington, just south of small bridge, and approximately ½ mile from station in azimuth 324°56′06″. Elevation: 2,510.2 meters (8,236 feet).

Plane coordinates: (I), x=212,589.28 feet; y=343,274.05 feet; grid azimuth to Arlington Monument=325°37′58″.[8] (II), x=805,153.88 feet; y=343,496.85 feet; grid azimuth to Arlington Monument=324°11′39″.[8]

Boone (Albany County, W. Mussetter, 1933).—About 21 miles northeast of Medicine Bow, 20 miles north by east of Rock River, in T. 24 N., R. 75 W., on low mesa which is most southwesterly one of group extending to north and east. There are scattering trees on north side and jagged rock outcrops about ⅓ mile south of top of mesa. To reach from Rock River, go north 2.8 miles on U. S. Highway 30 to Wheatland road, turn right and follow main-traveled road 10.5 miles, follow left fork 0.2 mile, follow left fork 11.4 miles to point where road joins from right, continue 0.3 mile, follow left fork (leaving main-traveled road) 0.4 mile to creek wash, (gray outcropping rocks about 150 yards to left), cross creek, turn left and go in westerly direction across country 2.0 miles to highest part of hill and station. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference mark no. 1 is standard reference disk in concrete, note 11a, on mesa, and 17.695 meters (58.05 feet) from station in azimuth 287°28′. No. 2 is standard reference disk in bedrock, note 12a, 1.5 feet below top of rock, and approximately ⅓ mile from station in azimuth 342°58′35″. No. 3 is standard reference disk in concrete, note 11a, on mesa, and 18.29 meters (60.0 feet) from station in azimuth 19°28′. Elevation: 2,232.6 meters (7,325 feet).

Plane coordinates: (I), x=321,544.55 feet; y=487,649.23 feet; grid azimuth to reference mark no. 2=343°24′57″.[8] (II), x=910,444.22 feet; y=490,585.25 feet; grid azimuth to reference mark no. 2=341°57′57″.[8]

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

Rattlesnake (U. S. G. S.) (Carbon County, W. Mussetter, 1933; 1934).—Not a U. S. Geological Survey station. About 10½ miles west of town of Elk Mountain, 11½ miles south by west of Hanna, in T. 20 N., R. 82 W., on highest point of long low ridge known as Rattlesnake Ridge at northwest foot of Elk Mountain, 22.5 feet northeast of 8-foot cairn. To reach from town of Elk Mountain, follow Hanna road west 4.1 miles to road leading off to left along fence, turn left and follow along fence 2.0 miles to crossroads, continue straight ahead (along fence) 1.1 miles to gate, pass through gate and continue 0.5 mile to gate at house, pass through gate and continue about 4 miles on main-traveled road to top of saddle, and proceed northwest to top of ridge and station. Marked by standard station disk in bedrock. Reference marks are standard reference disks in bedrock, note 12a. No. 1 is 21.34 meters (70.0 feet) from station in azimuth 242°26′. No. 2 is 22 feet southwest of cairn, and 13.49 meters (44.3 feet) from station in azimuth 59°01′. Azimuth from station to Salt Lake-Omaha Airway, site 28, beacon, is 102°16′07″. Elevation: 2,455.0 meters (8,054 feet).

Plane coordinates: (II), x=702,056.32 feet; y=378,535.31 feet.

Shirley (U. S. G. S.) (Carbon County, W. Mussetter, 1933; 1934).—About 20 miles north of Hanna, 25 miles northwest of Medicine Bow, 4 miles southwest of Shirley post office, on more westerly of 2 highest peaks of Shirley or Freeze-out Mountains, and on rough pinnacle of rock about 10 feet high. To reach from Medicine Bow, follow main graded road (Casper road) north 18 miles, follow left fork (straight ahead) north and west 18 miles to end of graded road at small bridge, follow right fork 3.5 miles to Quealey "Q" Ranch house, from here follow old sawmill road southwest 2 miles to mouth of Sawmill Canyon and end of truck travel, follow trail up canyon 1¼ miles to point near old sawmill, then right to west rim of canyon, and follow wagon trail south and southeast about 2 miles to station site. This trail passes about 50 yards north of station site, and starts down grade. The entire summit of mountain is covered with dense growth of fir and lodgepole, and walking, except in trails and clearings, is very difficult. The sheep wagon trail recrosses Sawmill Canyon Creek through boggy meadow just above point where creek enters rocky canyon. It is well blazed from here to station site, and it is very essential that this trail be found and followed. A triangular blaze was placed on 8-inch fir tree opposite station. Marked by U. S. Geological Survey station disk set in solid rock. Reference marks are standard reference disks in bedrock, note 12a. No. 1 is northeast of sheep wagon trail, and 224.0 feet from station in azimuth 221°45′. No. 2 is near end of backbone of rocks, and 59.10 feet from station in azimuth 21°01′. No. 3 is on outcropping ledge approximately ½ mile from station in azimuth 84°47′45″. Elevation: 2,790.6 meters (9,155 feet).

Plane coordinates: (I), x=123,364.10 feet; y=549,570.02 feet; grid azimuth to reference mark no. 3=85°43′43″.[8] (II), x=710,753.63 feet; y=547,464.03 feet; grid azimuth to reference mark no. 3=84°16′26″.[8]

Separation (U. S. G. S.) (Carbon County, W. Mussetter, 1933).—Not a U. S. Geological Survey station. About 13 miles southwest of Rawlins, on summit of prominent peak known as Separation Peak. To reach from Ideal Auto Camp at city limits of Rawlins, go west 1.9 miles on U. S. Highway 30 to graded road south, cross railroad tracks and follow right fork (graded road) southwest 4.5 miles, turn left onto graded road and go 3.6 miles (crossing narrow bridge at 1.4 miles, and following right fork at 1.6 miles) to end of road at fox farm, turn right through wire gap and go 1.4 miles up valley (passing to right of log cabin at 0.2 mile, and crossing creek to right at foot of quaking aspen grove), continue 1.0 mile on main trail, follow right fork up ridge, to point where main road goes down into draw, proceed southwest 1.4 miles to point where road is washed out and impassable, and follow trace of old road and ridges southwest to station. Marked by standard station disk in bedrock, note 2. Reference marks are standard reference disks in bedrock, note 12a. No. 1 is at foot of lone pine tree and approximately ¼ mile from station in azimuth 292°06′15″. No. 2 is at edge of cliff, and 9.20 meters (30.2 feet) from station in azimuth 343°45′. No. 3 is at edge of cliff, and 21.88 meters (71.8 feet) from station in azimuth 56°50′. Elevation: 2,585.4 meters (8,482 feet).

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

Plane coordinates: (II), x=483,105.26 feet; y=353,814.17 feet; grid azimuth to reference mark no. 1=292°08′43″.[8] (III), x=870,350.91 feet; y=356,718.00 feet; grid azimuth to reference mark no. 1=291°12′14″.[8]

Seminoe (U. S. G. S.) (Carbon County, W. Mussetter, 1933; 1934).—Not a U. S. Geological Survey station. About 27 miles east of north of Rawlins, 6 miles east of Ferris oil camp, on Barkley Peak which is highest point on east-and-west ridge on south side of Seminoe Mountains. The peak is composed of seamed igneous rock, and is very steep, covered with rock slides on south side and with grass on north side. To reach from Rawlins, follow U. S. Highway 287 north 15.5 miles to junction with Sand Creek road, follow Sand Creek road northeast to fork, follow right-hand road northeast 9.8 miles to General Petroleum Co. camp no. 16, from here go northeast 4 miles on main trail to Severson's ranch, and continue east 1.1 miles on main trail to point in valley at foot of steep grade, follow old trail south 1¼ miles up tributary creek to quaking aspen grove, and proceed south up steep ridge to station site. Station was established close to supposed location of U. S. Geological Survey station, which was not recovered. Marked by standard station disk, erroneously stamped Seminoe (U. S. G. S.), in bedrock, note 2. Reference marks are standard reference disks in bedrock, note 12a. No. 1 is about ⅓-way up slope from saddle, and about 0.5 mile from station in azimuth 279°31′44″. No. 2 is 63.22 feet (slope) from station in azimuth 89°19′. Azimuth from station to *Salt Lake-Omaha Airway, site 29, beacon* is 320°48′58″ and to high point of Ferris Mountains is 123°32′11″. Elevation: 2,727.0 meters (8,947 feet).

Plane coordinates: (II), x=574,901.61 feet; y=546,874.43 feet; grid azimuth to reference mark no. 1=279°20′43″.[8] (III), x=958,963.72 feet; y=551,306.33 feet; grid azimuth to reference mark no. 1=278°23′39″.[8]

Divide (Sweetwater County, W. Mussetter, 1933).—About 16 miles north by east of Wamsutter, in T. 22 N., R. 94 W., on low, bare, flat-topped hill, about 1.5 miles east of Wamsutter-Red Desert Wells road. To reach from Wamsutter, go north 7.9 miles on Red Desert Wells road to fork, continue straight ahead 1.7 miles to end of improved road, continue straight ahead 0.1 mile, follow left fork, go 3.2 miles to crossroads, continue straight ahead 1.3 miles (gray mound about 75 yards to right), continue 0.5 mile, leave road just beyond lowest part of draw, turn right and go in easterly direction 1.8 miles up left side of draw to top of hill and station. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is approximately ¼ mile from station in azimuth 294°11′45″. No. 2 is 15.565 meters (51.07 feet) from station in azimuth 343°51′. No. 3 is 13.565 meters (44.50 feet) from station in azimuth 85°48′. Elevation: 2,130.2 meters (6,989 feet).

Plane coordinates: (II), x=309,581.21 feet; y=437,731.28 feet; grid azimuth to reference mark no. 1=294°39′45″.[8] (III), x=695,454.85 feet; y=437,772.84 feet; grid azimuth to reference mark no. 1=293°43′01″.[8]

Bairoil (Fremont County, W. Mussetter, 1933).—About 35 miles north-northwest of Rawlins, 4 miles west-northwest of Bairoil oil camp, in T. 27 N., R. 91 W., near east edge of crest near center of long spur extending southward from east end of Green Mountains (ridge has scattering of trees on east side, and is ¼ mile south of pointed hill topped with slight growth of trees). To reach from Rawlins, follow U. S. Highway 287 north 35 miles to Lamont, go west 4.6 miles to Bairoil, go south across bridge, follow right fork west, follow trail northwest 3½ miles to ranch on left, continue north 2 miles, turn west and go ½ mile up open draw to end of truck travel, go west to summit of main ridge south of draw, and go south about 300 yards along ridge to station site. Marked by standard station disk in boulder, note 4. Reference marks no. 1 and no. 2 are standard reference disks in boulders, note 12c. No. 1 is on slope of ridge, about 25 feet west and 100 feet south of isolated group of trees, and approximately ½ mile from station in azimuth 198°57′26″. No. 2 is along crest of same ridge, and 205.25 feet from station in azimuth 220°38′. Reference mark no. 3 is standard reference disk in bedrock, note 12a, at rim of ridge, just west of group of pine trees, and 130.55 feet from station in azimuth 26°47′. Elevation: 2,657.0 meters (8,717 feet).

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

Plane coordinates: (II), x=416,118.57 feet; y=594,399.88 feet; grid azimuth to reference mark no. 1=199°09′57″.[8] (III), x=799,386.51 feet; y=596,193.10 feet; grid azimuth to reference mark no. 1=198°12′45″.[8]

Granite (Fremont County, C. I. Aslakson, 1933).—About 7 miles northwest of South Pass City and 4 miles north of south boundary line of the Washakie National Forest, in T. 30 N., R. 101 W., on high rounded jagged mountain known as Granite Peak, on highest point of third prominent peak back from south end of range. To reach from South Pass City, go north on Lander Road 1.5 miles to an old mine dump on right, turn left off Lander Road, and continue 1.3 miles to three forks, take extreme right-hand fork and continue 1.7 miles on main-traveled road to creek crossing at sign "Granier Meadows 4 mi.", from here follow main trail to Forest Service fire toolhouse that sits off the road to left, turn left and work way over trail which is very rough and rocky to an old sawmill site and end of truck travel. From here follow well-blazed trail along south side of mountain to old Forest Service telephone booth, continue on trail about ¼ mile, then turn to right and up mountain to highest point and station site, which is at point of old Forest Service lookout station. Mark is standard station disk in boulder, note 5. Reference marks are standard reference disks in boulders, note 12c. No. 1 is in saddle between Granite Peak and peak to east, 250 feet from station in azimuth 269°17′. No. 2 is 95.6 feet from station in azimuth 18°17′. Elevation: 3,180.5 meters (10,435 feet).

Plane coordinates: (III), x=464,989.88 feet; y=686,163.15 feet. (IV), x=824,270.46 feet; y=688,439.46 feet.

B. M. T 19 (Sweetwater County, C. I. Aslakson, 1933).—About 3 miles northeast of Farson, in SW¼ sec. 1, T. 25 N., R. 106 W., near southwest corner of school lot, 84.8 feet southwest of southwest corner of schoolhouse, 3 feet east of west fence, and 55 feet north of center line of South Pass City Road. To reach from Farson, go north 1.7 miles on U. S. Highway 187, to South Pass Road, turn east on this road and go 1.5 miles, then north 1.0 mile, then east again 0.15 mile to schoolhouse on north side of road. Mark is standard bench mark disk of U. S. Coast and Geodetic Survey, in block of concrete. Reference marks are standard reference disks in concrete, note 11a. No. 1 is in northwest corner of schoolyard, just east of west fence, south of north fence, and 232.69 feet from station in azimuth 180°56′. No. 2 is 24 feet south of center line of South Pass Road, directly south of entrance to school, and 118.38 feet from station in azimuth 311°50′. No. 3 is on west side of South Pass Road, about 150 yards south of bridge over irrigation ditch, and about ½ mile from station in azimuth 21°54′50″. Elevation: 2,024.38 meters (6,641.7 feet).

Plane coordinates: (III), x=321,166.62 feet; y=540,349.13 feet; grid azimuth to reference mark no. 3=22°21′23″.[8] (IV), x=682,742.18 feet; y=540,379.65 feet; grid azimuth to reference mark no. 3=21°27′42″.[8]

Prospect (Sublette County, C. I. Aslakson, 1933; 1936).—About 24 miles west of South Pass City, 7 miles east of Big Sandy, 1½ miles south of Big Sandy Creek, 3½ miles east of Little Sandy Creek, 1½ miles south of the "Leckie Dude Ranch", in T. 30 N., R. 104 W., ¼ mile southeast of highest point of rocky butte known as Little Prospect Mountain. To reach from Boulder Store, follow Rock Springs Highway south 14.5 miles; turn left off highway onto graded road at sign "Pleasant Valley Speedway" "Mitchell's Camp" and follow this road, generally northeast, 7.2 miles; take right fork and go east, passing to north of small store and gas pump at ranch, and follow main graded road 1.9 miles; take left fork and follow road north 1.6 miles; passing under flume and onto graded road that comes in from left; continue on main road, which runs generally south and follows along creek and telephone lines, 9.0 miles; bear left off graded road but keep on main-traveled road, and follow same 3.2 miles, generally east, to road coming in from south at sign "Rock Springs"; continue northeast over hills 2.0 miles to Leckie Ranch; follow main road east from ranch 2.0 miles to crossroads; turn right at sign "Sweetwater R. S. 21", and go south on little-traveled track road 0.6 mile. At top of grade take right fork through sagebrush and go southwest 1.2 miles to top of divide, which is just south of grove of trees in swamp flat; here turn right off road and go northwest through sagebrush about 0.2 mile to end of truck travel. From here station is about ¼ mile to northwest, near prominent rock cliffs. Pack west through aspen thicket to

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

top of ridge; then north along top of ridge about 200 yards to station. Twenty-minute pack. Mark is standard disk in boulder, note 5. Reference marks nos. 1 and 3 are standard disks in boulders, note 12c. No. 1 is 34.307 meters (112.56 feet) east of station in azimuth 289°50′; no. 3 is 21.930 meters (71.95 feet) north in azimuth 184°17′. No. 2 (azimuth mark) is U. S. Forest Service mark set in boulder on highest point of mountain, approximately ¼ mile northwest of station in azimuth 143°51′55″. Elevation: 2,710.8 meters (8,894 feet).

Plane coordinates: (III), x=361,913.10 feet; y=685,650.10 feet; grid azimuth to reference mark no. 2=144°12′42″.[5] (IV), x=721,206.63 feet; y=686,304.14 feet; grid azimuth to reference mark no. 2=143°18′37″.[5]

Little (Sublette County, C. I. Aslakson, 1933).—About 20 miles northwest of Farson, in T. 27 N., R. 108 W., on small low hill that slopes to the north, near central part of Little Colorado Desert. To reach from Farson, go north 6.1 miles on U. S. Highway 187, leave highway and turn left on sage road which parallels highway for 100 yards and then turns northwest, follow this road 3.6 miles to fork, keep straight ahead on right fork and go 7.7 miles, then 0.9 mile, and take left fork just before coming to some sheep corrals (about 400 feet south of spring), continue 0.2 mile to crossroads, leave main road, turn left (southeast) and follow main used road 6.0 miles to triangle trench just to right of road (the tracks made by 1933 survey party were deep and should be seen for many years). Leave road at triangle and head northwest, keeping to left of small wash which gradually turns to left, go 1 mile, turn right and go 0.6 mile to top of hill that slopes north, follow along top of ridge northwest and north 1.4 miles to station. Surface mark is standard station disk in concrete, note 1a. Underground mark is standard station disk in boulder. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 79.99 feet from station in azimuth 183°32′. No. 2 is 92.88 feet from station in azimuth 282°44′. No. 3 is on top of first ridge, about ten feet from trail which leads to station, and approximately ½ mile from station in azimuth 16°28′32″. Elevation: 2,165.9 meters (7,106 feet).

Plane coordinates: (III), x=234,730.62 feet; y=605,011.66 feet; grid azimuth to reference mark no. 3=17°08′10″.[5] (IV), x=595,308.28 feet; y=603,679.99 feet; grid azimuth to reference mark no. 3=16°14′18″.[5]

Colorado (Sublette County, C. I. Aslakson, 1933).—About 33 miles northwest of Farson, 12 miles southeast of Big Piney, and 7 miles east of Green River, in T. 28 N., R. 110 W., on highest part of flat-topped hill covered with sagebrush. To reach from Farson, go north 6.1 miles on U. S. Highway 187, then to left on sagebrush road that parallels highway about 100 yards, then turn northwest, follow this road 3.6 miles to fork, take right fork and continue 7.7 miles, continue on another right fork 0.9 mile, then take left fork just before coming to sheep corrals on right and go 0.2 mile to crossroads, then go 0.05 mile to another crossroad, then 0.15 mile and keep straight ahead for 11.35 miles to dim crossroads. Turn left off main road and go 3.0 miles, take right fork, cross wash, and go 1.0 mile to where road comes in from left, continue 2.8 miles to fork, take left fork and go 0.15 mile cross wash, and continue on dim road up draw about 2.4 miles where road becomes a trail. Follow horse trail and open glades 1.1 miles to top of hill at head of draw, then go straight ahead 0.1 mile down hill and southeast 0.5 mile to top of hill and station. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 104.3 feet from station in azimuth 239°09′. No. 2 is 90.61 feet from station in azimuth 332°19′. No. 3 is on first ridge from station about 10 feet from left of road (facing station), about 0.4 mile from station, and in azimuth 148°32′35″. Elevation: 2,229.6 meters (7,315 feet).

Plane coordinates: (III), x=180,173.19 feet; y=638,317.74 feet; grid azimuth to reference mark no. 3=149°20′31″.[5] (IV), x=540,240.35 feet; y=636,123.32 feet; grid azimuth to reference no. 3=148°26′33″.[5]

Halfmoon (U. S. F. S.) (Sublette County, C. I. Aslakson, 1933; 1936).—About 7 miles east by north of Pinedale, in T. 34 N., R. 108 W., at south edge of south boundary of Bridger National Forest, and on long east-west ridge which is bare and steep on south side and timbered on north side. Ridge is just south of Halfmoon Lake and is known as Halfmoon Mountain. To reach from Pinedale (small town on U. S. Highway 187), go east from "Cash Store" on graded road

[5] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

0.4 mile to second forks at base of hill; turn left and go north and northeast in direction of C. C. C. Camp sign on graded road 2.9 miles to old road turning back to right in almost opposite direction; this point is about 100 yards south of plain forks in main road. Leave main road and turn back on old road and follow it south down rocky hill 0.3 mile to forks at bottom of hill at 4- by 4-inch post; take left fork and follow it through boulder-strewn hills 0.9 mile to cattle guard; pass through guard and continue on main track road 1.15 miles to road "Y"; turn left and go 2.05 miles to forks; take right fork toward north end of mountain and go 0.3 mile to forks; take right fork, pass between some small log houses at Feltner's camp, and go 0.7 mile to forks; take right fork up steep slope and go 0.3 mile to base of steep rocky slope at edge of timber. Leave truck here (road continues east), and pack up hill, following along edge of timber, to top of ridge; follow south along top of ridge to highest point at southeast end and station. Pack is about 2½ miles and requires about 45 minutes. Mark is U. S. Forest Service mark set in concrete in depression in boulder. Reference marks are standard disks in boulders, note 12c. No. 1 is 27.813 meters (91.25 feet) east of station in azimuth 297°42′; no. 2 is 50.718 meters (166.40 feet) southwest in azimuth 36°19′. No. 3 is approximately 3/7 mile northwest of station in azimuth 140°05′14″. Elevation: 2,658.4 meters (8,722 feet).

Plane coordinates: (III), x=236,122.42 feet; y=814,996.58 feet; grid azimuth to reference mark no. 3=140°45′27″ [8] (IV), x=593,391.77 feet; y=813,646.12 feet; grid azimuth to reference mark no. 3=139°51′00″.[8]

Cora (U. S. G. S.) (Sublette County, C. I. Aslakson, 1933).—About 8 miles northwest of Pinedale, 3 miles west by south of Cora, 5 miles northeast of Daniel, in T. 34 N., R. 110 W., on highest point (north end) of summit of low flat-topped bare hill. To reach from Pinedale, go west 6.0 miles on U. S. Highway 187, turn right at Cora sign and continue north on graded road 1.6 miles, then west on old graded road along telephone line 1.35 miles to top of saddle, leave graded road, turn to right up hill and follow dim road to top of ridge, continue 1.1 miles to wire fence; station is 225 paces north of fence. Surface mark is standard station disk in concrete, note 1a. Underground mark is old U. S. Geological Survey mark set in stone 10 inches long, 9 inches thick, in mass of concrete. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 84.8 feet from station in azimuth 217°08′. No. 2 is at gate in east-and-west fence, approximately ⅛ mile from station in azimuth 10°36′27″. No. 3 is 133.3 feet from station in azimuth 127°16′. Elevation: 2,416.2 meters (7,927 feet).

Plane coordinates: (IV), x=518,440.56 feet; y=820,733.30 feet; grid azimuth to reference mark no. 2=10°33′38″.[8]

Mason (Sublette County, C. I. Aslakson, 1933).—About 16 miles northwest of Big Piney, 4 miles northwest of Mason post office in T. 31 N., R. 113 W., on long ridge that slopes from Bare Mountain east to Buddy Creek. To reach from Big Piney, go north on State Highway 287, passing Marbleton at 1.5 miles, and bridge at 2.3 miles and at 2.4 miles reach sagebrush road turning left off main highway, turn left and follow main-traveled sagebrush road, passing crossroads at 1.0 mile and at 5.15 miles from highway, at 6.6 miles keep to main road to left (road comes in from right and dim road goes straight ahead), at 12.6 miles keep left fork; at 16.75 miles keep main road to right; at 17.75 miles pass crossroads, continue to odometer reading of 18 miles north and west of above-mentioned highway to station site. Station is 40 feet south of road. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 18 feet south of sagebrush road and approximately 0.35 mile from station in azimuth 305°47′54″. No. 2 is 21.275 meters (69.70 feet) from station in azimuth 34°51′. No. 3 is 10 feet southwest of sagebrush road, and 25.65 meters (84.1 feet) from station in azimuth 135°24′. Elevation: 2,447.9 meters (8,031 feet).

Plane coordinates: (IV), x=433,905.30 feet; y=745,962.24 feet; grid azimuth to reference mark no. 1=305°57′55″.[8]

Tulsa (Sublette County, C. I. Aslakson, 1933).—About 7½ miles northwest of Tulsa, in T. 27 N., R. 113 W., on prominent partially-covered ridge, locally known as Hogback, about 20 feet west of face of cliff, and about ¼ mile north of

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

south end of highest part of ridge. To reach from Tulsa Hotel, at Tulsa, go north 0.3 mile on State Highway 287, leave highway and turn left onto graded dirt road and go 3.1 miles, take right fork and go 4.1 miles, then left fork (main road) and go 0.1 mile, take right fork just after crossing deep wash and go 0.85 mile, then follow right fork (main road) 0.2 mile. This road leads around north end of ridge to west side. From here it is about a 2-hour pack to station. Station could also be reached from east side by taking trucks up ridge which runs toward apparent highest part, then climbing up slope and rocks. Mark is standard disk station mark in boulder, note 4. Reference marks are standard reference disks in boulders, note 12c. No. 1 is about 20 feet from dead tree on edge of cliff, and 112.95 feet from station in azimuth 356°43′. No. 2 is 53.97 feet from station in azimuth 102°29′. No. 3 is on second ridge, in rock outcrop, and about ¼ mile from station in azimuth 168°19′22″. Elevation: 2,754.1 meters (9,036 feet).

Plane coordinates: (III), x=75,706.79 feet; y=608,434.13 feet; grid azimuth to reference mark no. 3=169°22′46″.[8] (IV), x=436,271.89 feet; y=604,609.64 feet; grid azimuth to reference mark no. 3=168°28′53″.[8]

Wyoming Peak (Lincoln County, C. I. Aslakson, 1933).—About 26 miles west of Big Piney, in sec. 11, T. 30 N., R. 116 W. on high mountain peak, known as Wyoming Peak, 11,400 feet in elevation. To reach from Big Piney, go north from Burney and Co.'s store on State Highway 287 0.15 mile, turn left off highway and go west 1.0 mile, take left fork and go 0.8 mile to T-fork; turn right and follow main-traveled road 4.25 miles, take right fork (graded road) and go 4.55 miles, take right fork at sign board reading "Middle Piney Lake 17.0 mi." and go 0.15 mile, then to right on main road 4.6 miles, then right at old log schoolhouse and go 5.6 miles on main road to forest boundary line and sign reading "Wyoming Peak 11 mi." Continue 1.6 miles, then follow left fork 0.15 mile, right fork (main road) 0.3 mile, take left fork at sign reading "Middle Piney Lake 4 mi." and go 0.6 mile to crossroads, continue straight ahead 0.5 mile, then along right fork 1.7 miles to good camp ground. From here cross creek and follow road along right side of creek to lake, follow pack trail along left side of lake, cross creek at the head of lake and follow well-blazed trail to fork on side of steep hill with small triangle blazed on dry post to the right of trail. Take right fork (top of Wyoming Peak can be seen straight ahead) and go about ¼ mile, take left fork just after crossing creek and follow trail up draw to its head (which is between Wyoming Peak and another peak to the left of Wyoming Peak). After reaching head of draw turn right onto ridge, then left up ridge to peak. Wyoming Peak has a large rock cairn and Forest Service telephone on top, a 3-hours' pack from the camp grounds with horses. Station is 21 feet northeast of Forest Service telephone, and approximately ½ mile northeast of lower peak. Surface mark is standard disk station mark in rock, note 4. Reference marks are standard reference disks in boulders, note 12c. No. 1 is 8.965 meters (29.41 feet) from station in azimuth 43°27′. No. 2 is 21.43 meters (70.31 feet) from station in azimuth 132°50′. Azimuth from station to peak, distant about ½ mile to southwest is 15°15′25″; and to *beacon west of station Tulsa* 321°44′03″. Elevation: 3,480.1 meters (11,418 feet).

Plane coordinates: (IV), x=354,690.56 feet; y=706,500.60 feet; grid azimuth to peak about ½ mile southwest=15°37′20″.[8]

Sheep (Lincoln County, C. I. Aslakson, 1933).—About 22 miles north of Kemmerer, and 21 miles southwest of Tulsa, in sec. 25, T. 25 N., R. 116 W., about ¾ mile south of south boundary of Wyoming National Forest, on extreme northwest end (not highest part of long ridge), known locally as Commissary Ridge. To reach from Kemmerer, go north 4.8 miles on State Highway 287 to Susie coal tipple; continue 1.25 miles, then turn left off highway just before arriving at high steel bridge over highway. Go 0.15 mile across track, take right fork and go 2.7 miles, then straight ahead on left fork 0.2 mile passing coal mine on right. Continue north on main-traveled road 5.8 miles, then 4.5 miles on right fork, then 1.8 miles on right fork to coal mine on left; continue 4.6 miles, then go 3.3 miles on left fork of main road to south fork of Fontenelle Creek, sometimes known as Bear Hole Creek. Continue across creek and go 0.25 mile, then turn left just after crossing ditch and just after arriving at old log buildings, continue 0.55 mile, take left fork and go 1.9 miles to ranch

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

owned by Walter Hankin. Inquire there as to best way to go up ridge. Station is marked by standard station disk in boulder, note 4. Reference marks are standard reference disks in boulders, note 12c. No. 1 is 90.39 feet (slope distance) from station in azimuth 32°14′. No. 2 is 52.83 feet (slope distance) from station in azimuth 93°05′. No. 3 is 5 feet west of one big pine tree and 8 feet north of another (both trees blazed with triangles), and about ½ mile from station in azimuth 149°16′49″. Elevation: 2,826.2 meters (9,272 feet).

Plane coordinates: (III), x=5,616.12 feet; y=535,183.11 feet; grid azimuth to reference mark no. 3=150°30′10″.[8] (IV), x=367,351.39 feet; y=530,288.01 feet; grid azimuth to reference mark no. 3=149°36′30″.[8]

Sublette (Lincoln County, C. I. Aslakson, 1933).—On high prominent mountain about 2¼ miles east of Idaho-Wyoming boundary, 3½ miles northeast of Border, and about 12 miles north of Cokeville, in sec. 8, T. 26 N., R. 119 W. To reach from Border Inn (yellow building, at Junction of U. S. Highway 30N and State Highway 89), go north 2.4 miles on State Highway 89, leave highway and go to right 0.9 mile to ranch at foot of mountain, owned by J. Layland. From here pack up canyon on trial about ½ mile, then turn left up onto ridge, then up ridge to highest point and station. Station mark is standard disk station mark in boulder, note 5. Reference marks are standard reference disks in boulders, note 12c. No. 1 is 102.6 feet from station in azimuth 328°03′. No. 2 is 148.5 feet from station in azimuth 150°45′. Elevation: 2,847.5 meters (9,342 feet).

Plane coordinates: (IV), x=251,089.93 feet; y=579,947.01 feet.

Paris Peak (Bear Lake County, Idaho, C. I. Aslakson, 1933).—On the highest part of Paris Peak, on rocky ledge. Best route to station is via Bloomington canyon. Go west from Bloomington up the canyon of same name about 8 miles until almost abreast of peak (here a sheep corral is just to right, and road turns right and encircles mountain). Climb peak by following ridge which runs north and south. There is no timber on ridge. Surface mark is standard disk station mark in rock, note 4. Reference marks are standard reference disks in rock, note 12c. No. 1 is on large flat rock, 55.54 feet from station in azimuth 291°30′. No. 2 is 16.22 feet from station in azimuth 45°12′. No. 3 is on flat rock among boulders, 0.1 mile from station in azimuth 89°51′22″. *Paris Peak cairn* (*U. S. G. S.*), is 3.0 meters (10 feet) from station in azimuth 61°02′. Elevation: 2,922.0 meters (9,587 feet).

Plane coordinates: (IV), x=103,073.96 feet; y=563,148.60 feet; grid azimuth to reference mark no. 3=90°50′25″.[8]

Dry Ridge (Caribou County, Idaho, C. I. Aslakson, 1933).—About 17.5 miles north-northeast of Georgetown, and 19 miles east-southeast of Soda Springs, near central part of Caribou National Forest, on summit of long bare ridge known as Dry Ridge. To reach from Montpelier, go northwest 12.0 miles on U. S. Highway 30N to Hoff & Sons grocery store and Shell service station at Georgetown, then leave U. S. Highway 30N and go east on main road 2.35 miles to fork and sign board "Johnson R. S. 21 miles." Go straight ahead on right fork (Georgetown Canyon Road to Johnson R. S.) 9.65 miles to summit of steep hill, continue 1.2 miles and take left fork at "Johnson R. S." sign and go 0.2 mile to summit of hill, continue 2.45 miles to summit of another hill, then 5.7 miles to bridge over small creek coming in from the left and Forest Service sign on tree pointing up creek and reading "Stewart Canyon Trail." (From here Johnson R. S. is distant 1.8 miles). Turn off main road and follow dim road through sagebrush and along left side of creek 0.65 mile into timber at edge of creek. From here follow Stewart Canyon trail (which is not very well blazed and in places is very faint) up left side of creek about 200 yards, cross creek, and follow right side of creek about ¾ mile to canyon that comes in from right, cross creek just after crossing dry wash and follow left side of creek about 200 yards, cross creek and follow dim rough trail along the right side of creek about 1.0 mile to bench where there is old camp site. Continue on trail (which goes slightly down hill for awhile) about 1.0 mile to saddle in opening and old rail enclosure. Here leave trail, turn right, and go up over sagebrush hill to highest point and station site. Station mark is standard disk station mark set with cement in iron pipe. Reference marks are standard reference disks set with cement in iron pipes. No. 1 is 48.8 feet from station

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

in azimuth 286°23′. No. 2 is 74.5 feet from station in azimuth 22°45′. Elevation: 2,742.8 meters (8,999 feet).

Plane coordinates: (IV), x=187,337.97 feet; y=744,806.68 feet.

Supplementary points

Mitchell, sugar mill, tank (Scotts Bluff County, Nebr., W. Mussetter, 1933).—No description of this station available.

Mitchell, sugar mill, stack (Scotts Bluff County, Nebr., W. Mussetter, 1933).—No description of this station available.

Morril, tank (Scotts Bluff County, Nebr., W. Mussetter, 1933).

Plane coordinates:[9] (I), x=836,899.36 feet; y=474,941.16 feet.

Lyman, tank, white top (Scotts Bluff County, Nebr., W. Mussetter, 1933).

Plane coordinates:[9] (I), x=807,607.11 feet; y=457,866.27 feet.

Lyman, tank, on tall structure (Scotts Bluff County, Nebr., W. Mussetter, 1933).

Plane coordinates:[9] (I), x=808,129.44 feet; y=458,853.14 feet.

Wyoming-Nebraska boundary monument no. 62 (Scotts Bluff County, Nebr., Goshen County, Wyo., W. Mussetter, 1933).—About 2 miles southwest of Lyman, Nebr., on Wyoming-Nebraska boundary line, just east of Packers Lake. To reach from Lyman, follow road ½ mile west to crossroads at Packers Lake sign, turn south and go 1.0 mile, then west ½ mile to station. Station mark is drill hole in top of Wyoming-Nebraska boundary monument no. 62, granite post 2.7 feet high and 0.3 foot square. Reference marks are standard reference disks in concrete, note 11a. No. 1 is in north-south fence line, about ½ mile from station in azimuth 240°06′. No. 2 is in Nebraska, in east-west fence line, 13 feet east of north-south fence, and 98.8 feet from station in azimuth 357°27′. No. 3 is in Wyoming, 90 feet west of north-south fence line, about 90 feet north of Packers Lake, and 113.7 feet from station in azimuth 88°36′.

Plane coordinates: (I), x=803,394.74 feet; y=450,227.60 feet; grid azimuth to reference mark no. 1=239°20′51″.[8]

G. L. O. corner (Goshen County, Wyo., Scotts Bluff County, Nebr., W. Mussetter, 1933).—About 2½ miles southwest of Lyman and 1 mile south of *Wyoming-Nebraska boundary monument no. 62*. To reach from Lyman, go west ½ mile, thence south 2.0 miles and west 0.5 mile to station, in front of white bungalow, at point of intersection of road corner. Marked by iron pipe, bent, with cap missing.

Plane coordinates:[9] (I), x=803,442.29 feet; y=446,164.50 feet.

Wyoming-Nebraska boundary monument no. 38 eccentric (Banner County, Nebr., W. Mussetter, 1933).—About 9 miles east of north of Albin, and 390.62 feet north-northeast of *Wyoming-Nebraska boundary monument no. 38* in right-of-way of State-line road. Reached from Albin by road east ¼ mile, then north 4.0 miles, then east 2.1 miles to State line at boundary monument no. 33, then north along State line 5.0 miles to station. Station is on east side of road at top of hill, 5 feet west of large square post. Surface and underground marks are standard disk station marks in concrete, notes 1a and 7a. Reference marks nos. 1 and 2 are standard reference disks in concrete, note 11a. No. 1 is 34 feet east of center line of State-line road, 3 feet west of north-south fence line, and 25.87 meters (84.9 feet) from station in azimuth 181°39′. No. 2 is in north-south fence line, about ½ mile from station in azimuth 359°39′50″. No. 3 is center of *Wyoming-Nebraska boundary monument no. 38*, granite post 8 inches square and 2.6 feet long in center of State-line road, and 390.62 feet from station in azimuth 4°14′27″.

Plane coordinates: (I), x=805,106.87 feet; y=323,746.86 feet; grid azimuth to reference mark no. 2=358°55′28″.[8]

Wyoming-Nebraska boundary monument no. 38 (Laramie County, Wyo.-Banner County, Nebr., W. Mussetter, 1933).—About 9 miles east of north of Albin, in center of State-line road, and 390.62 feet from *Wyoming-Nebraska boundary monument no. 38 eccentric* in azimuth 4°14′27″. Mark is granite monument 8 inches square and 2.6 feet long. Azimuth from monument to eccentric station is 184°14′26″.

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

Plane coordinates: (I), x=805,082.99 feet; y=323,356.92 feet; grid azimuth to *Wyoming-Nebraska boundary monument no. 38 eccentric*=183°30′05″.[7]

Albin, water tank (Laramie County, W. Mussetter, 1933).

Plane coordinates: (I), x=792,198.79 feet; y=275,549.33 feet.

Lookout (Albany County, W. Mussetter, 1933).—About 9 miles southeast of Rock River, 2 miles northwest of Lookout railroad station, on highest point (near west end) of bald hill in Laramie Plains. To reach from Rock River, follow U. S. Highway 30 southeast 8.9 miles to summit of grade, go through wire gap to left (northeast) opposite post bearing sign "F. A. P., 156 A" and "F. A. P. 123" (station bears 27° magnetic from this point), follow wagon trail northeast 1.2 miles to summit of low ridge, turn right (east) at summit of ridge, and follow up valley to point near its head, turn left and go to highest point of ridge and station. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is on ridge, and 28.42 meters (93.2 feet) from station in azimuth 286°07′. No. 2 is in valley, and approximately ½ mile from station in azimuth 41°15′46″. No 3 is on ridge, and 28.71 meters (94.2 feet) from station in azimuth 78°55′. Elevation: 2,236.2 meters (7,337 feet).

Plane coordinates: (I), x=321,045.83 feet; y=375,155.38 feet; grid azimuth to reference mark no. 2=41°41′55″.[8] (II), x=912,784.14 feet; y=378,096.96 feet; grid azimuth to reference mark no. 2=40°15′26″.[8]

Laramie (U. S. G. S.) (Albany County, W. Mussetter, 1933).—Not a U. S. Geological Survey station. On summit of low stony ridge about 2 miles north of and overlooking business district of Laramie. To reach from Laramie, go east on U. S. Highway 30 to Ninth Street, go north 1.75 miles on Ninth Street (past University) to dim trail to left just beyond point where pole line crosses main road, and opposite well-traveled road leading east to dump ground (just east of ridge on which station is located), go west 0.3 mile up valley, and bear left to station. Surface and underground marks are standard station disks in concrete, and erroneously stamped "Laramie U. S. G. S. 1933," notes 1a and 7a. Reference marks are standard reference marks in concrete, note 11a. No. 1 is 24.50 meters (80.4 feet) from station in azimuth 212°15′. No. 2 is in fence corner, 200.0 feet east of center line of Ninth Street, and approximately ½ mile from station in azimuth 332°52′02″. No. 3 is 24.765 meters (81.25 feet) from station in azimuth 21°52′. Elevation: 2,218.5 meters (7,279 feet).

Plane coordinates: (I), x=384,813.13 feet; y=243,941.34 feet; grid azimuth to reference mark no. 2=333°08′39″.[8]

County Road (U. S. G. S.) (Albany County, W. Mussetter, 1933).—About 7 miles northwest of Laramie, on summit of swell or ridge in Laramie Plains, southeast of alkali lake, and on level summit which slopes steeply to north and gently to south (highest ground in immediate vicinity). To reach from Laramie, go west over viaduct, go south 0.15 mile, go west 1.0 mile on main-traveled highway, go north 0.25 mile, go west 0.75 mile to graveled road leading north, go north 1.0 mile, go west, and follow main trail northwest 4.2 miles to south side of east-and-west fence, go north 50 yards to station. Marked by U. S. Geological Survey iron pipe and cap surrounded by concrete. Reference marks are standard reference disks in concrete, note 11a. No. 1 is in east-and-west fence line and approximately ¼ mile from station in azimuth 275°06′22″. No. 2 is in east-and-west fence line, and 179.82 feet from station in azimuth 6°11′. No. 3 is on same ridge, and 105.44 feet from station in azimuth 96°10′. Elevation: 2,249.0 meters (7,379 feet).

Plane coordinates: (I), x=351,779.63 feet; y=249,452.43 feet; grid azimuth to reference mark no. 1=275°27′46″.[8]

Salt Lake—Omaha Airway, site 38, beacon (Albany County, W. Mussetter, 1933).—Airway beacon is 36″ beacon on 51-foot tower, about 10 miles east of Laramie. To reach from Laramie, go east approximately 10 miles on Lincoln Highway to the intersection of Happy Jack Highway with Lincoln Highway, go east about ½ mile on Happy Jack Highway, turn left and go approximately 2 miles on trail to site on high ridge of Sherman Hill.

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[7] This azimuth has been computed by the first formula (p. 70), using both terms.

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

Plane coordinates: (I), x=426,747.79 feet; y=219,152.00 feet.

Laramie, University of Wyoming, stack (Albany County, W. Mussetter, 1933).

Plane coordinates: (I), x=385,733.36 feet; y=236,460.70 feet.

Laramie, Third Street Church, steeple (Albany County, W. Mussetter, 1933).

Plane coordinates: (I), x=382,987.38 feet; y=235,455.04 feet.

Laramie, power house, stack (Albany County, W. Mussetter, 1933).

Plane coordinates: (I), x=382,519.61 feet; y=236,745.33 feet.

Laramie, Standard Oil Refinery, stack, right-hand (westerly) of two (Albany County, W. Mussetter, 1933).

Plane coordinates: (I), x=381,137.87 feet; y=239,068.15 feet.

Laramie, cement plant, stack (Albany County, W. Mussetter, 1933).

Plane coordinates: (I), x=380,101.34 feet; y=219,753.99 feet.

Salt Lake-Omaha Airway, site 36, beacon (Albany County, W. Mussetter, 1933).—Airway beacon on 51-foot steel tower, 10 miles north of Laramie and about 1½ miles from Howell Station. Beacon is situated on ridge west of Lincoln Highway and Railroad. Laramie River approximately 1 mile west. Country slightly broken.

Plane coordinates: (I), x=370,290.85 feet; y=284,159.21 feet.

Salt Lake-Omaha Airway, site 35, beacon (Albany County, W. Mussetter, 1933).—Airway beacon on 50-foot tower, about 1 mile from Bosler. To reach from post office in Bosler, go south about ¼ mile on old Lincoln Highway, then turn on trail and go about ½ mile to site.

Plane coordinates: (I), x=351,845.12 feet; y=330,831.92 feet. (II), x=944,692.99 feet; y=334,553.68 feet.

Salt Lake-Omaha Airway, site 33, beacon (Albany County, W. Mussetter, 1933).—Airway beacon is 36″ revolving beacon on 51-foot tower, about 5 miles southeast of Rock River. To reach from Rock River, follow Lincoln Highway approximately 5 miles to site.

Plane coordinates: (I), x=296,081.87 feet; y=379,813.21 feet. (II), x=887,707.35 feet; y=382,125.80 feet.

Rock River, water tank (Albany County, W. Mussetter, 1933).

Plane coordinates: (I), x=278,177.30 feet; y=392,831.63 feet. (II), x=869,478.78 feet; y=394,690.85 feet.

Como (U. S. G. S.) (Albany County, W. Mussetter, 1933).—About 8 miles east of Medicine Bow, ½ mile east of Carbon-Albany county line, in T. 22 N., R. 77 W., on rounded hump on long east-and-west ridge known as Como Ridge. To reach from Medicine Bow, go east 6.3 miles on U. S. Highway 30 to county line, follow left fork (old road) 0.1 mile, turn left and follow road 1.4 miles toward ridge, and go north across country to ridge. Marked by standard U. S. Geological Survey station disk set in rock. Elevation: 2,191.2 meters (7,189 feet).

Plane coordinates: (I), x=256,972.81 feet; y=445,115.81 feet. (II), x=846,961.00 feet; y=446,428.13 feet.

Medicine Bow, tank (U. S. G. S.) (Carbon County, W. Mussetter, 1933).

Plane coordinates:[9] (I), x=219,025.50 feet; y=450,088.72 feet. (II), x=808,898.53 feet; y=450,441.39 feet.

Pine (U. S. G. S.) (Carbon County, W. Mussetter, 1933).—About 7 miles south of Medicine Bow, in T. 21 N., R. 78 W., on top of and about 35 yards east of southwest point of conspicuous ridge (steep and rocky at west end and sloping gradually to east) known as Piney Ridge. To reach from Medicine Bow, go east across railroad tracks and follow main-traveled road up hill 0.6 mile, follow right fork (leading along south side of landing field) 1.2 miles, follow left fork 0.7 mile to gate, pass through gate and follow road 0.7 mile to farmyard, pass through farmyard and go about 6 miles toward ridge (easily distinguished). Best route after passing through farmyard is road south through meadow to southwest side of ridge which is end of truck travel. Probably marked by standard U. S. Geological Survey station disk. Elevation: 2,212.0 meters (7,257 feet).

Plane coordinates: (I), x=226,383.80 feet; y=411,490.37 feet. (II), x=817,228.38 feet; y=412,040.03 feet.

Salt Lake-Omaha Airway, site 31, beacon (Carbon County, W. Mussetter, 1933).—Airway beacon on 51-foot steel tower, about 6 miles east of Hanna and 11 miles west of Medicine Bow. Beacon is situated on high ridge on north side

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

of Lincoln Highway. No road leading to site but may be reached by car in summer. Country abrupt and broken.

Plane coordinates:[9] (II), x=743,464.34 feet; y=432,518.44 feet.

Salt Lake-Omaha Airway, site 29, beacon (Carbon County, W. Mussetter, 1933).—Airway beacon at Department of Commerce intermediate field Dana on Salt Lake-Omaha Airway. Beacon is on 51-foot tower, 9 miles east of Walcott and 2 miles south of Dana. To reach from Hanna, go south approximately 15 miles on Lincoln Highway to site on north side of highway, between highway and railroad track.

Plane coordinates: (II), x=679,131.33 feet; y=419,840.32 feet.

St. Mary (U. S. G. S.) (Carbon County, W. Mussetter, 1933).—About 20 miles east of Rawlins, and 2½ miles north of Walcott, in T. 21 N., R. 84 W., on prominent pointed hill known as St. Mary Hill. To reach from Walcott, go east 0.1 mile along north side of track, turn left and go north 2.5 miles, turn left and go up draw about 0.1 mile, and go up hill in westerly direction to highest point and station. Marked by standard U. S. Geological Survey station disk set in rock projecting about 6 inches above ground. Azimuth from station to Parco Refinery stack is 85°38′36″, and to another stack at Parco Refinery, 85°39′54″. Elevation: 2,286.0 meters (7,500 feet).

Plane coordinates: (II), x=634,323.28 feet; y=411,526.40 feet; grid azimuth to Parco refinery stack=85°18′54″[8], and to another Parco refinery stack=85°20′12″.[8]

Salt Lake-Omaha Airway, site 27, beacon (Carbon County, W. Mussetter, 1933).—Airway beacon at Department of Commerce intermediate field Parco on Salt Lake-Omaha Airway. Beacon is on 51-foot tower, about 4 miles from Parco. To reach from Parco, go to northeast corner of the Parco Refinery property line, then go easterly approximately 3½ miles along pole line to site.

Plane coordinates: (II), x=574,530.03 feet; y=413,867.67 feet.

Salt Lake-Omaha Airway, site 26 B, beacon (Carbon County, W. Mussetter, 1933).—Airway beacon on 30-foot tower, about 1 mile from Rawlins. To reach from Rawlins, go west on Lincoln Highway to west limits of town, turn left and go about ¼ mile on trail to site on top of rugged ridge between Lincoln Highway and railroad.

Plane coordinates:[9] (II), x=522,949.60 feet; y=407,591.65 feet.

Latham (U. S. G. S.) (Sweetwater County, W. Mussetter, 1933).—Not a U. S. Geological Survey station. About 29 miles west of Rawlins, 17 miles east by north of Wamsutter, in southwest corner of T. 21 N., R. 92 W., north of cairn, and on flat-topped mesa that drops off to west of station site. To reach from Wamsutter, go east about 10 miles on U. S. Highway 30 to Continental Divide, turn north onto dirt road and go 0.8 mile, follow left fork 2.4 miles, follow left fork 0.3 mile, turn left (southwest) and go 0.1 mile to top of flat mesa and station. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is on top of flat mesa, and 107.41 feet from station in azimuth 222°11′. No. 2 is near side of road, and approximately ¼ mile from station in azimuth 249°25′50″. No. 3 is on top of mesa, and 97.75 feet from station in azimuth 42°00′. Elevation: 2,204.8 meters (7,234 feet).

Plane coordinates: (II), x=364,678.71 feet; y=393,100.93 feet; grid azimuth to reference mark no. 2=249°45′39″.[8] (III), x=751,281.95 feet; y=394,055.53 feet; grid azimuth to reference mark no. 2=248°49′03″.[8]

Cherokee (U. S. G. S.), cairn (Carbon County, W. Mussetter, 1933).

Plane coordinates:[9] (II), x=502,424.48 feet; y=419,521.88 feet. (III), x=888,589.09 feet; y=422,745.71 feet.

Salt Lake-Omaha Airway, site 26 A, beacon (Carbon County, W. Mussetter, 1933).—Airway beacon on 51-foot tower about 8 miles from Rawlins. To reach from Rawlins go west about 8 miles on Lincoln Highway, turn left and go south approximately 1½ miles on trail past Hadsell Railroad Station to site.

Plane coordinates: (II), x=483,273.92 feet; y=402,257.54 feet. (III), x=869,722.53 feet; y=405,165.17 feet.

Salt Lake-Omaha Airway, site 24, beacon (Sweetwater County, W. Mussetter, 1933).—Airway beacon at Department of Commerce intermediate field Cherokee

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No check on this position.

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on Salt Lake-Omaha Airway. Beacon is on 51-foot tower with wind cone about 23 miles west of Rawlins and 1 mile south of Lincoln Highway.

Plane coordinates: (II), x=408,337.32 feet; y=387,698.08 feet. (III), x=795,026.66 feet; y=389,371.76 feet.

Salt Lake-Omaha Airway, site 23, beacon (Sweetwater County, W. Mussetter, 1933).—Airway beacon on 51-foot tower, about 7 miles east of Wamsutter. To reach from Wamsutter, go east approximately 8 miles on Lincoln Highway, turn right and go south approximately 1 mile on trail to site on high point south of railroad and highway.

Plane coordinates: (II), x=354,972.53 feet; y=377,563.92 feet. (III), x=741,832.32 feet; y=378,360.17 feet.

Salt Lake-Omaha Airway, site 22, beacon (Sweetwater County, W. Mussetter, 1933).—Airway beacon on 51-foot tower, about 6 miles west of Wamsutter. To reach from Wamsutter, go west approximately 6 miles on Lincoln Highway, turn right and go north approximately 0.25 mile along trail to site.

Plane coordinates: (II), x=289,746.32 feet; y=362,271.58 feet. (III), x=676,865.44 feet; y=361,997.18 feet.

Salt Lake-Omaha Airway, site 21, beacon (Sweetwater County, W. Mussetter, 1933).—Airway beacon on 51-foot tower, about 13 miles from Wamsutter. To reach from Wamsutter, go west approximately 15 miles on Lincoln Highway, thence right (northwest) approximately 3.5 miles on trail to site.

Plane coordinates: (III), x=619,711.89 feet; y=361,902.43 feet.

Salt Lake-Omaha Airway, site 20, beacon (Sweetwater County, W. Mussetter, 1933).—Airway beacon at Department of Commerce intermediate field, Bitter Creek on Salt Lake-Omaha Airway. Beacon is on 51-foot tower northwest of Bitter Creek, approximately 30 miles west of Wamsutter and 10 miles east of point of rocks.

Plane coordinates: (III), x=551,262.41 feet; y=361,032.05 feet.

Cone (conical bare butte) west of long flat butte (Sublette County, C. I. Aslakson, 1933).

Plane coordinates: (III), x=330,941.35 feet; y=644,625.90 feet. (IV), x=690,882.90 feet; y=644,797.25 feet.

Beacon, west of station Tulsa (Sublette County, C. I. Aslakson, 1933).

Plane coordinates:[9] (III), x=75,294.62 feet; y=606,020.25 feet. (IV), x=435,897.67 feet; y=602,190.08 feet.

Border (Bear Lake County, Idaho; Lincoln County, Wyo.; C. I. Aslakson, 1933).—About 1 mile north of Border railroad station, and 1.3 miles south of Border Inn which is at intersection of U. S. Highway 30N and State Highway 89, on small hill about 150 feet high, about 75 yards west of highest part of hill, and 30 paces east of fence. To reach from Border Inn, go west 0.5 mile on U. S. Highway 30N, turn left and go south and east on main road 1.25 miles to side of hill, leave road and go up hill in southeast direction to station. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 83.91 feet from station in azimuth 179°31′. No. 2 is on crest of hill, 94.87 feet from station in azimuth 267°00′. No. 3 is in fence corner in southwest corner of field, at road corner, and about ½ mile from station in azimuth 122°33′13″. Elevation: 1,889.2 meters (6,198 feet).

Plane coordinates: (IV), x=238,996.31 feet; y=558,288.76 feet; grid azimuth to reference mark no. 3=123°12′02″.[8]

Geneva (Lincoln County, C. I. Aslakson, 1933).—About 13.5 miles north of Border Inn at Wyoming-Idaho line on U. S. Highway 30N, 3½ miles north of Geneva, about ¾ mile east of Idaho-Wyoming boundary line, and ¾ mile north of Thomas Fork Canyon, on rounded rocky shale-covered hill. There is higher ground about ¼ mile northeast of station. To reach from Border Inn on U. S. Highway 30N, go north 13.2 miles on State Highway 89 to mouth of canyon, leave highway, take left fork and go 0.1 mile to T-fork and end of truck travel. From here pack up ridge to north and east to rounded knob and station site. A good hour's pack with load. Station mark is standard station disk in a 4-inch cast-iron pipe ½ inch thick and 4 feet long with about 10 inches projecting above ground. Reference marks are standard reference disks in cast-iron pipe. No. 1 is 10.54 meters (34.6 feet) from station in azimuth

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No check on this position.

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304°06′. No. 2 is 9.38 meters (30.8 feet) from station in azimuth 89°31′. Elevation: 2,230.6 meters (7,318 feet).

Plane coordinates: (IV), x=241,581.58 feet; y=636,201.49 feet.

Paris Peak, cairn (U. S. G. S.) (Bear Lake County, Idaho, C. I. Aslakson, 1933).

Plane coordinates:[9] (IV), x=103,065.39 feet; y=563,144.50 feet.

HANNA TO BUFFALO ARC

Principal points

Pedro (U. S. G. S.) (Carbon County, W. R. Porter, 1934).—About 18 miles south-southwest of Alcova, 4 miles east of Pathfinder Reservoir, on highest of small group of four peaks overlooking Sage Creek basin at southern end of Pedro Range, 150 yards northwest of slightly lower peak, and 6 feet northeast of 4-foot rock cairn. To reach from Alcova, follow Sage Creek road south 10.0 miles, follow left fork 0.5 mile to top of grade and crossroads, continue straight ahead (south) 1.15 miles to an A-truss bridge, continue 2.15 miles to another bridge, continue 0.75 mile, follow left fork (main road) 0.25 mile to road leading to right (northwest), follow this road 0.25 mile across old bridge, turn left (southwest) and go 0.6 mile to large granite cross on left side of road, continue 1.55 miles to small house on left side of road, continue 0.2 mile to gate, continue west up hill 1.8 miles to small creek, cross creek, turn left and go 1.0 mile to small white house on left side of road, continue 1.0 mile, follow left fork 0.4 mile, follow left fork 0.25 mile to gate in fence corner, pass through gate and go 0.2 mile, follow right fork 0.75 mile to small homesteader's cabin and end of truck travel, follow up canyon to southwest about ⅜ mile, then bear right up draw to peak and station site. Marked by standard U. S. Geological Survey tablet in outcropping bedrock. Reference and azimuth marks are standard disks in bedrock, note 12b. No. 1 is 11.875 meters (38.96 feet) (slope) from station in azimuth 214°36′. No. 2 is 10.000 meters (32.81 feet) (slope) from station in azimuth 46°08′. Distance between reference marks is 18.741 meters (61.49 feet) (slope). Azimuth mark is on top of large rock pinnacle which is much lower than station, and approximately ⅜ mile from station in azimuth 248°25′38″. Azimuth from station to highest peak in Ferris Mountains is 80°25′. Elevation: 2,517.7 meters (8,260 feet).

Plane coordinates: (II), x=634,910.49 feet; y=598,391.32 feet; grid azimuth to azimuth mark=248°05′29″.[8]

Chalk (Carbon County, W. R. Porter, 1934).—About 21 miles southeast of Alcova, 19 miles east of Pathfinder Reservoir, 5 miles east of point where old Pedro-Shirley road drops over rim to south, in T. 27 N., R. 81 W., on extreme eastern end of mesa known locally as Chalk Hills which extends in northwesterly and southeasterly direction, and overlooks deep valleys to north and south. There is higher ground to southeast. To reach from Alcova bridge over North Platte River at Alcova, go south 9.05 miles on Sage Creek road, follow left fork 0.5 mile to crossroads, turn left (east) onto scraped road and go 1.95 miles, follow left fork 0.1 mile, follow left fork (main road) 0.6 mile, follow right fork 0.85 mile, follow left fork 0.2 mile to crossroads, continue 2.1 miles (keeping straight ahead at all crossroads) to forks just before crossing small creek, continue 0.6 mile, follow left fork 1.4 miles to point where road joins from right, continue south 1.45 miles and pass small tar-paper shack which is about ½ mile east of road, continue 2.2 miles to point where road joins from right at edge of rim, continue 0.15 mile, follow left fork east 1.45 miles (right fork leads over rim to station *Shirley* (*U. S. G. S.*), about 6 miles to west) along edge of rim to point where road starts to drop over rim, continue 0.55 mile, follow left fork 1.25 miles to sheep-bedding ground, turn right (south) and go to top of highest round hill (following sheep and stock trails), turn east and follow along ridge 2.35 miles to highest and most easterly end of mesa near south rim. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a. No. 1 is 24.03 meters (78.8 feet) (slope) from station in

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

azimuth 290°13′. No. 2 is 24.95 meters (81.9 feet) (slope) from station in azimuth 17°55′. Distance between reference marks no. 1 and no. 2 is 111.2 feet. Azimuth mark is standard U. S. Geological Survey bench mark (brass-capped 3-inch pipe), approximately 0.15 mile from station in azimuth 324°12′59″. Azimuth from station to cone-shaped peak is 3°06′01″, and to another cone-shaped peak is 103°03′57″. Elevation: 2,432.7 meters (7,981 feet).

Plane coordinates: (I), x=146,518.49 feet; y=614,037.91 feet; grid azimuth to azimuth mark=325°05′50″.[8] (II), x=732,259.22 feet; y=612,493.65 feet; grid azimuth to azimuth mark=323°38′15″.[8]

Alcova (U. S. G. S.) (Natrona County, W. R. Porter, 1934).—About 8 miles west of North Platte River, 7 miles northwest of Alcova, on northeast end of high grassy mesa which extends north and south with rim facing east, 20 feet from east rim, and 30 feet from north rim. To reach from Casper, follow U. S. Highway 87E south and west 11.0 miles to Goose Egg Inn, turn right onto graded road and go 2.05 miles to T-fork, take right fork and proceed 0.55 mile to bridge over North Platte River, continue west 0.7 mile, go 3.7 miles to T-fork, take left fork and go 4.4 miles to forks, take right fork and go 0.15 mile to oil-pumping station on right, continue 3.85 miles to forks, take left fork across bridge and go 2.7 miles to another pumping station on left side of road, continue 3.85 miles to small house on right side of road, continue 1.25 miles to top of grade and intersection of several roads 100 yards east of cattle guard, take extreme right (southeast) of three plainly-marked roads and go 0.95 mile to gate in fence corner, pass through gate, and go in easterly direction 1.4 miles across country to highest point of rim and station site. Marked by standard U. S. Geological Survey tablet set in 3-inch iron pipe, projecting 18 inches above ground. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 20.150 meters (66.10 feet) from station in azimuth 11°35′. No. 2 is 13.192 meters (43.28 feet) from station in azimuth 66°11′. Distance between reference marks is 16.480 meters (54.06 feet). Azimuth mark is 3 feet east of gate and fence corner, and approximately 1.4 miles from station in azimuth 99°08′46″. Elevation: 2,064.5 meters (6,773 feet).

Plane coordinates: (II), x=651,275.21 feet; y=721,778.76 feet; grid azimuth to azimuth mark=98°45′55″.[8]

Stinking (Natrona County, W. R. Porter, 1934).—About 23 miles S. 10° W. of Casper, 15½ miles east of Alcova, on top of cone-shaped soft chalk rock knob, in T. 30 N., R. 80 W., on divide between Stinking and Bates Creeks. Ridge with two knobs at about same elevation is about ¼ mile southeast, and to north-northeast is long narrow mesa extending northwest and southeast. To reach from Casper, follow U. S. Highway 87E southwest 11.2 miles to Goose Egg Inn, continue south 7.8 miles on highway to signboard reading "Medicine Bow" (second Medicine Bow road this side of Goose Egg Inn), turn left (east) through cattle guard and follow graded dirt road 8.85 miles through 9 more cattle guards, continue 0.45 mile beyond ninth cattle guard, turn right (south) onto graded road and go 0.35 mile to bridge over creek, continue 3.3 miles (passing through a pole gate at 1.4 miles and a wire gate at 2.8 miles from the bridge) to swinging pole gate, continue 0.5 mile to point 0.4 mile from Freeland's ranch, turn right through gate and go 0.15 mile to bridge over creek, continue 0.05 mile, follow left fork 0.1 mile, follow right fork 0.35 mile (passing through gate) to another fork, follow left fork 0.55 mile to second gate, follow left fork through gate, take left fork and go southwest and south on main road 2.8 miles to small cabin, turn right and go west 0.4 mile through gate to forks, follow left fork south 1.4 miles to point where road joins from right, continue 0.5 mile to point where main road crosses draw, turn left and go north and east 1¼ miles along foot of hill to foot of cone-shaped peak and end of truck travel; station site is on top of cone-shaped peak, about 45-minute pack. Surface mark is standard station disk in tile, note 6a. Underground mark is standard station disk in concrete, note 7a. Reference marks are standard reference disks in tile, note 13a. No. 1 is 11.95 meters (39.2 feet) (slope) from station in azimuth 298°11′. No. 2 is 14.16 meters (46.5 feet) (slope) from station in azimuth 209°01′. Distance between reference marks is 59.73 feet. Azimuth mark is standard reference disk in bedrock, note 12a, on northeast face of low, jagged, rock-covered chalk hill, about 400 feet lower than peak on which station is located, and approximately

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

½ mile distant in azimuth 127°37′55″. Azimuth from station to hump-backed peak is 89°30′07″. Elevation: 2,059.3 meters (6,756 feet).

Plane coordinates: (I), x=162,148.45 feet; y=682,095.85 feet; grid azimuth to azimuth mark=128°28′46″.[8] (II), x=746,146.46 feet; y=680,923.42 feet; grid azimuth to azimuth mark=127°00′53″.[8]

Casper (U. S. G. S.) (Natrona County, W. R. Porter, 1934).—About 8 miles south of Casper at head of C. Y. Canyon, in T. 32 N., R. 80 W., on partially-timbered rocky knob (higher ground to east and southeast). To reach from corner of Yellowstone and Wolcott Streets in Casper, go south and up grade 7.9 miles on Wolcott Street (Casper Mountain Road), pass Brookside Inn on right side of road, go 0.7 mile to barrel spring in U-turn in road, and continue 1.1 miles on main road, turn left and go 0.35 mile, follow right fork (straight ahead) 0.2 mile, follow right fork (Eadeville Road) west 0.4 mile, follow left fork 0.25 mile, pass through wire gate, and continue 0.15 mile, turn right onto road passing to right of peak and go 0.1 mile to top of ridge in timber and end of truck travel, turn left (west) and go up hill about 200 yards to station site. Marked by U. S. Geological Survey tablet in bedrock. Reference and azimuth marks are standard disks in bedrock, note 12a. No. 1 is 12.68 meters (41.6 feet) from station in azimuth 186°01′. No. 2 is 17.83 meters (58.5 feet) from station in azimuth 104°37′. Distance between reference marks is 65.95 feet. Azimuth mark is 25.6 feet north of center line of road, and approximately 1¼ miles (by road) from station in azimuth 293°06′55″. Following azimuths are from station: *Casper high school, stack,* 193°19′40″; *Casper, Mountain States Power and Light Co., stack,* 193°23′18″; *Casper, Chicago, Burlington & Quincy Railroad Co., stack,* 193°49′48″; and *Casper, courthouse, finial,* 193°59′51″. Elevation: 2,466.5 meters (8,092 feet).

Plane coordinates: (I), x=178,825.52 feet; y=757,879.89 feet; grid azimuth to azimuth mark=293°55′36″.[8] (II), x=760,876.28 feet; y=757,105.95 feet; grid azimuth to azimuth mark=292°27′22″.[8]

Reef (U. S. G. S.) (Natrona County, W. R. Porter, 1934).—About 15 miles west-northwest of Casper, 3.5 miles south of U. S. Highway 20, in southwest corner of sec. 19, T. 34 N., R. 81 W., on south edge and highest point of ridge known locally as The Reefs. To reach from Casper, go westerly 13 miles on U. S. Highway 20 to point where unimproved dirt road intersects highway from south (small concrete culvert on dirt road), turn left onto dirt road, pass through gate and go 2.85 miles on main-traveled road to northern end of sheep corrals near small reservoir, pass through gate and bear right 0.15 mile to ranch house, go west 250 yards to gate, pass through gate and go west across small creek, continue 0.4 mile to foot of ridge, bear right to saddle, turn left (southwest) and go 0.4 mile up ridge to highest point and station site. Marked by standard U. S. Geological Survey bench-mark disk (unstamped) set in iron pipe, projecting 1.3 feet above ground. Reference and azimuth marks are standard reference disks in concrete, note 11a. No. 1 projects 5 inches above ground, and is 72.00 feet from station in azimuth 263°39′. No. 2 projects 5 inches above ground, and is 60.76 feet from station in azimuth 171°33′. Distance between reference marks no. 1 and no. 2 is 96.50 feet. Azimuth mark projects 6 inches above ground, is 36 feet west of east edge of ridge, and 0.15 mile from station in azimuth 240°55′40″. *G. L. O. section corner, secs. 19, 30, 24, and 25, Tps. 34 N., Rs. 81 and 82 W.* (see description thereof) is 120.00 feet from station in azimuth 18°27′56″. Following azimuths are from station: *Oil refinery, east of Casper, stack,* 277°00′05″; *Casper, Chicago, Burlington & Quincy Railroad Co., stack,* 279°51′01″; *Casper, broadcasting station, top of radio mast,* 280°12′02″. Elevation: 1,807.5 meters (5,930 feet).

Plane coordinates: (II), x=693,265.21 feet; y=812,020.91 feet; grid azimuth to azimuth mark=240°26′13″.[8]

Mesa (U. S. G. S.) (Natrona County, W. R. Porter, 1934).—About 4½ miles north-northeast of Casper, 3 miles east of Buffalo-Casper road (U. S. Highway 87E), in T. 34 N., R. 79 W., on long, low, flat mesa extending east and west (highest ground in vicinity). To reach from corner of Yellowstone and Center Streets in Casper, follow U. S. Highways 87E and 20 west 1.8 miles to junction (just beyond bridge over North Platte River), follow right fork (U. S. Highway 87E) north 5.05 miles to Casper airport hangar on west side of road, continue

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

north 0.6 mile to point where Cole Creek Road intersects highway, turn right (east) onto unimproved dirt road and go 2.05 miles, follow right fork (straight ahead) 0.7 mile, turn right (south) and go 0.15 mile to top of mesa, turn left and follow top of mesa 0.05 mile to station site. Marked by old U. S. Geological Survey bench mark set in concrete. The disk has no identifying marks on its surface. Reference and azimuth marks are standard disks in concrete, note 11a, stamped "Mesa–1934". No. 1 is 28.94 meters (94.9 feet) from station in azimuth 280°41′. No. 2 is 24.032 meters (78.84 feet) (slope) from station in azimuth 18°00′. Distance between reference marks is 130.9 feet. Azimuth mark is on extreme end of mesa, and approximately 0.15 mile from station in azimuth 116°23′44″. Following azimuths are from station: *Casper, high school, stack,* 27°05′19″; Casper, water tank, finial, 44°13′28″; *Casper, broadcasting station, top of mast,* 13°48′24″; *Casper, Chicago, Burlington & Quincy Railroad Co., stack,* 28°59′18″; *Casper, Mountain States Light and Power Co., stack,* 29°29′23″; *Oil refinery east of Casper, stack,* 348°29′04″; and Casper, fire practice tower, red finial, 18°24′06″. Elevation: 1,666.0 meters (5,466 feet).

Plane coordinates: (I), x=203,031.51 feet; y=822,973.57 feet; grid azimuth to azimuth mark=117°09′03″.[8] (II), x=783,400.38 feet; y=822,798.84 feet; grid azimuth to azimuth mark=115°40′31″.[8]

Natrona (Natrona County, W. R. Porter, 1934).—About 1 mile south of business district of Casper, in T. 33 N., R. 79 W., 50 yards west of the Casper Mountain Road, on west edge of small mesa which bears the word "Casper" in white stone letters, and 25 feet east of edge of rim at point just above letter C in word "Casper". To reach from the corner of Yellowstone and Durbin Streets in Casper, go south 0.9 mile on Durbin Street to Wyoming National Guard Building, continue south up hill 0.35 mile to road leading off to right, follow this road 50 feet, and follow right fork 0.1 mile to west edge of rim and station site. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 18.545 meters (60.84 feet) from station in azimuth 286°50′. No. 2 is 28.749 meters (94.32 feet) from station in azimuth 15°20′. Distance between reference marks is 110.90 feet. Azimuth mark is on City Hall grounds, 109.2 feet south of building, 3.35 feet north of sidewalk, 4.5 feet west of driveway curbing, and approximately 1.4 miles from station in azimuth 184°53′09″. Following azimuths are from station: Casper, stack south of water tanks, 105°54′39″; Casper, water tank, finial, 111°21′26″; Casper, water tank, finial, 112°01′53″; Casper, tall concrete stack, 145°17′08″; *Casper, high school, stack,* 168°49′04″; *Casper, Mountain States Light and Power Co., stack,* 182°46′12″; *Casper, courthouse, finial,* 184°22′14″; Casper, city hall, flagstaff, 184°57′47″; *Casper, Chicago, Burlington & Quincy Railroad Co., stack,* 185°13′24″; Casper, schoolhouse, chimney, 214°21′53″; Casper, brewery, cupola, 214°43′27″; *Casper broadcasting station, top of radio mast,* 226°24′10″; and *Oil refinery east of Casper, stack,* 239°29′55″. Elevation: 1,634.3 meters (5,362 feet).

Plane coordinates: (I), x=188,823.49 feet; y=790,798.05 feet; grid azimuth to azimuth mark=185°40′29″.[8] (II), x=770,025.12 feet; y=790,268.96 feet; grid azimuth to azimuth mark=184°12′06″.[8]

B. M. Q 32 (Natrona County, W. R. Porter, 1934).—About 5 miles north of Casper, in T. 34 N., R. 79 W., 33.5 feet east of center line of U. S. Highway 87E, in fence row on east right-of-way fence, and in front of small yellow house. To reach from corner of Yellowstone and Center Streets in Casper, go west 1.8 miles on U. S. Highways 87E and 20 to junction (just beyond bridge across North Platte River), follow right fork (Highway 87E) 5.05 miles to Casper Airport hangar on west side of road, continue north 0.6 mile to Cole Creek road joining from east, continue straight ahead (north) 0.25 mile to yellow house with garage and 40-foot radio mast in back (on east side of highway). Marked by standard bench mark disk in concrete, projecting 6 inches above ground. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 projects 4 inches above ground, is 33.6 feet east of center line of highway, in east right-of-way line, and 26.36 meters (86.5 feet) from station in azimuth 15°08′. No. 2 projects 4 inches above ground, is 53.0 feet west of center line of highway, and 21.36 meters (70.1 feet) from station in azimuth 104°57′.

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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Distance between reference marks is 111.15 feet. Azimuth mark projects 8 inches above ground, is 69.2 feet east of center line of highway, 41.0 feet south of center line of crossroad, and 0.7 mile from station in azimuth 195°46′06″. *G. L. O. mark, SW 1/16, S 9,* is 19.69 meters (64.6 feet) from station in azimuth 280°30′. Distance between reference mark no. 1 and G. L. O. mark is 99 feet. Azimuth from station to *Oil refinery east of Casper, stack,* is 320°32′53″. Elevation: 1,627.72 meters (5,340.3 feet).

Plane coordinates: (I), x=187,823.03 feet; y=825,431.20 feet; grid azimuth to azimuth mark=196°33′44″.[8] (II), x=768,133.95 feet; y=824,863.92 feet; grid azimuth to azimuth mark=195°05′12″.[8]

Teapot (Natrona County, W. R. Porter, 1934).—About 17 miles north of Casper, about 1½ miles east of U. S. Highway 87E, in T. 36 N., R. 79 W., on hill that gradually slopes to east and drops off sharply to west and north (4-foot fence runs over top of hill). There are several hills of about same elevation to northeast. To reach from Casper, follow U. S. Highways 87E and 20 west 1.8 miles to junction, follow Highway 87E north 18.5 miles to road leading to right (east), follow this graded dirt road 1.9 miles to top of hill, turn right onto unimproved road and go 0.5 mile, follow right fork south along pipe line 0.45 mile, follow right fork (dim road) southwest 0.15 mile to another road, follow this road 0.55 mile, turn right (west) and go up hill 0.15 mile to fence line and station site. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 12.930 meters (42.42 feet) from station in azimuth 18°24′. No. 2 is 13.772 meters (45.18 feet) from station in azimuth 303°55′. Distance between reference marks is 16.126 meters (52.91 feet). Azimuth mark is 10 feet west of fence corner, 3 feet south of fence, and approximately ⅜ mile from station in azimuth 246°58′35″. Azimuth from station to *Water tank near station Midwest* is 191°12′03″. Elevation: 1,794.9 meters (5,889 feet).

Plane coordinates: (I), x=192,016.66 feet; y=890,564.65 feet; grid azimuth to azimuth mark=247°45′52″.[8] (II), x=770,645.88 feet; y=890,082.11 feet; grid azimuth to azimuth mark=246°17′02″.[8]

Lakota (Natrona County, W. R. Porter, 1934).—About 29 miles northwest of Casper, 28 miles southwest of Midwest, in T. 37 N., R. 82 W., near southeast end of long, low, sagebrush-covered mesa which overlooks basin to east, about 80 yards south of point where road crosses over rim of mesa, and 30 yards west of east edge of mesa. To reach from intersection of U. S. Highways 20 and 87E in Casper, follow Highway 20 west 7¾ miles, turn right (north) onto 33 Mile Road (graded county road) and go 8.4 miles to 2 railroad crossings, continue north and west 7.2 miles on main road to road from left, continue straight ahead (north) 1.45 miles on main road, follow right fork 2.25 miles, follow right fork 2.85 miles to top of divide, continue north about 75 yards to dim road from left (about 2.65 miles south by main road from 33 Mile railroad loading station), turn left (west) onto dim road (road follows top of ridge) and go 0.7 mile to gate, pass through gate and go 0.6 mile to railroad crossing, cross tracks, turn right on west side of tracks and go north and west 0.35 mile to small ranch, turn right (keeping to right of 2 tarpaper-covered shacks) and pass through two gates, go west 2.1 miles (keeping between houses and edge of rim) along ridge on dim road to prominent cone-shaped peak with small cairn on top (on right side of road), continue 0.5 mile, follow left fork (straight ahead) 1.25 miles to crossroads, turn right and go 0.85 mile to top of mesa (grade to top of rim is very steep), turn left and go 80 yards to station site. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Upper mark projects 4 inches above ground. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 projects 4 inches above ground, is 30 yards west of east end of mesa, and 59.64 feet from station in azimuth 57°45′. No. 2 projects 4 inches above ground, and is 77.30 feet from station in azimuth 144°43′. Distance between reference marks is 95.1 feet. Azimuth mark projects 3 inches above ground, is 300 yards west of east end of east-and-west ridge extending east from mesa proper, about 100 yards south of north edge, 100 yards north of south edge, and approximately 0.35 mile from station in azimuth 231°16′23″. Elevation: 1,796.2 meters (5,893 feet).

Plane coordinates: (II), x=668,101.80 feet; y=913,700.56 feet; grid azimuth to azimuth mark=230°50′31″.[8]

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

Illco (Natrona County, W. R. Porter, 1934).—About 12 miles north-northwest of Casper, 4 miles east of Illco railroad siding, 3½ miles west of U. S. Highway 87E, in T. 35 N., R. 80 W., 4 feet east of large boulder and on higher of 2 rocky sandstone knobs which are about 2 miles south of a higher rocky ridge. To reach from intersection of U. S. Highways 20 and 87E in Casper, follow Highway 87E 6.8 miles to Casper Airport, continue north 3.6 miles on highway to point where Ormstead County road comes in from right, continue north 0.9 mile to dim road on left (at south side of alkali flat), turn left onto dim road, pass through gate, turn sharp right and go 0.2 mile along west side of fence, follow left fork 0.3 mile to crossroads, continue straight ahead 0.75 mile to gate, pass through gate and go 0.35 mile to crossroads, turn left and go 0.95 mile to point where road passes under high-tension line, continue west (passing through rocky gap) 0.15 mile, follow left fork 0.3 mile to crossroads, continue straight ahead 0.45 mile to another crossroads, turn left and go 0.05 mile to corner of 4 fences, pass through gate and go west 0.45 mile along south side of east-and-west fence to top of ridge, continue west 0.8 mile to top of ridge which is low and grassy, turn right and follow ridge 0.2 mile to point where road begins, follow road north 1.1 miles; at this point station bears 30° magnetic, leave road and go north-northeast 0.8 mile to station site. Marked by standard station disk in bedrock, note 2. Reference and azimuth marks are standard disks in bedrock, note 12a. No. 1 is 64.21 feet from station in azimuth 247°24′. No. 2 is 35.32 feet from station in azimuth 318°26′. Distance between reference marks is 69.6 feet. Azimuth mark is near west end and on highest point of rocky outcrop in valley, and 0.5 mile from station in azimuth 344°16′48″. Elevation: 1,708.9 meters (5,607 feet).

Plane coordinates: (I), x=168,790.94 feet; y=859,028.82 feet; grid azimuth to azimuth mark=345°07′29″.[8] (II), x=748,243.02 feet; y=857,958.37 feet; grid azimuth to azimuth mark=343°38′48″.[8]

Dugout (Natrona County, W. R. Porter, 1934).—About 12½ miles west-northwest of Midwest, 20½ miles south of Kaycee, in sec. 13, T. 40 N., R. 81 W., on most eastern of 3 hills, on highest point of divide between Dugout Creek and south fork of Powder River, 60 feet south of north edge of hill, 300 feet north of south edge, on land owned by G. H. Snodgrass whose ranch house is in section 17. Station Tisdale (U. S. G. S.) (elevation 5,980 feet) is on central one of the 3 hills. To reach from Midwest, follow U. S. Highway 87E 6.65 miles to point where graded road joins from left or west (at this point there are 2 mail boxes and sign "Snodgrass Road"), turn left onto graded road and go west 4.75 miles, follow right fork (graded road) north 1.45 miles to top of small hill (about ¼ mile north of red shed and small gray house on east side of road, and 0.4 mile south of sheep shed and corrals on east side of road), turn left on hill and go west about 100 yards, follow dim road up hill 0.65 mile to point where dim road comes in from left, continue 1.5 miles up hill to gate in east-and-west fence, pass through gate, turn sharp right and go 0.35 mile to top of hill and station site. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Upper mark projects 4 inches above ground. Reference mark no. 1 is standard reference disk in bedrock, note 12a, 3 feet south of edge of rock rim, and 294.56 feet from station in azimuth 188°18′. Reference mark no. 2 is standard reference disk in concrete, note 11a, projecting 3 inches above ground, 30 feet south of north edge of hill, and 81.01 feet from station in azimuth 64°04′. Azimuth mark is standard disk in concrete, note 11a, projecting 3 inches above ground, on ridge extending east from high ground south of station, 1.5 miles by road from station, 1.5 miles by road west of graded country road, and approximately 0.5 mile from station in azimuth 297°38′25″; Following azimuths are from station: U. S. Geological Survey cairn 133°06′; *Water tank near station Midwest* 289°32′54″; and sharp peak near southwest end of Big Horn Mountains 150°18′42″. Elevation: 1,806.6 meters (5,927 feet).

Plane coordinates: (II), x=716,367.85 feet; y=1,009,849.35 feet; grid azimuth to azimuth mark=297°04′49″.[8]

Midwest (Natrona County, W. R. Porter, 1934).—About 4 miles southeast of Midwest, about 3 miles east of Salt Creek, on high conspicuous bluff that slopes gradually to east and drops off sharply to west, 100 feet east of rim, and 145 feet north of large black water tank on summit of bluff. To reach from Midwest

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

post office, go north to first intersection, turn east and go 0.3 mile to west edge of schoolyard, turn south and go 0.3 mile to bridge over creek, continue 0.3 mile to bridge over railroad, continue 0.3 mile to forks, follow left fork 0.55 mile, follow left fork 0.3 mile to well-traveled road, turn right onto this road and go 50 yards, follow left fork 0.35 mile to crossroads, continue straight ahead (east) 1.05 miles on main road to Conoco refinery, continue southwest 1.1 miles to unimproved road leading up hill to right, go up hill 0.65 mile to top of bluff near large black water tank and station site. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in bedrock, note 12a. No. 1 is 21.593 meters (70.84 feet) from station in azimuth 95°03′. No. 2 is 23.06 meters (75.7 feet) from station in azimuth 152°49′. Distance between reference marks is 21.610 meters (70.90 feet). Azimuth mark is on edge of rim, 2 feet east of small cairn, and approximately ¼ mile from station in azimuth 11°37′41″. Azimuth from station to highest peak visible in Big Horn Range is 145°22′. Elevation: 1,630.4 meters (5,349 feet).

Plane coordinates: (I), x=212,157.30 feet; y=985,250.90 feet; grid azimuth to azimuth mark=12°22′17″.[8] (II), x=788,326.99 feet; y=985,257.19 feet; grid azimuth to azimuth mark=10°53′00″.[8]

Meadow (Johnson County, W. R. Porter, 1934).—About 10 miles north of Midwest, 11 miles south of Sussex store, 4 miles east of Salt Creek, 3 miles south of Meadow Creek, in T. 41 N., R. 78 W., on grass-covered ridge (highest in vicinity), and 17.6 feet west of barbed-wire fence. There is higher, large, rounded, grass-covered hill about 3 miles east and cone-shaped knob (about same elevation) with rock cairn on top about 1 mile southeast. To reach from Midwest post office, go north 0.35 mile on U. S. Highway 87E to Gillette road, follow this road 0.2 mile, follow left fork (just after crossing railroad) 0.25 mile, follow right fork (Gillette road) 0.8 mile, follow right fork 0.8 mile to crossroads, continue straight ahead 3.75 miles to power plant on west side of road, continue north and east 0.95 mile to turn to right, turn left through cattle guard and go north 1.5 miles on old graded road to coulee, cross coulee and continue 0.45 mile, follow left fork (main road) 0.6 mile, follow right fork 0.3 mile to long frame building on left, follow road down Salt Creek 0.45 mile, turn right out of Salt Creek flat and go east 0.1 mile to left turn just past old log house on right, turn sharp right and go across flat 0.1 mile, to road leading east and southeast, continue on dim road 0.8 mile, turn sharp right and go 0.1 mile down into draw, turn sharp left and go 0.2 mile up draw (coming out of draw onto ridge between 2 draws), continue 1.55 miles on ridge to foot of steep hill, follow narrow road 0.2 mile up steep hill to summit, turn right and follow dim road northeast and east 0.65 mile along top of ridge, follow right fork 0.55 mile to saddle, turn right and go south 0.1 mile to highest point of narrow ridge extending north and south. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference marks are standard reference disks in concrete, note 11a, projecting 4 inches above ground. No. 1 is 1.6 feet west of wire fence, and 10.57 meters (34.7 feet) from station in azimuth 207°29′. No. 2 is 1.3 feet west of fence, and 7.69 meters (25.2 feet) from station in azimuth 319°39′. Distance between reference marks is 49.98 feet. Azimuth mark is standard reference disk in bedrock, note 12a, 15.0 feet south of center line of road, and approximately 0.35 mile from station in azimuth 76°53′34″. Azimuth from station to rock cairn is 341°02′47″. Elevation: 1,639.5 meters (5,379 feet).

Plane coordinates: (I), x=213,436.90 feet; y=1,053,137.09 feet; grid azimuth to azimuth mark=77°38′15″.[8] (II), x=787,840.49 feet; y=1,053,153.73 feet; grid azimuth to azimuth mark=76°08′40″.[8]

Wall (Johnson County, W. R. Porter, 1934).—About 18 miles northwest of Midwest, 10½ miles south-southeast of Kaycee, 1½ miles due west of U. S. Highway 87E, in T. 42 N., R. 81 W., 40 paces east of point of rim that runs north and south (rim gains altitude to south, drops off abruptly towards Wall Creek, and slopes gradually to northeast) along east side of Wall Creek. To reach from bridge over Powder River in Kaycee, follow Highway 87E southeast 7.5 miles to bridge over south fork of Powder River, continue 2.8 miles on highway to ranch road to right, turn right (keeping to left of ranch house)

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

and go west 0.5 mile on old road, turn left and go west-southwest up flat 0.35 mile to fence line on top of small knoll just west of flat, go through (take down) fence and work way up ridge to southwest 0.9 mile to top of rim, then work way southeast 0.9 mile along top of rim to station site. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 18.77 meters (61.6 feet) from station in azimuth 214°37′. No. 2 is 15.398 meters (50.49 feet) from station in azimuth 313°18′. Distance between reference marks is 85.23 feet. Azimuth mark is on small knoll on one of points of rim, 40 paces from edge, and approximately ½ mile from station in azimuth 156°08′37″. Elevation: 1,603.3 meters (5,260 feet).

Plane coordinates: (II), x=708,031.65 feet; y=1,061,833.82 feet; grid azimuth to azimuth mark=155°36′09″.[8]

Salt (Johnson County, W. R. Porter, 1934).—About 16 miles east-northeast of Kaycee, about 5 miles north-northwest of Sussex store, in T. 44 N., R. 79 W., on highest point of group of conspicuous hills (cone-shaped butte with rock cairn on top lies ½ mile to south). To reach from Kaycee post office, go north 0.3 mile on highway to Sussex road, follow this road 15.5 miles to Sussex-Buffalo road, follow this road north 9.35 miles to top of ridge, turn off graded road onto unimproved road and go southeast 0.55 mile, follow right fork 1.25 miles to fence, follow fence east 0.1 mile and pass through gate, go south 0.2 mile, follow left fork east 0.35 mile to field, go across field and along ridge 3.0 miles, follow left fork (old road) 0.3 mile to point where road turns down hill, leave road and continue south along top of ridge 0.75 mile, leave ridge, cross dry creek and go towards saddle between 2 hills, pass through saddle and follow along bottom of slope to east, pass around hill to southeast of saddle and cross another saddle to east, go southeast ¼ mile and over sharp saddle, and proceed west about 100 yards along ridge to station site. Surface mark is standard station disk in 4-inch iron pipe, projecting 6 inches above ground. Underground mark is standard station disk in concrete, note 7a. Reference and azimuth marks are standard disks in iron pipes, projecting 6 inches above ground. No. 1 is 14.914 meters (48.93 feet) from station in azimuth 225°33′. No. 2 is 15.360 meters (50.39 feet) from station in azimuth 126°30′. Distance between reference marks is 23.04 meters (75.6 feet). Azimuth mark is on south end of north-and-south ridge, and approximately ½ mile from station in azimuth 128°21′55″. Elevation: 1,481.7 meters (4,861 feet).

Plane coordinates: (I), x=191,845.45 feet; y=1,133,028.53 feet; grid azimuth to azimuth mark=129°10′20″.[8] (II), x=764,171.08 feet; y=1,132,453.10 feet; grid azimuth to azimuth mark=127°40′24″.[8]

Sussex (U. S. G. S.) (Johnson County, W. R. Porter, 1934).—About 6½ miles northwest of Kaycee, 2 miles northeast of North Fork of Powder River, in T. 44 N., R. 81 W., on northeast end and highest point of highest north-and-south ridge in vicinity, 18 yards northeast of 4-inch scrub pine tree marked with small triangular blaze. To reach from Kaycee, follow U. S. Highway 87E north 4.4 miles to bridge over North Fork of Powder River, continue north 2.7 miles to 2 mail boxes on right side of road (one is metal with name Wm. Leibee, other is wooden with name Williams), turn right (east) onto unimproved dirt road and go 0.15 mile to creek, cross creek and continue 0.3 mile, follow left fork 0.15 mile, follow left fork 0.15 mile (road parallels fence) to T-intersection, turn right (east) and go 0.8 mile, follow left fork (just after crossing wash) 0.15 mile to gate, pass through gate and go 1.1 miles to another gate, pass through gate and go 0.25 mile to top of grade, turn right onto dim road and go south along top of ridge 1.05 miles to gate, pass through gate and continue along ridge 1.2 miles to another gate, pass through gate and go 0.7 mile (azimuth mark on right side of road) continue along ridge 0.15 mile to point where road turns right and starts down steep grade, continue along ridge 0.25 mile to highest point and station site. Marked by standard U. S. Geological Survey bench-mark disk in outcropping bedrock. Reference marks are standard reference disks in bedrock, note 12a. No. 1 is at edge of hill, and 17.42 feet from station in azimuth 211°32′. No. 2 is on slope of hill, and 85.03 feet from station in azimuth 327°48′. Distance between reference marks is 94.2 feet. Azimuth mark is standard reference disk in concrete, note 11a, on north-

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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and-south ridge which is continuation of station ridge, and approximately 0.3 mile (0.4 mile by road) from station in azimuth 187°45′36″. Azimuth from station to highest peak in Big Horn Mountains 141°20′40″, and to sharp peak in Big Horn Mountains 132°03′48″. Elevation: 1,596.4 meters (5,238 feet).

Plane coordinates: (II), x=704,057.40 feet; y=1,137,342.06 feet; grid azimuth to azimuth mark=187°13′31″.[8]

Reno (Johnson County, W. R. Porter, 1934).—About 15 miles north by east of Kaycee, about 5 miles north-northwest of Reno Hill post office, on land owned by F. G. Carroll of Milwaukee, Wis., in T. 46 N., R. 81 W., on west end and highest point on highest of several hills in immediate vicinity, 5 feet east of 6-foot rock cairn which is built on 6- by 3- by 2-foot pyrite rock. To reach from Kaycee, follow U. S. Highway 87E north 4.4 miles to bridge over North Fork of Powder River, cross bridge and continue north 7.7 miles on highway to graded dirt road on right (21.6 miles south of bridge over North Fork of Crazy Woman Creek, 3.3 miles south of bridge over South Fork of Crazy Woman Creek, and 0.2 mile south of mail box with "T. M. Corpe" painted on it), turn right onto dirt road and go 3.0 miles, follow left fork 1.0 mile, follow left fork northeast 0.5 mile, turn left and go north 0.35 mile, turn right and go east 0.25 mile, follow left fork northeast 0.85 mile, follow right fork 0.1 mile, follow right fork (main-traveled road) 1.0 mile to point about ¼ mile southwest of large red barn, turn left and go north 2.0 miles on section-line road to white ranch house on west side of road, go northwest along right side of red building, cross deep coulee and follow dim road 0.4 mile to gate, pass through gate and follow dim road west 0.45 mile along north side of east-and-west fence to gate (azimuth mark about 10 feet west of gatepost), turn left through gate and go south 0.1 mile to small house and end of road, turn right and go west 0.8 mile across country to west bank of deep cut. By keeping close to base of hills to the right (north), truck can be driven about 0.4 mile to point about 200 yards northeast of northeast end of ridge on which station is located. Proceed southwest up ridge to high point (10-minute climb with heavy pack). Marked by standard station disk in iron pipe projecting 8 inches above ground. Reference marks are standard reference disks in pipe, projecting 8 inches above ground. No. 1 is 52.06 feet from station in azimuth 220°45′. No. 2 is 30.95 feet from station in azimuth 163°56′. Distance between reference marks is 43.6 feet. Azimuth mark is standard reference disk in concrete, note 11a, projecting 3 inches above ground, 2 feet south of east-and west fence, 25 feet west of fence corner, 1.2 miles by road from the end of truck travel at station, and 1.0 mile from station in azimuth 256°18′36″. Elevation: 1,634.1 meters (5,361 feet).

Plane coordinates: (II), x=696,973.57 feet; y=1,190,015.43 feet; grid azimuth to azimuth mark=255°47′29″.[5]

Bonnidee (Johnson County, W. R. Porter, 1934).—About 2¾ miles northeast of Bonnidee post office, on inconspicuous ridge extending north and south which slopes rather sharply to east and gently to west, and 96 feet north of center of road. To reach from Bonnidee post office, follow main road north 2.05 miles along section line, turn right and go 0.5 mile on trail to abandoned ranch to right, continue east 0.55 mile, follow left fork (main road) 1.25 miles, follow right fork (straight ahead) 0.05 mile, continue straight ahead (on left fork) 0.25 mile to top of ridge and station site. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Upper mark projects 4 inches above ground. Reference and azimuth marks are standard disks in concrete, note 11a, projecting 4 inches above ground. No. 1 is 13.290 meters (43.60 feet) from station in azimuth 260°40′. No. 2 is 12.315 meters (40.41 feet) from station in azimuth 169°01′. Distance between reference marks is 18.37 meters (60.3 feet). Azimuth mark projects 5 inches above ground, is 10 feet south of above-mentioned road, on east slope of low hill, and about 0.5 mile from station in azimuth 112°31′34″. Elevation: 1,446.8 meters (4,747 feet).

Plane coordinates: (I), x=206,405.30 feet; y=1,206,862.85 feet; grid azimuth to azimuth mark=113°18′01″.[8] (II), x=776,790.77 feet; y=1,206,642.20 feet; grid azimuth to azimuth mark=111°47′45″.[8]

Billy (Johnson County, W. R. Porter, 1934).—About 14½ miles south of Buffalo, 2½ miles southeast of the T-A Creek bridge on U. S. Highway 87E, 1.3 miles

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

southeast of J. P. Ranch, in T. 48 N., R. 82 W., on highest of several knobs of highest ridge about 1½ miles east of North Fork of Crazy Woman Creek. There are two cone-shaped knobs about ¼ mile to south. To reach from Buffalo post office, follow U. S. Highway 87E south 13.4 miles to small bridge over T-A Creek (hill to west of road has words in large white letters "TRY LOG CABIN CAMP" on east slope), leave highway at wooden mail box about 75 yards north of small bridge and go east through iron gate, follow unimproved road east 0.7 mile to the J. P. Ranch, just after crossing small bridge over ditch, turn right and go south through 2 iron gates, continue 0.2 mile to end of lane, pass through pole gate and go southwest 0.1 mile, turn left through pole gate and go east 0.15 mile to creek, cross creek and continue 0.1 mile to gate into alfalfa field, go southeast 0.15 mile across field, go east 0.25 mile over grass- and sagebrush-covered hill to point about 50 yards in from mouth of coulee, cross coulee and work way east 0.3 mile to gate in north-and-south fence, go southeast up ridge towards bare cone-shaped hill (keeping to right of cone-shaped hill and following trail east) about 1.2 miles to point on top of ridge, proceed south about 300 yards to top of knoll and station site. Marked by standard station disk in pipe. Reference marks are standard reference disks in bedrock, note 12a. No. 1 is 17.14 meters (56.2 feet) (slope) from station in azimuth 340°54′. No. 2 is 11.640 meters (38.19 feet) (slope) from station in azimuth 134°04′. Distance between reference marks is 27.94 meters (91.7 feet). Azimuth mark is standard disk in concrete, note 11a, about ¾ mile southwest of the J. P. Ranch, 17.5 feet southwest of pole gate in northeast-and-southwest fence line, 3 feet southeast of fence line, and approximately 1.3 miles from station in azimuth 124°42′20″. Elevation: 1,577.8 meters (5,176 feet).

Plane coordinates: (II), x=676,369.22 feet; y=1,265,286.45 feet; grid azimuth to azimuth mark=124°14′16″.[8]

Powder (Johnson County, W. R. Porter, 1934).—About 25 miles southeast of Buffalo, 7 miles west of Powder River, 10 miles east of Crazy Woman Creek, at east edge of T. 48 N., R. 79 W., 0.05 mile north of graded dirt road, on low inconspicuous knoll on divide between Powder River and Crazy Woman Creek. There are higher ridges to north and west. To reach from Buffalo, follow U. S. Highway 87E north to junction with U. S. Highway 16 (at north edge of town), turn right onto Highway 16 and go east 1.55 miles to point where highway curves to left, continue straight ahead 0.6 mile to point where road turns left, continue straight ahead 6.35 miles on main road to another road turning left, continue straight ahead (east and south) 8.25 miles on main road to bridge over Crazy Woman Creek, cross creek and continue 5.7 miles to forks and Gillette signboard, follow right fork 5.35 miles to small vacant white house about 100 yards south of road, continue south and east 1.35 miles to top of small saddle, turn left up small knoll and go north 0.05 mile to highest point and station site. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Upper mark projects 4 inches above ground. Reference and azimuth marks are standard disks in concrete, note 11a, projecting 4 inches above ground. No. 1 is 11.24 meters (36.9 feet) from station in azimuth 77°45′. No. 2 is 17.68 meters (58.0 feet) from station in azimuth 179°33′. Distance between reference marks is 74.8 feet. Azimuth mark is across canyon on first ridge to west, 24.5 feet east of center line of road, and approximately ½ mile from station in azimuth 105°38′25″. Azimuth from station to east gable of white schoolhouse is 101°10′29″. Elevation: 1,436.6 meters (4,713 feet).

Plane coordinates: (I), x=209,072.74 feet; y=1,269,163.14 feet; grid azimuth to azimuth mark=106°24′44″.[8] (II), x=777,819.07 feet; y=1,268,990.48 feet; grid azimuth to azimuth mark=104°54′12″.[8]

Muir (Johnson County, W. R. Porter, 1934).—About 21 miles east-southeast of Buffalo, 6 miles east of Crazy Woman Creek, 9 miles west of Powder River in T. 49 N., R. 79 W., on highest point of small ridge (about 0.25 mile long and about 75 feet wide) extending northwest and southeast. To reach from Buffalo post office, follow U. S. Highway 87E north 0.7 mile to junction with U. S. Highway 16, turn right (east) onto Highway 16 and go 1.5 miles, follow right fork southeast (just after crossing railroad tracks) 6.95 miles, follow right fork (straight ahead) 8.2 miles, cross wooden bridge over Crazy Woman Creek and continue 0.35 mile, cross wooden bridge over draw and continue straight ahead

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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2.0 miles to white schoolhouse about ¼ mile to right, continue straight ahead (east) up hill 3.3 miles, follow left fork (unimproved road) 0.5 mile, follow right fork 1.15 miles to point where road makes sharp right bend around head of draw in small saddle, turn left and bear to right up ridge 0.25 mile to station site. Surface and underground marks are standard station disks in concrete, notes 1a and 7a. Upper mark is flush with surface of ground. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 projects 4 inches above ground, and is 20.73 meters (68.0 feet) from station in azimuth 284°42′. No. 2 projects 4 inches above ground, and is 17.35 meters (56.9 feet) from station in azimuth 160°19′. Distance between reference marks is 110.65 feet. Azimuth mark is on east slope of first ridge to south, 18.0 feet west of center line of road, and approximately ⅜ mile from station in azimuth 9°29′36″. Azimuth from station to rock cairn, approximately 1½ miles distant, is 114°22′09″, and to cone-shaped mountain is 152°21′23″. Elevation: 1,458.4 meters (4,785 feet).

Plane coordinates: (I), x=197,170.90 feet; y=1,298,803.14 feet; grid azimuth to azimuth mark=10°17′57″.[8] (II), x=765,140.41 feet; y=1,298,306.00 feet; grid azimuth to azimuth mark=8°47′17″.[8]

Supplementary points

Casper, high school, stack (Natrona County, W. R. Porter, 1934).

Plane coordinates (I), x=188,105.14 feet; y=794,714.65 feet. (II), x=769,206.34 feet; y=794,165.69 feet.

Casper, Mountain States Power and Light Co., stack (Natrona County, W. R. Porter, 1934).

Plane coordinates: (I), x=189,366.97 feet; y=799,537.23 feet. (II), x=770,343.72 feet; y=799,018.99 feet.

Casper, Chicago, Burlington & Quincy Railroad Co., stack (Natrona County, W. R. Porter, 1934).

Plane coordinates: (I), x=189,767.31 feet; y=799,759.55 feet. (II), x=770,738.22 feet; y=799,251.53 feet.

Casper, broadcasting station, top of radio mast (Natrona County, W. R. Porter, 1934).

Plane coordinates: (I), x=196,527.33 feet; y=797,933.93 feet. (II), x=777,542.76 feet; y=797,600.41 feet.

Casper, courthouse, finial (Natrona County, W. R. Porter, 1934).

Plane coordinates:[9] (I), x=189,495.30 feet; y=798,234.14 feet. (II), x=770,505.51 feet; y=797,719.67 feet.

Oil refinery east of Casper, stack (Natrona County, W. R. Porter, 1934).

Plane coordinates: (I), x=207,158.11 feet; y=801,261.17 feet. (II), x=788,084.36 feet; y=801,199.97 feet.

G. L. O. section corner, secs. 19, 30, 24, and 25, Tps. 34 N., Rs. 81 and 82 W. (Natrona County, W. R. Porter, 1934).—About 15 miles west-northwest of Casper, about 3.5 miles south of U. S. Highway 20, and on ridge known locally as The Reefs. Probably marked by General Land Office pipe marker stamped with section, township, and range numbers. Station *Reef* (*U. S. G. S.*) is visible from ground at station.

Plane coordinates:[9] (I), x=112,602.56 feet; y=814,406.22 feet. (II), x=693,228.16 feet; y=811,906.80 feet.

G. L. O. mark, SW 1/16, S 9 (Natrona County, W. R. Porter, 1934).

Plane coordinates:[9] (I), x=187,886.41 feet; y=825,418.57 feet. (II), x=768,197.62 feet; y=824,852.93 feet.

Water tank near station Midwest (Natrona County, W. R. Porter, 1934).

Plane coordinates:[9] (I), x=212,095.68 feet; y=985,102.95 feet. (II), x=788,269.24 feet; y=985,107.68 feet.

SHOSHONE INDIAN RESERVATION AREA

Principal points

Bunion (Sublette County, J. Bowie, Jr., 1936).—About 24 miles due east of Boulder, about 6 miles air line northeast of Mitchell's Camp at Mud Lake, about

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

[9] No check on this position.

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3 miles due west of Big Sandy Peak (which is much higher than station peak), about 2 miles northwest of Big Sandy Lake, about ¾ mile northeast of sign at summit of Fish Creek Pass, on summit of Bunion Peak, a high, bare, rocky knob at east end of rocky ridge between Donald and Fish Creeks. To reach from Boulder Store, on Rock Springs Highway, 11.4 miles south of Pinedale, follow Rock Springs Highway south 14.5 miles; turn left off highway at sign "Pleasant Valley Speedway"—"Mitchell's Camp", and follow graded road generally northeast 7.2 miles; take right fork and go east, passing to north of small store and gas pump at ranch, and follow main graded road east 1.9 miles; take left fork and follow road north 1.6 miles, passing under flume and onto graded road that comes in from left; continue on main road, generally south, along creek and telephone line 9.0 miles; bear left off graded road, but keep on main-traveled road, following same generally east, 3.2 miles to road coming in from south and arrow sign reading "Rock Springs"; continue northeast 2.0 miles over hills to "Leckie Ranch"; continue east on main road 2.0 miles to crossroads; turn left at sign "Mitchell's Camp" and follow main road north up Dutch Joe Canyon 10.4 miles to Mitchell's Fish Camp, and end of truck travel. Mr. Mitchell supplied pack horses and guided party to station. General route to station is to follow main trail north about 6.0 miles to Fish Creek, which meets trail at right angle from east; turn right off main trail and follow dimmer trail up Fish Creek about 2.0 miles to summit of Fish Creek Pass; leave horses and back pack north up through scrub timber to top of main ridge; turn right and go east up ridge to top, highest point and station. About 4-hour horse pack, and 1½-hour back pack from Mitchell's camp. Station mark is standard disk in outcropping bedrock, note 2. Reference marks are standard disks in outcropping bedrock, note 12a. No. 1 is 9.722 meters (31.90 feet) south of station in azimuth 342°04′; no. 2 is 3.315 meters (10.88 feet) west in azimuth 71°43′. Azimuth mark is standard disk in small boulder, note 12c, in saddle of Fish Creek Pass, about 200 yards south of sign "Fish Creek Pass", and about 1 mile southwest of station in azimuth 32°06′04″.

Plane coordinates: (III), x=369,427.73 feet; y=759,442.41 feet; grid azimuth to azimuth mark=32°25′52″.[5] (IV), x=727,557.17 feet; y=760,208.50 feet; grid azimuth to azimuth mark=31°31′34″.[5]

Bonneville (Sublette County, J. Bowie, Jr., 1936).—On high rocky range lying just west of Continental Divide, about 26 miles east of Pinedale, 13 miles north of Mud Lake and end of nearest road, 3 miles north of Gelkie Mountain at south end of range, on highest summit of high (12,530 feet) prominent and rocky peak known as Mt. Bonneville, sometimes called "Raid Mountain", in about center of summit, in top of large semidetached fragment of rock, about 30 feet southwest of northeast edge of summit which is brink of sheer drop of approximately 2,000 feet to floor of narrow valley and partially frozen lake lying close against side of mountain. Station is best reached from west by pack train from ranch of Dennis Mitchell. From Pinedale, follow U. S. Highway 187 south 11.4 miles; turn left onto graded road at general store at Boulder and go 6.1 miles on main road; turn left onto track road just after passing through cut and go 0.1 mile; pass through gate, go east 0.2 mile, keep to right fork, go northeast 0.5 mile, pass through gate, and go straight ahead on left fork 0.8 mile; take right fork and go east over hill and across meadow 1.0 mile; turn right through upper wire gate and continue on 0.3 mile to Dennis Mitchell's ranch. Horses may be obtained here, and Mr. Mitchell is familiar with route to station. From ranch, go north about ⅓ mile, bearing right at curve in track road, to gate. Pass through gate and go north about 1½ miles to strand wire fence, and then east along fence to old road; turn right onto road and go east and northeast up Lovett Creek Canyon to end of canyon, thence northeast up trail to its end at top of mountains; continue easterly across country through timber to Forest Service trail (about 2 or 3 miles), then east along trail to Divide Lake, and northwest along west side of lake on Scab Creek trail for about 1½ miles to Little Divide Lake. Continue easterly around lake on well-marked trail for about 4 miles to sign "Scab Creek Trail", thence easterly along south side of Raid Creek for 3 or 4 miles until the going becomes very rough, then bear left up divide between Sheep Creek and Raid Creek for about 1 mile to end of horse travel in vicinity of several large snow drifts, which seem to lie there all the year. From end of horse travel, head northeast up steep and rocky slope toward high point and go about

[5] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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1½ miles to summit and station. From Mitchell's ranch to station is about 1½ days' steady traveling on horseback, with about 2 hours' hard packing on foot. After reaching open country about 3 miles east of Little Divide Lake, Mount Bonneville can be seen and easily identified as high and prominent peak on sky line. Seen from west, its distinctive shape is high peak to left (north), with lower, leaning peak short distance to right (south). Head as directly toward the peak as topography allows. Station mark is standard disk in boulder, note 4. Reference and azimuth marks are standard disks in boulders, note 12c. No. 1 is at northeast edge of summit, 6.454 meters (21.18 feet) east of station in azimuth 253°53′. No. 2 is on backbone of summit, 9.625 meters (31.58 feet) south of station in azimuth 348°23′. Azimuth mark is on summit of first low hill across draw to south, on northwesterly and lower summit of hill, 20 feet south of summit, and approximately 2.5 miles southwest of station in azimuth 39°00′30″.

Plane coordinates: (III), x=341,113.05 feet; y=799,726.31 feet; grid azimuth to azimuth mark=39°24′41″.[8] (IV), x=698,608.23 feet; y=800,040.72 feet; grid azimuth to azimuth mark=38°30′16″.[8]

Jim (Sublette County, J. Bowie, Jr., 1936).—About 26 miles east-southeast of Pinedale, about 15 miles due east of Boulder, about 9 miles southwest of Continental Divide, about 1½ miles south of Cow Camp (set of log buildings in timber on top of range), about 3 miles southwest of prominent double-topped mountain, on low rocky hill, on west of 2 hills of about same elevation, and in top of huge boulder which caps top of hill, and in which there is also a Forest Service triangulation station mark stamped "2, T-28-N, R-105-W." To reach from Pinedale, follow U. S. Highway 187 south 11.5 miles to Boulder Cash Store; turn left off highway and follow main graded road east 7.4 miles to forks; keep straight ahead on left fork 4.5 miles to T-road left; turn left with sign "Lander" and go east 2.0 miles to where main road turns sharply right and less-traveled road continues east; keep straight ahead off main highway and follow graded road east, north, and east 0.9 mile to large white house on south side of road; continue east 1.4 miles to forks at board gate; take left fork and go 0.5 mile to small house on right and corral on left; pass between house and corral and follow main road up small stream 2.5 miles to forks in low open divide; turn left and continue on main road up steep grade 2.1 miles to forks at sign "Cow Camp – 5 Miles, Pocket Creek Driveway." This sign is on low grassy divide about 0.1 mile beyond summit of long grade. Turn left at sign, cross small creek, and follow main road 3.0 miles to sign in small flat reading "Divide Lake Trail, Pocket Creek Driveway." This trail goes straight ahead over steep hill and is impassable to trucks. Bear to right around side of hill for about 200 yards, turn sharply back to left and follow new route up steep hill and then old route for total of 0.6 mile to sign on left "Salt Ground N. 42." Continue about ½ mile to point about 0.1 mile from large, low, grassy bowl; turn right off road and go across country following top of ridge about ½ mile to top of hill and station. Doubtful if trucks can be driven last ½ mile. Station mark is standard disk in outcropping bedrock, note 4. Reference and azimuth marks are standard disks in boulders, note 12c. No. 1 is 8.988 meters (29.49 feet) northeast of station in azimuth 216°12′; no. 2 is 15.516 meters (50.91 feet) west in azimuth 81°19′. Azimuth mark is on hill to north, about 200 yards north of small creek, in top of large boulder at large well-balanced rock, about 25 yards south of lone tree, and approximately ¾ mile north of station in azimuth 184°33′21″. *Station 2, T. 28 N., R. 105 W.* (*U. S. F. S.*) (see geographic position and description thereof) is 0.238 meter (0.78 foot) from station in azimuth 123°45′.

Plane coordinates: (III), x=326,904.05 feet; y=759,433.93 feet; grid azimuth to azimuth mark=184°59′36″.[8] (IV), x=685,037.97 feet; y=759,528.26 feet; grid azimuth to azimuth mark=184°05′17″.[8]

Divide Lake (Sublette County, J. Bowie, Jr., 1936).—About 19 miles east-southeast of Pinedale, about 12 miles northeast of Boulder, on low but prominent, timbered ridge lying along south side of Divide Creek, at headwaters of Scab Creek, about 2 miles northwest of Big Divide Lake, about ½ mile northwest of north end of Little Divide Lake, at northwest end of ridge which begins at lake as high rocky point, about ½ mile north by west of another small lake, on highest point of ridge, on its longitudinal center, and 35 feet

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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north of small pine tree. To reach from Pinedale, follow route towards station *Bonneville* (p. 156) as far as Little Divide Lake. From northwest end of diversion ditch from Big Divide Lake go north along west side of Little Divide Lake about ¼ mile and bear to left through timber, following well-blazed trail about ½ mile to station on high point of ridge. Horses can be taken to station, which is about 6-hour ride from Mitchell's ranch. Station marked by a standard disk in outcropping bedrock, note 2. *Divide Lake reference mark no. 1* is U.S. Forest Service disk stamped "2-33-100 9971 1928" set in drill hole in outcropping bedrock, on high rocky point at north end of ridge, 10.228 meters (33.56 feet) north of station in azimuth 203°02′. Reference mark no. 2 is standard disk in outcropping bedrock, note 12a, at west edge of summit, 6.217 meters (20.40 feet) northwest from station in azimuth 132°16′. Azimuth mark is standard disk in outcropping bedrock, note 12a, in top of high and prominent rock outcrop which is about 40 feet higher than ground to south, on highest point of rock, 10 feet south of dead cedar snag rooted in crevice in rock, and approximately 0.25 mile east of station in azimuth 277°11′33″.

Plane coordinates: (III), x=299,959.91 feet; y=792,934.00 feet; grid azimuth to azimuth mark=277°41′59″.[8] (IV), x=657,567.76 feet; y=792,597.94 feet; grid azimuth to azimuth mark=276°47′35″.[8]

Pebble (Fremont County, J. Bowie, Jr., 1936).—About 7 miles northwest of Riverton, on highest and northeast hill of barren ridge which forms north side of mesa sloping up from Riverton and breaking off abruptly into "Five-Mile Valley", and about 0.75 mile northeast of where U. S. Highway 287 crosses ridge which is highest summit on road between Riverton and Morton post office. Hill has excellent visibility in all directions. To reach from Riverton, follow U. S. Highway 287 west from center of town 6.7 miles to road summit, snow fence on southwest side of highway, and track crossroad. Azimuth mark is northeast of this intersection. Turn right and go northeast on old graded road 0.5 mile; turn left and go northeast ¼ mile to top of bare hill and station. Surface mark is standard disk in top of pipe set in concrete. Disk is about 8 inches above ground, and top of concrete mass is 2 inches below surface of ground. Underground mark is standard disk in concrete, note 7a. Reference marks are standard disks in boulders, note 12c. No. 1 is 9,830 meters (32.25 feet) north of station in azimuth 169°15′; and no. 2, 14.010 meters (45.96 feet) east in azimuth 256°10′. Azimuth mark is standard disk in concrete, note 11a, about 100 yards northeast of U. S. Highway 287 at point where route to station leaves highway, between 2 old graded highways, about 25 yards southeast of track road, 5 feet north of telephone pole, and approximately 0.6 mile south-southwest from station in azimuth 23°07′53″.

Plane coordinates: (III), x=571,189.59 feet; y=880,574.38 feet; grid azimuth to azimuth mark=22°56′57″.[8]

Rawlins (Fremont County, J. Bowie, Jr., 1936).—About 4 miles air line south-southwest from village of Sandraw. To reach station from Riverton; from East Main Street follow U. S. Highway 287 south toward Lander 1.1 miles to Y of the Lander and Sandraw roads, just beyond Wind River steel bridge; take left fork (Sandraw road) and go 7.9 miles to Y on top of hill; take right fork and go 12.4 miles to Y where left fork leads to Sandraw, visible to southeast; take right fork and go 1.7 miles to crossroads. Azimuth mark is G. L. O. pipe reinforced with concrete in southwest corner of intersection. Turn right at crossroads and go 0.2 mile to road intersection; turn right and follow road (keeping to right fork at 0.1 mile) 0.5 mile to station on small knoll about 30 yards west of road. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference marks are standard disks in concrete, note 11a. No. 1 is 13.215 meters (43.46 feet) north of station in azimuth 161°09′; no. 2 is 15.815 meters (51.89 feet) east in azimuth 272°25′. Azimuth mark (see above) is about ½ mile southeast from station in azimuth 320°00′05″.

Plane coordinates: (III), x=643,807.76 feet; y=761,500.58 feet; grid azimuth to azimuth mark=319°38′16″.[8]

Alkali (Fremont County, J. Bowie, Jr., 1936).—About 28 miles east by north from Lander, about 14 miles southeast from Riverton, about 4 miles north of "Texas Camp", on highest peak of Alkali Buttes. Peak is very prominent, being

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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considerably higher than anything else for miles around, and can easily be identified from all directions. To reach from intersection of East Main Street and U. S. Highway 320 in Riverton, follow road southerly towards Lander 1.1 miles to Y just beyond Wind River steel bridge; turn left off pavement onto Sandraw road and go 1.3 miles to T-road left running east between 2 stone cairns in fence line. Keep straight ahead on main-traveled road 5.65 miles to forks at top of hill; take left fork and follow bladed road 3.55 miles to wash; cross wash and go 0.15 mile to forks; take right fork (bladed road) and follow it 2.65 miles to crossroads at sign "Texas Camp 4 Miles"; keep straight ahead 0.4 mile across wash to tar-paper shack; continue east on bladed road 0.5 mile; turn left off road and go north up draw 1.3 miles to pocket almost surrounded by cliffs and end of truck travel. From here pack up cliffs, and then up ridge to highest point and station. Station mark is standard disk in outcropping bedrock, note 2. Reference and azimuth marks are standard disks in outcropping bedrock, note 12a. No. 1 is 10.230 meters (33.56 feet) southwest from station in azimuth 45°10′; no. 2 is 9.998 meters (32.80 feet) northwest in azimuth 118°00′. Azimuth mark is on a lower point of ridge that slopes down to southwest from top of hill, and is about 0.3 mile southwest from station in azimuth 38°20′14″. Azimuth from station to Texas Camp, silver storage tank, approximately 4 miles distant, is 344°10′15″; and to tar-paper shack, north corner, distant about 1½ miles, is 359°28′12″.

Plane coordinates: (III), x=653,135.35 feet; y=817,416.92 feet; grid azimuth to azimuth mark=37°56′53″.[8]

Sand (Fremont County, J. Bowie, Jr., 1936).—About 33 miles air line northeast of Lander, about 13 miles south by west of Shoshoni, about 12 miles east of Riverton, on highest part of flat top of large prominent bare mesa which has good visibility in all directions. Mesa has fine sand top and is sparsely covered with grass and sagebrush. To reach from Riverton, follow route given for station *Conant* (page 162) as far as forks 4.3 miles beyond bridge in wash; take left fork and go 0.9 mile to crossroad; turn left and follow track road north 1.5 miles to top of hill. Azimuth mark is about 50 yards southeast of this point. Turn left off road and go 0.2 mile to highest point and station. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 8.440 meters (27.69 feet) southeast of station in azimuth 302°21′; no. 2 is 8.412 meters (27.60 feet) southwest in azimuth 35°36′. Azimuth mark is on east edge of flat top of mesa, about 50 yards east of point where track road leading to station crosses hill, and ¼ mile southeast of station in azimuth 303°05′00″. *Riverton, municipal water tank, finial,* and *Riverton, State Prison farm, tank* (see geographic positions thereof) may also be used as azimuth marks.

Plane coordinates: (III), x=656,572.52 feet; y=863,381.64 feet; grid azimuth to azimuth mark=302°41′02″.[8]

Wind (Fremont County, J. Bowie, Jr., 1936).—About 9 miles east and 9 miles north of Fort Washakie, 1¼ miles west of U. S. Highway 287, on sharp barren peak which forms bluff on east side of Wind River, and is ¼ mile east of Kinnear steel bridge over river. Peak rises 500 feet from river, and is highest point along bluffs for several miles. To reach from St. Michaels Mission at Ethete post office, which is reached from Fort Washakie by taking gravel road east from crossroad, about 1 mile south of Agency, go to main intersection at northwest corner of Mission grounds, and drive north on graded road 9.5 miles, keeping to main graded road which follows closely new telephone line north and northeast; cross Kinnear steel bridge over Wind River. Station is visible from bridge ¼ mile to east. Continue on 0.5 mile; take right of nearly equal forks up hill and go easterly 0.35 mile, keeping to left fork up hill at 0.3 mile, then coming into well-traveled crossroad at top of mesa; turn right on main road and go southerly 0.2 mile; telephone line crosses road; leave road, turn right and drive across country southwesterly to station hill, going up from left or south slope 0.65 mile to end of truck travel on side hill 150 feet south of station. Station mark is standard disk welded to iron pipe 3 feet long set in concrete. Reference marks are standard disks in concrete, note 11a. No. 1 is 6.180 meters (20.28 feet) east of station in azimuth 260°18′;

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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no. 2 is 6.690 meters (21.95 feet) south in azimuth 357°41′. Azimuth mark is standard G. L. O. pipe (1914) approximately 0.3 mile northeast of station in azimuth 208°53′38″.

Plane coordinates: (III), x=513,915.12 feet; y=900,803.11 feet; grid azimuth to azimuth mark=208°51′30″.[8]

Hudson (Fremont County, J. Bowie, Jr., 1936).—About 4 miles air line east of Hudson, on mesa. To reach from Hudson: Follow U. S. Highway 287 northerly 2.2 miles; turn right onto dirt road and go 0.1 mile; turn left on dirt road to T-fork and go 1.4 miles to point opposite white house; turn right and follow dim road which leads directly away from house and towards and up hill to mesa, 0.8 mile to azimuth mark on right of road; continue 0.2 mile, turn right off road, and go obliquely about 100 yards to station on small knoll. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 9.480 meters (31.10 feet) east of station in azimuth 262°12′; no. 2 is 10.050 meters (32.97 feet) southwest in azimuth 39°12′; and azimuth mark (see above) is about ¼ mile northeast from station in azimuth 222°27′04″. Azimuth from station to *Riverton, municipal water tank, finial* is 218°29′48″.

Plane coordinates: (III), x=561,699.92 feet; y=816,649.02 feet; grid azimuth to azimuth mark=222°17′40″.[8]

Erosion (Fremont County, J. Bowie, Jr., 1936).—About 9 miles northwest of Riverton, 2 miles northeast of Wind River, ¾ mile southwest of U. S. Highway 287 at point 1 mile northwest of highway summit, on northwest end of low barren spur ridge in badlands northeast of Wind River, and at southwest edge of mesa overlooking Wind River Valley. To reach from Riverton, follow U. S. Highway 287 northerly 7.0 miles from its junction with U. S. Highway 320 to road summit where gravel road turns right towards station *Pebble;* continue northwest on highway and at 8.0 miles turn left down dirt bank in ditch 30 feet west of 2-foot pipe culvert, and go south-southwest across country. At 8.4 miles reach edge of badlands, turn left and go east and southeast 0.2 mile to east edge of eroded area and edge of mesa. Turn right and go west along saddle to west end of ridge 0.2 mile to station. Station marked by standard disk in boulder, note 4. Reference marks are standard disks in buried boulders which project several inches above ground, note 12c. No. 1 is 9.462 meters (31.04 feet) southwest of station in azimuth 37°15′; and no. 2 is 10.321 meters (33.86 feet) northwest in azimuth 147°21′. Distance between reference marks is 16.223 meters (53.23 feet). Station *Pebble* (see geographic position and description thereof) may be used as an azimuth mark.

Plane coordinates: (III), x=562,980.14 feet; y=877,341.55 feet; grid azimuth to station *Pebble*=248°30′20.8″.

S. C. S. no. 34 (Fremont County, J. Bowie, Jr., 1936).—Traverse station of the Soil Conservation Service, about ¼ mile west of Sandraw road, on hill known locally as Seven Mile Hill, about 7 miles southeast of Riverton and 21 miles northeast of Lander. To reach from junction of East Main Street and U. S. Highway 320 in Riverton, follow highway southerly toward Lander 1.1 miles to Y just across Wind River steel bridge; bear left onto Sandraw road and go southeasterly 6.3 miles to top of grade where grade drops toward south and dim road comes in from east. Turn sharply back to right and follow dim road 0.4 mile to edge of rim and station on left. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference marks are standard disks in concrete, note 11a. No. 1 is 14.572 meters (47.81 feet) east of station in azimuth 261°22′; no. 2 is 15.132 meters (49.65 feet) south in azimuth 343°03′. Azimuth mark is standard disk in large boulder, note 12c, 100 yards south of road to station, and about 0.3 mile east of station in azimuth 272°43′43″.

Plane coordinates: (III), x=611,931.27 feet; y=823,953.78 feet; grid azimuth to azimuth mark=272°26′39″.[8]

S. C. S. no. 1 (Fremont County, J. Bowie, Jr., 1936).—About 1½ miles south of Riverton, on top of low-rolling mesa lying along south side of Wind River and east of Beaver Creek, about 0.2 mile west of Sandraw road, on low, gravelly point at northwest corner of mesa, on southeast side of wide comparatively shallow draw, 20 yards west of high point of mesa, and 15 feet southeast of extreme northwest edge of point. Station is in position of traverse station of Soil Con-

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

servation Service. To reach station from Riverton, intersection of Main Street and U. S. Highway 320: follow highway southerly 1.1 miles; bear left onto Sandraw road just after crossing Wind River bridge, and go 1.6 miles to top of hill or 0.3 mile past T-road east at 2 stone cairns; turn right and go across country northwest along top of mesa 0.3 mile to northwest corner of mesa and station. Station originally marked by 1¼-inch gas pipe about 14 inches long. Re-marked with surface and underground marks, standard station disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is on high point of mesa, 12.972 meters (42.56 feet) east of station in azimuth 263°55′. No. 2 is at northwest crest of mesa, and 15.907 meters (52.19 feet) southeast of station in azimuth 329°08′. Distance between reference marks is 15.549 meters (51.01 feet). Azimuth mark is on Sandraw road, 0.45 mile south along road from iron deck truss bridge, 150 yards north along road from T-road east at 2 stone cairns, 30 feet east of center line of Sandraw road, on fence line, and approximately 0.25 mile northeast of station in azimuth 217°21′29″. Azimuth from station to church spire, distant about ½ mile, is 82°23′49″.

Plane coordinates: (III), x=599,530.23 feet; y=846,002.97 feet; grid azimuth to azimuth mark=217°06′16″.[8]

Madden (Fremont County, J. Bowie, Jr., 1936).—About 2.7 miles north of Riverton, on east side of Riverton-Shoshoni highway (U. S. Highway 320), on opposite side of road from lane leading to Mrs. Mary Madden's house which has red roof and is located in cottonwood grove, on highway right-of-way, 16.7 meters (55 feet) east of center line of highway, 3.9 meters (13 feet) south of center of swinging wooden gate, and 1.9 meters (6 feet) west of wire fence. To reach from East Main Street in Riverton, follow U. S. Highway 320 north 2.7 miles to Mrs. Mary Madden's house on left and station on right. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is on west side of highway, 11.2 meters (37 feet) west of center line of highway, 6.5 meters (21 feet) north of center line of lane leading west into Mrs. Mary Madden's house, 3.4 meters (11 feet) north of southeast corner of Mrs. Madden's lawn, and 1 meter (3 feet) east of yard fence, and 29.998 meters (98.42 feet) west of station in azimuth 110°35′. No. 2 is 17.4 meters (57 feet) east of center line of highway, 0.5 meter (2 feet) west of wire fence, 10.0 meters (33 feet) north of center line of swinging wooden gate, and 14.077 meters (46.18 feet) north of station in azimuth 185°49′. Azimuth mark is about 2¼ miles north of Riverton, in southeast corner of cross-road intersection with east-west gravel road, about 4 yards north of north side of wooden bridge, 3 feet east of east edge of road, and approximately 0.3 mile from station in azimuth 0°13′04″. Azimuth from station to *Riverton, State Prison Farm, tank,* is 304°49′32″.

Plane coordinates: (III), x=598,881.37 feet; y=873,815.31 feet; grid azimuth to azimuth mark=359°57′55″.[8]

S. C. S. no. 105 (Fremont County, J. Bowie, Jr., 1936).—Traverse station of the Soil Conservation Service located on second rim east of Wind River, and about 4 miles east of Riverton. To reach from intersection of East Main Street and U. S. Highway 320 in Riverton, follow road southerly towards Lander 1.1 miles to "Y" just beyond Wind River steel bridge; turn left off pavement onto Sandraw road and go 1.3 miles to T-road left running east between two stone cairns in fence line; turn left onto this road and go 0.5 mile to fence corner on left and "Y"; bear left (north) and go 1.6 miles to "Y"; bear right on dimmer road and go 0.2 mile to road intersection. Keep straight ahead 0.8 mile to "Y"; bear left and follow winding road across washes and up mesa 1.6 miles; turn left (west) and drive across country 0.1 mile to station. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 14.800 meters (48.56 feet) northeast of station in azimuth 237°47′; and no. 2 is 13.840 meters (45.41 feet) northwest in azimuth 140°58′. Azimuth mark is on west side of road to station, at point where telephone line crosses road, and 0.4 mile south of station in azimuth 345°33′22″. *U. S. G. S. flag* (see geographic position thereof) is 19.600 meters (64.30 feet) west of station in azimuth 71°02′.

Plane coordinates: (III), x=616,207.00 feet; y=860,080.55 feet; grid azimuth to azimuth mark=345°15′34″.[8]

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

S. C. S. no. 45 eccentric (Fremont County, J. Bowie, Jr., 1936).—About 9 miles southeast of Riverton, on rolling treeless ridge known locally as Nine Mile Hill, 0.45 mile east of Sandraw road, along road leading east to oil fields, 0.25 mile east of southeast corner of fence, about on range with south fence line and low slanting hill on near horizon to east, 39 feet north of center of oil field road, and east of local high point which occurs at road junction. To reach from junction of East Main Street and U. S. Highway 320 in Riverton, follow Highway 320 southerly 1.1 miles, bear left onto Sandraw road just after crossing Wind River bridge and go 7.9 miles; take left fork at fence corner on left at top of hill and go east 0.45 mile to station on left. Station *S. C. S. no. 45* (see geographic position and description thereof) is distant 1.979 meters (6.49 feet) in azimuth 317°18′. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 35 feet north of center of oil field road, and 12.019 meters (39.43 feet) west of station in azimuth 68°37′. No. 2 is 12.873 meters (42.23 feet) north of station in azimuth 163°32′. Distance between reference marks is 18.372 meters (60.28 feet). Azimuth mark is on oil field road, 0.2 mile east of its junction with Sandraw road, 45 feet north of center of oil field road, 12 feet south of fence, about 100 yards west along fence from its southeast corner, and approximately 0.3 mile west of station in azimuth 74°51′14″. Azimuth from station to *Riverton, municipal water tank, finial* (see geographic position thereof), distant about 9 miles, is 144°26′18″.

Plane coordinates: (III), x=623,041.66 feet; y=821,073.78 feet; grid azimuth to azimuth mark=74°32′28″.[8]

Muskrat (Fremont County, J. Bowie, Jr., 1936).—About 34 miles northeast of Lander, about 17 miles east of Riverton, on one of hills along west side of broad Muskrat valley. To reach from junction of East Main Street and U. S. Highway 320, in Riverton, follow road southerly towards Lander 1.1 miles to "Y" just beyond Wind River steel bridge; bear left off pavement onto Sandraw road and go 1.3 miles to T-road east; turn east onto T-road passing between 2 stone cairns on fence line and go 0.5 mile to "Y" at fence corner on left; bear right and go 3.4 miles to "Y"; bear left onto Muskrat road and go 3.4 miles to bridge in wash; continue 4.3 miles to "Y"; bear right and go 5.0 miles to "Y"; bear left on main-traveled road and go 2.1 miles to top of grade with low rock cap on left; leave road and go north across country about 0.1 mile to rock cap and station. Station mark is standard disk in outcropping bedrock, note 2. Reference marks are standard disks in outcropping bedrock, note 12a. No. 1 is 6.230 meters (20.44 feet) southeast of station in azimuth 327°39′; and no. 2 is 9.910 meters (32.51 feet) southwest in azimuth 30°45′. *Muskrat azimuth mark* (see description and geographic position thereof) is marked with standard disk in concrete, note 11a, and is about 2 miles distant in azimuth 249°42′44″.

Plane coordinates: (III), x=686,671.18 feet; y=849,919.62 feet; grid azimuth to *Muskrat azimuth mark*=249°14′09.9″.

Muskrat azimuth mark (Fremont County, J. Bowie, Jr., 1936).—About 19 miles east of Riverton, about 2 miles north of Muskrat road, about 1 mile north-northeast of group of low rocky buttes, ½ mile east of west edge of Muskrat valley, near northwest end of slight rise in ground ¼ mile northeast of shallow wash, and about 2 miles from station *Muskrat* in azimuth 249°42′44″. Station most easily located by following compass course across country from station *Muskrat*. To reach from Riverton, follow directions for route to station *Muskrat;* go 0.1 mile beyond top of grade at that station, turn left onto old road and go 0.5 mile; take right fork and go 1.6 miles to end of road; continue northeasterly across country, heading for northwest end of what appears to be low ridge, 0.5 mile to top of rise and station. Station mark is standard disk in concrete, note 11a. Stations *Muskrat* and *Shoshone* (see descriptions and geographic positions thereof) may be used as azimuth marks.

Plane coordinates: (III), x=696,754.61 feet; y=853,742.69 feet.

Conant (Fremont County, J. Bowie, Jr., 1936).—About 35 miles east by north of Lander, about 19 miles east-southeast of Riverton, on bare hill at head of side valley running into Conant Creek from west. To reach from junction of East Main Street and U. S. Highway 320 in Riverton, follow road southerly towards Lander 1.1 miles to Y just beyond Wind River steel bridge; bear left

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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off pavement onto Sandraw road and go 1.3 miles; turn left (east) onto T-road passing between two stone cairns on fence line and go 0.5 mile to Y at fence corner on left; bear right and go 3.4 miles to Y; bear left onto Muskrat road and go 3.4 miles to bridge in wash; cross bridge and continue on main-traveled road 4.3 miles to Y; bear left with main-traveled road and go 0.5 mile, or 0.1 mile beyond plank corduroy in wash; bear right onto old and well-traveled road which winds in general direction along west side of drainage of Muskrat and Conant Creeks 4.7 miles to Y; bear left and go 3.9 miles to reversed Y at wire gate in fence, from which Lon Poston's ranch buildings are plainly visible, distant 0.3 mile. Turn sharply back to right and follow dim road up draw 1.4 miles to Y; bear left and drive up hill 0.4 mile to top and station site. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference marks are standard disks in concrete, note 11a. No. 1 is 13.380 meters (43.90 feet) southwest from station in azimuth 32°18′; no. 2 is 11.521 meters (37.80 feet) northwest in azimuth 126°10′. *Conant azimuth mark* (see geographic position and description thereof) is marked by a standard disk in outcropping bedrock, and is 2 miles east of station in azimuth 297°34′00″.

Plane coordinates: (III), x=686,919.60 feet; y=813,720.33 feet; grid azimuth to *Conant azimuth mark*=297°05′31.2″.

Conant azimuth mark (Fremont County, J. Bowie, Jr., 1936).—About 21½ miles east-southeast of Riverton, 1½ miles south by east of Poston's ranch, ¼ mile east of Conant Creek, on second point of bluff east of creek, 0.4 mile west of highest point of bluff, at south edge of crest of bluff, 10 feet east of stone cairn, and in range with Poston's ranch and east end of highest ridge on horizon to south. To reach from Riverton, follow route given in description of station *Conant* (p. 162) until wire gate 0.3 mile from Poston's ranch is reached; pass through gate, go 0.3 mile, turn right along east side of open reservoir at ranch, and go south on road up valley 0.4 mile; pass through gate and go 0.6 mile; pass through gate, go 50 yards, bear left on dim road and go 0.5 mile; turn left through gate in creek fence, cross creek, bear left and go northeast across country 0.3 mile to where gully breaks through bluff, and end of truck travel. Go about 50 yards to top of bluff, thence along crest about 50 yards to station. Mark is standard disk in outcropping bedrock, note 12a. Station *Conant* (see geographic position and description thereof) is about 2 miles distant in azimuth 117°35′36″. Azimuth to westerly of three surface tanks at Poston's ranch, distant about 1½ miles, is 176°26′13″.

Plane coordinates: (III), x=697,442.51 feet; y=808,337.34 feet.

Greek (Fremont County, J. Bowie, Jr., 1936).—About 21 miles east and 4 miles south of Lander, about 2 miles east of Beaver Creek, on extreme western projection of local ridge between two broad east-west draws about 2 miles apart, on highest knoll in vicinity, and about 12 feet south of trail which goes down into valley to west. To reach from junction of U. S. Highways 287 and 320 in Riverton, follow Highway 287 south 1.1 miles, or 0.1 mile beyond Wind River steel bridge; turn left (south) onto gravel road leading to stations *Rawlins* and *Sandraw* and at 9.1 miles reach Y; take right fork and at 21.6 miles reach Y; left fork of Y leads to Sandraw, visible to east; take right fork, reach dim crossroads at 23.3 miles, turn right and go west; at 23.5 miles and road intersection, turn right and follow main-traveled road north, keeping right fork at 23.5 miles; at 24.0 miles and station *Rawlins*, turn left and go southwesterly across country or along dim track road to south side of two small water holes reached at 24.3 miles; continue southwesterly along old track road to rim of mesa; at 25.0 miles reach junction with track road running along rim of mesa, turn right and go northwest along rim; at 27.4 miles road forks; take left fork and go south-southwesterly over and down rim to broad east-west valley; continue south across valley along road visible going up ridge to south, and at 27.9 miles reach road forks. Right fork leads west 0.9 mile to knoll visible to west in middle of valley and azimuth mark. Take left fork and go south across valley; at 28.7 miles cross main wash and continue south up ridge on south side of valley; at 30.0 miles reach road forks on top of ridge; turn right and go west about 75 yards to highest point and station. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference mark no. 1 is standard disk in outcropping bedrock, note 12a, in top of rock ledge in small draw, and 28.050 meters (92.03 feet) south of station in azimuth 358°21′. Reference mark no. 2 and azimuth mark are standard disks in concrete, note 11a. No. 2 is 13.505 meters (44.31 feet) west of station in azimuth 83°07′. *Greek azimuth mark* is on

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top of small lone knoll in middle of broad valley (see above), about 25 feet north of northeast corner of concrete dug-out house on top of knoll, and about 1¼ miles north of station in azimuth 166°35′02″.

Plane coordinates: (III), x=626,743.72 feet; y=753,610.71 feet; grid azimuth to *Greek azimuth mark*=166°15′50.4″.

Beaver (Fremont County, J. Bowie, Jr., 1936).—About 17 miles air line east-southeast of Lander, near north end of north-south ridge in badlands between headwaters of east branch of Popo Agie River and Beaver River. To reach from junction of U. S. Highway 287 and State Highway 287 at east end of Lander, go northeast on U. S. Highway 287; at 6.5 miles turn right off highway onto dirt road which soon joins side hill road; turn right (south) onto sidehill road, and at 7.3 miles take right fork and follow main-traveled road; at 8.0 miles, T-road, turn left (east); at 9.2 miles, T-road south at west brow of hill, turn right (south) and follow road along east side of fence line; at 10.1 miles take left fork and go southeast; at 10.4 miles take left fork; at 12.5 miles take left fork about 100 feet south of wash and follow winding road; at 18.0 miles, cross road, turn right; at 18.8 miles, dim intersection, keep straight ahead on right fork; at 18.9 miles, intersection, keep straight ahead; at 19.1 miles, dim road enters brighter road, turn right onto brighter road; at 19.9 miles, Y, take right fork; at 21.3 miles, Y, take left fork; at 21.4 miles, intersection, turn left; at 21.7 miles, cross road and Y, turn right (south) and follow road south along top of ridge; at 22.7 miles, azimuth mark is to right of road; at 23.6 miles, reach station, 65 yards to right (west) of road, about 25 yards east of west brow of ridge, and about 150 yards east of south end of ditch eroded in valley to west. Station is on highest point in vicinity, overlooks valley of Beaver River; station ridge continues to climb to south. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. Station and reference marks project about 8 inches above ground. No. 1 is 11.278 meters (37.00 feet) west of station in azimuth 84°22′; no. 2 is 11.512 meters (37.77 feet) north in azimuth 178°39′. Distance between reference marks is 16.705 meters (54.81 feet). Azimuth mark is on knoll covered with short growth of Russian thistle, on highest point in vicinity, about 9 yards west of dim road (see route to station, above), and about 3 yards east of brow of knoll at head of draw to west and approximately 0.9 mile northeast of station in azimuth 206°46′23″.

Plane coordinates: (III), x=573,704.76 feet; y=759,027.69 feet; grid azimuth to azimuth mark=206°35′13.″[8]

Uncle (Fremont County, J. Bowie, Jr., 1936).—About 14 miles east of Lander, about 10 miles southeast of Hudson, on low divide on north side of headwaters of Beaver Creek, on upper (south) end of sage slopes that extend southeast from vicinity of Hudson. To reach from Hudson: go east on graded dirt road 0.7 mile from Hudson Bar, passing to left of old lumber yards; turn right just after passing small blue house and go south up lane, passing to right of shearing plant, 0.8 mile; take left fork and go southeast on old rut road 5.1 miles; at top of grade and small dry pond on right, bear right and go south along top of divide on old weeded-over rut road 4.2 miles; turn left and go east about 50 yards to top of low hill and station. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 20.450 meters (67.09 feet) southwest of station in azimuth 44°37′. No. 2 is 14.020 meters (46.00 feet) northwest in azimuth 125°27′. Azimuth mark is on small rise, about 50 yards west of track road, and 0.2 mile southwest of station in azimuth 27°40′52″.

Plane coordinates: (III), x=580,317.81 feet; y=777,745.40 feet; grid azimuth to azimuth mark=27°28′40″.[8]

Greek azimuth mark (Fremont County, J. Bowie, Jr., 1936).—About 1¼ miles from station *Greek* (see description thereof) in azimuth 166°35′02″, and on small, lone knoll in middle of broad valley, about 25 feet north of northeast corner of concrete dugout house on top of knoll. Mark is standard disk in concrete, note 11a.

Plane coordinates: (III), x=624,893.85 feet; y=761,178.51 feet.

Mt. Arter azimuth mark (Fremont County, J. Bowie, Jr., 1936).—About 0.8 mile south southeast from station *Mt. Arter* (see description thereof) in azi-

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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muth 329°06′14″, and on southeast end of ridge running southerly and southeasterly from that station, on top of and near northeast side of prominent group of boulders. Marked by standard disk.

Plane coordinates: (III), x=438,729.47 feet; y=762,239.14 feet. (IV), x=796,810.78 feet; y=764,100.01 feet.

White (Fremont County, J. Bowie, Jr., 1936).—About 19 miles northwest of Riverton, about 8 miles east-northeast of Pavillion, on low flat-topped mesa lying on divide about 1 mile north of Five-mile or Maverick Creek, and about ½ mile south of east-west road. Main divide between Big Muddy and Maverick Creeks is about 1½ miles north of and a few feet higher than station. To reach from transformer station at end of pavement in Pavillion, go 6.2 miles on Maverick Springs road; take right fork (north) and go 1.1 miles to bridge; continue north 0.1 mile, turn right off graded road and go east on track road that crosses side wash, bear south around hills, then east in straight line over hills and along ridge, 7.4 miles to lone butte on right. From lone butte continue east on road 3.4 miles; turn right and go across country 0.6 mile to top of low flat mesa and station. Station mark is standard disk in concrete, note 1a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 10.750 meters (35.27 feet) north of station in azimuth 206°38′; no. 2 is 11.460 meters (37.60 feet) west in azimuth 109°43′. Distance between reference marks is 16.630 meters (54.56 feet). Azimuth mark on south side of road at point where one leaves road to drive across country to station, and is approximately 0.5 mile north from station in azimuth 189°59′38″.

Plane coordinates: (III), x=552,520.17 feet; y=944,623.90 feet; grid azimuth to azimuth mark=189°51′31″.[8]

Canyon (U. S. G. S.) (Hot Springs County, J. Bowie, Jr., 1936).—About 13 miles south of Thermopolis, on highest point at east end of Owl Mountain, overlooking Wind River Canyon, about 1 mile west of bottom of canyon, on longitudinal and transverse centers of low rocky ridge having a few scattered trees on summit, which lies along (parallel to) canyon rim, 103 yards north of 7-foot stone cairn established in local geological survey by graduate students of Princeton University, 40 feet west of top rim of canyon, and in top of large cubical boulder about 4 feet high. To reach from junction of main street and U. S. Highway 20 in Thermopolis, follow highway south 3.5 miles; turn right through gate on track road just after crossing bridge over railroad tracks, thence south 1.5 miles; take left fork over Red Creek Wash, go 0.2 mile, keep straight ahead at slanting cross road, go south 0.3 mile, passing to right of stockyards; go through gate and follow track road up steep grade 6.1 miles to intersection of number of dim roads at salt ground; bear about half left, and follow rough but well-traveled road south and southeast along canyon 3.5 miles to cow camp, thence south 0.3 mile and pass through gate; go southeast 0.3 mile to top of ridge (summit of Owl Mountain), thence due east along summit, across country 2.7 miles to station on edge of canyon. Station mark is unstamped U. S. Geological Survey disk set in drill hole in boulder described above. Reference mark no. 1 is standard disk in outcropping bedrock, note 12a, at rim of canyon, 12.529 meters (41.11 feet) northeast of station in azimuth 218°55′. Reference mark no. 2 is standard disk in top of large boulder, note 12d, 9.852 meters (32.32 feet) southeast of station in azimuth 308°30′. Azimuth mark is standard disk in outcropping bedrock, note 12a, 300 yards north of canyon rim, on small rocky point at northeast edge of low rim ridge lying just east of point where canyon cuts in from north, 7 yards north of highest point of rocks, and approximately 0.35 mile west of station in azimuth 89°39′36″. *Cairn near station Canyon (U. S. G. S.)* (see geographic position and description thereof) mentioned above is 94.70 meters (310.7 feet) from station in azimuth 335°19′.

Plane coordinates: (III), x=647,711.88 feet; y=1,017,882.55 feet; grid azimuth to azimuth mark=89°16′39″.[8]

Lost Well (Fremont County, J. Bowie, Jr., 1936).—About 16 miles southwest of Shoshoni, about 11 miles north-northwest of Riverton, on highest point of Lost Well Butte, high and prominent butte lying at northeast end of high mesa divide on south side of Maverick Creek and on north side of Paradise Valley. Butte is very prominent from north and east. Best reached from

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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Riverton by following main highway west towards Diversion Dam about 7 miles from highway junction to Y intersection and large sign Paradise Valley; turn right off highway and follow main-graded road north and east 8.0 miles to point where highway turns right (east) at large tar-paper house. Continue straight ahead north 0.3 mile on dirt grade to several ditch and road forks; continue straight ahead north on main road along main ditch 0.4 mile. Just after crossing wash in creek, at top of north bank, turn left off road and go west across head of large ditch siphon; then follow dim track road north 0.8 mile to south base of butte. From here pack northeast to break in middle of rim, turn right at top and go 100 feet to station. Station mark is standard disk welded to 3-foot iron pipe set in concrete. Reference marks are standard disks welded to 3-foot iron pipes set in concrete. No. 1 is 10.026 meters (32.89 feet) northeast of station in azimuth 244°47′; no. 2 is 6.890 meters (22.60 feet) southeast in azimuth 317°54′. Azimuth mark is standard disk in concrete, note 11a, about 200 feet northeast of tar-paper house, on east side of road to station, 15 feet west of telephone pole, and 1.2 miles south of station in azimuth 354°52′45″.

Plane coordinates: (III), x=587,350.32 feet; y=915,428.78 feet; grid azimuth to azimuth mark=354°39′19″.[8]

Thermopolis (Hot Springs County, J. Bowie, Jr., 1936).—About 1 mile north-northwest of Thermopolis post office, on highest point of high red butte with cliffs around top known locally as "Round Top", and 56 feet west-southwest of large rock cairn. Station overlooks southeast part of Thermopolis. To reach from Thermopolis post office, go north on first street east of post office, past west side of Fair Grounds, and up hill to cross road at south side of airport, 1.1 miles. Turn left and go west along north side of cemetery and continue around to end of road at base of butte on its southwest side, 0.6 mile. From here graded trail leads to top of butte and station. Ten-minute pack. Station marked by standard disk in rock outcrop which projects several inches. Reference marks are standard disks in rock outcrops which project several inches. No. 1 is 17.650 meters (57.91 feet) southwest from station in azimuth 44°10′, and no. 2 is 5.322 meters (17.46 feet) northwest in azimuth 151°20′. Distance between reference marks is 19.880 meters (65.22 feet). Azimuth mark is probably standard disk on northwest corner of concrete base of street light set in circular park in middle of main street of Thermopolis, about 120 feet west of C. B. & Q. Railroad track at grade crossing ½ block south of depot, and about 1½ miles southeast of station in azimuth 327°53′22″. Azimuth from station to *Thermopolis, public school, cupola* (see geographic position thereof), is 354°14′26″.

Plane coordinates: (III), x=640,439.08 feet; y=1,091,822.05 feet; grid azimuth to azimuth mark=327°31′23″.[8]

Whitney (Hot Springs County, J. Bowie, Jr., 1936).—About 14 miles west of Thermopolis, about 5 miles south of Owl Creek Highway, on prominent red butte, ½ mile northwest of Whitney ranch buildings which are at south fork of Muddy Creek. To reach station from main intersection in Thermopolis, follow Owl Creek Highway west 5.1 miles; take left fork off highway and continue west 3.3 miles, passing to left of schoolhouse; take left fork up main canyon and follow main-graded road southwest and west 2.6 miles; keep to right fork in front of house in small grove and continue west 2.6 miles; cross cattle guard, turn left and go south across creek and up hills 1.2 miles; take left fork and go east down canyon about 1 mile on main road which detours around wash-out; bear back to right up another canyon southwest 3.6 miles to Whitney ranch, first buildings from fork. From ranch, continue west on track road up canyon 0.1 mile; bear right off track road and go northwest across country to northwest corner of old field and end of truck travel. From here pack up steep slope about ¼ mile of hard climbing to top of butte and station. Station mark is standard disk in outcropping bedrock, note 2. Reference and azimuth marks are standard disks in outcropping bedrock, note 12a. No. 1 is 7.963 meters (26.13 feet) northeast of station in azimuth 223°15′; no. 2 is 10.312 meters (33.83 feet) southwest in azimuth 51°55′. Azimuth mark is on station ridge, and 0.25 mile east of station in azimuth 261°10′12″.

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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Plane coordinates: (III), x=571,123.52 feet; y=1,080,647.62 feet; grid azimuth to azimuth mark=260°59′05″.[8]

Sears (Hot Springs County, J. Bowie, Jr., 1936).—About 26 miles northwest of Shoshoni, about 18 miles southwest of Thermopolis, 6 miles northwest of Sears ranch, on summit of Owl Mountains, on second peak (second ridge) west of old stage road through Mexican Pass, on highest point in vicinity, and on top of large rock outcrop. To reach from Shoshoni, follow U. S. Highway 320 west toward Riverton; at 4.4 miles turn right (northwest) onto graded road; at 4.7 miles turn right, cross Maverick Creek, and continue north on graded road along west side of river; at 9.2 miles keep to left (west) fork; at 16.0 miles take right fork (little used grade) and go northwest and north; at 23.8 miles take right fork; at 26.9 miles, pole gate (Sears ranch is about 0.3 mile beyond this gate), turn sharply right and go east on old dim track road that bears to left around base of bare hills; at 27.3 miles take left fork north; at 27.8 miles, road turns to right into canyon, bear left (west) on old track road 0.1 mile, and take dim right fork north; at 28.9 miles pass through gate and continue on old stage road to top of Mexican Pass. Top part of this grade is very rocky. At 31.2 miles, or about 100 yards beyond top of pass, take dim left fork west; at 32.1 miles, Black Rock Springs are to right, continue west on dim road along ridge. At 35.2 miles reach top of divide between 2 small rock domes; station is about 200 yards to southwest, on top of peak. Azimuth mark is about 120 yards northwest along road, and then 120 yards north to top of ridge. Station mark is standard disk in outcropping bedrock, note 2. Reference marks are standard disks in outcropping bedrock, note 12a. No. 1 projects about 6 inches, and is 5.377 meters (17.64 feet) east of station in azimuth 252°05′; no. 2 projects about 18 inches, and is 7.560 meters (24.80 feet) northwest in azimuth 157°59′. Distance between reference marks is 9.584 meters (31.44 feet). Azimuth mark is standard disk in top of large boulder about 12 feet high, note 12c, on top of spur ridge which extends north and northwest from station, and is approximately ⅜ mile from station in azimuth 196°46′02″.

Plane coordinates: (III), x=563,841.00 feet; y=1,031,176.13 feet, grid azimuth to azimuth mark=196°36′05″.[8]

Bend (Fremont County, J. Bowie, Jr., 1936).—About 11 miles northeast of Riverton, about 6 miles southwest of Shoshoni, 1 mile west of Big Horn River, 1½ miles southeast of U. S. Highway 320, on highest and most southerly of group of low rocky buttes, and 3 feet north of south edge of butte, top of which is level and gravelly. To reach from intersection of U. S. Highways 20 and 320 in Shoshoni, follow Highway 320 west, and at 5.9 miles turn left onto old highway and go southwest; at 8.0 miles reach curve in old highway, from which station is about ¼ mile to east. Truck can be driven to south end of butte by following up draw passing southwest of station, thence northeasterly to base of butte, total distance of ½ mile. Back pack requires 5 minutes. Station mark is standard disk in boulder, note 4, projecting about 2 inches. Reference marks are standard disks in rock ledges, note 12a, which project from sloping sides of butte. No. 1 is on southeast slope, 8.228 meters (26.99 feet) southeast of station in azimuth 306°17′; no. 2 is on south slope, 11.899 meters (39.04 feet) south in azimuth 18°57′. Distance between reference marks is 12.280 meters (40.29 feet). Azimuth mark is standard disk in boulder, note 12c, which projects about 2 feet, is about 100 feet south of southerly one of two stone pillars, and is about ¼ mile southwest of station in azimuth 50°11′07″. *Shoshoni, C. & N. W. Ry., redwood water tank, finial* (see geographic position thereof) may also be used as azimuth mark.

Plane coordinates: (III), x=641,751.10 feet; y=918,400.89 feet; grid azimuth to azimuth mark=49°49′18″.[8]

Badwater (Fremont County, J. Bowie, Jr., 1936).—About 7 miles northeast of Shoshoni, about 10 miles south of Owl Creek Mountains, about 8 miles east of U. S. Highway 20, about 2½ miles north of Badwater Creek, in low country almost entirely surrounded by higher hills, about 2 miles northeast of prominent group of flat-topped hills, on low rise on southeast side of graded highway leading northeast from village of Bonneville, and about 3½ miles northeast of that village. To reach from junction of U. S. Highways 20 and 320 in Shoshoni, follow Highway 20 north 3.0 miles to underpass (railroad); continue north 0.2

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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mile to graded road to right; turn right and follow this road east along north side of Badwater Creek 2.7 miles to several forks at southeast corner of ranch yard and about ¼ mile north of roundhouse at Bonneville; keep straight ahead and follow main road east along top of ridge, passing about ¼ mile north of Bonneville, 1.2 miles to forks; take right fork east and continue on main road through low pass 2.7 miles to forks at sign "A. Auer, G. Fuller". Right fork goes east toward azimuth mark. Take left fork and go 0.7 mile to top of low grade; turn right off road and go east about 100 yards to highest point of rise and station. Station mark is standard disk in outcropping bedrock, note 2. Reference marks are standard disks in outcropping bedrock, note 12a. No. 1 is 5.807 meters (19.05 feet) southeast of station in azimuth 326°31′; and no. 2 is 8.822 meters (28.94 feet) west in azimuth 77°52′. Azimuth mark, not described, but probably standard disk in bedrock, is at rock cairn, at low point of rocks, about 0.6 mile south of station in azimuth 4°40′17″.

Plane coordinates: (III), x=697,223.65 feet; y=963,324.70 feet; grid azimuth to azimuth mark=4°09′47″.[8]

Camp (Fremont County, J. Bowie, Jr., 1936).—About 17 miles north of Riverton, about 14 miles west of Shoshoni, about 3½ miles north of Five-mile or Maverick Creek, on a low gravel ridge which overlooks all country to east and south, but is somewhat lower than main divide to northwest. To reach from main highway intersection in Shoshoni, go west on main highway towards Riverton 3.4 miles; from west end of bridge continue on 0.9 mile; turn right off highway and follow graded dirt road west 0.3 mile; cross Five-mile or Maverick Creek bridge, turn left and go west on track road along ridge 2.3 miles; turn right at small triangle trench and go west again down small canyon and follow main old road, weeded over but passable, 2.1 miles; pass water tank and pump and continue west 3.3 miles; keep straight ahead at old crossroads and go west 1.5 miles to trench at right; turn right and go north across country, passing to left of mushroom rocks and up flat valley 1.9 miles to end of truck travel at base of hill and old sheep camp site. Truck can be driven to top of hill by selecting route first; hard pull of about 100 feet. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference marks are standard disks in concrete, note 11a. No. 1 is 14.658 meters (48.09 feet) east of station in azimuth 271°17′; no. 2 is 12.650 meters (41.50 feet) west in azimuth 118°17′. Azimuth mark is standard disk in sandstone, note 12a, near very large mushroom-shaped sandstone rock, 0.25 mile south from station in azimuth 0°34′02″.

Plane coordinates: (III), x=599,879.96 feet; y=940,021.44 feet; grid azimuth to azimuth mark=0°18′38″.[8]

Burgess (Fremont County, J. Bowie, Jr., 1936).—About 16 miles northwest of Shoshoni, about 8 miles west of south end of Wind River Canyon, about 3 miles south of base of Owl Range and about 1 mile south of prominent low hill on that base, about 3 miles north of Little Muddy Creek, on low divide on old road that passes along barren country about 2 miles west of Burgess ranch, and on property belonging to that ranch. To reach from main highway intersection in Shoshoni, go west on highway 4.4 miles; turn right off highway and go west on graded road 0.3 mile; cross bridge over Maverick Creek and continue north on main graded road 4.5 miles to fork and sign "Burgess ranch 10½ miles"; keep straight ahead (north) on right fork toward Burgess ranch 4.1 miles; cross Little Muddy wash and continue north 0.4 mile; take left fork, dim and weeded over, just after passing through narrow cut and just before crossing small wooden culvert, and follow this track road, which is very dim in places, northwest across barren flats 3.9 miles to fork. Right fork goes northeast to Burgess ranch, visible and about 2 miles distant. Keep to left fork and go northwest 2.1 miles to low barren divide, and station about 33 paces west of road. Station mark is standard disk in boulder, note 4. Reference and azimuth marks are standard disks in boulders, note 12c. No. 1 is 16.300 meters (53.48 feet) northeast of station in azimuth 204°48′; no. 2 is 18.684 meters (61.30 feet) east in azimuth 285°19′. Azimuth mark is on same ridge as station, and 0.25 mile south therefrom in azimuth 353°56′02″.

Plane coordinates: (III), x=613,558.58 feet; y=993,379.85 feet; grid azimuth to azimuth mark=353°38′26″.[8]

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

Big Horn (Fremont County, J. Bowie, Jr., 1936).—About 5 miles northwest of Shoshoni, about 2 miles west of U. S. Highway 20, in rough triangle with Big Horn River about 1 mile west, Badwater Creek about 1 mile south, and C. B. & Q. R. R. about ¼ mile east. On north end of group of low gravel hills, and about 60 yards south of north end of gravel ridge. To reach from intersection of U. S. Highways 20 and 320 in Shoshoni, follow Highway 20 north 3.0 miles to underpass (railroad); at 3.7 miles and south side of low divide, first north of underpass, turn left (west) onto dim track road; at 4.1 miles, take left fork, west; at 5.3 miles cross railroad tracks, passing through two gates (azimuth mark at west gate), and follow main track road northwest; at 6.1 miles reach northwest point of hills, turn left and go southeast to top of ridge 0.2 mile to station. Station mark is standard disk in boulder, note 4, flush with ground. Reference marks are standard disks in boulders, note 12c, projecting about 6 inches. No. 1 is 7.170 meters (23.52 feet) southeast from station in azimuth 309°00′. No. 2 is 10.546 meters (34.60 feet) southwest in azimuth 44°11′. Distance between reference marks is 13.274 meters (43.55 feet). Azimuth mark is standard disk in concrete, note 11a, at grade crossing over railroad tracks, 103 feet west of track, 7 feet north of north gate post (see above), 3 feet west of fence line, and approximately ¾ mile southeast of station in azimuth 305°27′39″. *Shoshoni, C. & N. W. Ry., redwood water tank finial* (see geographic position thereof) may also be used as azimuth mark.

Plane coordinates: (III), x=654,659.09 feet; y=960,448.07 feet; grid azimuth to azimuth mark=305°03′45″.[8]

Lucerne (Hot Springs County, J. Bowie, Jr., 1936).—About 7 miles north and 2 miles east of Thermopolis, 1¼ miles north of Lucerne post office, at half section lane road going west from U. S. Highway 20, and in northeast quarter sec. 30, T. 44 N., R. 94 W., 35 feet west of highway, 35 feet north of lane road, 25 feet north of wire gate in fence corner, 12 feet southeast of angling ditch, and 4 feet west of fence. To reach from Thermopolis go east, then northerly on U. S. Highway 20 (oiled road) 7.3 miles to Lucerne; continue north on highway 1.2 miles to station on left. Station mark is standard disk in concrete, note 1a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 28.910 meters (94.85 feet) southeast of station in azimuth 299°57′; no. 2 is 10.594 meters (34.76 feet) southwest in azimuth 38°51′. Azimuth mark is about 40 feet east of center line of U. S. Highway 20, and 0.2 mile south of station in azimuth 356°29′36″.

Plane coordinates: (II), x=277,447.43 feet; y=1,125,889.41 feet; grid azimuth to azimuth mark=357°04′34″.[8] (III), x=651,764.13 feet; y=1,125,284.14 feet; grid azimuth to azimuth mark=356°05′46″.[8]

Gumbo (Hot Springs County, J. Bowie, Jr., 1936).—About 10 miles northeast of Thermopolis, about 5 miles east of Lucerne store and post office, on low gumbo hills lying about 1 mile north of Kirby Creek and road, and about midway between creek and high bluffs to north. To reach from main intersection in Thermopolis: go north on highway 7.6 miles to Lucerne store and post office; turn right and follow main graded road east 0.3 mile; cross railroad tracks and continue east on main graded road 0.7 mile; cross Big Horn River bridge and continue east on main graded road 1.3 miles; bear left at T-intersection and follow main graded road north and east along north side of Kirby Creek 3.6 miles; turn left off grade about 30 yards west of small culvert, go back to northwest up steep slope, cross country to top of ridge, bear right and go north along top of ridge 0.6 mile to highest point and station. Station mark is standard disk in concrete, note 1a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 8.820 meters (28.94 feet) west of station in azimuth 84°36′; no. 2 is 8.620 meters (28.28 feet) north in azimuth 169°54′. Azimuth mark is on station ridge, near its south end, and 0.4 mile south of station in azimuth 339°17′38″.

Plane coordinates: (II), x=302,638.08 feet; y=1,123,670.40 feet; grid azimuth to azimuth mark=339°48′37″.[8] (III), x=676,988.54 feet; y=1,123,496.22 feet; grid azimuth to azimuth mark=338°49′51″.[8]

Buffalo (Hot Springs County, J. Bowie, Jr., 1936).—About 13 miles southeast of Thermopolis, on bare grassy slopes about 3.5 miles south of Buffalo Creek,

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

on first hill having trees on top. There are several hills south and west that are much higher and have timber-covered tops. To reach from Thermopolis follow U. S. Highway 20 south from main street 4.0 miles, cross bridge and go 0.1 mile; turn left off highway and follow graded road east up Buffalo Creek 4.6 miles to fork. Right fork leads to station *Copper*. Take left fork and go east 2.2 miles keeping to main-traveled road. Road to right at ranch house leads to *Copper azimuth mark*. Continue east on main-traveled road 3.2 miles. Left fork through gate marked "No trespassing" leads to Kirby. Take right fork through gate or cattle guard and continue east up canyon 1.5 miles to fork to right. Stone house ruins and hay yards are about ¼ mile to north from this point. Take right fork and go up steep slope south on rough and crooked road 3.5 miles to point about 100 yards south of crest of divide. There is flag on hill about ¼ mile east of this fork. Turn back to right and go west on old road, little better than trail, 0.6 mile; cross small rocky wash and trail plays out; bear left to top of ridge and go west at about same elevation 0.7 mile to low hill with scattered trees and station. Station mark is standard disk in outcropping bedrock, note 2. Reference and azimuth marks are standard disks in outcropping bedrock, note 12a. No. 1 is 10.977 meters (36.01 feet) southeast of station in azimuth 309°21′; no. 2 is 10.390 meters (34.09 feet) southwest in azimuth 28°44′. Azimuth mark is on north side of trail to station, and about 0.35 mile northeast in azimuth 244°39′00″.

Plane coordinates: (III), x=701,293.11 feet; y=1,052,336.83 feet; grid azimuth to azimuth mark=244°07′37″.[8]

Red (Hot Springs County, J. Bowie, Jr., 1936).—About 9 miles air line south-southwest from Thermopolis, about 5 miles west of Wind River Canyon, on highest point of high bare ridge lying between Red Canyon and crest of Owl Mountains. Station site is visible from Thermopolis as black-capped hill on skyline. To reach from Thermopolis, follow U. S. Highway 20 south 3.5 miles to gate to right with sign "No Hunting or Trespassing", about 0.1 mile beyond railroad overpass, turn right through this gate and follow track road winding south along Big Horn River 1.5 miles to forks just west of railroad bridge; take left fork across Red Canyon Wash and continue south 0.15 mile to fork; take right fork straight ahead and go 0.35 mile to second gate; pass through gate and follow track road up steep bare slope 4.9 miles to point on ridge where road starts down south slope; turn right off track road and go west across country, following ridge about 2 miles to highest point and station. Trucks can be driven to station in dry weather. Station mark is standard disk in boulder, note 4. Reference and azimuth marks are standard disks in boulders, note 12c. No. 1 is 9.752 meters (31.99 feet) southeast of station in azimuth 329°47′; no. 2 is 6.274 meters (20.58 feet) west in azimuth 105°06′. Azimuth mark is on same ridge as station, on low point which is slightly lower than station, and approximately ¼ mile south of station in azimuth 344°33′54″.

Plane coordinates: (III), x=623,313.65 feet; y=1,046,778.57 feet; grid azimuth to azimuth mark=344°14′41″.[8]

Club (Hot Springs County, J. Bowie, Jr., 1936).—Five miles south of Thermopolis post office, along U. S. Highway 20, at entrance to Thermopolis Country Club, 70 feet southeast of center line of highway, 46 feet east of center of road leading to Country Club, in southwest corner of pasture, 5 feet east and 4 feet north of fence corner. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference mark no. 1 is standard disk in concrete, note 11a, 1 foot south of fence line south of highway, and 16.714 meters (54.84 feet) north of station in azimuth 197°19′. Reference mark no. 2 is probably standard disk in north end of west concrete headwall of pipe culvert under road leading to Country Club, and 18.513 meters (60.74 feet) west of station in azimuth 93°43′. Distance between reference marks is 27.706 meters (90.90 feet). Azimuth mark is standard disk in concrete, note 11a, about 100 yards southwest of summit of slight ridge, about 40 feet southeast of center line of highway, 7 feet southeast of fence line, and approximately 0.3 mile northeast of station in azimuth 227°39′38″. *Thermopolis, public school, cupola* (see geographic position thereof) may be used as azimuth mark.

Plane coordinates: (III), x=644,446.17 feet; y=1,066,749.34 feet; grid azimuth to azimuth mark=227°17′05″.[8]

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

Sage (Hot Springs County, J. Bowie, Jr., 1936).—About 5½ miles west-southwest of Thermopolis, 1 mile west of Red Canyon road, 2 miles south of Owl Creek road, about 1½ miles northeast of high flat-topped mesa (highest point in vicinity), and on highest point of sagebrush-covered mesa which bluffs to south and slopes to north. Station is about ¼ mile west of east edge of mesa. To reach from Thermopolis post office go south 1 block, thence west on Owl Creek road; at 2.8 miles turn left (south) onto Red Canyon road, not graded; at 3.2 miles take right fork, main canyon road; at 3.9 miles take right fork, leave main-traveled road and go west; at 4.8 miles bear left at second group of buildings and go southwest on dim track road up slope to top of divide; at 5.5 miles take left fork and go south and west along top of ridge 1.0 mile to station. Station mark is standard disk in boulder, note 4. Reference marks are standard disks in boulders, note 12c. Boulders are small and project several inches. No. 1 is 8.315 meters (27.28 feet) north of station in azimuth 171°34′; no. 2 is 10.417 meters (34.18 feet) west in azimuth 89°36′. Distance between reference marks is 12.389 meters (40.65 feet). Azimuth mark is standard disk in outcropping bedrock, note 12a, on top of first knoll south of saddle in north-south ridge, east of dim track road, and about 0.3 mile northeast of station in azimuth 217°42′47″. *Thermopolis, public school, cupola* (see geographic position thereof) may also be used as azimuth mark.

Plane cordinates: (III), x=616,820.49 feet; y=1,083,838.37 feet; grid azimuth to azimuth mark=217°24′30″.[8]

Coal (Hot Springs County, J. Bowie, Jr., 1936).—About 12 miles northwest of Thermopolis, on southeast end of barren ridge lying 4½ miles (air line) north of Thermopolis-Anchor oiled highway, 4 miles (air line) southeast of Waugh Dome Oil Field, 150 yards southwest of highest road summit on graded road leading north from oiled highway to oil field mentioned above, and on divide between Coal Draw to north and another draw to south. Ridge slopes off to west, then up to higher peak about ¾ mile to northwest on which is cairn; ridge drops off steeply to south of station. To reach from Thermopolis, main intersection: follow Anchor graded highway west 5.4 miles to steel truss bridge over Owl Creek; continue west on oiled highway 2.5 miles to graded road to right at old tin mail box marked "Crom Miller." Turn right onto this road and follow it northwesterly towards Waugh Dome Oil Field 5.2 miles to road summit at crest of ridge; turn left off road and go west about 150 yards up steep slope to highest point and station. Station mark is standard disk in boulder, note 4. Reference marks are standard disks in boulders, note 12c. No. 1 is 19.462 meters (63.85 feet) northeast of station in azimuth 220°21′, and no. 2 is 12.278 meters (40.28 feet) northwest in azimuth 148°15′. Azimuth mark is probably standard disk set in top of huge sandstone outcrop projecting about 15 feet above ground, about 150 yards north of large wash, about 50 yards southwest of graded highway leading to station, about 20 yards west of east end of long line of rock outcrops, and approximately 1¼ miles south from station in azimuth 2°00′47″. Other distances and azimuths from station are as follows: Waugh Dome Oil Field, most easterly storage tank, center, approximately 4 miles, 146°09′43″; white farmhouse, north corner, approximately 4 miles, 343°14′03″.

Plane coordinates: (II), x=220,329.22 feet; y=1,127,579.67 feet; grid azimuth to azimuth mark=2°44′43″.[8] (III), x=594,628.50 feet; y=1,125,997.38 feet; grid azimuth to azimuth mark=1°45′55″.[8]

Copper azimuth mark (Fremont County, J. Bowie, Jr., 1936).—About 17 miles southeast by south of Thermopolis, about 9 miles east of Wind River Canyon, on easterly ridge of Copper Mountain Range lying along east side of Jones Creek Basin, on second and highest ridge across basin to east from main ridge of Copper Mountains, on highest rocky point of ridge, about 1 mile east of Jones Creek cow camp, and on summit of high point of rocks just above south end of drift fence along crest of ridge. To reach from Thermopolis, follow U. S. Highway 20 south from main street 4.1 miles or 0.1 mile beyond large steel bridge; bear left (east) on graded dirt road, and go 6.8 miles; turn right around fence corner off graded road, just after passing through cattle guard, and go south towards ranch house 100 yards; take right fork through fence, cross Buffalo Creek and follow track road up steep slope 3.7 miles; keep to left fork (south) into Jones Creek valley, and continue south up Jones Creek 3.4 miles to two-story house on left; continue south on dim road 0.7 mile to

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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crossroads at east side of Jones Creek crossing, thence south up Jones Creek 3.0 miles to Jones Creek cow camp; turn left across creek just after passing house, go diagonally across pasture to gate, pass through gate and bear left to top of ridge, thence east across meadow to gate—total distance of 0.5 mile from cow camp. Pass through gate and go east along small irrigation ditch 0.2 mile; turn right and go south up canyon about 1 mile to summit of ridge; turn left and follow old road easterly along summit about 0.5 mile to end of truck travel at south end of drift fence at base of rocky point. Go south through gap to right of rocky point 200 yards to open grassy space among rocks, turn left at point where rock wall is broken down, and climb east through rocks about 50 yards to summit and station. Station marked by standard disk in outcropping bedrock, note 12a. Station *Copper* (see description and geographic position thereof) is about 2 miles west of station in azimuth 83°05′37″.

Plane coordinates: (III), x=705,262.26 feet; y=1,015,891.79 feet; grid azimuth to *Copper*=82°33′41″.6.

Joker (Fremont County, J. Bowie, Jr., 1936).—About 16¼ miles southeast of east of Thermopolis, about 8 miles east of Wind River Canyon, on summit of cross ridge jutting west from main north-south ridge along east side of Jones Creek Basin, about 1 mile west along drift fence from summit of north-south ridge, about 1 mile south of Jones Creek cow camp, ⅜ mile west along fence from point where fence makes decided "V", ¼ mile east of higher rocky summit which lies directly east of Jones Creek pass, on second prominent summit west of main north-south ridge, on high point of local summit, and 35 feet south of drift fence. To reach from Thermopolis, follow U. S. Highway 20 south 4.1 miles from main street, or 0.1 mile beyond large steel bridge; bear left (east) on graded dirt road and go 6.8 miles; turn right around fence corner, off graded road, just after passing cattle guard, and go south towards ranch house 100 yards; take right fork through fence, cross Buffalo Creek, and follow track road up slope 3.7 miles; keep to left fork into Jones Creek valley, continue south up Jones Creek 3.4 miles to two-story house on left; go south on dim road 0.7 mile to crossroads at east side of Jones Creek crossing, thence south along Jones Creek 3.0 miles to Jones Creek cow camp, and continue south along creek 0.2 mile to gate. Pass through gate and go south 0.3 mile to corrals on left; bear right and follow old wagon road and trail south along east side of main wash, heading for summit to left of higher point on east side of main pass south from Jones Creek Basin, approximately 0.6 mile to drift fence and station. Station mark is standard disk in outcropping bedrock, note 2. Reference marks are standard disks in outcropping bedrock, note 12a. No. 1 is along ridge line, 20 feet south of drift fence, and 14.390 meters (47.21 feet) west of station in azimuth 106°14′. No. 2 is 20 feet north of drift fence, in top of south edge slanting rock outcrop, and 17.519 meters (57.48 feet) northwest of station in azimuth 156°29′. *Copper azimuth mark* (see description and geographic position thereof) is about 1.5 miles east by north from station in azimuth 244°36′46″.

Plane coordinates: (III), x=697,908.89 feet; y=1,012,321.11 feet; grid azimuth to *Copper azimuth mark*=244°05′58″.3.

Antelope (Fremont County, J. Bowie, Jr., 1936).—About 23 miles west northwest of Shoshoni, about 23 miles air line north northwest of Riverton, about 13 miles south of Owl Creek Mountains, about 10 miles northeast of Pavillion, about 10 miles southeast of Merriam ranch, 110 paces south of graded road that leads from Shoshoni to Merriam ranch, 3 paces south of old track road that is no longer used, and in open prairie which has no trees or brush. To reach from junction of U. S. Highways 20 and 320 in Shoshoni, follow Highway 320 west 4.4 miles to road to right; turn right (west) onto this road and go 0.3 mile to intersection with north-south graded road at wooden bridge over Big Dry or Maverick Creek; turn right across creek and follow main graded road north 4.5 miles to fork; take left fork and follow graded road west 6.8 miles to forks; take left fork and follow main graded road west 5.5 miles to forks; keep to left fork and continue west on main graded road 5.8 miles to low rise on south side of road and station. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 10.619 meters (34.84 feet) southeast of station in azimuth 329°24′; no. 2 is 11.762 meters (38.59 feet) southwest in azimuth 69°36′. Azimuth mark is on road from Shoshoni to

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station, on west end of low mesa, about 75 yards north of old graded road, and approximately 0.7 mile east of station in azimuth 293°24′47″.

Plane coordinates: (III), x=556,107.14 feet; y=975,623.28 feet; grid azimuth to azimuth mark=293°16′06″.[8]

Merriam (Fremont County, J. Bowie, Jr., 1936).—About 20 miles north-northeast of Diversion Dam, 17 miles north-northwest of Pavillion, on highest one of range of prominent barren hills lying about 5 miles northwest of Merriam Ranch, 3 miles northwest of Shotgun Butte, 1 mile north of Big Muddy Creek, on summit at head (west end) of deepest and most prominent one of numerous canyons cutting into range from east, in top of flat rock ledge on longitudinal center of summit, and 50 feet north of rocky point at south end of summit. To reach station from junction of U. S. Highways 320 and 287 in Riverton: follow Highway 287 west 17.7 miles; turn right (north) onto Pavillion road, go 6.7 miles to end of pavement at Pavillion, thence north on Maverick Springs road 6.2 miles; take right fork and go 8.0 miles (or 0.7 mile beyond Merriam Ranch); take left fork northwest up Big Muddy Creek 4.0 miles (or 0.5 mile beyond small schoolhouse); turn left onto dim road just before reaching small wooden bridge, and go west on this old road 1.6 miles (or 0.2 mile beyond frail pole bridge); turn right off road and go north across country and up small valley 0.2 mile to end of truck travel. Azimuth mark is at this point, and station is about ½ mile (airline) north-northwest. Go north along east side of wash down center of valley and cross around head of wash, thence west up shoulder of ridge, along south side of deepest and most prominent canyon about ½ mile to summit and station. About ¾ mile; 20 minutes easy packing. Station mark is standard disk in outcropping bedrock, note 2. Reference mark no. 1 is standard disk in outcropping bedrock, note 12a, on rocky backbone of summit, and 5.010 meters (16.44 feet) north of station in azimuth 196°17′. Reference mark no. 2 is standard disk in boulder, note 12d, on crest of ridge, in top of boulder at north side of small point of rocks, and 8.956 meters (29.38 feet) south of station in azimuth 15°51′. Azimuth mark is standard disk in outcropping bedrock, note 12a, at end of truck travel on route to station (see above), on low rocky ridge which lies along east side of deep wash and splits small valley which extends from road back into hills, in top of ledge at west edge of ridge, 50 yards north of its south end, and approximately 0.5 mile south from station in azimuth 347°39′51″.

Plane coordinates: (III), x=493,862.33 feet; y=1,024,383.21 feet; grid azimuth to azimuth mark=347°40′48″.[8]

Sheep (Fremont County, J. Bowie, Jr., 1936).—About 28 miles northwest of Shoshoni, about 14 miles east-northeast of Pavillion, about 4 miles east of Merriam ranch, about 1 mile east of Sheep Creek, about 1 mile south of range of prominent red rocky hills, and on low bare hill. There are similar hills about 1 mile to south, but they are not as high as station hill. To reach from intersection of U. S. Highways 20 and 320 in Shoshoni, follow Highway 320 west 4.4 miles to road to right (west); turn right onto this road and go west 0.3 mile to intersection with graded road at wooden bridge over Big Dry or Maverick Creek; turn to right across creek and follow main graded road north 4.5 miles to forks; take left fork and go west on graded road 6.8 miles to forks; take left fork and go west on graded road 5.5 miles to forks; keep to left fork and continue on main graded road 11.0 miles to forks at John A. Winnegar's mail box. Keep straight ahead and go north 1.8 miles to forks at F. C. Meter's mail box; take right fork (left fork goes west to Merriam ranch) and go north on graded road 1.5 miles to curve to left and azimuth mark on right. Turn right off road here, and go across country 0.7 mile to top of ridge; turn right and go south along crest about 0.1 mile to highest point and station. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 7.895 meters (25.90 feet) east of station in azimuth 282°49′; and no. 2 is 4.721 meters (15.49 feet) south in azimuth 359°16′. Azimuth mark is 1.5 miles north of F. C. Meter's mail box (see above), between graded road to west and track road to east, 12 paces east of center line of graded road, 10 paces southeast of point of intersection of

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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curve in graded road, and approximately 0.7 mile west of station in azimuth 88°09′16″.

Plane coordinates: (III), x=537,269.66 feet; y=1,008,683.06 feet; grid azimuth to azimuth mark=88°03′29″.[8]

Ants (Fremont County, J. Bowie, Jr., 1936).—About 12 miles northeast of Diversion Dam, about 9 miles northwest of Pavillion, about 2 miles south of Barquin Coal Mine, and on bare gravel hill lying about ¼ mile south of Pavillion-Maverick Springs road. To reach from end of pavement at transformer station in Pavillion, go north on Maverick Springs road 6.2 miles to where new grade turns right; keep to right fork, straight ahead, and go 2.3 miles to Barquin Mine mail box and road fork; take left fork and go northwest 0.3 mile to north base of hill; turn left off graded road and go southwest around base of hill to southwest side; turn back to left and go up steep gravel slope to top, distance 0.4 mile from road. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 7.287 meters (23.91 feet) southeast from station in azimuth 331°30′; no. 2 is 8.930 meters (29.30 feet) southwest in azimuth 44°50′. Azimuth mark is at road forks, 0.4 mile east of station in azimuth 270°29′39″.

Plane coordinates: (III), x=491,082.14 feet; y=976,474.69 feet; grid azimuth to azimuth mark=270°31′02″.[8]

Nome (Fremont County, J. Bowie, Jr., 1936).—About 10 miles north and 9 miles west of Pavillion, on rough bare rocky ridge running east-southeast and west-northwest, first high ridge 1 mile southwest of Maverick Springs Creek, 100 yards west of road from Pavillion. To reach from end of pavement at transformer station in Pavillion, go north on Maverick Springs road 6.2 miles to point where new grade turns right. Keep to right fork straight ahead (northwest) and go 2.3 miles to Barquin Mine mail box and fork; take left fork and go northwest 0.3 mile to north base of hill; continue northwesterly ¼ mile to crossroads sign "Barquin coal mine 2 Mi."; road straight ahead (northwesterly) is old graded road and is Maverick Springs road; follow this main-traveled road 6.0 miles from crossroads to road summit with low white cliffs to west, and station at cairn visible 200 yards to west, on highest point in vicinity. Station mark is standard disk in outcropping bedrock, note 2. Reference and azimuth marks are standard disks in outcropping bedrock, note 12a. No. 1 is 8.015 meters (26.30 feet) east of station in azimuth 283°00′; no. 2 is 5.450 meters (17.88 feet) south in azimuth 8°52′. Azimuth mark is on large sandstone rock which stands about 6 feet higher than surrounding ground, and is approximately 0.3 mile east of station in azimuth 251°03′47″.

Plane coordinates: (III), x=465,296.44 feet; y=993,826.59 feet; grid azimuth to azimuth mark=251°09′10″.[8]

Crowheart (U. S. G. S.) (Fremont County, J. Bowie, Jr., 1936).—On summit of Crowheart Butte, prominent barren sandstone butte, 23 miles northwest of Fort Washakie, 2 miles southeast of Lenore post office, 1½ miles northeast of Wind River, and ¾ mile northeast of Morton-Lenore graded road. To reach from Fort Washakie, follow State Highway 287 north 15.5 miles to U. S. Highway 287 on southwest side of Diversion Dam; turn right onto Highway 287 and go north across dam 1.0 mile to graded road to left about 100 yards beyond north end of bridge. Turn left off highway and follow road along canal 0.2 mile to red truss bridge over canal; turn left over this bridge and go 0.3 mile to forks; keep to left on main road up hill 0.1 mile to forks; take right fork and follow graded road over hill 1.2 miles to T-intersection with another graded road; turn left and follow graded road northwesterly 8.7 miles to mail box on right marked "E. W. Brubaker". Continue on graded road 1.9 miles along southwest foot of Crowheart Butte to road summit, and on 0.3 mile to track road to right. Leave graded road and follow track road east up and over mesa 1.1 miles; turn right and drive southeast across country 0.6 mile, keeping on northeast side of deep gully, to end of truck travel in deep canyon. From here climb steep slope to top of butte and

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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station, about ½-hour pack. Station mark is U. S. Geological Survey disk. Reference and azimuth marks are standard disks in outcropping bedrock, note 12a. No. 1 is 52.792 meters (173.20 feet) southeast of station, in azimuth 308°08′; and no. 2 is 24.218 meters (79.46 feet) southwest in azimuth 43°52′. Azimuth mark is about 50 yards east of end of truck travel (see above) in deep valley on northwest side of hill, on south side of steep slope, about 25 yards north of gully at bottom of valley, about 15 feet north of peculiar-looking round rock pedestal set on top of sandstone column about 7 feet high, and in top of sandstone outcrop. It is about ½ mile northwest from station in azimuth 144°49′11″. Azimuth and reference marks are in soft sandstone and will probably not last more than five years.

Plane coordinates: (III), x=408,116.73 feet; y=963,438.19 feet; grid azimuth to azimuth mark=145°03′23″.[8]

Lawrence (Fremont County, J. Bowie, Jr., 1936).—About 17½ miles west-northwest from Fort Washakie, about 3½ miles in magnetic azimuth 306° from St. Lawrence ranger station, on apex of high bare and tilted ridge which slopes up from northeast and lies between St. Lawrence Creek and North Fork of Sage Creek, at southwest end of crest, and about 15 feet southwest of slightly higher point of crumbling rock. To reach from Fort Washakie, follow State Highway 287 north 7.0 miles; bear left onto graded road at bottom of broad valley, and go northwest and west on main graded road 5.5 miles; take left fork at foot of grade just beyond pass and continue southwest on main-traveled road 13.5 miles to end of truck travel at St. Lawrence ranger station. Horses may usually be obtained at ranger station. Go north across valley, crossing St. Lawrence Creek, and up ridge to crest, thence west along ridge for about 3 miles to highest point and station. Horses can be taken to station; about 1½ hours of easy riding. Station mark is standard disk in outcropping bedrock, note 2. Reference and azimuth marks are standard disks in outcropping bedrock, note 12a. No. 1 is at edge of rock dike along southwest edge of summit, and 26.163 meters (85.84 feet) southwest of station in azimuth 39°33′; no. 2 is on crest of summit, in top of small ledge which is flush with ground, and is 16.504 meters (54.15 feet) west of station in azimuth 75°30′. Azimuth mark is on comb of rim rock running along longitudinal center of ridge, 12 feet north of south edge of rim rock, and approximately 0.3 mile east of station in azimuth 269°26′17″.

Plane coordinates: (III), x=374,985.49 feet; y=876,613.88 feet; grid azimuth to azimuth mark=269°45′27″.[8]

Bold (Fremont County, J. Bowie, Jr., 1936).—About 29 miles air line northwest of Fort Washakie, at head of Spring Creek, between Bob and Willow Creeks, on high barren ridge, which shows up from State Highway 287 as only bare grassy peak in vicinity. Estimated elevation of peak about 10,500 feet. There is rough high outcrop of sandstone about 40 feet high at east end of ridge, approximately ¼ mile east of station, and low grassy saddle about ½ mile to southwest of station. To reach from Crowheart Store on U. S. Highway 287, 31 miles by road northwest of Fort Washakie, follow highway easterly 0.45 mile; turn right off highway at sign "Meadow Creek R. S. 10 Mi." and go southerly and westerly on only well-traveled and graded road 9.8 miles to Meadow Creek Ranger station and end of truck travel. Road to ranger station is closely followed by telephone line for entire distance. Ranger can furnish information as to where horses can be secured. From ranger station take No. 1 Forest Service Boldy Mountain Trail southwest 2 miles up canyon to its head at old cross-trail; follow old trail westerly 2½ miles to crest of barren ridge; go southeast ½ mile to top of barren peak and station. Distance 5 miles, requiring 2-hour horse pack. Station mark is standard disk in bedrock, note 2. Reference and azimuth marks are standard disks in outcropping bedrock, note 12a. No. 1 is 8.850 meters (29.04 feet) north of station in azimuth 180°28′; no. 2 is 9.815 meters (32.20 feet) east in azimuth 283°57′. Azimuth mark is in sandstone outcrop, at west edge of sandstone bluffs, and 0.25 mile east of station in azimuth 278°13′20″.

Plane coordinates: (III), x=332,179.54 feet; y=929,183.60 feet; grid azimuth to azimuth mark=278°39′12″.[8]

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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Coulee (U. S. G. S.) (Fremont County, J. Bowie, Jr., 1936).—About 16 miles east and 1 mile north of Dubois, on highest point of Crow Peak which is on west spur of Crow Mountain, 1½ miles west-southwest of point where road from Lenore to Crow Basin crosses summit of Crow Mountain, and somewhat lower than road at this summit. Peak is sharp, rocky, and timbered near top. To reach from Lenore post office, follow route given in description of station *Crow* (p. 188) as far as road summit on Crow Mountain, 20.9 miles from Lenore. Azimuth mark is at this summit. From here go southwesterly along northwest side of slope, and on east side of ravine to point east of station. From end of truck travel is about 30-minute pack west to top of ridge and station. Station mark is bronze disk in boulder, note 4. Reference mark no. 1 is standard disk in boulder, note 12c, 6.368 meters (20.89 feet) southwest of station in azimuth 29°20′; no. 2 is standard disk in outcropping bedrock, note 12a, 6.587 meters (21.61 feet) west of station in azimuth 115°57′. Distance between reference marks is 8.888 meters (29.16 feet). Azimuth mark is standard disk in outcropping bedrock, note 12a, at point where Lenore-Crow Basin road crosses summit (see above), 20 feet east of center line of road, near southwest end of low rocky ledge, and about 1½ miles from station in azimuth 257°40′54″.

Plane coordinates; (III), x=351,001.73 feet; y=1,054,195.01 feet; grid azimuth to azimuth mark=258°04′08″.[8]

Muddy (U. S. G. S.) (Fremont County, J. Bowie, Jr., 1936).—About 21 miles east and 9 miles north of Dubois, 6½ miles north-northeast of French's Sheep Camp at south end of Crow Creek Basin, on highest point of divide between Crow Creek and South Fork of Owl Creek, and at head of Dry Creek. Peak is known locally as "Monument Peak." To reach from Lenore post office follow route given in description of station *Crow* (p. 188) to French's Sheep Camp, from which place station is visible to north and east. Follow horse trail up Crow Creek; at about 6 or 7 miles where creek makes turn of about 20° to left or to north-northwest, well-marked Forest Service trail leads easterly through timber to within several hundred feet in elevation of station. Alternate route follows trail road east from French's Sheep Camp to top of ridge, thence northerly along ridge to station, about 4-hour horse pack. Truck can be driven over this route to within about 2-hour pack of station, pitch immediately after leaving road at top of ridge being hardest to negotiate. Station mark is brass disk in conglomerate rock outcrop. Reference and azimuth marks are standard disks in boulders, note 12c. Boulders project about 10 inches above ground. No. 1 is 4.424 meters (14.51 feet) southwest of station in azimuth 39°36′. No. 2 is 10.993 meters (36.07 feet) northwest in azimuth 140°54′. Azimuth mark is on divide that extends northwest from station, about 40 yards northwest from first summit northwest of station, on small mound and 4 feet northeast of trail, and about ¼ mile from station in azimuth 146°55′15″. *Wiggins Peak, cairn* and *Washakie Needles, highest point* (see geographic positions thereof) can also be used as azimuth marks.

Plane coordinates: (III), x=381,607.78 feet; y=1,094,643.30 feet; grid azimuth to azimuth mark=147°13′48″.[8]

Tatro (Fremont County, J. Bowie, Jr., 1936).—About 6 miles west of Lander, on highest foothill in vicinity, on highest point of grass-covered hill which has buff-colored bluffs on south side, slopes gradually to north and is fairly steep on east and west sides, 9 yards west of break on east side and 18 yards north of break on south side. To reach from Fremont Vocational High School in Lander, follow State Highway 287 north 0.15 mile; turn left (west) onto graded road and at 3.9 miles pass azimuth mark on left; at 4.4 miles turn right into T-road north, cross creek, and follow main-traveled road, at 6.7 miles take left fork and go west to old log house; at 6.8 miles pass old log house, and proceed westerly 0.1 mile to east side of draw, thence southerly up ridge to bottom of steep pitch, distance 1.1 miles. From here station is 10-minute pack up ridge to south. Station mark is standard disk in boulder, note 4. Reference and azimuth marks are standard disks in boulders, note 12c. No. 1 is flush with ground, and 9.724 meters (31.90 feet) west of station in azimuth 81°05′. No. 2 projects 6 inches above ground, and is 8.206 meters (26.92 feet) south of station in azimuth 11°35′. (Distance between reference marks is 10.293 meters (33.77 feet).) Azimuth mark is at mileage 3.9 (see above), at

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

point where telephone line crosses road, 0.2 mile southeast of house northwest of road, 75 yards southeast of center line of road, 20 yards southwest of point of ridge, on west slope, on large flat boulder, and approximately 2 miles east of station in azimuth 275°40′26″. Azimuth from station to Lander, Fremont Vocational High School, chimney on west side, is 275°18′55″.

Plane coordinates: (III), x=471,745.09 feet; y=793,320.79 feet; grid azimuth to azimuth mark=275°44′43″.[8]

Mesa (Fremont County, J. Bowie, Jr., 1936).—In about the same location as station Sage (U. S. G. S.), 11 miles north of Fort Washakie, about 4 miles south-southeast of Diversion Dam, on northeast corner of large flat mesa which is crossed by State Highway 287, about 1 mile east of highway and on extension of mesa which resembles railroad fill. Ground slopes off abruptly to north, east, and south, and station is about 20 feet from edge of mesa in each of these directions. To reach from Fort Washakie, go north from Conoco gasoline station 13.5 miles to unimproved road to right about 0.3 mile north of northwest fence corner; turn right on this track road and follow it southeast across mesa 0.7 mile to wire gate in fence; pass through gate and go southeast about ½ mile to point where road starts down off mesa; turn right off road and go 0.2 mile south across country up steep slope to higher mesa; turn left and go east about 100 yards to northeast corner of mesa and station. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 7.865 meters (25.80 feet) south of station in azimuth 25°03′; and no. 2, 10.788 meters (35.39 feet) northwest in azimuth 123°27′. Azimuth mark is on line from station to Crowheart Butte, about 3 feet south of east-west fence line, 18 feet east of center of wire gate, 13 feet northeast of center line of track road that leads from highway to station, and approximately 1¼ miles northwest from station in azimuth 138°59′42″.

Plane coordinates: (III), x=453,903.10 feet; y=911,381.48 feet; grid azimuth to azimuth mark=139°06′47″.[8]

Diversion (Fremont County, J. Bowie, Jr., 1936).—On north rim of Wind River, about 1½ miles northeast of Diversion Dam. To reach from junction of U. S. Highway 287 and State Highway 287 (32 miles north and west of Lander), go north on U. S. Highway 287; at 0.8 mile cross Wind River at Diversion Dam; at 1.3 miles cross bridge over irrigation canal, turn sharply left and follow dirt road along north side of canal; at 1.4 miles and "Y", turn right (azimuth mark is here); at 1.6 miles and "Y", turn right and follow road north to saddle in north rim, reaching saddle at 2.3 miles. Station is about ¼ mile east of this saddle, on highest point in vicinity, 4 feet north of edge of rim. Truck may be driven to station by continuing north a few yards, thence east along road on north side of ridge, thence south up ridge to station, total distance of about 0.35 mile. Station mark is standard disk attached to 3-foot bronze rod, bottom embedded in concrete, and top projecting 9 inches above ground. Reference marks are standard disks in concrete, note 11a. No. 1 is at break of slope, 14.014 meters (45.98 feet) northeast of station in azimuth 215°20′. No. 2 is 5 feet north of edge of rim, and 10.291 meters (33.76 feet) west of station in azimuth 108°45′. Distance between reference marks is 19.607 meters (64.33 feet). Azimuth mark is standard disk in concrete block 6 by 2½ by 2 feet high, at site of old building, 0.1 mile west of U. S. Highway 287, 60 yards north by east of top of north bank of irrigation canal, 30 yards east by south of north end of "Y" on road, about 60 yards east by south of house and corral, and about ¾ mile south of station in azimuth 357°49′52″.

Plane coordinates: (III), x=447,944.92 feet; y=937,375.65 feet; grid azimuth to azimuth mark=357°57′54″.[8]

Bald Mountain (Fremont County, J. Bowie, Jr., 1936).—About 16 miles west from Lander, 11½ miles southwest from Fort Washakie, on east side of Wind River Mountains, on prominent peak which is visible from most parts of Wind River Valley, and has appearance of gently sloping bare dome. To reach from Fort Washakie, follow State Highway 287 southerly 1.15 miles to Wind River-Ethete road; turn right (west) and at 1.8 miles, jog right about 100 feet and

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

continue westerly and southwesterly on gravel road; at 4.5 miles take left fork (gravel road); at 6.3 miles and end of gravel take right fork; at 7.3 miles pass cattle guard in fence line; at 11.2 miles several trail roads leave graded road and ascend hill in more direct routes. In normal weather take right-hand road and at 11.6 miles re-enter improved road; at 19.1 miles telephone line crosses road about 0.2 mile beyond top of saddle, and graded road continues on 1.3 miles to Mosquito Park Ranger Station. Turn sharply to left south of telephone line and follow road which runs northeasterly to top of divide north of bare mountain to east; at 19.8 miles turn right across country at point east of rock breaks; and at 20.4 miles reach highest point on bare ridge and station, which is 35 feet south of rock cairn and pole of U. S. Geological Survey. Station mark is standard disk in boulder, note 4. Reference marks are standard disks in boulder, note 12c. No. 1 is 16.508 meters (54.16 feet) southeast from station in azimuth 300°47′, and no. 2 is 20.578 meters (67.51 feet) southwest in azimuth 21°51′. Distance between reference marks is 24.313 meters (79.77 feet). Azimuth mark is standard disk in outcropping bedrock, note 12a, on rocky ridge which has prominent bluffs, on highest point of ridge as seen from station, 9 yards northeast from edge of bluff and about 0.8 mile southeast of station in azimuth 295°17′49″.

Plane coordinates: (III), x=424,136.49 feet; y=804,918.12 feet; grid azimuth to azimuth mark=295°29′23″.[8] (IV), x=781,543.22 feet; y=806,546.65 feet; grid azimuth to azimuth mark=294°34′57″.[8]

Magnuson (Fremont County, J. Bowie, Jr., 1936).—About 12 miles west of Fort Washakie, on rocky top of first timbered foothills on east side of Wind River Mountains, on high ridge between upper branches of north and south forks of Little Wind River, about 100 yards northwest of and 6 feet lower than highest point, on limestone outcrop. There are some live pines and many dead ones on ridge. To reach from road intersection just east of trading post and post office in Fort Washakie, go west on gravel road that passes just south of post office 0.6 mile to forks with stone crusher in corner on right; turn right across creek and follow main road 4.1 miles to dirt road intersection; turn left onto dirt road and go 1.5 miles to forks at cattle guard; take left fork straight ahead through cattle guard and go 0.5 mile to forks; take right fork straight ahead and go 8.9 miles on winding improved road that is very steep for last two miles to saddle where telephone line crosses road. Azimuth mark is about 150 yards northwest of this point. Turn right off this road and go east up grassy slope about 200 yards to end of truck travel at edge of trees where slope becomes very steep. Continue up slope about 0.15 mile to top and station. Station marked by standard disk in outcropping bedrock. Reference marks are standard disks in outcropping bedrock, note 12a. No. 1 is 16.211 meters (53.19 feet) southeast of station in azimuth 317°58′, and no. 2 is 5.536 meters (18.16 feet) southwest in azimuth 38°15′. Azimuth mark is standard disk in boulder, note 12c, about 150 yards northwest of point where telephone line crosses road, about 15 yards southwest of road, and approximately ¼ mile west-southwest from station in azimuth 76°45′31″.

Plane coordinates: (III), x=400,372.89 feet; y=848,661.62 feet; grid azimuth to azimuth mark=77°00′46″.[8]

Park (Fremont County, J. Bowie, Jr., 1936).—About 24 miles west-northwest of Lander, about 8 miles northeast of continental divide, in second line of foothills going west into the divide, near headwaters of Little Wind River, on rocky spur of Mt. Shoshone in Wind River Mountains, about 3 miles south of ranger station in Washakie Park, and just south of small park known locally as "Little Washakie Park." To reach from Fort Washakie, follow route given in description of station *Magnuson* (see above) until saddle where telephone line crosses road is reached. Continue on only road 3.0 miles to ranger station in Washakie Park. Mr. White St. Clair, ranger, can guide party to station. From cabin at ranger station, follow trail that runs east along north side of wire fence about ½ mile to gate; go through gate and follow well-marked horse trail south across flats and up about 1 mile to top of ridge; continue on trail down south side of ridge into valley and southwest along valley about 2 miles to where horse trail enters timber on south side of clearing near southwest end of valley known as "Little Washakie Park." Follow horse trail through timber up draw about ½ mile to clearing in saddle. Azimuth mark is near center of

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

this clearing. Turn right at tree with triangular blaze and follow blazed trail about 100 yards to another tree with triangular blaze and end of horse travel. From here follow blazed trail about ¼ mile up steep slope, winding among huge granite boulders, to station. Station is not on highest point of ridge, but on second point of boulders north of saddle, on edge of cliff that drops off vertically for 100 feet to south, slopes gradually to west, is about 100 yards east of higher peak, and 6 feet east of large granite boulder on ledge. Ranger station at Washakie Park is end of truck travel, and it is best to take horses from there. With horses it requires about 2 hours to reach station from ranger cabin; on foot 2½ hours. Horse trail through Little Washakie Park is not plain, but it is only necessary to follow valley in southwesterly direction. Station marked by standard disk in boulder, note 4. Reference and azimuth marks are standard disks in boulders, note 12c. No. 1 is 11.524 meters (37.81 feet) west-southwest from station in azimuth 70°09′, and no. 2 is 3.444 meters (11.30 feet) north in azimuth 177°08′. Azimuth mark is in approximate center of small rectangular clearing, in low grassy saddle on trail from ranger cabin to station, in granite boulder about 4 feet southwest of small evergreen tree with two triangular blazes on it, and 0.3 mile southeast from station in azimuth 320°10′26″.

Plane coordinates: (III), x=387,217.71 feet; y=831,089.23 feet; grid azimuth to azimuth mark=320°27′39″.[8] (IV), x=744,211.85 feet; y=832,131.23 feet; grid azimuth to azimuth mark=319°33′09″.[8]

Rawie (Fremont County, J. Bowie, Jr., 1936).—About 17 miles northwest of Fort Washakie, 10½ miles west-southwest of Diversion Dam, 1 mile southeast of west end of Bull Lake, on southerly of 2 grassy knobs on top of narrow bare ridge running down from Bull Lake Mountain, and on highest point in vicinity. Ridge is first one southeast of Bull Lake, and lake is visible from station. To reach from Fort Washakie, go north on State Highway 287; at 6.9 miles turn left (west) onto graded road; at 7.5 miles and "Y", bear left on main-traveled road; at 12.4 miles and "Y", bear right on graded road; at 13.2 miles cross irrigation ditch just beyond white schoolhouse, turn sharply right, and follow along west side of fence line; at 13.7 miles and "Y", bear left on main-traveled road; at 15.1 miles and "Y", bear left on least-traveled road south of fence line; at 16.0 miles and "Y", keep right on main-traveled road; at 18.5 miles and creek crossing, bear left (westerly) on bright road; at 19.5 miles, wire gate; at 19.7 miles and dim "Y" just before main road crosses wash, bear right on dim road which runs northerly and westerly up very narrow gulley, thence northwesterly; at 20.1 miles and track road, turn left (southwesterly); at 20.3 miles turn right (northwesterly) and go 0.1 mile to azimuth mark. Station is on top of ridge to west, and truck may be driven to top of ridge by going southwesterly to saddle 0.1 mile south of station and end of truck travel at 21.0 miles. Station mark is standard disk in boulder, note 4. Reference and azimuth marks are standard disks in boulders, note 12c. No. 1 is 9.767 meters (32.04 feet) north of station in azimuth 204°58′; no. 2 is 4.544 meters (14.91 feet) in azimuth 126°57′. Distance between reference marks is 9.874 meters (32.39 feet). Azimuth mark is about 0.1 mile northwest of track road, on brow of small ridge, about 100 yards northwest of cattle trail sign, on easterly one of two large boulders, and approximately ½ mile east of station in azimuth 264°27′57″.

Plane coordinates: (III), x=399,635.36 feet; y=909,938.37 feet; grid azimuth to azimuth mark=264°43′21″.[8]

Tel (Fremont County, J. Bowie, Jr., 1936).—About 15 miles northwest of Lander, about 7 miles southwest of Fort Washakie, on east side of Continental Divide, in high foothills of Wind River Mountains, on summit of sharp knoll which is partly encircled by curve in road from village of Wind River to Mosquito Park, about 75 yards south of road at closest point, and in vicinity of U. S. Geological Survey bench mark (El. 7,467.4). To reach from Indian Agency in Fort Washakie, follow State Highway 287 south 1.15 miles to intersection with Ethete-Wind River road; turn right (southwest) onto this road and go 0.6 mile to village of Wind River; jog right and continue southwest on main gravel road 2.7 miles to fork, take left fork and continue on gravel road 1.7 miles to forks at end of gravel; take right fork and go 1.1 miles to

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

cattle guard; continue on winding road up hill 3.7 miles to small knoll on left and station on top. Mark is standard disk in outcropping bedrock, note 2. Reference and azimuth marks are standard disks in outcropping bedrock, note 12a. No. 1 is 4.953 meters (16.25 feet) east of station in azimuth 291°28′, and no. 2 is 10.160 meters (33.33 feet) north in azimuth 175°25′. Azimuth mark is in rock outcrop about 50 yards north of highway, and approximately 0.4 mile east of station in azimuth 281°35′35″.

Plane coordinates: (III), x=433,708.98 feet; y=829,833.78 feet; grid azimuth to azimuth mark=281°45′42″.[8]

Mill (Fremont County, J. Bowie, Jr., 1936).—About 8 miles north of Lander and 7 miles south of Fort Washakie, at curve in State Highway 287, in "V" of intersection where dirt road goes north and paved highway curves to left towards Fort Washakie, 17.4 meters (57 feet) northeast of center line of Highway 287, 10.0 meters (33 feet) west of center line of graded road, in line with right-of-way fence of graded road, about 200 feet northwest of small yellow house, and 5.8 meters (19 feet) south of southeast corner fence post. To reach from Lander, go north on State Highway 287 about 8 miles to curve to left where dirt road goes north; station is in acute intersection; there are 8 mail boxes in intersection, white house on left, and yellow house on right. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 8.8 meters (29 feet) west of center line of north-south graded road, 13.7 meters (45 feet) northeast of center line of Highway 287, 20.4 meters (67 feet) northwest of highway sign "STOP", and 11.672 meters (38.29 feet) south of station in azimuth 355°12′. No. 2 is 13.8 meters (45 feet) north-northeast of center line of Highway 287, 13.9 meters (46 feet) west of southeast corner fence post, 21.0 meters (69 feet) west of center line of north-south graded road, and 17.881 meters (58.66 feet) northwest of station in azimuth 141°10′. Azimuth mark is on low rise, 15 paces north of center line of Highway 287, 8 paces south of right-of-way fence, and 0.5 mile northwest of station in azimuth 127°21′29″.

Plane coordinates: (III), x=488,121.52 feet; y=828,325.98 feet; grid azimuth to azimuth mark=127°23′18″.[8]

Fort Washakie (Fremont County, J. Bowie, Jr., 1936).—In south part of village of Fort Washakie, 0.2 mile south from Indian Agency, at prominent road intersection, 49.1 meters (161 feet) west of center line of State Highway 287, 7.5 meters (25 feet) northwest of center line of graded road, 12.0 meters (39 feet) south of center line of gravel road, about 15 meters (49 feet) northwest of irrigation ditch which runs along southeast side of graded road south of station, and in telephone line, 4.2 meters (14 feet) west of telephone pole no. 621. To reach from Fort Washakie, follow Highway 287 south from Indian Agency 0.2 mile to point where four roads fan off to southwest at sign "Sacajawea Grave 2½ Miles" and station on right. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is between irrigation ditch and graded road, 6.2 meters (20 feet) southeast of center line of graded road, and 13.730 meters (45.05 feet) southeast of station in azimuth 301°10′. No. 2 is 8.0 meters (26 feet) northwest of center line of graded road, 17.8 meters (58 feet) south of center line of gravel road, in telephone line, and 10.384 meters (34.07 feet) southwest from station in azimuth 40°45′. Azimuth mark is about 75 yards south of curve in graded road, about 10 meters (33 feet) west of center line of road, in telephone line, about 4 meters (13 feet) south of telephone pole that stands in "V" of road fork where two roads go west from main graded road, and approximately 0.3 mile southwest from station in azimuth 30°55′04″. Azimuth from station to Fort Washakie, large white house, ball on top of conical cupola, distant ¼ mile, is 144°07′07″.

Plane coordinates: (III), x=465,082.12 feet; y=851,526.82 feet; grid azimuth to azimuth mark=31°00′25″.[8]

Wise (Fremont County, J. Bowie, Jr., 1936).—About 10 miles north-northeast of Lander, 5 miles northwest of Hudson, 0.1 mile north of house at Otto Wise

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

Coal Mine, on west rim of large mesa which overlooks low lands along south side of Little Wind River, 65 yards northwest of mine shaft, and 12 yards northeast of brow of steep southerly slope of mesa. To reach from Hudson, go west on dirt road at north end of business district on U. S. Highway 287; at 0.3 mile take right fork west of river bridge; at 0.7 mile cross railroad tracks at mile pole 1538 and turn left along north side of track; at 1.1 miles take right fork; at 3.6 miles take right fork and continue on main-traveled road; at 4.6 miles take left fork; at 6.5 miles take left fork (azimuth mark is 0.1 mile northeast of this point); at 6.8 miles reach Otto Wise Mine. From here truck may be driven to station by continuing north 0.2 mile, thence northeast up gentle slope to top of mesa and station. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference marks are standard disks in concrete, note 11a. No. 1 is 10.325 meters (33.87 feet) east of station in azimuth 252°40′. No. 2 is on brow of mesa, 9.930 meters (32.58 feet) northwest of station in azimuth 145°25′. Distance between reference marks is 16.311 meters (53.51 feet). Azimuth mark is standard disk in outcropping bedrock, note 12a, northeast of road forks as described above, 26 yards east of center line of right fork road, at bottom of slope leading up to mesa, and in sandstone ledge 2 feet high and 12 feet north of south end. It is approximately 0.4 mile southeast of station in azimuth 320°23′38″.

Plane coordinates: (III), x=529,858.93 feet; y=837,269.81 feet; grid azimuth to azimuth mark=320°19′04″.[8]

Wyopo (Fremont County, J. Bowie, Jr., 1936).—About 2 miles northeast of Lander, on gravel hill 50 yards east of U. S. Highway 287, and 50 yards northeast of large black oil storage tank of Derby Dome Wyoming Oil Company. To reach from highway forks at east end of main street in Lander, take left fork and follow U. S. Highway 287 north 2.3 miles to dirt road on right about 30 yards south of large black oil tank; leave highway and keeping to two left forks, circle around back of oil tank 0.1 mile to station, 6 feet north of east-west fence and 40 feet east of fence corner. Surface and underground marks are standard disks in concrete; upper mark projects 3 inches above ground. Reference marks are standard disks in concrete, note 11a, projecting 3 inches above ground. No. 1 is 4.855 meters (15.93 feet) east of station in azimuth 280°03′, and no. 2, 6.688 meters (21.94 feet) north in azimuth 172°03′. Azimuth mark is standard disk in boulder, note 12c, about 100 yards east of telephone pole no. 1732 on east side of U. S. Highway 287, about 150 feet higher in elevation than highway, and approximately 0.8 mile north of station in azimuth 206°47′18″. Distance between reference marks is 9.398 meters (30.83 feet).

Plane coordinates: (III), x=516,192.70 feet; y=796,912.74 feet; grid azimuth to azimuth mark=206°44′50″.[8]

Popo (Fremont County, J. Bowie, Jr., 1936).—About 8 miles west of Lander, on highest point of hogback ridge formed by vertical strata of rock which extends in line approximately northwest and southeast for several miles, and about ½ mile north of U. S. Highway 287. To reach from Lander, go to Standard Filling Station at east edge of town; thence on U. S. Highway 287 southeast 7.9 miles to farm road intersection; here, just before reaching white schoolhouse, turn left and go 0.1 mile to wire gate; pass through gate and go 0.8 mile to old road to left, reached just after crossing small draw; turn back sharply to left and go about 150 yards around foot of first knoll; turn right and follow up small valley between two ridges about 0.1 mile to wire fence and end of truck travel. Azimuth mark is about 100 yards north of this point. From here continue up valley about 200 yards to its end in small saddle, turn left and go northwest up side of hill to highest point of hill and station. Station mark is standard disk in outcropping bedrock, note 2. Reference mark no. 1 is standard disk in outcropping bedrock, note 12a, 3.799 meters (12.46 feet) east of station in azimuth 274°17′. Reference mark no. 2 is standard disk in boulder, note 12c, 4.257 meters (13.97 feet) southeast of station in azimuth 346°03′. Azimuth mark is standard disk in outcropping bedrock, note 12a, about 100 yards north of end of truck travel (see above), in top of vertical outcrop about 15 feet high, the second large outcrop north of wire fence, and approximately ¼ mile southeast of station in azimuth

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

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321°15′56″. Azimuth from station to northeast corner of white schoolhouse, distant approximately 1 mile, is 5°23′48″.

Plane coordinates: (III), x=530,837.36 feet; y=761,865.60 feet; grid azimuth to azimuth mark=321°11′15″.[5]

Lander azimuth mark (Fremont County, J. Bowie, Jr., 1936).—One thousand eight hundred and eighty-one feet from station *Lander* (see description thereof) in azimuth 104°36′50″, about on range with Wind River Peak, and 270 yards west of drift fence along southwest edge of summit. Marked by standard disk in top of boulder, note 12d about 6 feet above surrounding ground.

Plane coordinates: (III), x=501,969.92 feet; y=762,642.11 feet; grid azimuth to *Lander*=284°36′15″.[7]

Willow (Fremont County, J. Bowie, Jr., 1936).—About 28½ miles air line west-northwest of Fort Washakie, on highest rocky peak of Kirkland Mountains, in forks between heads of north and south forks of Willow Creek, and on south end and high part of divide 2 miles northwest of North Fork of Bull Lake Creek. From station the divide runs northwesterly 3 miles to Indian Pass. Ridge in vicinity of station is rough with several rocky tips. Approximate elevation is 12,000 feet. To reach from Crowheart Store on U. S. Highway 287, 31 miles by road northwest of Fort Washakie, follow highway easterly 0.45 mile; turn right off highway at sign "Meadow Creek R. S. 10 Mi.", and go southerly and westerly on only well-traveled and graded road 9.8 miles to Meadow Creek Ranger Station and end of truck travel. Road to ranger station is followed closely by telephone line for entire distance. Ranger can furnish information as to where horses can be secured. General route from ranger station follows No. 1 Forest Service Boldy Mountain Trail 2.0 miles up canyon to its head at old cross-trail; thence westerly on old trail about 2½ miles to crest of barren ridge (½ mile northwest of station *Bold*); thence down (south) ¾ mile to spring and good camp site; thence about 200 yards south from spring to trail (blazed) leading westerly; follow this trail westerly about 4 miles up north side of Willow Creek Valley; cross Willow Creek to left, leaving blazed trail, and continue up draw and on up steep slopes above timber line southwesterly to highest rocky peak and station. About 5-hour horse pack from ranger station. Station mark is standard disk in outcropping bedrock, note 2. Reference and azimuth marks are standard disks in outcropping bedrock, note 12a. No. 1 is 18.330 meters (60.14 feet) southwest from station in azimuth 56°24′; no. 2 is 11.940 meters (39.17 feet) north from station in azimuth 182°57′. Azimuth mark is in rock outcrop on first prominent rocky butte about 0.5 mile southeast of station in azimuth 303°17′38″.

Plane coordinates: (III), x=322,469.30 feet; y=905,358.64 feet; grid azimuth to azimuth mark=303°44′52″.[8] (IV), x=678,290.08 feet; y=905,364.68 feet; grid azimuth to azimuth mark=302°50′13″.[8]

Bull Lake (Fremont County, J. Bowie, Jr., 1936).—About 21½ miles west-northwest from Fort Washakie, 7 miles southwest from southwest end of Bull Lake, on high and prominent rocky peak of divide between Bull Lake Creek and North Fork of Sage Creek, on easterly of two rocky summits which are separated by deep notch, 40 feet east by north of highest rocky point, on flat bedrock, 5 feet north of edge of vertical cliff at south side of summit, and at location of station Bull Lake (U. S. G. S.), the rock cairn marking of which has been removed. To reach from Fort Washakie, follow State Highway 287 north 7.0 miles, bear left on graded road in bottom of broad valley, and continue northwest and west on main graded road 5.5 miles; take left fork at foot of grade just beyond pass and continue southwest on main-traveled road 13.5 miles to end of truck travel at St. Lawrence Ranger Station. Go westerly on horseback along north side of St. Lawrence Creek about 1½ miles to edge of timber; bear right up through canyon and then along timbered rocky ridge (Paradise Ridge) about 4 miles to intersection with trail along North Fork of Sage Creek, thence northwesterly along this trail about 1½ miles to base of smooth grassy slope on west side of peak. Go up slope about ⅜ mile to end of horse travel at foot of west end of rocky

[7] This azimuth has been computed by the first formula (p. 70), using both terms.
[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

summit; pack easterly along south side of sheer cliffs about ¼ mile to narrow crevice leading to top of east peak, just east of deep notch which separates two summits. Climb up through this crevice about 25 feet to top, thence easterly about 50 yards to station. About 4 hours hard riding from ranger station and ½ hour of fairly difficult packing. Rope needed to haul packs up crevice to summit. Station mark is standard disk in outcropping bedrock, note 2. Reference marks are standard disks in outcropping bedrock, note 12a. No. 1 is near west edge of slightly lower level space, in flat ledge rock, and 13.761 meters (45.15 feet) north of station in azimuth 191°15′; no. 2 is along crest of summit, 15 feet north of south edge of summit, and 23.839 meters (78.21 feet) northeast of station in azimuth 228°52′. Azimuth mark is standard disk in boulder, note 12c, on first local summit of ridge southwest of narrow valley at foot of peak, about 100 yards north by west of two triangle-blazed trees on either side of dim trail leading along ridge, in burnt-over section of timber, on top of very friable shale rock, and about 1.5 miles southwest of station in azimuth 32°00′08″.

Plane coordinates: (III), x=363,427.93 feet; y=894,312.83 feet; grid azimuth to azimuth mark=32°21′07″.[8]

Wilson (U. S. G. S.) (Fremont County, J. Bowie, Jr., 1936).—About 24 miles west by south of Fort Washakie, on Shoshone Indian Reservation, about 3½ miles northeast of Continental Divide, about 3½ miles south-southeast of Windy Gap, on westerly one of two high (12,500-foot) rocky promontories lying at south side of head of Wilson Creek and at junction of north-south range and divide between Wilson Creek and North Fork of Little Wind River. Promontories are separated by deep notch in which rise two needle-like and unscalable crags. Station promontory juts east into and almost overhangs sink which contains head of Wilson Creek, sheer drop of about 2,500 feet. There is prominent high point of about same elevation as station on rim about 300 yards to northwest. To reach from Fort Washakie, follow State Highway 287 north 7.0 miles, bear left onto graded road at bottom of broad valley, and follow main road northwest and west 5.5 miles; take left fork at foot of grade just beyond pass, and go 13.5 miles to St. Lawrence ranger station and end of truck travel. Horses may usually be obtained at ranger station. Follow Forest Service trail northwesterly up northeast side of St. Lawrence Basin to Paradise Pass, about 4 miles; continue westerly down Paradise Valley on trail to creek in bottom, about 2 miles; thence southwest past Lytle Lake and along rocky ridge, passing above Steamboat Lake to Hatchet Lake, about 5 miles; thence south along west side of Hatchet Lake and west up steep ridge to Windy Gap where trail drops down into valley of South Fork of Bull Lake Creek. From Hatchet Lake to Windy Gap is about 2 miles. From Windy Gap station bears south-southeast, distance of about 3½ miles. Leave trail at Windy Gap, pick circuitous route southerly through rocks on west slope of ridge as far as horses can be taken. This will be about 3 or 4 miles of actual travel, and horses will be left at point about ⅜ mile north of high rocky point on crossridge at east end of which azimuth mark is located. Continue southerly on foot, keeping below crest on west slope for about ¾ mile; bear left and climb east through rocks about ¼ mile to top of promontory and station. From ranger station to end of horse travel is about 10-hour ride. From end of horse travel to station is about 45-minute easy backpack. Station mark is unstamped U. S. Geological Survey disk, set in highest solid rock of promontory, 35 feet south of north edge of summit. Reference marks are standard disks in boulders, note 12d. No. 1 is in top of flat rock near north edge of summit, and 8.450 meters (27.72 feet) north of station in azimuth 185°53′; no. 2 is in longitudinal center of summit which is 100 feet in width, and is 6.518 meters (21.38 feet) northwest of station in azimuth 137°36′. Azimuth mark is on fourth rocky point of rim north of station, 50 yards south of high rocky point, 25 yards east of crest of crossridge, 20 yards southwest of rim, and is standard disk in flat ledge, note 12a, approximately 0.8 mile north from station in azimuth 165°32′04″.

Plane coordinates: (III), x=337,617.27 feet; y=844,177.89 feet; grid azimuth to azimuth mark=165°56′53″.[8] (IV), x=694,408.40 feet; y=844,431.96 feet; grid azimuth to azimuth mark=165°02′21″.[8]

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

Dennis (Fremont-Sublette Counties, J. Bowie, Jr., 1936).—On mountain on Continental Divide, at southwest corner of Shoshone Indian Reservation. Best reached from Boulder, by going to ranch of Dennis Mitchell about 8 miles northeast of Boulder, securing horses and going northward 10 miles to North Fork Ranger Station; from ranger station follow High Line Trail in northwest direction to lake on North Fork of Boulder Creek; follow creek 6 miles to headwaters lake in small saddle in pass exactly on top of Continental Divide. Station is on top of peak on left, and azimuth mark is on top of peak on right. Azimuth mark is at slightly lower elevation than station. Not advisable to attempt to reach this station except in July or August. Station mark is standard disk in outcropping bedrock, note 2. Reference and azimuth marks are standard disks in outcropping bedrock, note 12a. No. 1 is 4.025 meters (13.21 feet) northeast from station in azimuth 231.0°; no. 2 is 3.730 meters (12.24 feet) southeast in azimuth 336.3°. *Dennis azimuth mark* is about 1 mile east of station in azimuth 276°47′49″.

Plane coordinates: (III), x=295,306.46 feet; y=854,471.81 feet; grid azimuth to *Dennis azimuth mark*=277°19′09″.[7] (IV), x=651,939.74 feet; y=854,053.08 feet; grid azimuth to *Dennis azimuth mark*=276°24′35″.[7]

Dennis azimuth mark (Fremont County, J. Bowie, Jr., 1936).—On Continental Divide, on rock outcrop, at slightly lower elevation than station *Dennis* (see description thereof), and about 1 mile east from that station in azimuth 276°47′49″. Mark is standard disk in outcropping bedrock, note 12a.

Plane coordinates: (III), x=299,586.79 feet; y=853,922.03 feet. (IV), x=656,228.18 feet; y=853,571.32 feet.

Bob (Fremont County, J. Bowie, Jr., 1936).—About 32 miles air line west-northwest of Fort Washakie, on divide 1½ miles north of North Fork of Bull Lake Creek, 1¼ miles northwest of Indian Pass, on high rocky peak at head of Bob Creek, at estimated height of about 12,500 feet. Huge cliffs in basin at head of Bob Creek in horseshoe shape open to east, lie about ¼ mile east of station. To reach from Crowheart Store on U. S. Highway 287, 31 miles by road northwest from Fort Washakie, follow highway easterly 0.45 mile; turn right off highway at sign "Meadow Creek R. S. 10 Mi." and drive southerly and westerly on only well-traveled and graded road 9.8 miles to Meadow Creek Ranger Station, and end of truck travel. Road to ranger station is followed closely by telephone line for entire distance. Information as to best route and trails to station, as well as where horses may be obtained can be had at ranger station. General route to station as follows: from ranger station pack trail leads up old woods road to basin at head of Meadow Creek; thence to left up ridge on well-blazed trail. Follow this marked and plain trail southwesterly along southeast slope of Bob Creek to timber line; continue southwesterly until Indian Pass at head of Bob Creek is reached. From Indian Pass (saddle on divide where drainage starts to flow down into North Fork of Bull Lake Creek to southwest) bear right or northwest down around rock points and up to north to high rocky peak 1¼ miles northwest of Indian Pass and station. About 5-hour horse pack from ranger station. Station mark is standard disk in outcropping bedrock, note 2. Reference and azimuth marks are standard disks in outcropping bedrock, note 12a. No. 1 is 17.630 meters (57.84 feet) north from station in azimuth 200°01′; no. 2 is 10.900 meters (35.76 feet) east in azimuth 255°01′. *Bob azimuth mark* (see description thereof) is about ¾ mile southwest in azimuth 58°20′52″.

Plane coordinates: (III), x=304,212.86 feet; y=913,604.19 feet; grid azimuth to *Bob azimuth mark*=58°51′00″.[7] (IV), x=659,904.83 feet; y=913,318.51 feet; grid azimuth to *Bob azimuth mark*=57°56′16″.[7]

Bob azimuth mark (Fremont County, J. Bowie, Jr., 1936).—On eastern end of higher ridge about ¾ mile from station *Bob* (see description thereof). Azimuth of *Bob* from azimuth mark is 238°20′23″. To reach from station *Bob*, pack southwest across shale rock to station set in bedrock just northeast of highest point of ridge. Mark is standard disk in bedrock, note 12a.

Plane coordinates: (III), x=301,018.93 feet; y=911,673.68 feet. (IV), x=656,742.10 feet; y=911,337.42 feet.

Meadow (Fremont County, J. Bowie, Jr., 1936).—About 26 miles northwest of Fort Washakie, about 15 miles west-northwest of Diversion Dam, 5½ miles south of Burris post office, about 4 miles south of Meadow Creek ranger

[7] This azimuth has been computed by the first formula (p. 70), using both terms.

For notes in regard to marking of stations see p. 65.

station, just south of graded road leading from Crowheart store to ranger station, 53 feet south of center line of road, and at west edge of main summit. To reach from Fort Washakie, follow State Highway 287 north 15.6 miles; take left fork and follow highway 15.0 miles to side road left, 0.45 mile south of Crowheart store; turn left and follow graded road towards Meadow Creek ranger station, 4.9 miles to station. Station mark is standard disk in outcropping bedrock, note 2. Reference and azimuth marks are standard disks in outcropping bedrock, note 12a. No. 1 is on the flat, 13.590 meters (44.59 feet) southeast of station in azimuth 306°35′; no. 2 is about 5 feet lower than station, and 12.952 meters (42.49 feet) southwest from station in azimuth 60°02′. Azimuth mark is on top of slight rise, in top of flat rock outcrop 12 yards south of center line of road, and about 0.4 mile west of station in azimuth 72°54′08″.

Plane coordinates: (III), x=365,539.38 feet; y=948,343.48 feet; grid azimuth to azimuth mark=73°14′53″.[8]

Dinwoody (U. S. G. S.) (Fremont County, J. Bowie, Jr., 1936).—About 7 miles east and 17 miles south of Dubois, 2 miles west of Indian Reservation line, on divide between Dry and Dinwoody Creeks, on highest point of long hogback rocky ridge. Station ridge appears smooth from east, runs nearly north and south with easy slopes, and reaches its highest point at station. West of station is saddle, and ½ mile west is 200-foot higher rough ridge. Station is 1 foot east of east edge of 5-foot cairn, and 150 yards south of granite outcrop of nearly same elevation. To reach from Sacajawea Lodge on Dinwoody Creek, and on U. S. Highway 6.7 miles northwest from Burris post office, follow U. S. Highway 287 southeast 0.4 mile to sign "Phillips", "Wilderness Lodge 5 mi."; leave highway, turn back to right and follow Phillips plain well-traveled road southwesterly up towards mountains 1.3 miles; cross plank bridge over large canal and continue southerly 1.6 miles; take left fork and follow main-traveled road south and southwest along east side of lakes 2.2 miles to Phillips' ranch buildings and lodge at south end of lake, and end of truck travel. Station is visible from lodge in magnetic azimuth 216° (southwest) on smooth ridge to right of and beyond cliffs. Pick up trail at fence corner ¼ mile south of lodge, and follow plain trail south up steep slope to saddle, thence to right (westerly) along or near crest of ridge up toward station. Pick up plain trail through old barn and continue up crest of ridge, following closely above Dinwoody Canyon cliffs to large cairn. Go through narrow pass in rocks and across saddle. Pick up trail at west side of main saddle and follow trail marked by piles of rocks westerly up station ridge to north-south ridge crest where there are two rams' horns on trail. Leave trail, turn left and follow ridge south to top and highest point, about ½ mile south of rams' horns and marked trail. Elevation is about 12,000 feet. Horse pack requires about 4½ hours. Station mark is U. S. Geological Survey aluminum disk, stamped "11598 VA" set in rock. Reference and azimuth marks are standard disks in outcropping bedrock, note 12a. No. 1 is 13.955 meters (45.78 feet) northeast of station in azimuth 230°42′; no. 2 is 14.190 meters (46.56 feet) south in azimuth 351°36′. Azimuth mark is on small rock ledge, approximately 0.5 mile southwest of station in azimuth 42°03′09″.

Plane coordinates: (III), x=300,550.07 feet; y=955,277.54 feet; grid azimuth to azimuth mark=42°33′58″.[8] (IV), x=655,578.36 feet; y=954,927.51 feet; grid azimuth to azimuth mark=41°39′07″.[8]

Sacajawea (Fremont County, J. Bowie, Jr., 1936).—About 27 miles southeast of Dubois, along U. S. Highway 287, 3.3 miles northwest of Burris post office, 3.0 miles east-southeast of Sacajawea Lodge, on highest road elevation between these last two-named places, on sagebrush-covered flat, ½ mile north of grassy ridge south of highway, about 105 yards west-southwest of boulder 8 feet high in telephone line on north side of highway, and 68 feet south of center line of highway. Station mark is standard disk in boulder, note 4. Reference and azimuth marks are standard disks in boulders, note 12c. Station and reference marks are in small boulders which project several inches above ground. Reference mark no. 1 is 8.705 meters (28.56 feet) southeast from station in azimuth 313°50′; no. 2 is 17.920 meters (58.79 feet) south-

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

west in azimuth 28°17′. Distance between reference marks is 17.702 meters (58.08 feet). Azimuth mark is on low ridge, about 20 yards northeast of medium-sized boulder on top of ridge, about 30 yards southeast of medium-sized boulder on northwest slope of ridge, in small boulder flush with ground, and about ¼ mile southeast of station in azimuth 330°22′09″.

Plane coordinates: (III), x=345,990.30 feet; y=997,314.80 feet; grid azimuth to azimuth mark=330°46′02″.[8]

Pasup (Fremont County, J. Bowie, Jr., 1936).—About 10 miles north-northwest of Diversion Dam, about 9 miles east of Lenore post office, about 6½ miles northeast of Crowheart Butte, about 1½ miles east of Pasup Creek, on main butte lying about ¼ mile south of Teapot Butte which is lower than main butte. Station is on north edge of butte, south by east of the "Teapot", 21 feet south of edge of cliff, and 27 feet west of edge of cliff at break to south. To reach from Diversion Dam on Wind River and junction of U. S. and State Highways 287, go north on highway 0.9 mile, take left fork just after crossing dam and follow road along base of hills, passing caretaker's house on west side of canal, and following road up hill; at 1.5 miles take right fork and follow main-traveled road; at 2.3 miles keep to left fork (station *Diversion* is about ¼ mile to east); at 2.7 miles enter graded road and turn left (road leads to Lenore post office); at 5.2 miles turn right off graded road and follow track road in scraped area; at 6.9 miles keep straight ahead (northwest) on main-traveled road; at 9.6 miles take left fork straight ahead; at 11.8 miles take right fork straight ahead; at 12.9 miles turn right and follow very dim track road leading east on north side of deep wash eating towards road from east; at 13.2 miles cross Pasup Creek and continue on old washed-out road up hills to east; at 14.3 miles bear left at northwest side of the "Teapot" and go northeast to top of first low ridge, then follow ridge around arc 1.8 miles to top of main divide at southeast base of main butte. From here trail leads up north side of mesa and station is about ⅓ mile northwest. Station mark is standard disk in outcropping bedrock, flush with ground. Reference and azimuth marks are standard disks in outcropping bedrock, note 12a. Reference marks are flush with ground. No. 1 is 5.352 meters (17.56 feet) northeast of station in azimuth 231°29′; no. 2 is 28.197 meters (92.51 feet) west in azimuth 108°33′. Azimuth mark is approximately 75 yards west of east end of butte, along north edge of rock ledge and at point where ledge recedes to south going westerly, and approximately ⅓ mile southeast of station in azimuth 305°52′52″. Cairn on the "Teapot" is approximately 150 yards northwest of station in azimuth 154°22′35″.

Plane coordinates: (III), x=432,996.95 feet; y=983,783.76 feet; grid azimuth to azimuth mark=306°03′15″.[8]

Ega (Fremont County, J. Bowie, Jr., 1936).—About 7.5 miles north and 1.0 mile east of Lenore post office on one of many grassy pebble hills on mesa country between Pasup (or Dry) and Crow Creeks, 5 miles east of Crow Creek, 2.5 miles west of Pasup Creek, 2 miles northwest of well-traveled track road from Lenore to Dry Creek, and ½ mile northeast of track road running northwest between Dry and Crow Creeks. Ridge is smooth and grassy, and about 100 yards long northwest and southeast. There is higher smooth ridge ½ mile northeast. Draw at northwest end of station ridge opens out into wide flat drainage running to southwest; this is evidently Ega Draw. To reach from Lenore post office, drive southeast on main-traveled road toward Riverton 0.5 mile; leave graded highway, turn half left onto poor road winding easterly up through rock cliffs and go 0.6 mile; come out on top of mesa and continue on poor road straight ahead (northerly) 1.8 miles; drop down off mesa and, after crossing dry coulee, continue on only plain road northeasterly 3.7 miles to top of dugway and small saddle in ridge; continue straight ahead (northeasterly) 1.4 miles to cross road, little traveled. Leave main road, turn left and drive northwesterly on track road 0.45 mile; keep to right fork, straight ahead, on main-traveled road, northwesterly up through low hills 1.35 miles to point where road comes out into large drainage—flat draw running south-southwesterly, at west foot of pebble hill. Station is visible from here, on bare hill ½ mile to north. Leave road, turn right and drive north-northeast across country up south side of draw, and on to top of ridge 0.5 mile to station.

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 7.746 meters (25.41 feet) east of station in azimuth 257°18′; no. 2 is 8.649 meters (28.38 feet) north in azimuth 163°12′. Azimuth mark is on right side of road to station, at point where one leaves road to drive across country to station, and approximately 0.5 mile south from station in azimuth 16°10′58″.

Plane coordinates: (III), x=399,364.83 feet; y=1,009,303.05 feet· grid azimuth to azimuth mark=16°26′35″.[8]

Maverick (Fremont County, J. Bowie, Jr., 1936).—About 19 miles north of Diversion Dam, 14 miles north-northeast of Crowheart Butte, on Maverick Springs Ridge, on oil dome belonging to Union Oil Company, on high point near east edge of dome, 60 yards east-southeast of derrick on high point of dome, 80 feet north of south edge of summit, and 4.5 feet north of station *Post, S. line SE. ¼ sec. 15.* (See geographic position and description thereof.) To reach from junction of U.S. Highway 287 and U.S. Highway 320 at Riverton, follow Highway 287 west 17.7 miles; turn right (north) on Pavillion road and go north 6.7 miles to transformer station at end of pavement at Pavillion; thence north on Maverick Springs road 6.2 miles; keep to left fork or lesser-traveled road at "Y" and go 2.3 miles; keep to left fork at "Y" and go 0.5 mile; keep straight ahead on Maverick Springs road at fork and go 13.2 miles; take right fork and go 1.4 mile; take right fork and go north up steep and rocky slope 1.1 miles to oil field on summit; thence east 0.1 mile along south edge of summit to station. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference marks are standard disks in concrete, note 11a. No. 1 is 15 feet north of south edge of summit, and 19.453 meters (63.82 feet) south of station in azimuth 0°37′. No. 2 is 15 yards northeast of edge of summit and 21.350 meters (70.05 feet) southwest of station in azimuth 56°07′. Azimuth mark is standard disk in outcropping bedrock, on high point at southeast end of ridge, 6 feet northwest of southeast edge of point, and approximately 0.4 mile east of station in azimuth 282°36′19″.

Plane coordinates. (III), x=439,244.76 feet; y=1,028,710.80 feet; grid azimuth to azimuth mark=282°45′46″.[8]

French (Fremont County, J. Bowie, Jr., 1936).—About 28 miles northwest of Pavillion, on summit of bare stony hill, highest of group of low hills in vicinity, lying about 1 mile northeast of Big Dry Creek and ¼ mile northeast of Little Dry Creek, about ½ mile north-northeast of home of Claude French, and 100 yards east of and 35 feet higher than Jones' Spring road. Station hill is knoll at southwest end of barren ridge, and is on range with prominent conical red and black peak about 3 miles to northwest and gap in nearby hills to southeast through which distant horizon is visible. To reach station from junction of U. S. Highways 320 and 287 in Riverton, follow Highway 287 west 17.7 miles; turn right (north) onto Pavillion road and go 6.7 miles to end of pavement at Pavillion; thence north on Maverick Springs road 6.2 miles; take left fork and go northwest 2.3 miles; keep to left fork and go 0.5 mile; take right fork and go straight ahead on Maverick Springs road 0.1 mile; keep straight ahead at crossroads and go 13.1 miles along main road to "Y"; take left fork and go 7.2 miles; turn right at triangle intersection and go 1.0 mile to where road passes between two low hills; turn right and go easterly across country and up hill 100 yards to summit and station. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference marks are standard disks in boulders, note 12d. No. 1 is in top of conical projecting boulder, 22.779 meters (74.73 feet) northeast of station in azimuth 233°06′; no. 2 is about 3 feet lower than station, and 15.532 meters (50.96 feet) southeast of station in azimuth 320°11′. Azimuth mark is standard disk in boulder, note 12d, along Jones' Spring road, 240 feet west of center of road, in north end of large flat outcrop of whitish rock at south edge of north end of draw which parallels road, and about 0.6 mile southeast of station in azimuth 337°20′52″.

Plane coordinates: (III), x=409,455.91 feet; y=1,048,770.39 feet; grid azimuth to azimuth mark=337°34′59″.[8]

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

Crow (Fremont County, J. Bowie, Jr., 1936).—About 19 miles west and 14 miles north of Dubois, 11 miles north of French's Sheep Camp in Crow Creek Basin, about 3 miles west and ½ mile south of Washakie Needles, and due north of head of Crow Creek, on highest peak for many miles around except Washakie Needles and Dome Mountain. To reach from Lenore post office, go northwesterly on main graded road up Wind River; at 1.1 miles, graded forks, turn right, leave main road and take road leading to Tipperary. At 8.8 miles take left fork with sign "Tipperary" and go northerly on bladed road; at 13.0 miles take left fork with sign "Tipperary" and go northerly; at 13.8 miles cross lane through two wire gates and continue northwesterly on main-traveled road; at 15.4 miles keep to left fork west along south side of fence; at 15.8 miles pass through wire gate and go north along west side of fence on track road which is being surveyed (1936) for improvement. From here road winding up mountain is visible straight ahead. At 16.8 miles foot of steep mountain grade is reached; continue up Crow Mountain road; at 20.9 miles reach summit of road; at 22.9 miles road forks at dug triangle; continue straight ahead, northerly, on main-traveled road; at 24 miles reach cabins in south end of Crow Basin known as French's Sheep Camp. From here horse trail leads up Crow Creek, the last mile or so being hardly more than a sheep trail and hard to follow but not hard going. From head of Crow Creek is about 30-minute horse pack to top of ridge and station. From French's Sheep Camp to station is about 5- or 6-hour horse pack. Station can also be reached from station *Muddy* (*U. S. G. S.*) (see description thereof) by following along top of ridge, about 3½-hour horse pack; going is rough in places and trail up Crow Creek is preferred. Station mark is standard disk in boulder, note 4. Reference mark no. 1 is standard disk in outcropping bedrock, note 12c, 16.302 meters (53.48 feet) southwest of station in azimuth 27°20′. No. 2 is standard disk in outcropping bedrock note 12a, 9.245 meters (30.33 feet) west in azimuth 89°37′. Azimuth mark is standard disk in boulder, note 12c, about ¼ mile south of station in azimuth 5°36′28″. It is near south end of knoll before it becomes saddle leading to south, and is about 20 yards west of break on east side. *Wiggins Peak, cairn* and *Washakie Needles, highest point* (see geographic positions thereof) may also be used as azimuth marks.

Plane coordinates: (III), x=364,637.23 feet; y=1,120,112.57 feet; grid azimuth to azimuth mark=5°57′42″.[8]

Contact (Fremont County, J. Bowie, Jr., 1936).—About 7 miles east and 5½ miles south of Dubois, 1¼ miles north by west from spring in Red Draw Basin, 1 mile due west from J. H. Anderson's ranch on Wind River and U. S. Highway 287, ⅓ mile north and on second ridge from wire gate in east-west fence, on west end and highest point of short steep bare ridge with red sides, and near small cairn on highest point of small local ridge a few yards north and above several large pines in side of draw. From small saddle which is 6 feet lower than and 30 feet to southwest of station, there rises to west and southwest much higher ridge, strewn with large boulders. To reach from Burris post office on U. S. Highway 287 about 27 miles southeast of Dubois, follow highway northwesterly 6.7 miles to Sacajawea Lodge on Dinwoody Creek; continue on Highway 287 northwesterly 6.5 miles; cross old steel bridge over Wind River (new bridge under construction), and continue northerly 1.1 miles to end of truck travel at J. H. Anderson's ranch 200 yards to left below highway, and road forks with sign "Hunting Camp 19 miles Harold Butler." Cross Wind River about 150 yards below Anderson's house and go southwesterly on trail and old wagon road up Red Draw which runs along northwest foot of butte 1.0 mile to southwest of Anderson's house. When entering canyon, go around fence corner to left and not through gate. Continue up Red Draw about 1 mile from river to spring of good water in basin some yards to left of trail. Trail divides here, right branch going to station, other to azimuth mark. Turn right at spring and climb north up through red cliff breaks to top of ridge, thence north across draws to lone southeast fence corner; fence runs west and northeast from corner. Turn left (west) up fence line 200 yards to wire gate; pass through gate and go north up through near saddle and on north across draw about ¼ mile to next ridge and station; total distance from spring is about 1¼ miles. Station mark is standard disk in outcropping bedrock, note 2. Reference marks are standard disks in outcropping bedrock, note 12a. No. 1 is 6.970 meters

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

(22.87 feet) north of station in azimuth 191°10′; no. 2 is 4.190 meters (13.75 feet) northeast in azimuth 236°05′. *Contact azimuth mark* (see description thereof) is marked by standard disk in bedrock, note 12a, and is about 1¼ miles south of station in azimuth 347°32′51″.

Plane coordinates: (III), x=301,149.98 feet; y=1,017,740.31 feet; grid azimuth to *Contact azimuth mark*=348°03′45.3″.

Contact azimuth mark (Fremont County, J. Bowie, Jr., 1936).—At southwest end of prominent cliff butte which can be seen 1.0 mile to southwest from Anderson's house (see description of station *Contact*, p. 188). To reach station from spring in Red Draw Basin, mentioned in description of station *Contact*, continue southwesterly up through basin, keeping to left in main drainage; go through wire gate ½ mile from spring, then swing back east along smooth saddle and climb through break in cliffs to highest point on ridge and azimuth mark. Mark is standard disk in outcropping bedrock, note 12a. Azimuth from mark to station *Contact*, distant about 1¼ miles, is 167°33′04″.

Plane coordinates: (III), x=302,563.08 feet; y=1,011,056.30 feet.

Dennison (Fremont County, J. Bowie, Jr., 1936).—About 4 miles west of Duncan post office, about 2 miles south of Dennison Ranch, on high point near west end of high bare (except for small rocks and grass) hill, highest in vicinity, lying on divide between Bear Creek and Wiggins Fork. Hill comes up from south and east in long gradual slope in form of semicircle, and station is about 300 yards east-northeast of its west end, 300 yards north-northwest of drift fence between Dennison and Double Diamond Ranch properties, 200 yards north of center of shallow saddle, and 60 yards east-northeast of head of draw extending to south. To reach from Dubois, follow U. S. Highway 287 southeast about 11 miles, turn left onto graded road at J. H. Anderson's ranch house 200 yards to right, and follow main graded road down north fork of Wind River Valley 9.6 miles; take left fork just before reaching Double Diamond Ranch buildings, and go north up Bear Creek 3.0 miles to road summit 0.2 mile beyond cattle-guard crossing; turn left on very dim washed-out road and go 100 yards to wire gate; pass through gate and continue southwest on old road 0.3 mile; bear left across shallow wash and continue southwest along northwest side of deep timbered draw 0.3 mile; turn left across draw at shallow crossing and immediately turn right and continue southwest along southeast side of draw to drift fence; bear right along drift fence for about 0.5 mile to saddle, turn right and go 0.1 mile to station on summit. Trucks can be taken to station. Surface mark is standard disk welded to end of pipe 3 feet long, set in concrete beneath surface of ground. Under ground mark is standard disk in concrete, note 7a. Reference marks are standard disks welded to pipes 3 feet long set in concrete beneath surface of ground. No. 1 is 10.645 meters (34.92 feet) north of station in azimuth 168°27′; no. 2 is 9.122 meters (29.93 feet) northeast of station in azimuth 239°05′. Distance between reference marks is 11.490 meters (37.70 feet). Azimuth mark is standard disk in concrete, note 11a, on summit of knoll across saddle from station, 60 feet south of drift fence, and about 0.2 mile south of station in azimuth 349°40′14″.

Plane coordinates: (III), x=302,600.02 feet; y=1,074,293.07 feet; grid azimuth to azimuth mark=350°11′05″.[8]

Kent (U. S. G. S.) (Fremont County, J. Bowie, Jr., 1936).—About 11 miles north-northwest of Duncan post office, on highest point of sharp peak known as Mount Kent, on divide between Caldwell and Bear Creeks, and 3½ miles east of Wiggins Fork. From southeast mountain appears smooth with two well-defined, sharp peaks about ¼ mile apart, the left (station) peak being the higher. Mount Kent appears to be highest point on south end of long high ridge with higher points to north. To reach from Burris post office, 27 miles southeast of Dubois, follow route given in description of station *Duncan* (p. 190) as far as wire gate where road crosses ridge 2.0 miles beyond cross road leading to Duncan post office. Pass through gate and go about 0.7 mile to Butler's ranch, where pack horses and guide can be obtained. From Butler's ranch follow horse trail northwest about 10 miles across high ridge and mesa to Bear Creek Basin. Cross this valley and follow trail north up opposite slope, and then west up steep slope to highest point and station. It is about 2½ miles from Bear Creek Basin to top of Mount Kent, and about 2,500-foot climb.

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

Station mark is standard U. S. Geological Survey disk set in highest point of mountain. Reference and azimuth marks are standard disks in outcropping bedrock, note 12a. No. 1 is 16.119 meters (52.88 feet) south of station in azimuth 17°55′; and no. 2 is 3.844 meters (12.61 feet) northwest in azimuth 151°10′. Azimuth mark is on first peak north of station, and about ¼ mile distant in azimuth 224°58′12″. *Wiggins Peak, cairn* and *Warm Springs, fire lookout tower* (see geographic positions thereof) are visible from ground at this station and may be used as azimuth marks.

Plane coordinates: (III), x=306,555.66 feet; y=1,124,354.26 feet; grid azimuth to azimuth mark=225°28′35″.[8]

Duncan (Fremont County, J. Bowie, Jr., 1936).—About 15 miles east-northeast of Dubois, on highest point of smooth, nearly barren ridge lying on bench about 1½ miles northeast of Duncan post office, about ¾ mile south of Butler's ranch, 0.4 mile southeast of well-traveled road leading to Butler's ranch, and about ¼ mile west of east fork of Wind River which runs in deep gorge along northeast foot of ridge. There are a few pine trees on northeast slope of ridge. To reach from Burris post office, which is on U. S. Highway 287, about 21 miles north of junction of that highway with State Highway 287 at Diversion Dam, and about 27 miles southeast of Dubois; follow U. S. Highway 287 northwest 13.2 miles to steel bridge over Wind River (new bridge and road are now under construction at this point). Cross bridge and continue 1.1 miles to road on right at sign "Hunting Camp 19 miles Harold Butler" and J. H. Anderson's ranch buildings on right of highway. Turn right off highway on this road and follow main graded road up valley 6.6 miles to bridge over river; cross bridge and continue on main road 3.0 miles to forks at Double Diamond Ranch buildings; take right fork and follow main road up mesa 2.7 miles to white post and sign. Continue northeast along edge of bench 0.8 mile to crossroads (Duncan post office is down to right in this valley under bench); keep straight ahead and follow main road 2.0 miles to wire gate where road crosses ridge (see description of station *Kent* (*U. S. G. S.*)); turn right off road and go east up ridge 0.4 mile to highest point and station. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 9.590 meters (31.46 feet) southwest of station in azimuth 49°00′; no. 2 is 15.217 meters (49.92 feet) northwest in azimuth 136°01′. Azimuth mark is about 0.15 mile north of several log buildings at ranch, about 25 yards east of road to Butler's ranch, and about 0.6 mile southwest of station in azimuth 29°02′56″. Other distances and azimuths from station are as follows: northeast corner of ranch house, ¾ mile, 38°45′14″; *Warm Springs, fire lookout tower* (see geographic position thereof), 20 miles, 77°18′04″; south corner of most southerly of ranch buildings, at Butler's ranch, approximately ¾ mile, 196°03′44″.

Plane coordinates: (III), x=331,916.35 feet; y=1,078,424.80 feet; grid azimuth to azimuth mark=29°29′13″.[8]

Castle Rocks (Hot Springs County, J. Bowie, Jr., 1936).—About 44 miles west and 8 miles north of Thermopolis, 4½ miles air line in azimuth 278° magnetic from T. McCoy's ranch buildings and visible therefrom, 1¼ miles northeast of North Fork of Owl Creek, in center of sec. 25, T. 44 N., R. 102 W., on highest point of middle one of three rocky peaks known locally as "Three Peaks", but named "Castle Rocks" on U. S. Geological Survey quadrangle sheet. North peak is slightly higher than station peak, and south peak is slightly lower. To reach from Thermopolis post office, go south 1 block, thence west on anchor Highway; at 5.7 miles cross Owl Creek and begin travel on oiled highway; at 18.2 miles reach end of oiled road; at 26.3 miles, Embar School, take left fork and go westerly; at 34.0 miles, Anchor School on left, take right fork up over hill northwesterly, and follow main-traveled road; at 35.3 miles, T-road leads north to "Buffalo Head Ranch", continue straight ahead on main-traveled road; at 35.6 miles take left fork about 50 yards west of mail box with panel from car hood for door—right fork goes to Anchor post office about 1½ miles distant; at 36.2 miles pass through wire gate and go west along south side of fence; at 37.3 miles pass through wire gate in north-south fence and continue west on main road on north side of North Fork of Owl Creek; at 41.7 miles reach Tim McCoy's ranch buildings at junction of North Fork of Owl Creek and Dude

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

Camp Creek, go through pole gate at southeast corner of yard, turn west and follow main-traveled road up north side of North Fork of Owl Creek; at 46.3 miles take right fork, natural water hole on north side of road, and go north and east up slope (cabin is in flat about ½ mile distant on road going straight ahead); at 46.8 miles, cabin on right of road, continue up slope to north; at 47.6 miles azimuth mark is about 100 feet north of road; at 47.7 miles, old log cabin is on right (north) side of road, continue northwest on skid road on south side of draw and through trees; at 47.9 miles cross draw and go north across country over low divide; at 48.4 miles cross small brook and go west across country along north side of valley and north of aspen grove; at 48.8 miles reach end of truck travel at base of steep slope leading up northeast slope of north peak. From here station is on middle one of three rocky peaks to west. Best reached by climbing along slope to saddle between middle and north peaks, thence south to station. Vertical cliffs make access by any other route difficult. Pack requires ¾ hour. Road in vicinity of McCoy's ranch has spots of gumbo and is very sticky in wet weather. Station mark is standard disk in outcropping bedrock, note 2. Reference marks are standard disks in outcropping bedrock, note 12a. No. 1 is 4.073 meters (13.36 feet) southwest of station in azimuth 64°12′; no. 2 is 3.281 meters (10.76 feet) northwest in azimuth 132°35′. Distance between reference marks is 4.190 meters (13.75 feet). Azimuth mark is standard disk in boulder, note 12c, in valley, about 0.1 mile southeast of old log cabin, about 100 feet north of track road, on top of large lone boulder about ⅛ mile west of group of large boulders, and about 1 mile southeast of station in azimuth 310°52′22″. All marks are flush with ground.

Plane coordinates: (III), x=422,936.67 feet; y=1,124,172.39 feet; grid azimuth to azimuth mark=311°04′28″.[8]

Hamilton (Hot Springs County, J. Bowie, Jr., 1936).—About 22 miles west-northwest of Thermopolis, about 1 mile north of North Fork of Owl Creek, about 2 miles southwest of Hamilton Dome Oil Field, at head of canyon that extends to south from oil field and has steep, bare slopes to northwest and bluffs to southeast, on high bare hill which overlooks country for miles on all sides. To reach from main intersection in Thermopolis, go west on Owl Creek Highway 17.4 miles to graded road to right at sign "Hamilton Dome"; turn right off main highway and go north on graded road across Owl Creek and through group of ranch buildings 1.7 miles to T-intersection with graded road; turn left, then take right fork and follow main graded road up hill 3.8 miles to point where telephone line crosses road. Azimuth mark is to left at this point. Continue north 0.3 mile to Y about 0.1 mile south of oil field camp; turn back to left on graded road and go 0.7 mile to south side of large circular oil storage tank; leave graded road and follow old track road southwest along southeast side of big wash for about 1½ miles to deep side wash; cross side wash and go southwest up hogback of bare ridge for about 0.8 mile to highest point and station. Big wash mentioned above comes out of deep canyon between two high hills, on more southerly one of which station is located. Truck could be driven to station in 1936, but soil is eroding so rapidly that route described above may soon become impassable. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference marks are standard disks in concrete, note 11a. No. 1 is 9.120 meters (29.92 feet) northeast of station in azimuth 214°18′; no. 2 is 10.758 meters (35.30 feet) west in azimuth 91°36′. Azimuth mark is standard Coast and Geodetic Survey bench mark disk stamped "H 49 1934", set in concrete post, on west side of graded highway leading to Hamilton Dome Oil Field (see route to station, above), at point where telephone line crosses highway, about 0.4 mile south of oil field camp, 15 paces west of center line of graded highway, 13 paces north of telephone pole, and approximately 2 miles northeast of station in azimuth 239°59′23″.

Plane coordinates: (III), x=536,028.95 feet; y=1,124,797.73 feet; grid azimuth to azimuth mark=239°53′43″.[8]

Morants (Hot Springs County, J. Bowie, Jr., 1936).—About 31 miles west and 8 miles north of Thermopolis, about 4 miles north of Anchor schoolhouse on Thermopolis-Anchor graded road, about 4 miles northeast of Anchor post office, 1 mile east of McKenzie shearing pens, between two dry washes, on knoll at east and higher end of low barren ridge, and about 3 feet from south brow of knoll, on highest point in vicinity. North of station ridge are number of par-

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

allel ridges, station ridge being southern one of series. To reach from Thermopolis post office, go south 1 block, thence west on Anchor Highway; at 5.7 miles cross Owl Creek and begin travel on oiled highway; at 18.2 miles reach end of oiled road; at 26.3 miles, Embar School, take left fork and proceed westerly; at 34.0 miles reach Anchor School on left, take right fork over hill northwest and follow main-traveled road; at 35.3 miles, T-road leads north to "Buffalo Head Ranch", turn right and go north; at 36.7 miles go through gate in east-west fence and continue north. From point 50 yards north of gate station site is visible on right end of first rough ridge in magnetic azimuth 17°. At 37.0 miles keep to left fork straight ahead (northerly) on slightly bladed road; at 38.1 miles reach McKenzie sheep pens, long, red, tin-roofed sheds and corrals. Here leave bladed road, turn right and go north along west side of corral and over small divide. At 38.2 miles turn right (east) onto old bladed road, a cabin is about 150 yards to northeast. At 39.2 miles, road starts down at end of ridge; turn right and go south across country about 0.1 mile to top of knoll and station. Surface and underground marks are standard disks in concrete, notes 1a and 7a. Reference and azimuth marks are standard disks in outcropping bedrock, note 12a. Reference marks are on south slope of knoll, and are in top of rock ledges which protrude from slope. No. 1 is 19.075 meters (62.58 feet) east of station in azimuth 277°12′; no. 2 is 15.955 meters (52.35 feet) south in azimuth 359°58′. Azimuth mark is on highest point of ledge on north side of first dry wash north of station, about 15 yards north of break at top of ledge, and approximately 0.3 mile north of station in azimuth 171°26′38″.

Plane coordinates: (III), x=480,299.61 feet; y=1,120,137.68 feet; grid azimuth to azimuth mark=171°29′43″.[8]

Anchor (Hot Springs County, J. Bowie, Jr., 1936).—About 33 miles due west of Thermopolis, about 28 miles north of Diversion Dam, on summit of main Owl Creek Mountains, about 3 miles west of high and prominent rim on mountain, and about 1½ miles west of new road being built over range from vicinity of Bargee on south to Owl Creek highway on north. To reach from main intersection in Thermopolis, follow Owl Creek highway west 18.0 miles to end of pavement (first five miles of highway are gravel); continue west on main road 6.2 miles to where road to left through gate leads to Owl; continue west on graded road 1.9 miles; take left fork at large white schoolhouse and continue west on graded road 2.0 miles, to where main road follows right fork west along Owl Creek, and Curtiss ranch is 0.4 mile to west. Take left fork and follow main road southwest up creek 0.4 mile to where new grade begins. Continue southwest up new grade 7.6 miles to white fill with borrow pit on right, 0.5 mile before reaching gate at summit of divide. Turn right, cross borrow pit, and go west through sage brush 0.3 mile to small corral and spring; bear left, passing between corral and spring, go south up stock trails to top of steep slope and salt lick 0.2 mile from spring. Turn right across rocks, go about 100 yards and pick up old road, and follow it west along divide 1.0 mile; bear right off road at edge of big sagebrush and continue west up grassy slope 0.3 mile to north end of top and station. Station mark is standard disk in concrete, note 1a. Reference marks are standard disks in concrete, note 11a. No. 1 is 8.168 meters (26.80 feet) southwest of station in azimuth 40°56′; no. 2 is 9.070 meters (29.76 feet) northwest in azimuth 119°00′. Azimuth mark is standard disk in outcropping bedrock, note 12a, on south side of first saddle southeast of station, distant therefrom about 0.5 mile in azimuth 303°18′02″.

Plane coordinates: (III), x=469,947.52 feet; y=1,079,439.39 feet; grid azimuth to azimuth mark=303°22′44″.[8]

Lime (Hot Springs County, J. Bowie, Jr., 1936).—On grassy hill on high ridge 1½ miles northeast of South Fork of Owl Creek, 1 mile south of ranch with large log corrals through which Thermopolis-Dubois graded road passes, 1.0 mile southeast of road summit where road starts down towards South Fork, and about ⅓ mile south of highest point of road. There is higher bare rocky point ¾ mile southeast of station, and prominent grassy saddle 200 feet lower and ½ mile west. Vicinity of station is bare of timber along ridge and on south slope, but there is tall timber on north slope 50 yards from station. To

[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

reach from Thermopolis post office, go south 1 block, then west on Anchor Highway (graded) 5.7 miles; cross steel truss bridge over Owl Creek, and follow oiled highway 12.5 miles to where oiled surface ends. Continue on only graded highway westerly 8.1 miles to white schoolhouse (Embar School) in forks; take left fork and follow main-traveled road westerly 7.7 miles to Anchor School, white schoolhouse with green out-buildings on left of road; take left fork straight ahead and go westerly along north side of fence 0.8 mile; take left fork and follow main-traveled road south 0.7 mile to creek; cross North Fork of Owl Creek and go 150 yards; cross bridge over ditch and follow right fork, main-traveled road, westerly 0.5 mile; take right fork straight ahead and go west and up hill 0.7 mile; at top of steep hill, on bench, take right fork (west) and follow only well-traveled road west paralleling mountains 5.6 miles to old car chassis and lumber on right of road; turn left with road, cross Middle Branch of Owl Creek for third time, and start up mountain. Follow only road up southwesterly. This is the old Dubois road, which was once worked and bladed. Go up mountain 3.9 miles to road summit; continue west down into meadow with cabin, 0.8 mile. Pass through wire gate and through large log corrals, and continue southwesterly on road upgrade 0.8 mile from corrals where road curves to right, and note lone northeast fence corner 300 yards south from road. Leave road, turn left and drive up south 0.2 mile to fence corner with 3 blazes on post, thence 0.4 mile south-southeast to main saddle, broad and grassy. Turn left and drive easterly up steep grassy stony hill to top, 0.6 mile to station. Station mark is standard disk in outcropping bedrock, note 2. Reference and azimuth marks are standard disks in outcropping bedrock, note 12a. No. 1 is 9.640 meters (31.63 feet) east of station in azimuth 294°26′; no. 2 is 5.260 meters (17.26 feet) north in azimuth 166°40′. Azimuth mark is in top of first rock ledge about 0.25 mile southeast of station in azimuth 317°04′31″.

Plane coordinates: (III), x=426,976.94 feet; y=1,090,878.50 feet; grid azimuth to azimuth mark=317°15′57″.[8]

South Fork (Fremont County, J. Bowie, Jr., 1936).—About 8 miles north and 6.5 miles west of Fort Washakie post office, ½ mile south of South Fork of Sage Creek (on north corner of small barren mesa which may be hill known as Norkok Butte), 300 yards south of Fort Washakie-St. Lawrence Ranger Station graded road where road goes through low pass in hills, after which it drops down grade into creek valley. Station is about 300 feet higher than road at pass. Sage Creek white schoolhouse is about 1 mile from station in magnetic azimuth 269°. To reach from Conoco Service Station in Fort Washakie, follow State Highway 287 (oiled road) northerly 7.0 miles; at point 300 yards south of highway bridge over Sage Creek leave highway, turn half left onto graded road towards St. Lawrence Ranger Station, and follow main graded road northwesterly 4.8 miles to road summit at northeast foot of butte or mesa, where green fields are first visible in valley ahead. Leave road at summit, turn left and drive up southeast across country 0.2 mile to east shoulder and end of truck travel, 200 yards east of station. Climb west to top and on over to north corner of mesa, 5-minute walk. Station mark is standard disk in concrete, note 1a. Reference and azimuth marks are standard disks in concrete, note 11a. No. 1 is 11.702 meters (38.39 feet) east of station in azimuth 298°59′; no. 2 is 9.450 meters (31.00 feet) south in azimuth 18°37′. Azimuth mark is 30 feet south of center line of graded road, and 0.25 mile east of station in azimuth 250°14′28″.

Plane coordinates: (III), x=434,250.99 feet; y=894,301.07 feet; grid azimuth to azimuth mark=250°24′34″.[8]

Supplementary points

Shoshoni, Chicago & North Western Ry. redwood water tank, finial (Fremont County, J. Bowie, Jr., 1936).

Plane coordinates: (III), x=672,040.28 feet; y=936,328.25 feet.

Red and white flag near station Lost Well (Fremont County, J. Bowie, Jr., 1936).

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[8] This azimuth has been computed by the first formula (p. 70), neglecting the second term.

For notes in regard to marking of stations see p. 65.

Plane coordinates:[9] (III), x=587,673.95 feet; y=915,642.27 feet.

Thermopolis, public school, cupola (Hot Springs County, J. Bowie, Jr., 1936).

Plane coordinates: (III), x=641,064.90 feet; y=1,085,991.29 feet.

Riverton, municipal water tank, finial (Fremont County, C. I. Aslakson, 1931; 1936).

Plane coordinates: (III), x=595,412.99 feet; y=859,276.62 feet.

Wiggins Peak, cairn (Fremont County, J. Bowie, Jr., 1936).

Plane coordinates: (III), x=323,623.24 feet; y=1,150,036.91 feet.

Washakie Needles, highest point (Hot Springs County, J. Bowie, Jr., 1936).

Plane coordinates: (III), x=380,746.55 feet; y=1,122,996.46 feet.

Warm Springs, fire lookout tower (Fremont County, J. Bowie, Jr., 1936).

Plane coordinates:[9] (III), x=224,201.11 feet; y=1,055,015.88 feet. (IV), x=577,647.62 feet; y=1,053,427.02 feet.

Lander, Bishop-Randell Hospital, SW. corner, stack (Fremont County, J. Bowie, Jr., 1936).

Plane coordinates:[9] (III), x=505,049.55 feet; y=786,103.81 feet.

Lander, Wyoming State Training School, new building, kitchen, cupola (Fremont County, J. Bowie, Jr., 1936).

Plane coordinates:[9] (III), x=510,762.22 feet; y=792,607.95 feet.

Riverton, State Prison Farm, tank (Fremont County, J. Bowie, Jr., 1936).

Plane coordinates:[9] (III), x=601,437.34 feet; y=872,053.62 feet.

T. 32 N., R. 95 W., sec. 5, northeast corner (Fremont County, C. I. Aslakson, 1931; 1936).—Closing corner of secs. 4 and 5, T. 32 N., R. 95 W., marked with G. L. O. mark inscribed with designating data, 6.070 meters (19.91 feet) in azimuth 270°11′ from *G. L. O. Station 22* (see geographic position and description thereof).

Plane coordinates:[9] (III), x=646,079.91 feet; y=771,566.51 feet.

Cairn, near station Canyon (U. S. G. S.) (Hot Springs County, J. Bowie, Jr., 1936).—Seven-foot cairn established in local survey by graduate students of Princeton University, 94.70 meters (310.7 feet) in azimuth 335°19′ from station *Canyon (U. S. G. S.)*. (See geographic position and description thereof.)

Plane coordinates:[9] (III), x=647,843.50 feet; y=1,017,601.15 feet.

Divide Lake reference mark no. 1 (U. S. F. S.) (Sublette County, J. Bowie, Jr., 1936).—U. S. Forest Service disk stamped "2–33–100 9971 1928" set in drill hole in outcropping bedrock, 10.228 meters (33.56 feet) in azimuth 203°02′ from station *Divide Lake* (see geographic position and description thereof).

Plane coordinates:[9] (III), x=299,973.30 feet; y=792,964.75 feet. (IV). x=657,580.65 feet; y=792,628.91 feet.

Station 2, T. 28 N., R. 105 W. (U. S. F. S) (Sublette County, J. Bowie, Jr., 1936).—U. S. Forest Service triangulation station mark stamped "2, T–28–N, R–105–W" in top of same huge boulder on which station *Jim* (see geographic position and description thereof) is located, and 0.238 meter (0.78 foot) from that station in azimuth 123°45′.

Plane coordinates:[9] (III), x=326,903.38 feet; y=759,434.35 feet. (IV), x=685,037.30 feet; y=759,528.66 feet.

Post, S. line S. E. ¼ sec. 15 (Fremont County, J. Bowie, Jr., 1936).—Post 4 inches square, marked "S line SE¼ sec. 15", 1.37 meters (4.5 feet) in azimuth 10°14′ from station *Maverick* (see geographic position and description thereof).

Plane coordinates:[9] (III), x=439,243.94 feet; y=1,028,706.35 feet.

S. C. S. no. 45 (Fremont County, J. Bowie, Jr., 1936).—Traverse station of Soil Conservation Service, marked by iron pipe, and 1.979 meters (6.49 feet) southeast of station *S. C. S. no. 45 eccentric* (see description thereof) in azimuth 317°18′.

Plane coordinates:[9] (III), x=623,046.08 feet; y=821,069.04 feet.

U. S. G. S. flag (Fremont County, J. Bowie, Jr., 1936).

Plane coordinates:[9] (III), x=616,146.28 feet; y=860,059.38 feet.

Sho (Fremont County, J. Bowie, Jr., 1936).—About 3½ miles south of Shoshone Lake, about ½ mile west of junction of Shoshone and Johnson Creeks, on east end of high rocky ridge having rock thumbs on north shoulder, about 20 feet below top of ridge, 19 feet north of vertical rock wall at north side of top of ridge, and about 26 feet east of ridge of shoulder running to north. To reach

[9] No check on this position.

For notes in regard to marking of stations see p. 65.

from station *Mount Arter* (see description thereof) return to Shoshone Lake, and take trail leading south up valley to junction of creeks mentioned above; horses may be ridden part of way up north shoulder; back pack to top of ridge and station requires about 20 minutes. Station mark is standard disk wedged in drill hole near west end of small boulder, about flush with ground. *Mount Arter azimuth mark* (see description thereof) is distant about 2 miles in azimuth 254°18′43″.

Plane coordinates:[9] (III), x=428,165.75 feet; y=759,308.37 feet; grid azimuth to *Mt. Arter azimuth mark*=254°29′37″.[7] (IV), x=786,293.72 feet; y=761,002.42 feet; grid azimuth to *Mt. Arter azimuth mark*=253°35′18″.[7]

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[7] This azimuth has been computed by the first formula (p. 70), using both terms.
[9] No check on this position.

For notes in regard to marking of stations see p. 65.

PLANE COORDINATE PROJECTION TABLES FOR WYOMING

TABLE I

Lat.		y	Tabular difference for 1 sec. of lat.	Lat.		y	Tabular difference for 1 sec. of lat.
°	′	Feet		°	′	Feet	
40	40	0.00	101.19483	41	41	370,405.64	101.21283
	41	6,071.69	517		42	376,478.41	333
	42	12,143.40	533		43	382,551.21	350
	43	18,215.12	567		44	388,624.02	383
	44	24,286.86	600		45	394,696.85	417
	45	30,358.62	633	41	46	400,769.70	101.21433
40	46	36,430.40	101.19650		47	406,842.56	483
	47	42,502.19	700		48	412,915.45	500
	48	48,574.01	717		49	418,988.35	533
	49	54,645.84	750		50	425,061.27	567
	50	60,717.69	783	41	51	431,134.21	101.21583
40	51	66,789.56	101.19817		52	437,207.16	617
	52	72,861.45	833		53	443,280.13	650
	53	78,933.35	867		54	449,353.12	683
	54	85,005.27	900		55	455,426.13	717
	55	91,077.21	917	41	56	461,499.16	101.21750
40	56	97,149.16	101.19967		57	467,572.21	767
	57	103,221.14	.19983		58	473,645.27	800
	58	109,293.13	.20017		59	479,718.35	833
	59	115,365.14	050	42	00	485,791.45	867
41	00	121,437.17	067	42	01	491,864.57	101.21883
41	01	127,509.21	101.20100		02	497,937.70	917
	02	133,581.27	133		03	504,010.85	950
	03	139,653.35	167		04	510,084.02	1983
	04	145,725.45	200		05	516,157.21	2017
	05	151,797.57	217	42	06	522,230.42	101.22033
41	06	157,869.70	101.20250		07	528,303.64	067
	07	163,941.85	283		08	534,376.88	100
	08	170,014.02	317		09	540,450.14	133
	09	176,086.21	350		10	546,523.42	150
	10	182,158.42	367	42	11	552,596.71	101.22200
41	11	188,230.64	101.20400		12	558,670.03	217
	12	194,302.88	433		13	564,743.36	250
	13	200,375.14	467		14	570,816.71	267
	14	206,447.42	483		15	576,890.07	317
	15	212,519.71	517	42	16	582,963.46	101.22333
41	16	218,592.02	101.20550		17	589,036.86	367
	17	224,664.35	583		18	595,110.28	400
	18	230,736.70	617		19	601,183.72	433
	19	236,809.07	633		20	607,257.18	450
	20	242,881.45	667	42	21	613,330.65	101.22483
41	21	248,953.85	101.20700		22	619,404.14	517
	22	255,026.27	733		23	625,477.65	550
	23	261,098.71	767		24	631,551.18	583
	24	267,171.17	783		25	637,624.73	600
	25	273,243.64	817	42	26	643,698.29	101.22633
41	26	279,316.13	101.20850		27	649,771.87	667
	27	285,388.64	883		28	655,845.47	700
	28	291,461.17	900		29	661,919.09	733
	29	297,533.71	933		30	667,992.73	750
	30	303,606.27	0967	42	31	674,066.38	101.22783
41	31	309,678.85	101.21000		32	680,140.05	817
	32	315,751.45	033		33	686,213.74	850
	33	321,824.07	050		34	692,287.45	867
	34	327,896.70	083		35	698,361.17	917
	35	333,969.35	117	42	36	704,434.92	101.22933
41	36	340,042.02	101.21150		37	710,508.68	967
	37	346,114.71	167		38	716,582.46	2983
	38	352,187.41	200		39	722,656.25	3033
	39	358,260.13	250		40	728,730.07	050
	40	364,332.88	267				

Plane coordinate projection tables for Wyoming—Continued

Table I—Continued

Lat.	y	Tabular difference for 1 sec. of lat.	Lat.	y	Tabular difference for 1 sec. of lat.
° ′	*Feet*		° ′	*Feet*	
42 41	734,803.90	101.23083	43 46	1,129,641.55	101.25033
42	740,877.75	117	47	1,135,716.57	067
43	746,951.62	150	48	1,141,791.61	083
44	753,025.51	167	49	1,147,866.66	117
45	759,099.41	217	50	1,153,941.73	150
42 46	765,173.34	101.23233	43 51	1,160,016.82	101.25183
47	771,247.28	267	52	1,166,091.93	217
48	777,321.24	283	53	1,172,167.06	233
49	783,395.21	333	54	1,178,242.20	267
50	789,469.21	350	55	1,184,317.36	300
42 51	795,543.22	101.23383	43 56	1,190,392.54	101.25333
52	801,617.25	417	57	1,196,467.74	367
53	807,691.30	433	58	1,202,542.96	383
54	813,765.36	483	59	1,208,618.19	433
55	819,839.45	500	44 00	1,214,693.45	450
42 56	825,913.55	101.23533	44 01	1,220,768.72	101.25483
57	831,987.67	567	02	1,226,844.01	500
58	838,061.81	583	03	1,232,919.31	533
59	844,135.96	633	04	1,238,994.63	583
43 00	850,210.14	650	05	1,245,069.98	600
43 01	856,284.33	101.23683	44 06	1,251,145.34	101.25633
02	862,358.54	717	07	1,257,220.72	650
03	868,432.77	733	08	1,263,296.11	700
04	874,507.01	767	09	1,269,371.53	717
05	880,581.27	800	10	1,275,446.96	750
43 06	886,655.55	101.23833	44 11	1,281,522.41	101.25783
07	892,729.85	867	12	1,287,597.88	800
08	898,804.17	900	13	1,293,673.36	850
09	904,878.51	917	14	1,299,748.87	867
10	910,952.86	950	15	1,305,824.39	900
43 11	917,027.23	101.23983	44 16	1,311,899.93	101.25933
12	923,101.62	4017	17	1,317,975.49	5950
13	929,176.03	050	18	1,324,051.06	6000
14	935,250.46	067	19	1,330,126.66	017
15	941,324.90	100	20	1,336,202.27	050
43 16	947,399.36	101.24133	44 21	1,342,277.90	101.26083
17	953,473.84	167	22	1,348,353.55	100
18	959,548.34	183	23	1,354,429.21	150
19	965,622.85	217	24	1,360,504.90	167
20	971,697.38	267	25	1,366,580.60	200
43 21	977,771.94	101.24283	44 26	1,372,656.32	101.26233
22	983,846.51	300	27	1,378,732.06	250
23	989,921.09	350	28	1,384,807.81	300
24	995,995.70	367	29	1,390,883.59	317
25	1,002,070.32	400	30	1,396,959.38	350
43 26	1,008,144.96	101.24433	44 31	1,403,035.19	101.26383
27	1,014,219.62	467	32	1,409,111.02	417
28	1,020,294.30	483	33	1,415,186.87	433
29	1,026,368.99	517	34	1,421,262.73	467
30	1,032,443.70	550	35	1,427,338.61	500
43 31	1,038,518.43	101.24583	44 36	1,433,414.51	101.26533
32	1,044,593.18	617	37	1,439,490.43	567
33	1,050,667.95	650	38	1,445,566.37	583
34	1,056,742.74	667	39	1,451,642.32	617
35	1,062,817.54	700	40	1,457,718.29	650
43 36	1,068,892.36	101.24733	44 41	1,463,794.28	101.26683
37	1,074,967.20	750	42	1,469,870.29	717
38	1,081,042.05	800	43	1,475,946.32	733
39	1,087,116.93	817	44	1,482,022.36	767
40	1,093,191.82	850	45	1,488,098.42	800
43 41	1,099,266.73	101.24883	44 46	1,494,174.50	101.26833
42	1,105,341.66	917	47	1,500,250.60	867
43	1,111,416.61	933	48	1,506,326.72	883
44	1,117,491.57	4967	49	1,512,402.85	917
45	1,123,566.55	5000	50	1,518,479.00	950

Plane coordinate projection tables for Wyoming—Continued

Table I—Continued

Lat.	y	Tabular difference for 1 sec. of lat.	Lat.	y	Tabular difference for 1 sec. of lat.
° ′	*Feet*		° ′	*Feet*	
44 51	1,524,555.17	101.26983	45 06	1,615,699.89	101.27433
52	1,530,631.36	7017	07	1,621,776.35	450
53	1,536,707.57	033	08	1,627,852.82	483
54	1,542,783.79	067	09	1,633,929.31	533
55	1,548,860.03	100	10	1,640,005.83	550
44 56	1,554,936.29	101.27133	45 11	1,646,082.36	101.27583
57	1,561,012.57	167	12	1,652,158.91	600
58	1,567,088.87	183	13	1,658,235.47	650
59	1,573,165.18	217	14	1,664,312.06	667
45 00	1,579,241.51	250	15	1,670,388.66	700
45 01	1,585,317.86	101.27283	45 16	1,676,465.28	101.27733
02	1,591,394.23	317	17	1,682,541.92	750
03	1,597,470.62	333	18	1,688,618.57	800
04	1,603,547.02	383	19	1,694,695.25	817
05	1,609,623.45	400	20	1,700,771.94	

TABLE II

Lat.	Colog A	Log C	Lat.	Colog A	Log C
° ′					
40 40	1.49089849	1.338502−10	41 21	1.49091590	1.348892−10
41	9892	8755	22	1633	9145
42	9934	9009	23	1675	9398
43	1.49089977	9263	24	1718	9651
44	1.49090019	9517	25	1761	1.349904
45	0061	1.339770			
			41 26	1803	1.350157
40 46	0104	1.340024	27	1846	0410
47	0146	0278	28	1888	0663
48	0189	0531	29	1931	0916
49	0231	0784	30	1973	1168
50	0273	1038			
			41 31	1.49092016	1.351423−10
40 51	1.49090316	1.341292−10	32	2058	1675
52	0358	1545	33	2101	1927
53	0401	1799	34	2144	2179
54	0443	2053	35	2186	2433
55	0486	2306			
			41 36	2229	2686
40 56	0528	2560	37	2271	2938
57	0571	2814	38	2314	3191
58	0613	3067	39	2357	3445
59	0655	3321	40	2399	3698
41 00	0698	3574			
			41 41	1.49092442	1.353952−10
41 01	1.49090740	1.343827−10	42	2484	4204
02	0783	4080	43	2527	4456
03	0825	4334	44	2569	4709
04	0868	4588	45	2612	4962
05	0910	4841			
			41 46	2655	5214
41 06	0953	5095	47	2697	5466
07	0995	5348	48	2740	5719
08	1038	5601	49	2782	5972
09	1080	5854	50	2825	6224
10	1123	6108			
			41 51	1.49092868	1.356475−10
41 11	1.49091165	1.346360−10	52	2910	6727
12	1208	6614	53	2953	6980
13	1250	6867	54	2996	7233
14	1293	7120	55	3038	7485
15	1335	7374			
			41 56	3081	7737
41 16	1378	7627	57	3124	7990
17	1420	7880	58	3166	8242
18	1463	8132	59	3209	8494
19	1505	8386	42 00	3252	8746
20	1548	8639			

Plane coordinate projection tables for Wyoming—Continued

Table II—Continued

Lat.	Colog A	Log C	Lat.	Colog A	Log C
° ′			° ′		
42 01	1.49093294	1.359000−10	43 06	1.49096072	1.375371−1
02	3337	9252	07	6114	5624
03	3379	9504	08	6157	5875
04	3422	1.359757	09	6200	6125
05	3465	1.360009	10	6243	6377
42 06	3507	0261	43 11	1.49096286	1.376629−10
07	3550	0513	12	6328	6880
08	3593	0765	13	6371	7132
09	3635	1017	14	6414	7384
10	3678	1269	15	6457	7635
42 11	1.49093721	1.361522−10	43 16	6500	7886
12	3763	1774	17	6542	8138
13	3806	2026	18	6585	8389
14	3849	2279	19	6628	8640
15	3892	2530	20	6671	8892
42 16	3934	2782	43 21	1.49096714	1.379144−10
17	3977	3035	22	6756	9395
18	4020	3287	23	6799	9646
19	4062	3539	24	6842	1.379898
20	4105	3792	25	6885	1.380149
42 21	1.49094148	1.364043−10	43 26	6928	0400
22	4190	4294	27	6971	0652
23	4233	4546	28	7013	0903
24	4276	4798	29	7056	1154
25	4319	5050	30	7099	1405
42 26	4361	5302	43 31	1.49097142	1.381657−10
27	4404	5555	32	7185	1908
28	4447	5807	33	7228	2159
29	4489	6060	34	7270	2411
30	4532	6310	35	7313	2662
42 31	1.49094575	1.366562−10	43 36	7356	2913
32	4618	6815	37	7399	3165
33	4660	7065	38	7442	3416
34	4703	7318	39	7485	3667
35	4746	7569	40	7527	3918
42 36	4789	7821			
37	4831	8074	43 41	1.49097570	1.384170−10
38	4874	8325	42	7613	4421
39	4917	8577	43	7656	4671
40	4959	8829	44	7699	4923
			45	7742	5174
42 41	1.49095002	1.369081−10			
42	5045	9332	43 46	7785	5425
43	5088	9584	47	7827	5677
44	5130	1.369836	48	7870	5927
45	5173	1.370088	49	7913	6178
			50	7956	6429
42 46	5216	0339			
47	5259	0591	43 51	1.49097999	1.386681−10
48	5301	0843	52	8042	6931
49	5344	1094	53	8085	7182
50	5387	1346	54	8127	7434
			55	8170	7685
42 51	1.49095430	1.371598−10			
52	5473	1849	43 56	8213	7936
53	5515	2101	57	8256	8188
54	5558	2353	58	8299	8439
55	5601	2604	59	8342	8689
			44 00	8385	8940
42 56	5644	2856	44 01	1.49098428	1.389192−10
57	5686	3108	02	8470	9443
58	5729	3359	03	8513	9694
59	5772	3611	04	8556	1.389944
43 00	5815	3863	05	8599	1.390196
43 01	1.49095858	1.374114−10	44 06	8642	0447
02	5900	4365	07	8685	0699
03	5943	4617	08	8728	0950
04	5986	4869	09	8771	1200
05	6029	5120	10	8813	1450

Plane coordinate projection tables for Wyoming—Continued

Table II—Continued

Lat.	Colog A	Log C	Lat.	Colog A	Log C
° ′			° ′		
44 11	1.49098856	1.391703−10	44 46	1.49100357	1.400488−10
12	8899	1954	47	0400	0738
13	8942	2204	48	0443	0990
14	8985	2456	49	0486	1241
15	9028	2707	50	0529	1491
44 16	9071	2958	44 51	1.49100572	1.401743−10
17	9114	3209	52	0615	1995
18	9156	3460	53	0658	2244
19	9199	3711	54	0701	2495
20	9242	3962	55	0743	2747
44 21	1.49099285	1.394213−10	44 56	0786	2997
22	9328	4464	57	0829	3248
23	9371	4715	58	0872	3500
24	9414	4967	59	0915	3750
25	9457	5217	45 00	0958	4001
44 26	9500	5468	45 01	1.49101001	1.404253−10
27	9542	5719	02	1044	4503
28	9585	5970	03	1087	4754
29	9628	6221	04	1130	5005
30	9671	6472	05	1172	5256
44 31	1.49099714	1.396723−10	45 06	1215	5507
32	9757	6974	07	1258	5758
33	9800	7225	08	1301	6009
34	9843	7476	09	1344	6260
35	9886	7727	10	1387	6511
44 36	9928	7978	45 11	1.49101430	1.406761−10
37	1.49099971	8229	12	1473	7013
38	1.49100014	8480	13	1516	7263
39	0057	8731	14	1559	7513
40	0100	8982	15	1601	7765
44 41	1.49100143	1.399233−10	45 16	1644	8016
42	0186	9484	17	1687	8266
43	0229	9735	18	1730	8517
44	0272	1.399985	19	1773	8769
45	0314	1.400237	20	1816	9019

TABLE III

X′	Scale in units of 7th place of logs	Scale expressed as a ratio	X′	Scale in units of 7th place of logs	Scale expressed as a ratio
Feet			*Feet*		
0	−255.5	0.9999412	100,000	−205.9	0.9999526
5,000	255.4	412	105,000	200.8	538
10,000	255.0	413	110,000	195.5	550
15,000	254.4	414	115,000	189.9	563
20,000	253.5	416	120,000	184.1	576
25,000	−252.4	0.9999419	125,000	−178.0	0.9999590
30,000	251.0	422	130,000	171.7	605
35,000	249.4	426	135,000	165.1	620
40,000	247.6	430	140,000	158.3	636
45,000	245.5	435	145,000	151.2	652
50,000	−243.1	0.9999440	150,000	−143.9	0.9999669
55,000	240.5	446	155,000	136.3	686
60,000	237.6	453	160,000	128.5	704
65,000	234.5	460	165,000	120.4	723
70,000	231.2	468	170,000	112.1	741
75,000	−227.6	0.9999476	175,000	−103.6	0.9999761
80,000	223.7	485	180,000	94.8	782
85,000	219.7	494	185,000	85.7	803
90,000	215.3	504	190,000	76.4	824
95,000	210.7	514	195,000	66.8	846

Plane coordinate projection tables for Wyoming—Continued

Table III—Continued

X'	Scale in units of 7th place of logs	Scale expressed as a ratio	X'	Scale in units of 7th place of logs	Scale expressed as a ratio
Feet			*Feet*		
200,000	−57.0	0.9999869	350,000	+352.3	1.0000811
205,000	47.0	892	355,000	369.8	851
210,000	36.7	915	360,000	387.5	892
215,000	26.2	940	365,000	405.5	934
220,000	15.4	965	370,000	423.7	0976
225,000	−4.3	0.9999990	375,000	+442.2	1.0001018
230,000	+7.0	1.0000016	380,000	460.9	061
235,000	18.5	043	385,000	479.9	105
240,000	30.3	070	390,000	499.1	149
245,000	42.3	097	395,000	518.6	194
250,000	+54.6	1.0000126	400,000	+538.3	1.0001239
255,000	67.1	155	405,000	558.3	286
260,000	79.9	184	410,000	578.5	332
265,000	92.9	214	415,000	599.0	379
270,000	106.2	245	420,000	619.7	427
275,000	+119.7	1.0000276	425,000	+640.6	1.0001475
280,000	133.5	307	430,000	661.9	524
285,000	147.5	340	435,000	683.3	573
290,000	161.7	372	440,000	705.0	623
295,000	176.3	406	445,000	727.0	674
300,000	+191.0	1.0000440	450,000	+749.2	1.0001725
305,000	206.0	474	455,000	771.6	777
310,000	221.3	510	460,000	794.3	829
315,000	236.8	545	465,000	817.3	882
320,000	252.5	581	470,000	840.5	935
			475,000	863.9	989
325,000	+268.5	1.0000618			
330,000	284.8	656			
335,000	301.3	694			
340,000	318.0	732			
345,000	335.0	771			

Table of constants

Constant	Zone			
	I	II	III	IV
λ, central meridian	105° 10′ 00″.000	107° 20′ 00″.000	108° 45′ 00″.000	110° 05′ 00″.000
log R	−0.00002555	−0.00002555	−0.00002555	−0.00002555
log $(\frac{1}{6}\rho_0^2)_g$	4.5807451−20	4.5807451−20	4.5807451−20	4.5807451−20
log $\left(\frac{1}{6\rho_0^2 \sin 1''}\right)_g$	9.8951702−20	9.8951702−20	9.8951702−20	9.8951702−20

$$\text{Geodetic azimuth}-\text{grid azimuth}=\Delta\alpha+\frac{(y_2-y_1)\,(2x_1'+x_2')}{(6\rho_0^2 \sin 1'')_g}$$

TABLE FOR COMPUTING $\Delta\alpha$

($\Delta\alpha$ *has same sign as* $\Delta\lambda$)

Latitude	$\Delta\lambda$=(Central meridian−λ)																	Tabular differences	
	0° 05′	0° 10′	0° 15′	0° 20′	0° 25′	0° 30′	0° 35′	0° 40′	0° 45′	0° 50′	0° 55′	1° 00′	1° 05′	1° 10′	1° 15′	$\Delta\lambda$=1′	$\Delta\lambda$=1″
° ′	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″	′ ″		
40 40	3 15.5	6 31.0	9 46.5	13 02.0	16 17.5	19 33.0	22 48.5	26 04.0	29 19.5	32 35.1	35 50.6	39 06.1	42 21.6	45 37.1	48 52.7	+39.10	+0.652
50	16.2	32.3	48.5	04.6	20.8	37.0	53.1	09.3	25.5	41.7	35 57.8	14.0	30.2	46.4	49 02.6	.23	.654
41 00	3 16.8	6 33.6	9 50.5	13 07.3	16 24.1	19 40.9	22 57.7	26 14.6	29 31.4	32 48.3	36 05.1	39 21.9	42 38.8	45 55.7	49 12.5	+39.37	+0.656
10	17.5	35.0	52.4	09.9	27.4	44.9	23 02.3	19.8	37.3	32 54.8	12.3	29.8	47.4	46 04.9	22.4	.50	.658
20	18.2	36.3	54.4	12.5	30.7	48.8	06.9	25.1	43.2	33 01.4	19.6	37.7	42 55.9	14.1	32.2	.63	.661
30	18.8	37.6	56.4	15.1	33.9	52.7	11.5	30.3	49.1	07.9	26.8	45.6	43 04.4	23.2	42.1	.76	.663
40	19.4	38.9	9 58.3	17.8	37.2	19 56.6	16.1	35.6	29 55.0	14.5	33.9	39 53.4	12.9	32.4	49 51.9	+39.89	.665
50	20.1	40.2	10 00.3	20.4	40.5	20 00.5	20.7	40.8	30 00.9	21.0	41.1	40 01.2	21.3	41.5	50 01.6	+40.02	.667
42 00	3 20.7	6 41.5	10 02.2	13 23.0	16 43.7	20 04.4	23 25.2	26 45.9	30 06.7	33 27.5	36 48.2	40 09.0	43 29.8	46 50.6	50 11.4	+40.15	+0.669
10	21.4	42.8	04.2	25.6	46.9	08.3	29.7	51.1	12.5	33.9	36 55.4	16.8	38.2	46 59.6	21.1	.28	.671
20	22.0	44.1	06.1	28.1	50.2	12.2	34.3	26 56.3	18.4	40.4	37 02.5	24.5	46.6	47 08.7	30.8	.41	.674
30	22.7	45.4	08.1	30.7	53.4	16.1	38.8	27 01.4	24.2	46.8	09.6	32.3	43 55.0	17.7	40.4	.54	.676
40	23.3	46.6	10.0	33.3	56.6	19.9	43.3	06.6	29.9	53.3	16.6	40.0	44 03.3	26.7	50.1	.67	.678
50	24.0	47.9	11.9	35.8	16 59.8	23.7	47.7	11.7	35.7	33 59.7	23.7	47.7	11.7	35.7	50 59.7	.80	.680
43 00	3 24.6	6 49.2	10 13.8	13 38.4	17 03.0	20 27.6	23 52.2	27 16.8	30 41.5	34 06.1	37 30.7	40 55.3	44 20.0	47 44.6	51 09.3	+40.92	+0.682
10	25.2	50.5	15.7	41.0	06.2	31.4	23 56.7	21.9	47.2	12.4	37.7	41 03.0	28.2	47 53.5	18.8	+41.05	.684
20	25.9	51.7	17.6	43.5	09.4	35.3	24 01.1	27.0	52.9	18.8	44.7	10.6	36.5	48 02.4	28.3	.18	.686
30	26.5	53.0	19.5	46.0	12.5	39.1	05.6	32.1	30 58.6	25.1	51.7	18.2	44.8	11.3	37.8	.30	.688
40	27.1	54.3	21.4	48.6	15.7	42.8	10.0	37.1	31 04.3	31.4	37 58.6	25.8	44 53.0	20.1	47.3	.43	.691
50	27.8	55.5	23.3	51.1	18.9	46.6	14.4	42.2	10.6	37.8	38 05.6	33.4	45 01.2	29.0	51 56.8	.56	.693
44 00	3 28.4	6 56.8	10 25.2	13 53.6	17 22.0	20 50.4	24 18.8	27 47.2	31 15.7	34 44.1	38 12.5	41 40.9	45 09.3	48 37.8	52 06.2	+41.68	+0.695
10	29.0	58.0	27.1	56.1	25.1	54.2	23.2	52.2	21.3	50.3	19.4	48.4	17.5	46.5	15.6	.81	.697
20	29.6	6 59.3	29.0	13 58.6	28.3	20 57.9	27.6	27 57.2	26.9	34 56.6	26.2	41 55.9	25.6	48 55.3	25.0	+41.93	.699
30	30.3	7 00.5	30.8	14 01.1	31.4	21 01.6	31.9	28 02.2	32.5	35 02.8	33.1	42 03.4	33.7	49 04.0	34.4	+42.06	.701
40	30.9	01.8	32.7	03.6	34.5	05.4	36.3	07.2	38.1	09.0	39.9	10.9	41.8	12.7	43.7	.18	.703
50	31.5	03.0	34.5	06.1	37.6	09.1	40.6	12.2	43.7	15.2	46.8	18.3	49.8	21.4	52 53.0	.31	.705
45 00	3 32.1	7 04.3	10 36.4	14 08.5	17 40.7	21 12.8	24 44.9	28 17.1	31 49.2	35 21.4	38 53.6	42 25.7	45 57.9	49 30.1	53 02.2	+42.43	+0.707
10	32.7	05.5	38.2	11.0	43.7	16.5	49.3	22.0	31 54.8	27.6	39 00.3	33.1	46 05.9	38.7	11.5	.55	.709
20	33.4	06.7	40.1	13.5	46.8	20.2	53.6	26.9	32 00.3	33.7	07.1	40.5	13.9	47.3	20.7	.68	.711

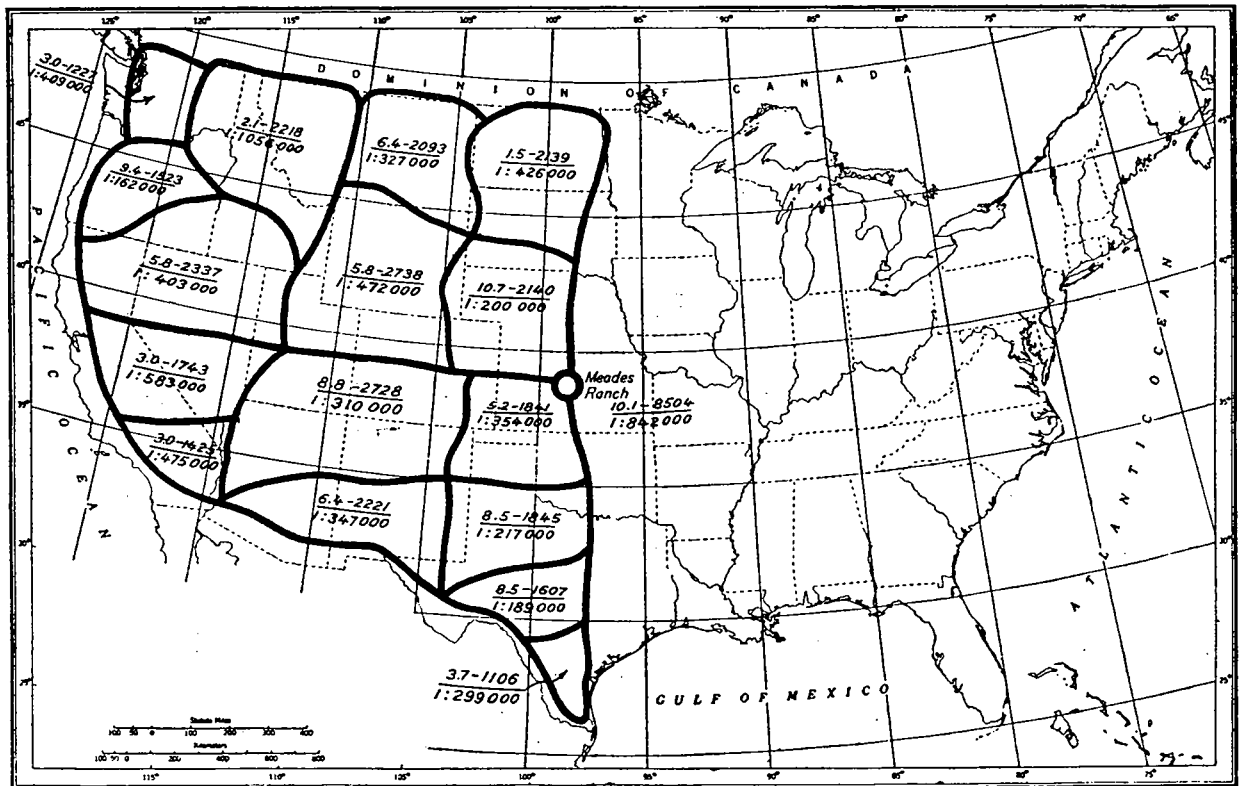

FIGURE 5.—Arcs included in the western adjustment and loop closures.

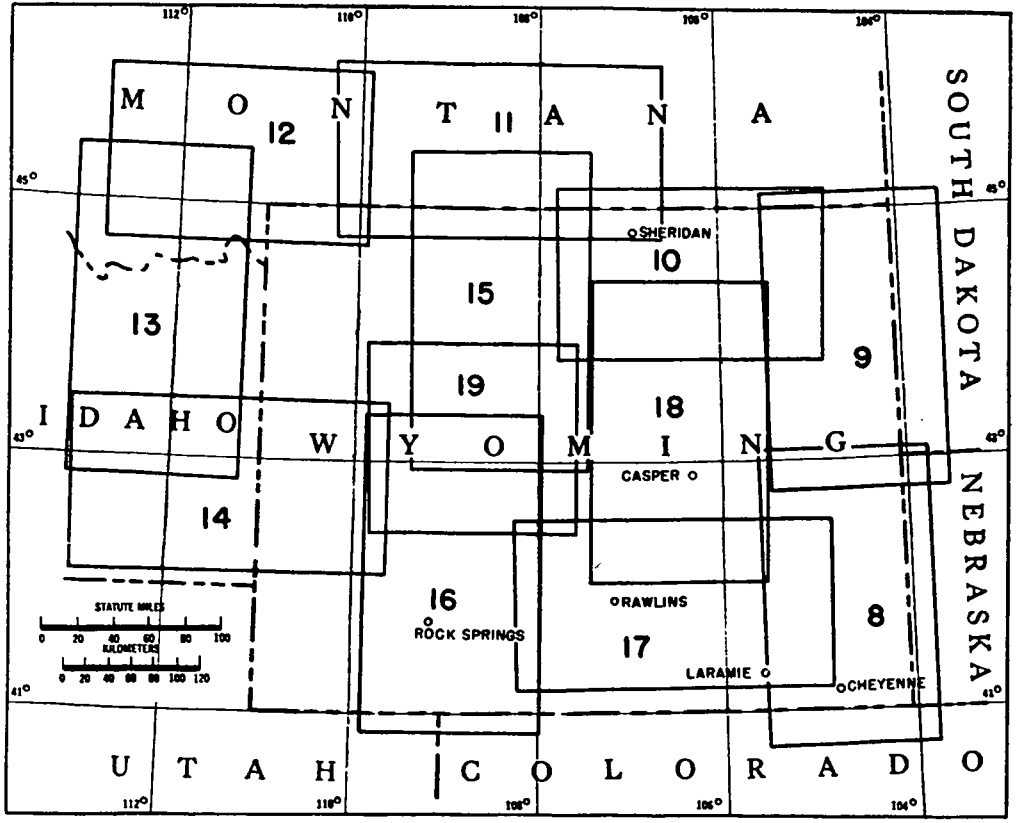

FIGURE 7.—Index map of Wyoming showing areas covered by each of the following sketches, figures 8 to 19.

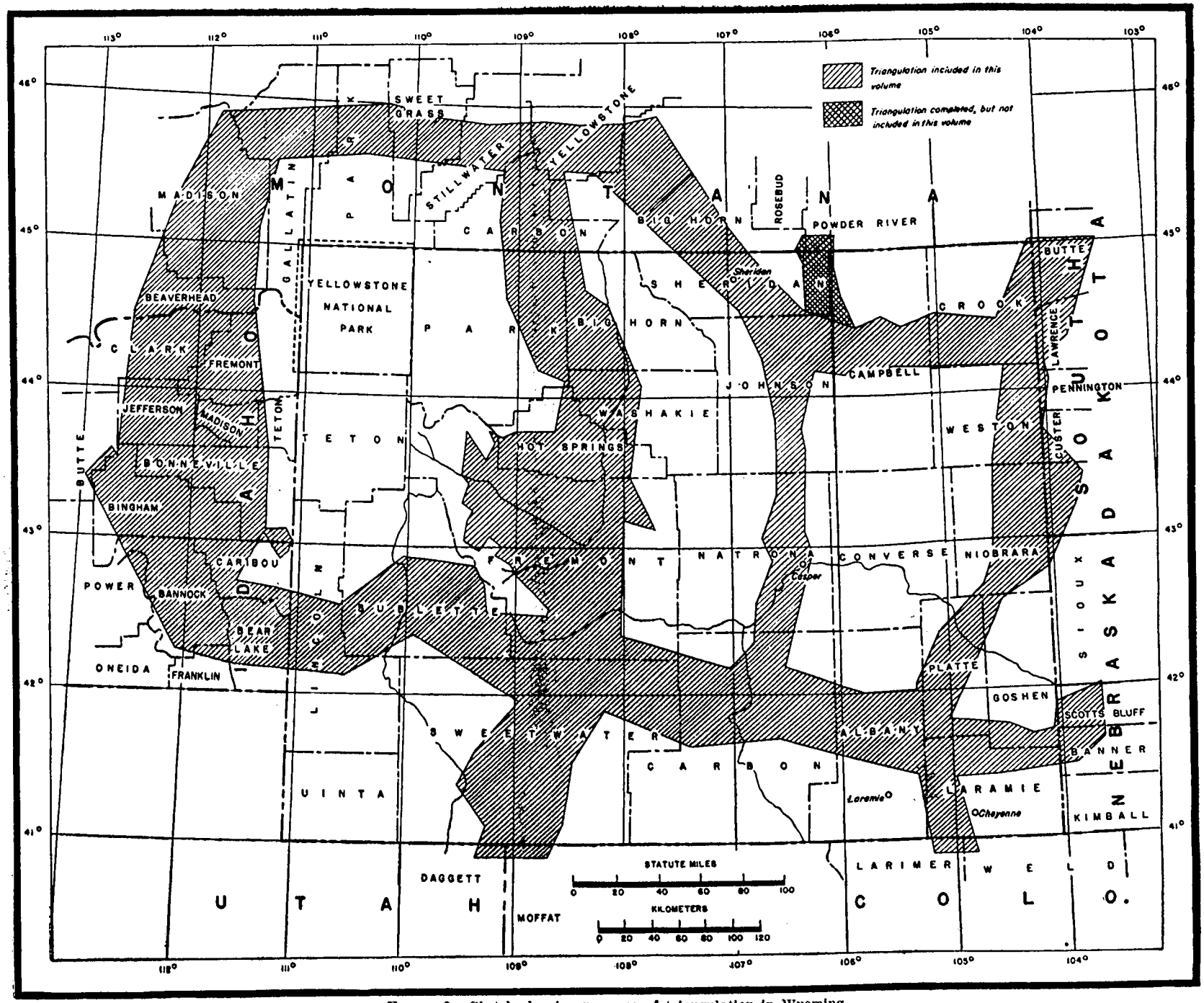

FIGURE 6.—Sketch showing progress of triangulation in Wyoming.

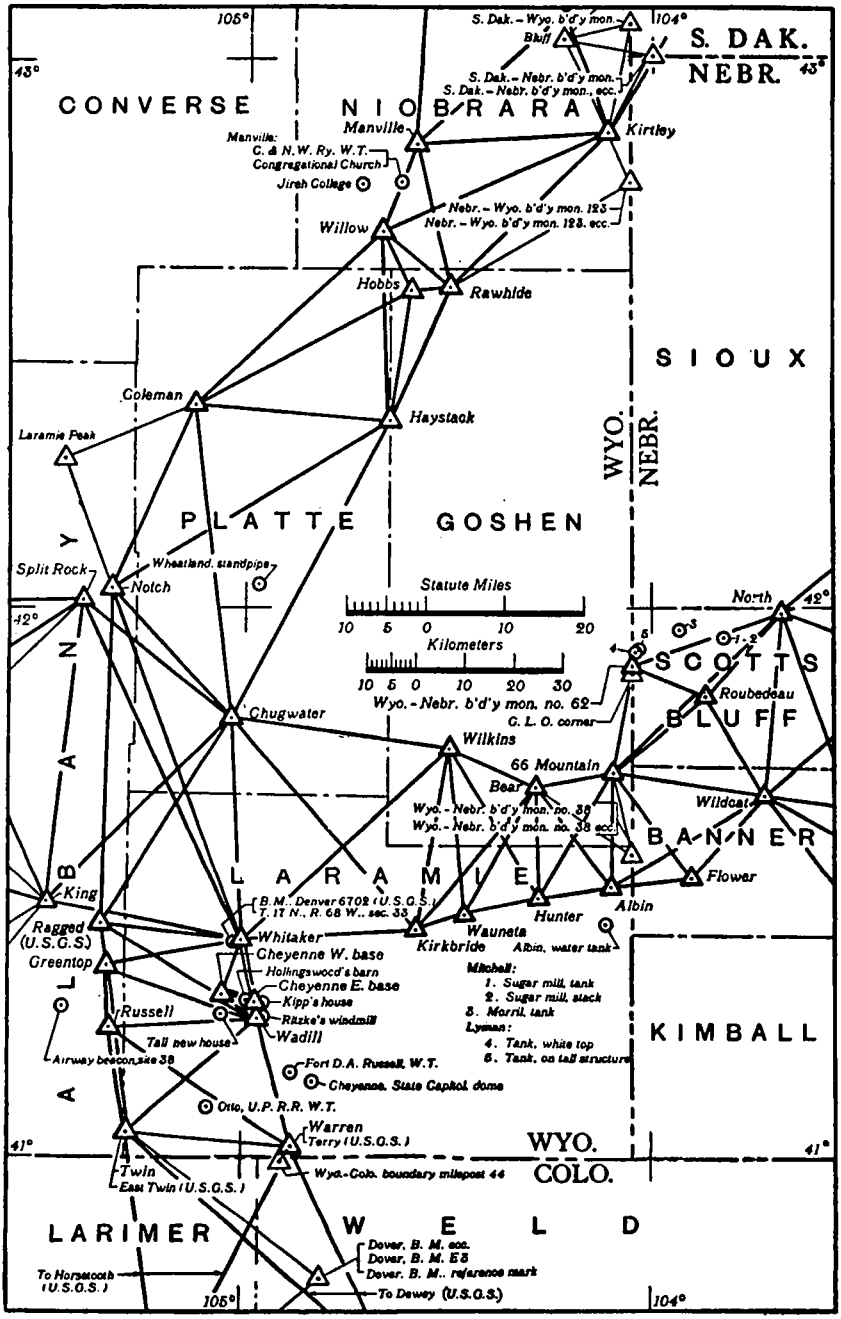

FIGURE 8.—Triangulation along the one-hundred-and-fourth meridian arc and the forty-second parallel arc.

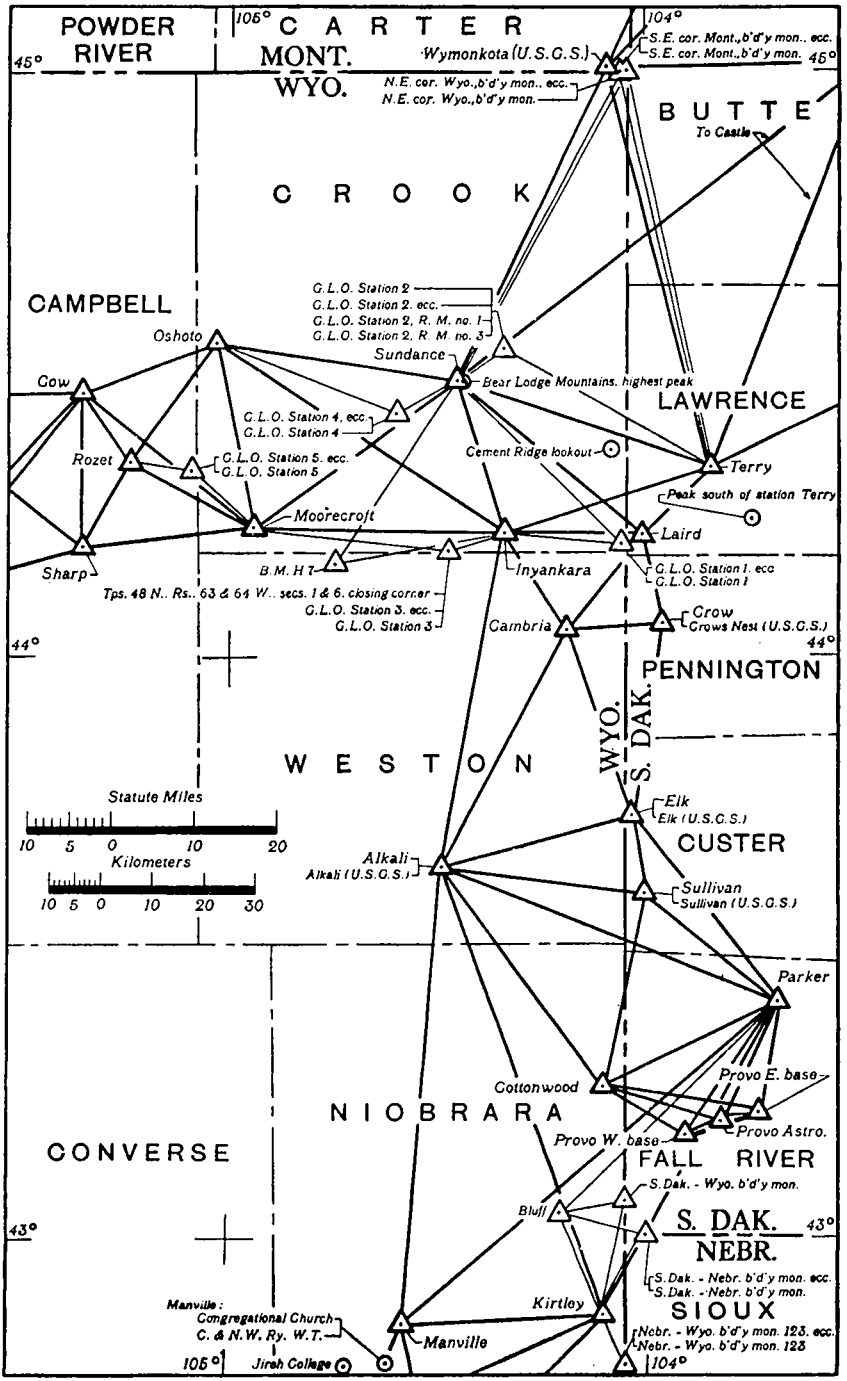

FIGURE 9.—Triangulation along the one-hundred-and-fourth meridian arc and junction with the Sundance, Wyo., to Bozeman, Mont., arc.

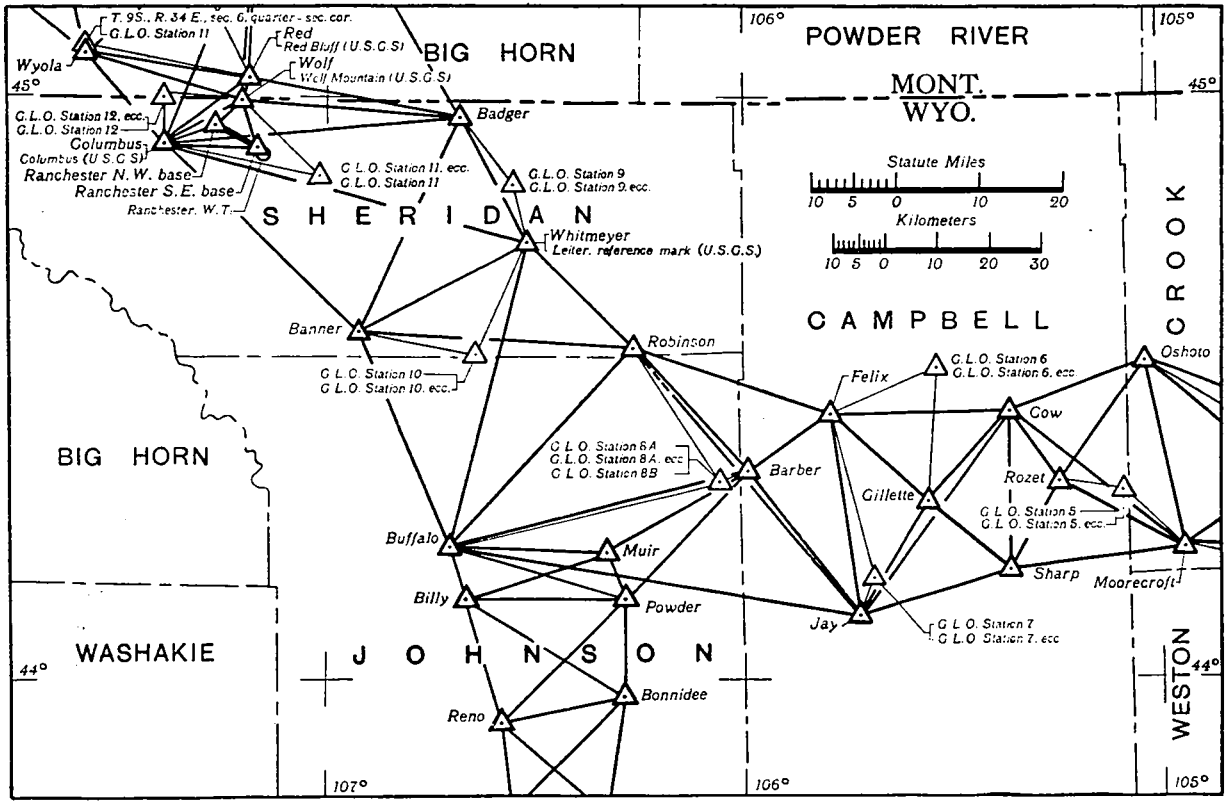

FIGURE 10.—Triangulation along the Sundance, Wyo., to Bozeman, Mont., arc and junction with the Hanna to Buffalo arc.

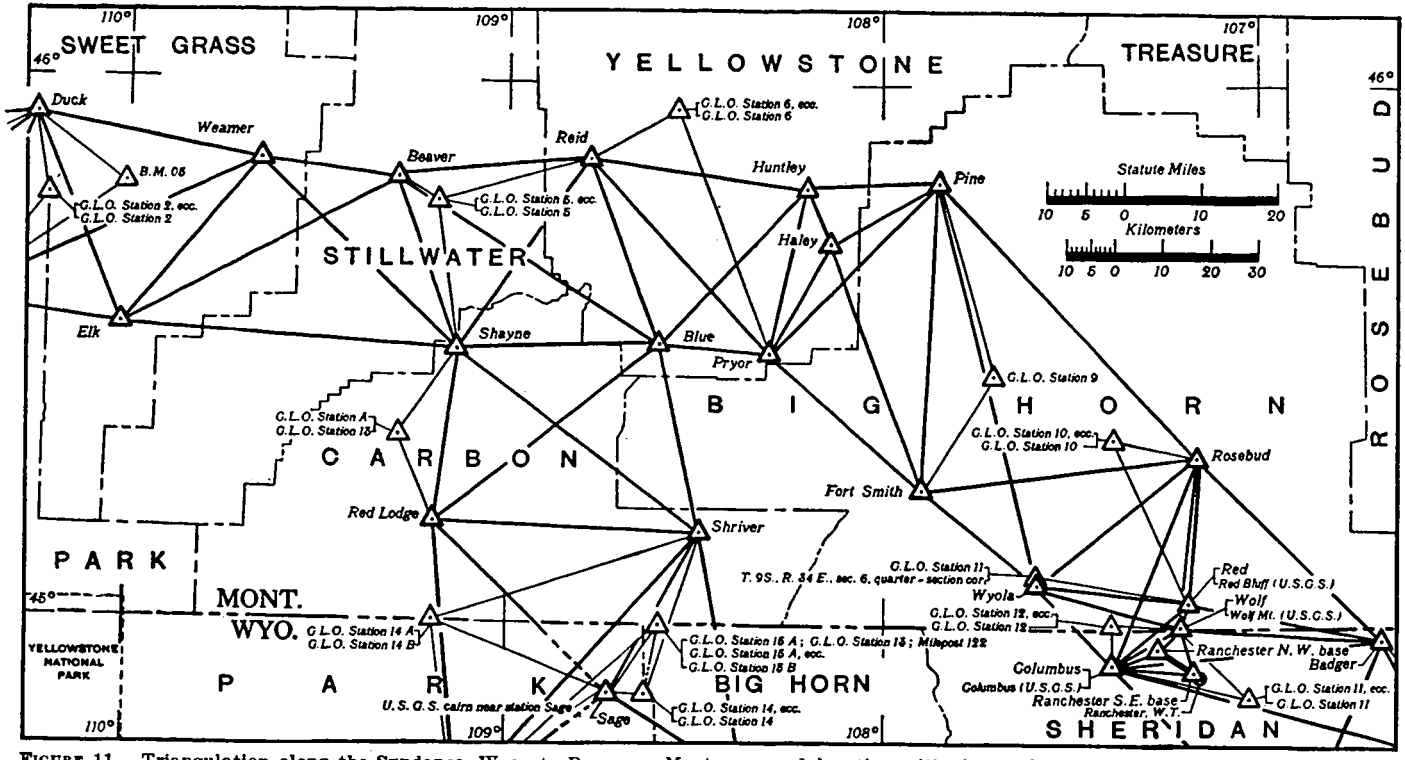

FIGURE 11.—Triangulation along the Sundance, Wyo., to Bozeman, Mont., arc and junction with the one-hundred-and-eighth meridian arc.

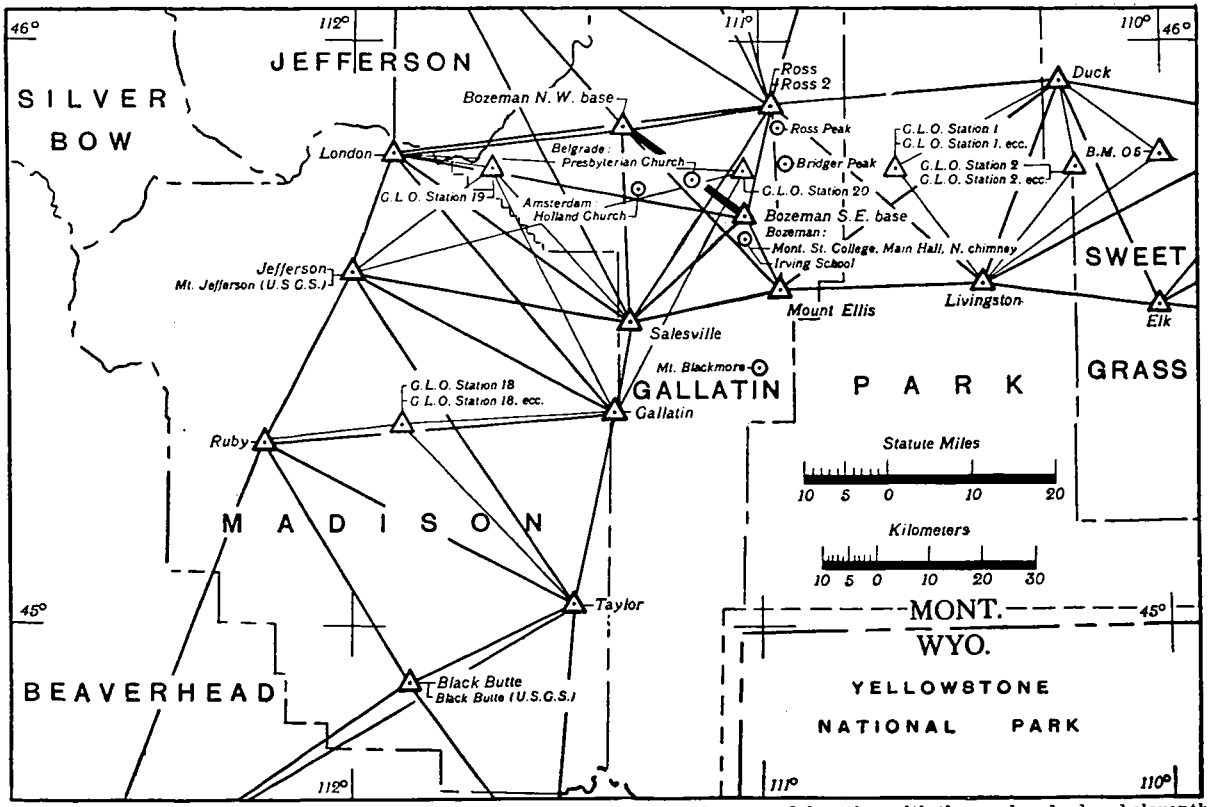

FIGURE 12.—Triangulation along the Sundance, Wyo., to Bozeman, Mont., arc and junction with the one-hundred-and-eleventh meridian arc.

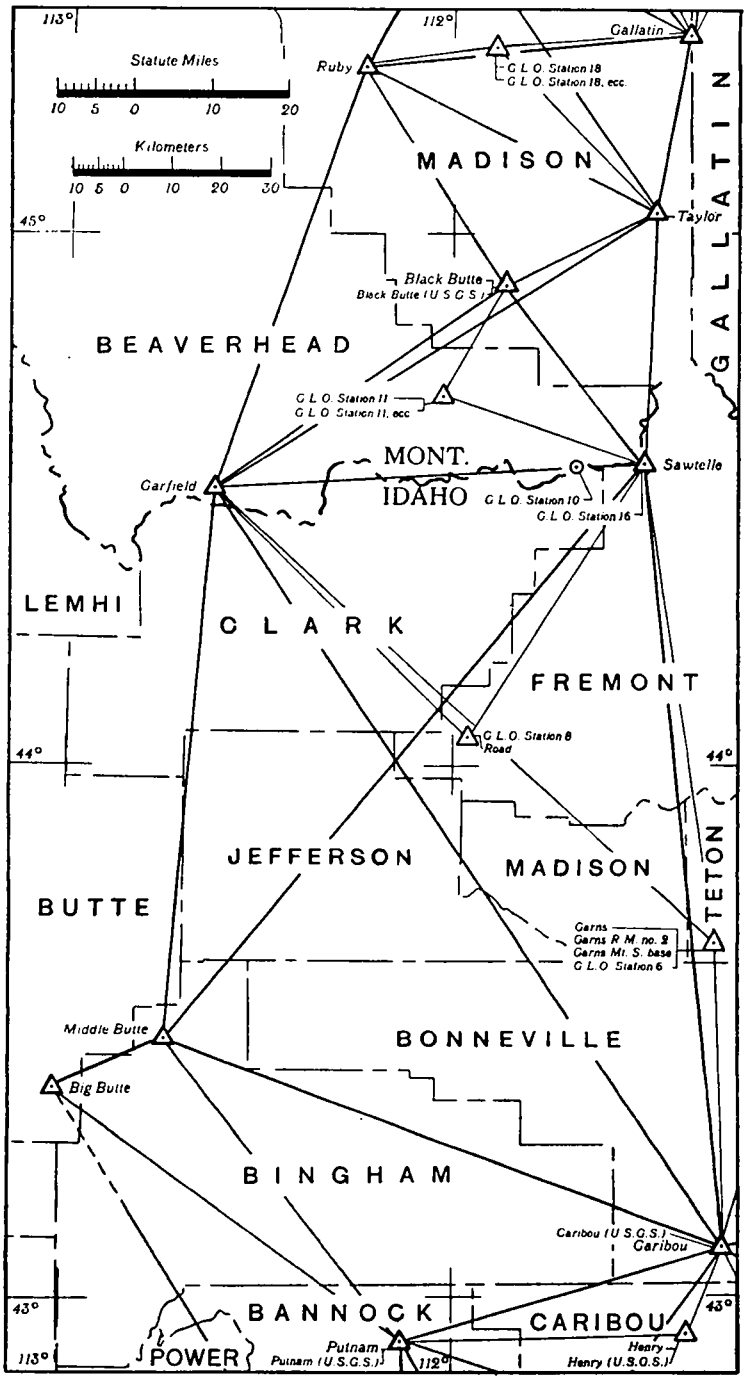

FIGURE 13.—Triangulation along the one-hundred-and-eleventh meridian arc.

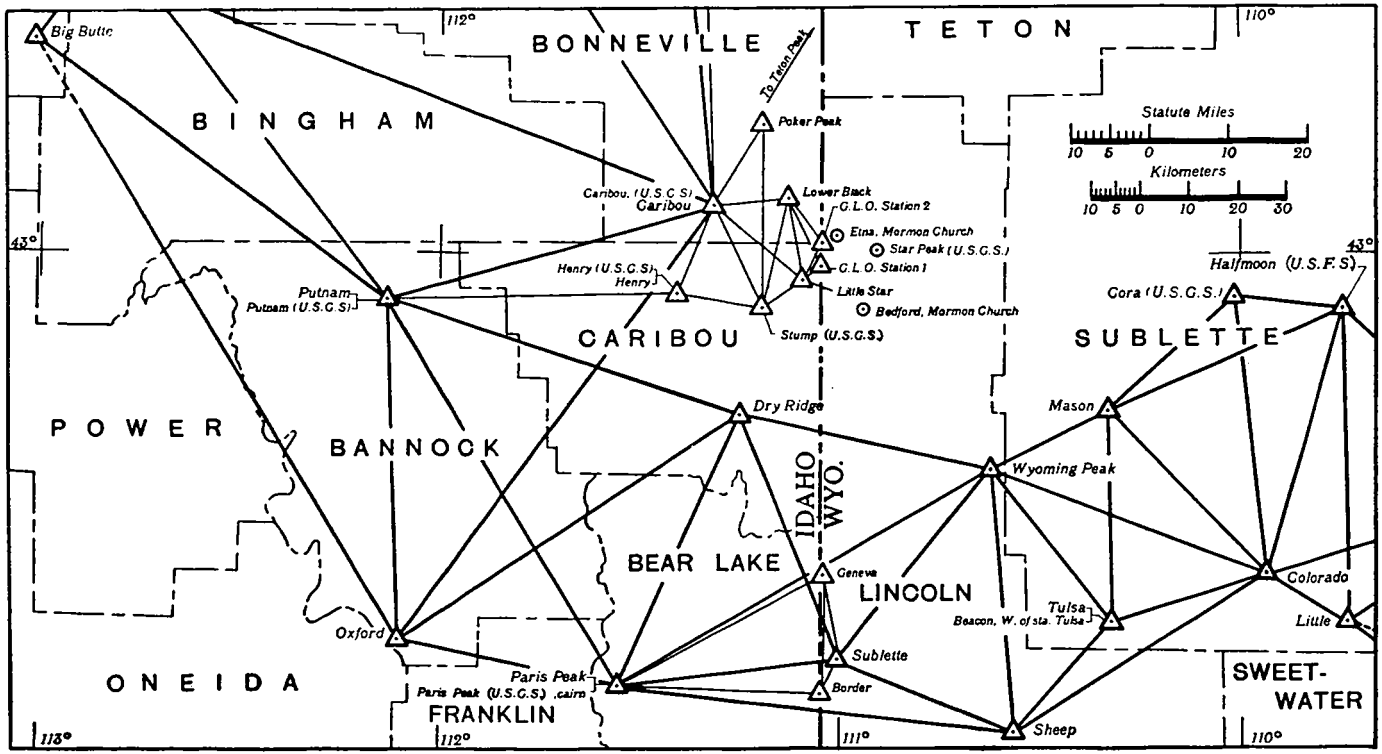

FIGURE 14.—Triangulation along the one-hundred-and-eleventh meridian arc and the forty-second parallel arc.

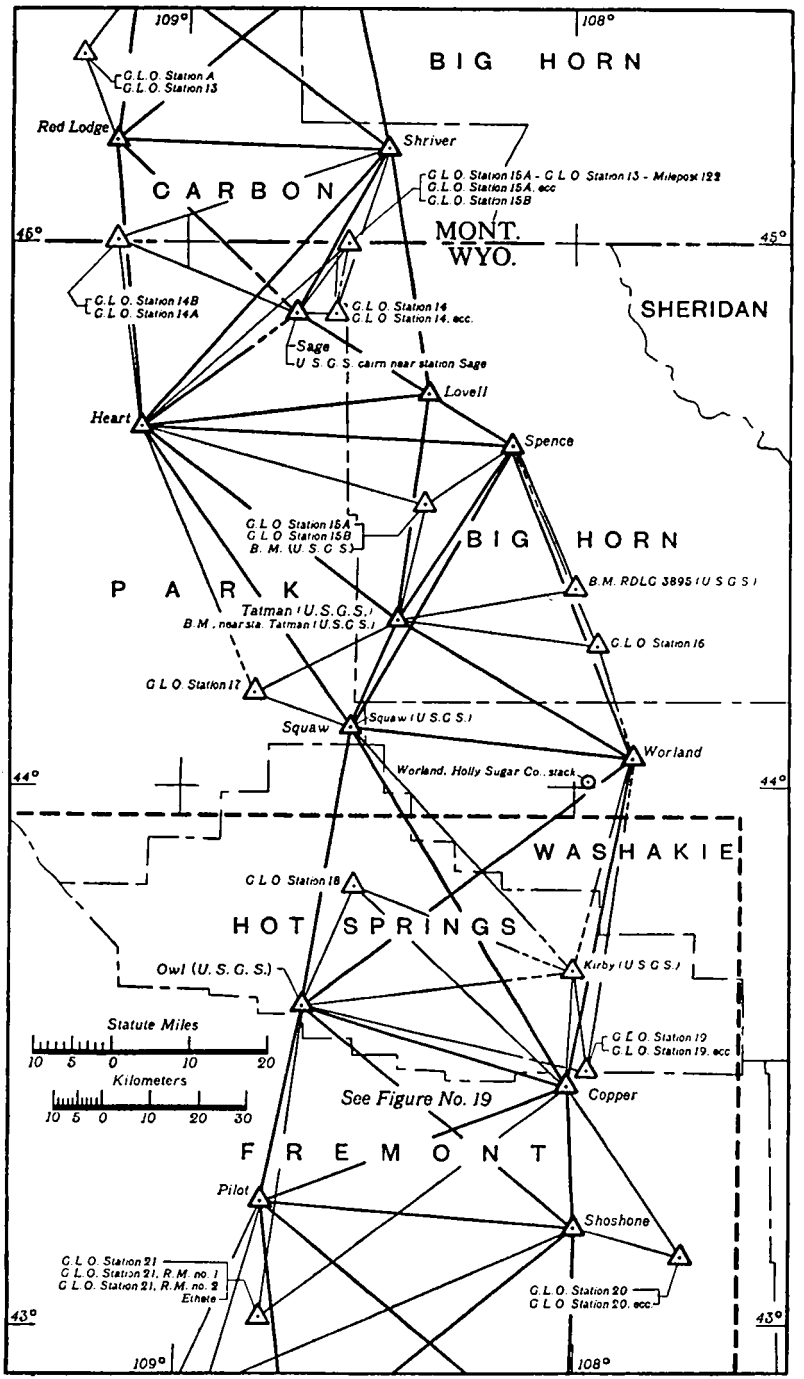

FIGURE 15.—Triangulation along the one-hundred-and-eighth meridian arc.

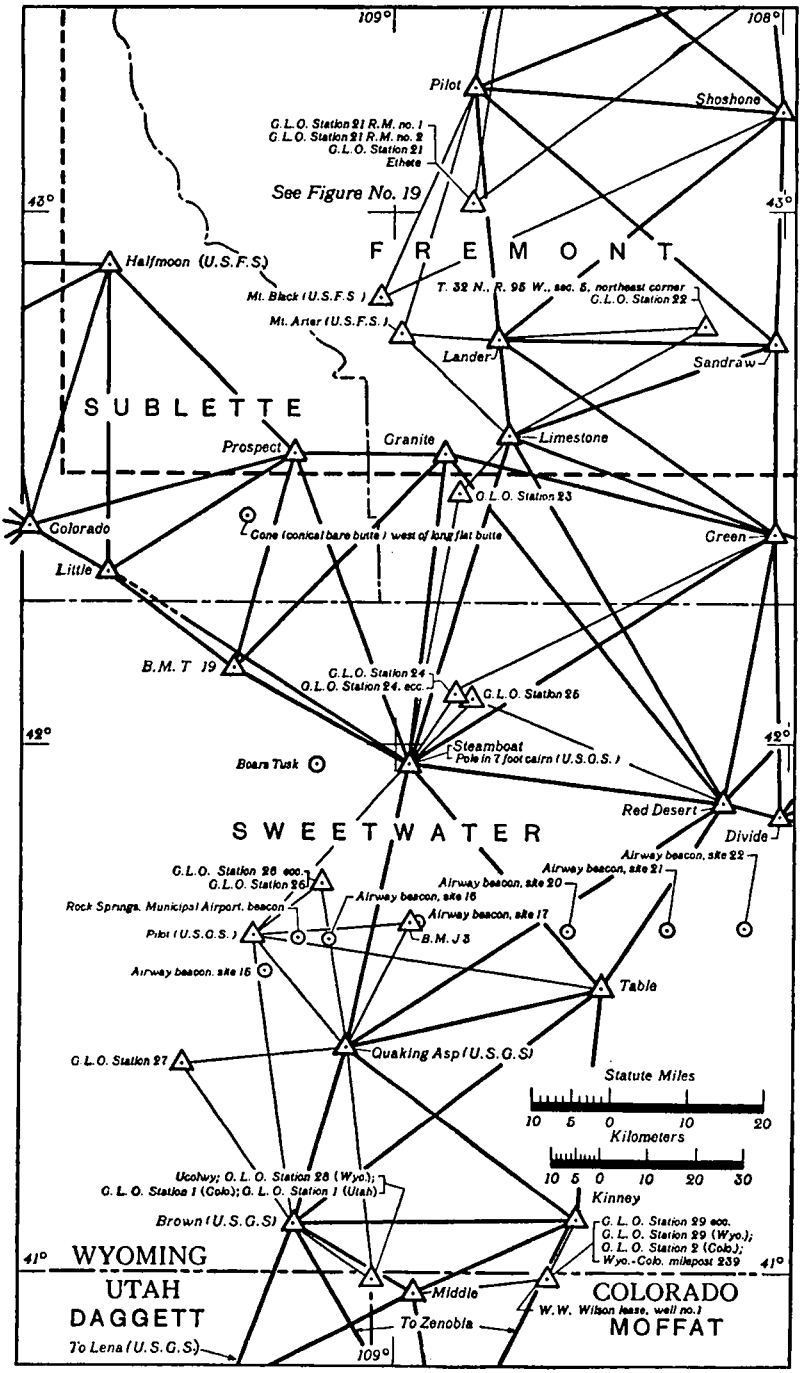

FIGURE 16.—Triangulation along the one-hundred-and-eighth meridian arc and junction with the forty-second parallel arc.

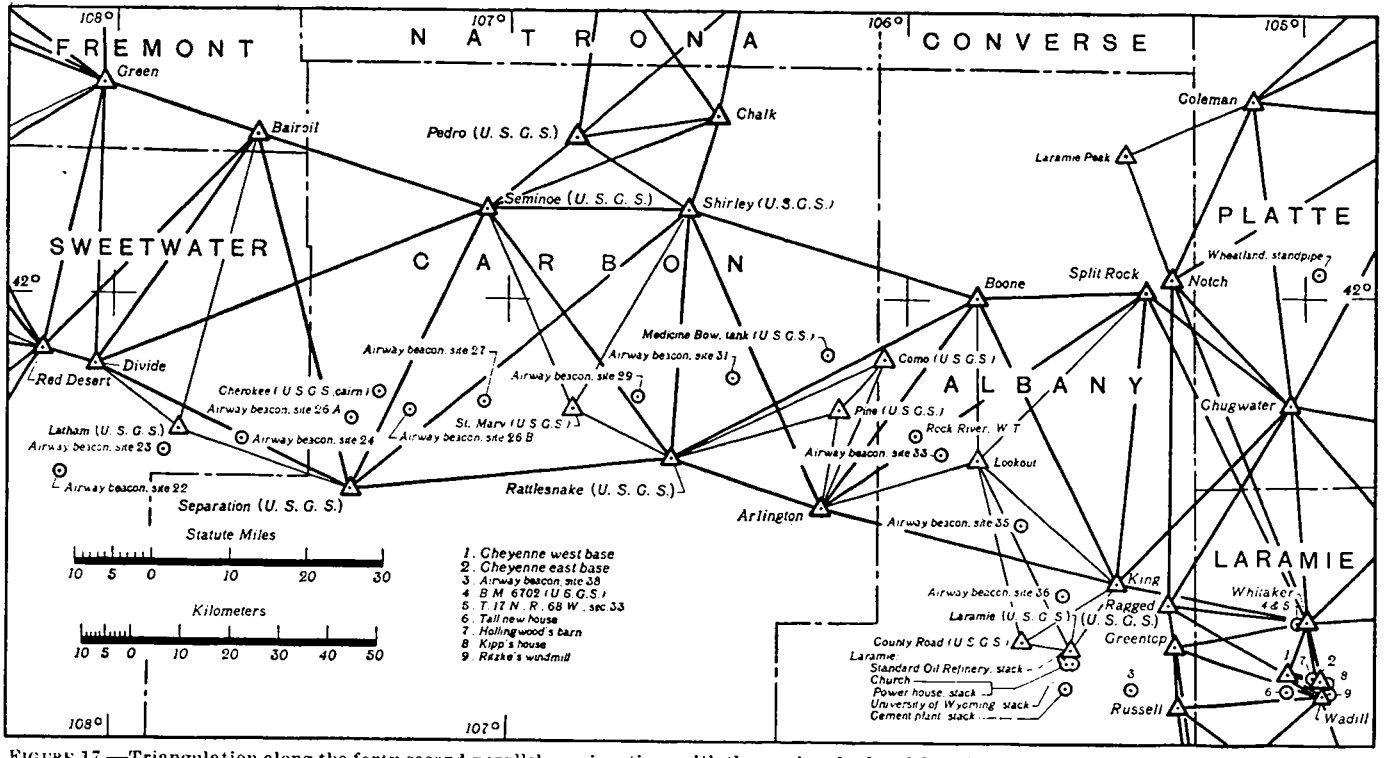

FIGURE 17.—Triangulation along the forty-second parallel arc, junctions with the one-hundred-and-fourth meridian arc and the Hanna to Buffalo arc.

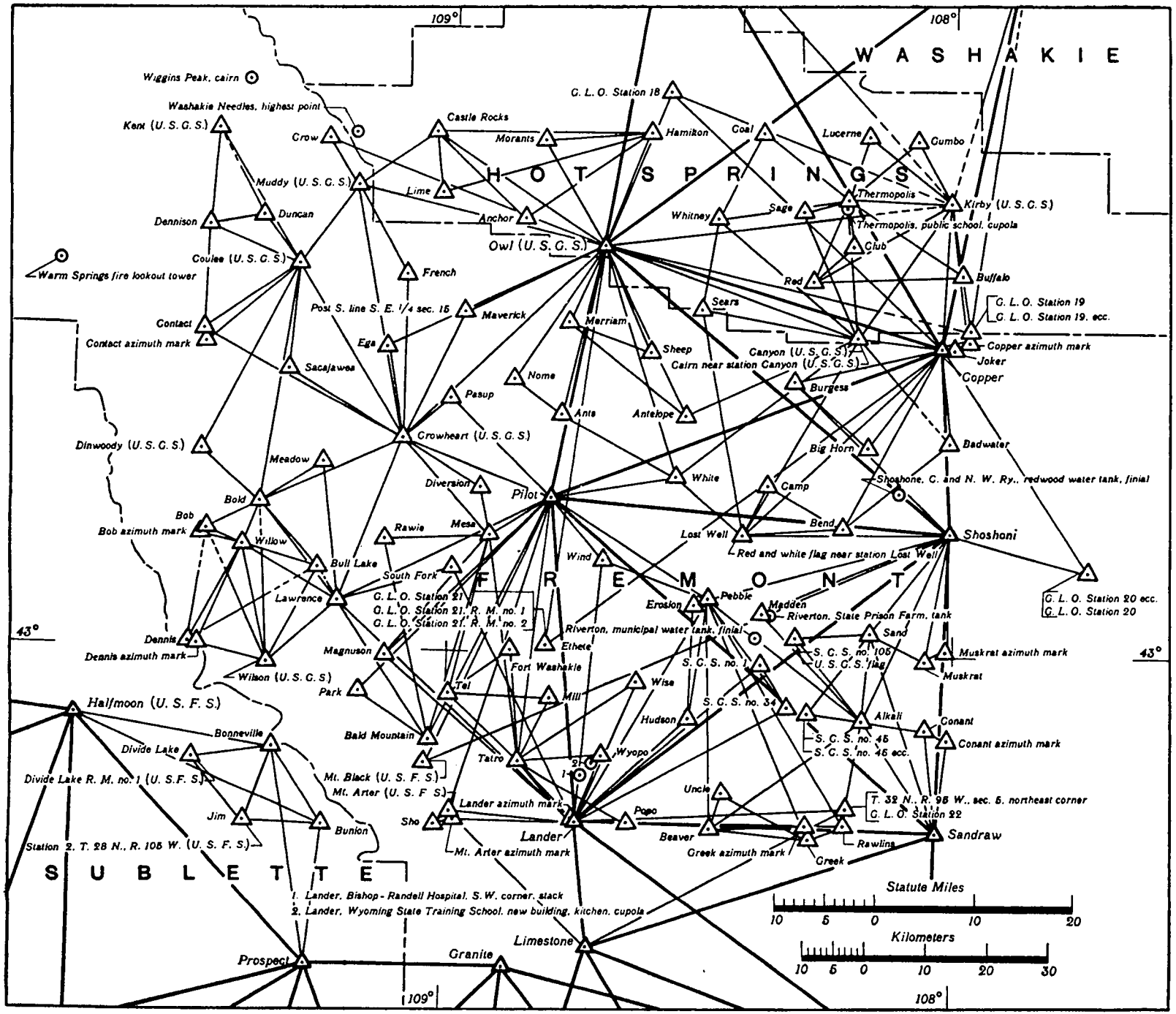

FIGURE 19.—Triangulation in the Shoshone Indian Reservation area.

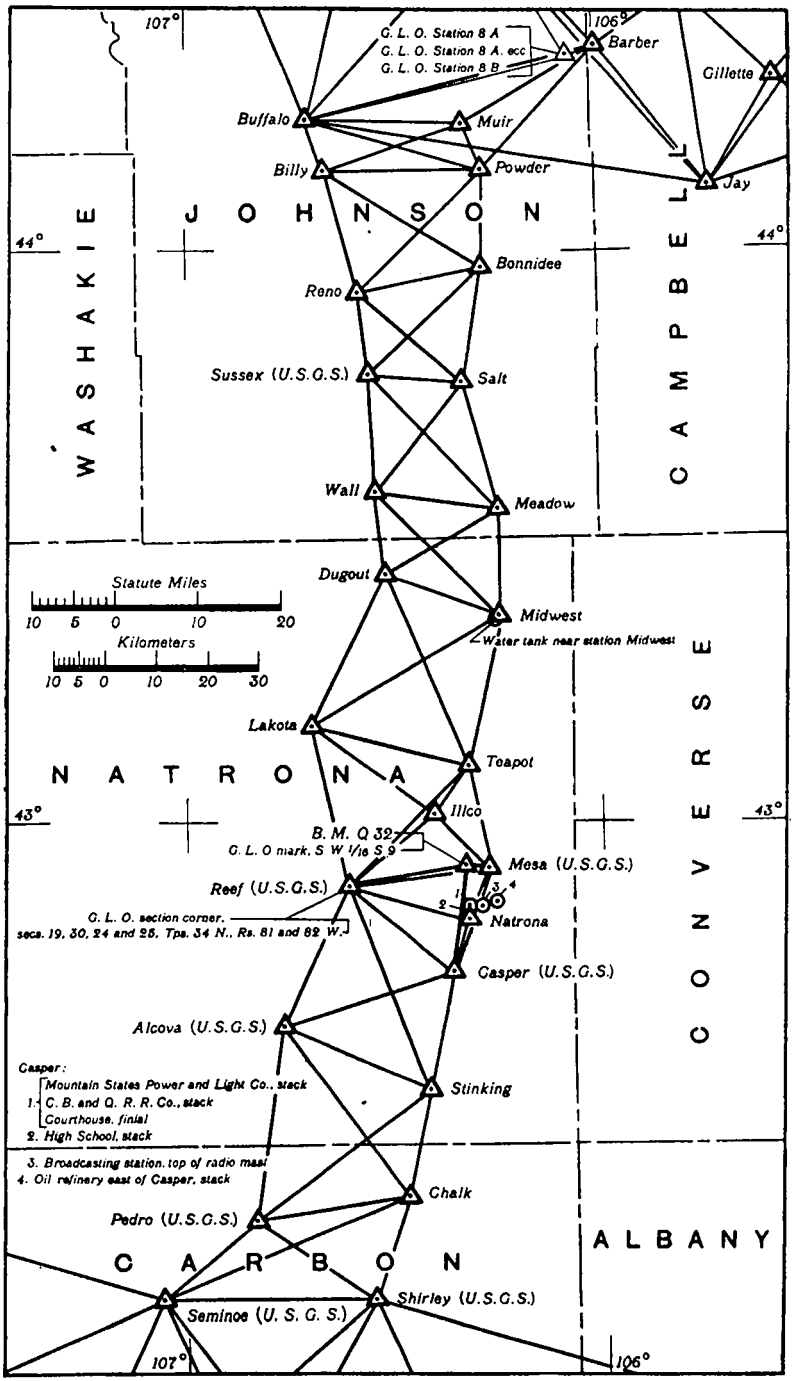

FIGURE 18.—Triangulation along the Hanna to Buffalo arc.

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Station	Geographic position	Description and plane coordinates	Elevation	Sketch
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Airway beacon. (*See* Salt Lake-Omaha Airway.)				
Albin	42	130	130	8
Albin, water tank	46	141		8
Alcova (U. S. G. S.)	49	146	146	18
Alkali (Fremont County)	53	158		19
Alkali (U. S. G. S.)	22	83	83	9
Alkali (Weston County)	19	77	77	9
Amsterdam, Holland Church, spire (Mont.)	26	92	92	12
Anchor	61	192		19
Antelope	57	172		19
Ants	57	174		19
Arlington	43	132	132	17
Astronomic, Provo (S. Dak.)	19	78	78	9
Badger	28	97	97	10, 11
Badwater	56	167		19
Bairoil	43	134	134	17
Bald Mountain	58	177		19
Banner	28	96	96	10
Barber	28	95	95	10, 18
Barn, Hollingswood's	21	81	81	8, 17
Beacon, Airway. (*See* Salt Lake-Omaha Airway.)				
Beacon, municipal airport, Rock Springs	41	127		16
Beacon, west of station Tulsa	49	144		14
Bear	42	130	130	8
Bear Lodge Mountains, highest peak	22	83	83	9
Beaver	55	164		19
Beaver (Mont.)	30	101	101	11
Bedford, Mormon Church, spire	25	90		14
Belgrade, Presbyterian Church, spire (Mont.)	26	92		12
Bench mark. (*See* B. M.)				
B. M. Denver 6702 (U. S. G. S.)	21	82	82	8, 17
B. M. E 3, Dover (Colo.)	20	80	80	8
B. M. eccentric, Dover (Colo.)	20	80	80	8
B. M. H 7	31	104	104	9
B. M. J 3	40	126	126	16
B. M. O 5 (Mont.)	34	107	107	11, 12
B. M. Q 32	50	148	148	18
B. M. RDLG 3895 (U. S. G. S.)	38	120	120	15
B. M. reference mark, Dover (Colo.)	20	81	81	8
B. M. T 10	44	135	135	16
B. M. (U. S. G. S.) (*see* Description of G. L. O. Station 15 A)	38	120		15
B. M. (U. S. G. S.), near station Tatman (U. S. G. S.)	38	120		15
Bend	55	167		19
Big Butte (Idaho)	23	85	85	13, 14
Big Horn	56	169		19
Billy	51	153	153	10, 18
Bishop-Randell Hospital, SW. corner, stack, Lander	62	194		19
Black Butte (Mont.)	23	86	86	12, 13
Black Butte (U. S. G. S.), cairn (Mont.) (*see* Description of station Black Butte (Mont.))	26	92		12, 13
Blue (Mont.)	29	100	100	11
Bluff	21	82	82	8, 9
Boar's Tusk	40	126		16
Bob	59	184		19
Bob azimuth mark	60	184		19
Bold	57	175		19
Bonneville	53	156		19
Bonnidee	51	153	153	10, 18
Boone	43	132	132	17
Border (Wyo.-Idaho)	49	144	144	14
Boundary milepost:				
44, Colorado-Wyoming (Colo.-Wyo.)	20	81	81	8
122, Wyoming-Montana; G. L. O. Station 13 (Wyo.); G. L. O. Station 15 A (Mont.)	37	119	119	11, 15
239, Wyoming-Colorado; G. L. O. Station 29 (Wyo.); G. L. O. Station 2 (Colo.)	41	127		16

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Boundary monument:				
123, Nebraska-Wyoming (Nebr.-Wyo.)	21	82		8, 9
123 eccentric, Nebraska-Wyoming	21	82	82	8, 9
Eccentric, northeast corner Wyoming (Mont.)	22	83	83	9
Eccentric, South Dakota-Nebraska (Nebr.)	21	83		8, 9
Eccentric, southeast corner Montana (S. Dak.)	22	84		9
Northeast corner Wyoming (Mont-S. Dak.-Wyo.)	22	84		9
No. 38, Wyoming-Nebraska (Wyo.-Nebr.)	46	140		8
No. 38 eccentric, Wyoming-Nebraska (Nebr.)	46	140		8
No. 62, Wyoming-Nebraska (Wyo.-Nebr.)	45	140		8
South Dakota-Nebraska (S. Dak.-Nebr.)	21	83	83	8, 9
South Dakota-Wyoming (S. Dak.-Wyo.)	21	83	83	8, 9
Southeast corner Montana (Mont.-S. Dak.)	22	84	84	9
Bozeman:				
Irving School, spire (Mont.)	26	92		12
Montana State College, main hall, north chimney (Mont.)	26	92		12
Northwest base (Mont.)	24	88	88	12
Southeast base (Mont.)	24	88	88	12
Bridger Peak (Mont.)	27	93		12
Broadcasting station, top of radio mast, Casper	52	155		18
Brown (U. S. G. S.)	36	117	117	16
Buffalo (Hot Springs County)	56	169		19
Buffalo (Johnson County)	28	96	96	10, 18
Bull Lake	59	182		19
Bunion	53	155		19
Burgess	56	168		19
Cairn:				
Black Butte (U. S. G. S.) (Mont.)	26	92		12, 13
Cherokee (U. S. G. S.)	48	143		17
Mt. Jefferson (U. S. G. S.) (Mont.)	26	92	92	12
Near station Canyon (U. S. G. S.)	62	194		19
Paris Peak (U. S. G. S.) (Idaho)	49	145		14
U. S. G. S. near station Sage	38	120		11, 15
Wiggins Peak	62	194		19
Cambria	19	79	79	9
Camp	56	168		19
Canyon (U. S. G. S.)	55	165		19
Canyon (U. S. G. S.), cairn near station	62	194		19
Caribou (Idaho))	23	86	86	13, 14
Caribou (U. S. G. S.) (Idaho) (*see* Description of station Caribou (Idaho)	25	90		13, 14
Casper:				
Broadcasting station, top of radio mast	52	155		18
Chicago, Burlington & Quincy Railroad Co., stack	52	155		18
Courthouse, finial	52	155		18
High school, stack	52	155		18
Mountain States Power and Light Co., stack	52	155		18
Oil refinery east of, stack	52	155		18
Casper (U. S. G. S.)	49	147	147	18
Castle (S. Dak.)	20	80	80	9
Castle Rocks	61	190		19
Cement plant, stack, Laramie	47	142		17
Cement Ridge lookout	31	102		9
Chalk	49	145	145	17, 18
Cherokee (U. S. G. S.), cairn	48	143		17
Cheyenne:				
East base	17	75	75	8, 17
State Capitol, dome	20	81	81	8
West base	17	75	75	8, 17
Chicago & North Western Railway Co.:				
Redwood water tank, finial, Shoshoni	61	193		19
Water tank, Manville	21	82	82	8, 9
Chicago, Burlington & Quincy Railroad Co., stack, Casper	52	155		18
Chimney, Kipp's house	21	81	81	8, 17
Chugwater	18	75	75	8, 17
Church, steeple, Third Street, Laramie	46	142		17
Club	56	170		19
Coal	57	171		19
Coleman	18	76	76	8, 17
Colorado	44	136	136	14, 16

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Colorado-Wyoming boundary milepost:				
44 (Colo.-Wyo.)	20	81	81	8
239; G. L. O. Station 29 (Wyo.); G. L. O. station 2 (Colo.)	41	127		16
Columbus	28	97	97	10, 11
Columbus (U. S. G. S.)	33	106		10, 11
Como (U. S. G. S.)	47	142	142	17
Conant	54	162		19
Conant azimuth mark	54	163		19
Cone (conical bare butte) west of long flat butte	49	144		16
Congregational Church, steeple, Manville	21	82	82	8, 9
Contact	60	188		19
Contact azimuth mark	61	189		19
Copper	35	111	111	15, 19
Copper azimuth mark	57	171		19
Cora (U. S. G. S.)	44	137	137	14
Cottonwood	19	77	77	9
Coulee (U. S. G. S.)	57	176		19
County Road (U. S. G. S.)	46	141	141	17
Courthouse, finial, Casper	52	155		18
Cow	27	94	94	9, 10
Crow	60	188		19
Crow (S. Dak.)	19	79	79	9
Crowheart (U. S. G. S.)	57	174		19
Crows Nest (U. S. G. S.) (S. Dak.)	22	83	83	9
Cupola:				
Jireh College	21	82	82	8, 9
Thermopolis, public school	61	194		19
Wyoming State Training School, new building, kitchen, Lander	62	194		19
Dennis	59	184		19
Dennis azimuth mark	59	184		19
Dennison	61	189		19
Dewey (U. S. G. S.) (Colo.)	17	73	73	8
Dinwoody (U. S. G. S.)	60	185		19
Diversion	58	177		19
Divide	43	134	134	16, 17
Divide Lake	53	157		19
Divide Lake reference mark no. 1 (U. S. F. S.)	62	194		19
Dome, State Capitol, Cheyenne	20	81	81	8
Dover:				
B. M. E 3 (Colo.)	20	80	80	8
B. M. eccentric (Colo.)	20	80	80	8
B. M. reference mark (Colo.)	20	81	81	8
Dry Ridge (Idaho)	45	139	139	14
Duck (Mont.)	30	102	102	11, 12
Dugout	50	150	150	18
Duncan	61	190		19
East base, Cheyenne	17	75	75	8, 17
East base, Provo (S. Dak.)	19	78	78	9
East Twin (U. S. G. S.)	20	81	81	8
Ega	60	186		19
Elk (Mont.)	30	101	101	11, 12
Elk (S. Dak.)	19	78	78	9
Elk (U. S. G. S.) (S. Dak.)	22	83	83	9
Erosion	54	160		19
Etheto	39	122	122	15, 16, 19
Etna, Mormon Church, spire	25	90		14
Felix	27	94	94	10
Fire lookout tower, Warm Springs	62	194		19
Flag, red and white, near station Lost Well	61	193		19
Flower (Nebr.)	42	129		8
Fort D. A. Russell, water tank	20	81	81	8
Fort Smith (Mont.)	29	99	99	11
Fort Washakie	59	180		19
French	60	187		19
Gallatin (Mont.)	23	87	87	12, 13
Garfield (Mont.)	23	86	86	13
Garns (Idaho)	25	90	90	13
Garns Mountain south base (Idaho)	25	91	91	13
Garns reference mark no. 2 (Idaho)	25	90	90	13

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G. L. O. corner (Wyo.-Nebr.)	45	140		8
G. L. O. mark, SW. 1/16 S. 9 (*see* description of station B. M. Q 32)	52	155		18
G. L. O. section corner, secs. 19, 30, 24 and 25, Tps. 34 N., Rs. 81 and 82 W	52	155		18
G. L. O. Station 1 (Colo.); G. L. O. Station 1 (Utah); G. L. O. Station 28 (Wyo.); Ucolwy	41	127	127	16
G. L. O. Station 1 (Mont.)	34	107	107	12
G. L. O. Station 1 (Utah); G. L. O. Station 1 (Colo.); G. L. O. Station 28 (Wyo.); Ucolwy	41	127	127	16
G. L. O. Station 1 (Wyo.-Idaho)	25	90	90	14
G. L. O. Station 1 (Wyo.-S. Dak.)	31	103	103	9
G. L. O. Station 1 eccentric (Mont.)	34	107	107	12
G. L. O. Station 1 eccentric (S. Dak.)	31	102	102	9
G. L. O. Station 2 (Colo.); G. L. O. Station 29 (Wyo.); Wyoming-Colorado boundary milepost 239	41	127		16
G. L. O. Station 2 (Mont.)	34	107	107	11, 12
G. L. O. Station 2 (Wyo.)	31	103	103	9
G. L. O. Station 2 (Wyo.-Idaho)	25	90	90	14
G. L. O. Station 2 eccentric (Mont.)	34	107	107	11, 12
G. L. O. Station 2 eccentric (Wyo.)	31	103	103	9
G. L. O. Station 2, reference mark no. 1 (Wyo.)	31	103		9
G. L. O. Station 2, reference mark no. 3 (Wyo.)	31	103		9
G. L. O. Station 3 (Wyo.)	31	103	103	9
G. L. O. Station 3 eccentric (Wyo.)	31	103	103	9
G. L. O. Station 4 (Wyo.)	31	104	104	9
G. L. O. Station 4 eccentric (Wyo.)	31	104	104	9
G. L. O. Station 5 (Mont.)	33	107	107	11
G. L. O. Station 5 (Wyo.)	31	104	104	9, 10
G. L. O. Station 5 eccentric (Mont.)	33	107	107	11
G. L. O. Station 5 eccentric (Wyo.)	31	104	104	9, 10
G. L. O. Station 6 (Idaho)	25	91	91	13
G. L. O. Station 6 (Mont.)	33	107		11
G. L. O. Station 6 (Wyo.)	32	104	104	10
G. L. O. Station 6 eccentric (Mont.)	33	107	107	11
G. L. O. Station 6 eccentric (Wyo.)	32	104	104	10
G. L. O. Station 7 (Wyo.)	32	104	104	10
G. L. O. Station 7 eccentric (Wyo.)	32	104	104	10
G. L. O. Station 8 (Idaho)	25	91	91	13
G. L. O. Station 8 A (Wyo.)	32	105		10, 18
G. L. O. Station 8 A eccentric (Wyo.)	32	105	105	10, 18
G. L. O. Station 8 B (Wyo.)	32	105		10, 18
G. L. O. Station 9 (Mont.)	33	107	107	11
G. L. O. Station 9 (Wyo.)	32	105	105	10
G. L. O. Station 9 eccentric (Wyo.)	32	105	105	10
G. L. O. Station 10 (Idaho-Mont.)	26	92	92	13
G. L. O. Station 10 (Mont.)	33	107	107	11
G. L. O. Station 10 (Wyo.)	32	105		10
G. L. O. Station 10 eccentric (Mont.)	33	107	107	11
G. L. O. Station 10 eccentric (Wyo.)	32	105		10
G. L. O. Station 11 (Beaverhead County) (Mont.)	26	92		13
G. L. O. Station 11 (Big Horn County) (Mont.)	33	106	106	10, 11
G. L. O. Station 11 (Wyo.)	33	106	106	10, 11
G. L. O. Station 11 eccentric (Mont.)	25	92	92	13
G. L. O. Station 11 eccentric (Wyo.)	32	105	105	10, 11
G. L. O. Station 12 (Mont.)	33	106	106	10, 11
G. L. O. Station 12 eccentric (Mont.)	33	106	106	10, 11
G. L. O. Station 13 (Mont.)	37	119		11, 15
G. L. O. Station 13 (Wyo.); G. L. O. Station 15 A (Mont.); Wyoming-Montana boundary milepost 122	37	119	119	11, 15
G. L. O. Station 14 (Wyo.)	37	119		11, 15
G. L. O. Station 14 eccentric (Wyo.)	37	119	119	11, 15
G. L. O. Station 14 A (Mont.)	37	119		11, 15
G. L. O. Station 14 B (Mont.)	37	119		11, 15
G. L. O. Station 15 A (Mont.); G. L. O. Station 13 (Wyo.); Wyoming-Montana boundary milepost 122	37	119	119	11, 15
G. L. O. Station 15 A (Wyo.)	38	120	120	15
G. L. O. Station 15 A eccentric (Mont.)	37	119		11, 15
G. L. O. Station 15 B (Wyo.)	38	120		15
G. L. O. Station 15 B (Wyo.-Mont.)	37	120		11, 15
G. L. O. Station 16 (Idaho-Mont.)	25	91		13
G. L. O. Station 16 (Wyo.)	38	120		15
G. L. O. Station 17 (Wyo.)	38	121	121	15
G. L. O. Station 18 (Mont.)	26	92	92	12, 13
G. L. O. Station 18 (Wyo.)	39	121	121	15, 19

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G. L. O. Station 19 (Mont.)	27	93	93	12
G. L. O. Station 19 (Wyo.)	39	122		15, 19
G. L. O. Station 19 eccentric (Wyo.)	39	122	122	15, 19
G. L. O. Station 20 (Mont.)	27	93	93	12
G. L. O. Station 20 (Wyo.)	39	122		15, 19
G. L. O. Station 20 eccentric (Wyo.)	39	122	122	15, 19
G. L. O. Station 21 (Wyo.)	39	123		15, 16, 19
G. L. O. Station 21, reference mark no. 1 (Wyo.)	39	123		15, 16, 19
G. L. O. Station 21, reference mark no. 2 (Wyo.)	39	123		15, 16, 19
G. L. O. Station 22 (Wyo.)	39	123	123	16, 19
G. L. O. Station 23 (Wyo.)	40	124	124	16
G. L. O. Station 24 (Wyo.)	40	125		16
G. L. O. Station 24 eccentric (Wyo.)	40	124	124	16
G. L. O. Station 25 (Wyo.)	40	125	125	16
G. L. O. Station 26 (Wyo.)	40	126		16
G. L. O. Station 26 eccentric (Wyo.)	40	126	126	16
G. L. O. Station 27 (Wyo.)	41	127	127	16
G. L. O. Station 28 (Wyo.); G. L. O. Station 1 (Colo.); G. L. O. Station 1 (Utah); Ucolwy	41	127	127	16
G. L. O. Station 29 (Wyo.); G. L. O. Station 2 (Colo.); Wyoming-Colorado boundary milepost 239	41	127		16
G. L. O. Station 29 eccentric (Wyo.)	41	127	127	16
G. L. O. Station A (Mont.)	37	118	118	11, 15
Geneva	49	144	144	14
Gillette	27	94	94	10, 18
Granite	43	135	135	16, 19
Greek	55	163		19
Greek azimuth mark	55	164		19
Green	36	114	114	16, 17
Greentop	17	74	74	8, 17
Gumbo	56	169		19
Haley (Mont.)	29	99	99	11
Halfmoon (U. S. F. S.)	44	136	136	14, 16, 19
Hamilton	61	191		19
Haystack	18	76	76	8
Heart	34	108	108	15
Henry (Idaho)	24	89	89	13, 14
Henry (U. S. G. S.) (Idaho) (see description of station Henry (Idaho))	24	89		13, 14
High school, stack, Casper	52	155		18
Hobbs	18	76	76	8
Holland Church, spire, Amsterdam (Mont.)	26	92	92	12
Hollingswood's barn	21	81	81	8, 17
Holly Sugar Co., stack, Worland	38	121		15
Horsetooth (U. S. G. S.) (Colo.)	17	73	73	8
House, Kipp's, chimney	21	81	81	8, 17
Hudson	53	160		19
Hunter	42	130	130	8
Huntley (Mont.)	29	100	100	11
Ilico	50	150	150	18
Inyankara	19	79	79	9
Irving School, spire, Bozeman (Mont.)	26	92		12
Jay	28	95	95	10, 18
Jefferson (Mont.)	23	88	88	12
Jim	53	157		19
Jireh College, cupola	21	82	82	8, 9
Joker	57	172		19
Kent (U. S. G. S.)	61	189		19
King	43	131	131	8, 17
Kinney	36	116	116	16
Kipp's house, chimney	21	81	81	8, 17
Kirby (U. S. G. S.)	39	121	121	15, 19
Kirkbride	42	131	131	8
Kirtley	18	77	77	8, 9
Laird (S. Dak.)	19	79	79	9
Lakota	50	149	149	18
Lander	35	113	113	16, 19
Lander azimuth mark	59	182		19
Lander, Bishop-Randell Hospital, SW. corner, stack	62	194		19

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Lander, Wyoming State Training School, new building, kitchen, cupola	62	194		19
Laramie:				
Cement plant, stack	47	142		17
Power house, stack	47	142		17
Standard Oil Refinery, stack, right hand (westerly) of two	47	142		17
Third Street Church, steeple	46	142		17
University of Wyoming, stack	46	142		17
Laramie (U. S. G. S.)	46	141	141	17
Laramie Peak	21	82	82	8, 17
Latham (U. S. G. S.)	48	143	143	17
Lawrence	57	175		19
Leiter reference mark (U. S. G. S.)	33	106		10
Lena (U. S. G. S.) (Utah)	37	118	118	16
Lime	61	192		19
Limestone	36	114	114	16, 19
Little	44	136	136	14, 16
Little Star (Idaho)	24	89	89	14
Livingston (Mont.)	30	102	102	12
London (Mont.)	24	88	88	12
Lookout	46	141	141	17
Lost Well	55	165		19
Lost Well, red and white flag near station	61	193		19
Lovell	35	109	109	15
Lower Black (Idaho)	24	89	89	14
Lucerne	56	169		19
Lyman:				
Tank, on tall structure (Nebr.)	45	140		8
Tank, white top (Nebr.)	45	140		8
Madden	54	161		19
Magnuson	58	178		19
Manville	18	77	77	8, 9
Manville:				
Chicago & North Western Railway Co., water tank	21	82	82	8, 9
Congregational Church, steeple	21	82	82	8, 9
Mason	44	137	137	14
Maverick	60	187		19
Meadow (Fremont County)	60	184		19
Meadow (Johnson County)	51	151	151	18
Medicine Bow, tank (U. S. G. S.)	47	142		17
Merriam	57	173		19
Mesa	58	177		19
Mesa (U. S. G. S.)	50	147	147	18
Middle (Colo.)	37	117	117	16
Middle Butte (Idaho)	23	85	85	13
Midwest	51	150	150	18
Midwest, water tank near station	52	155		18
Mill	59	180		19
Mitchell:				
Sugar mill, stack (Nebr.)	45	140		8
Sugar mill, tank (Nebr.)	45	140		8
Montana State College, main hall, north chimney, Bozeman (Mont.)	26	92		12
Montana-Wyoming boundary milepost 122; G. L. O. Station 13 (Wyo.), G. L. O. Station 15 A (Mont.)	37	119	119	11, 15
Moorecroft	27	93	93	9, 10
Morants	61	191		19
Mormon Church:				
Spire, Bedford	25	90		14
Spire, Etna	25	90		14
Morril, tank (Nebr.)	45	140		8
Mount Arter (U. S. F. S.)	39	124		16, 19
Mount Arter azimuth mark	55	164		19
Mount Black (U. S. F. S.)	39	123		16, 19
Mount Blackmore (Mont.)	26	92	92	12
Mount Ellis (Mont.)	30	102	102	12
Mount Jefferson (U. S. G. S.), cairn (Mont.)	26	92	92	12
Mountain States Power and Light Co., stack, Casper	52	155		18
Muddy (U. S. G. S.)	58	176		19
Muir	51	154	154	10, 18
Municipal airport, beacon, Rock Springs	41	127		16
Muskrat	54	162		19
Muskrat azimuth mark	54	162		19

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Nebraska-South Dakota boundary monument (Nebr.-S. Dak.)	21	83	83	8, 9
Nebraska-South Dakota boundary monument eccentric (Nebr.)	21	83		8, 9
Nebraska-Wyoming boundary monument:				
123 (Nebr.-Wyo.)	21	82		8, 9
123 eccentric	21	82	82	8, 9
No. 38 (Nebr.-Wyo.)	46	140		8
No. 38 eccentric (Nebr.)	46	140		8
No. 62 (Nebr.-Wyo.)	45	140		8
Nome	57	174		19
North (Nebr.)	41	128		8
Northeast corner Wyoming:				
Boundary monument (Mont.-S. Dak.-Wyo.)	22	84		9
Boundary monument eccentric (Mont.)	22	83	83	9
Northwest base, Bozeman (Mont.)	24	88	88	12
Northwest base, Ranchester	29	98	98	10, 11
Notch	18	76	76	8, 17
Oil refinery east of Casper, stack	52	155		18
Oshoto	27	93	93	9, 10
Otto, Union Pacific Railroad Co., water tank	20	81	81	8
Owl (U. S. G. S.)	35	111	111	15, 19
Oxford (Idaho)	23	84	84	14
Paris Peak (Idaho)	45	139	139	14
Paris Peak cairn (U. S. G. S.), (Idaho) (*see* description of station Paris Peak (Idaho))	49	145		14
Park	58	178		19
Parker (S. Dak.)	19	77	77	9
Pasup	60	186		19
Peak south of station Terry (S. Dak.)	22	83	83	9
Pebble	53	158		19
Pedro (U. S. G. S.)	49	145	145	17, 18
Pilot	35	112	112	15, 16, 19
Pilot (U. S. G. S.)	40	126	126	16
Pine (Mont.)	29	99	99	11
Pine (U. S. G. S.)	47	142	142	17
Poker Peak (Idaho)	25	90		14
Pole in 7-foot cairn (U. S. G. S.) (*see* description of station Steamboat)	40	126		16
Popo	59	181		19
Post, S. line SE. ¼ sec. 15	63	194		19
Powder	51	154	154	10, 18
Power house, stack, Laramie	47	142		17
Presbyterian Church, spire, Belgrade (Mont.)	26	92		12
Prospect	44	135	135	16, 19
Provo:				
Astronomic (S. Dak.)	19	78	78	9
East base (S. Dak.)	19	78	78	9
West base (S. Dak.)	19	78	78	9
Pryor (Mont.)	29	100	100	11
Public school, cupola, Thermopolis	61	194		19
Putnam (Idaho)	23	84	84	13, 14
Putnam (U. S. G. S.) (Idaho) (*see* description of station Putnam (Idaho))	25	90		13, 14
Quaking Asp (U. S. G. S.)	36	116	116	16
Radio mast, top of, broadcasting station, Casper	52	155		18
Ragged (U. S. G. S.)	17	74	74	8, 17
Ranchester:				
Northwest base	29	98	98	10, 11
Southeast base	29	98	98	10, 11
Water tower	33	106		10, 11
Rattlesnake (U. S. G. S.)	43	133	133	17
Rawhide	18	77	77	8
Rawlo	58	179		19
Rawlins	53	158		19
Red	56	170		19
Red (Mont.)	28	97	97	10, 11
Red and white flag near station Lost Well	61	193		19

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Red Bluff (U. S. G. S.) (Mont.)	33	106		10, 11
Red Desert	36	115	115	16, 17
Red Lodge (Mont.)	34	108	108	11, 15
Reef (U. S. G. S.)	50	147	147	18
Reference mark:				
Dover B. M. (Colo.)	20	81	81	8
Leiter (U. S. G. S.)	33	106		10
No. 1, Divide Lake (U. S. F. S.)	62	194		19
No. 1, G. L. O. Station 2 (Wyo.)	31	103		9
No. 1, G. L. O. Station 21	39	123		15, 16, 19
No. 2, Garns (Idaho)	25	90	90	13
No. 2, G. L. O. Station 21	39	123		15, 16, 19
No. 3, G. L. O. Station 2 (Wyo.)	31	103		9
Reid (Mont.)	29	101	101	11
Reno	51	153	153	10, 18
Ritzke's windmill	21	81	81	8, 17
Riverton:				
Municipal water tank, finial	62	194		19
State Prison Farm, tank	62	194		19
Road (Idaho)	25	91	91	13
Robinson	28	95	95	10
Rock River, water tank	47	142		17
Rock Springs, municipal airport, beacon	41	127		16
Rosebud (Mont.)	29	97	97	11
Ross (Mont.)	24	89	89	12
Ross 2 (Mont.)	30	102		12
Ross Peak (Mont.)	27	93	93	12
Roubedeau (Nebr.)	41	129		8
Rozet	27	93	93	9, 10
Ruby (Mont.)	23	87	87	12, 13
Russell	17	74	74	8, 17
Sacajawea	60	185		19
Sage (Hot Springs County)	57	171		19
Sage (Park County)	34	109	109	11, 15
Sage, U. S. G. S. cairn near station	38	120		11, 15
St. Mary (U. S. G. S.)	47	143	143	17
Salesville (Mont.)	23	88	88	12
Salt	51	152	152	18
Salt Lake-Omaha Airway:				
Site 15, beacon	41	127		16
Site 16, beacon	41	127		16
Site 17, beacon	40	126		16
Site 20, beacon	49	144		16
Site 21, beacon	48	144		16
Site 22, beacon	48	144		16, 17
Site 23, beacon	48	144		17
Site 24, beacon	48	143		17
Site 26 A, beacon	48	143		17
Site 26 B, beacon	48	143		17
Site 27, beacon	48	143		17
Site 29, beacon	47	143		17
Site 31, beacon	47	142		17
Site 33, beacon	47	142		17
Site 35, beacon	47	142		17
Site 36, beacon	47	142		17
Site 38, beacon	46	141		8, 17
Sand	53	159		19
Sandraw	35	113	113	16, 19
Sawtelle (Idaho-Mont.)	23	86	86	13
S. C. S. no. 1	54	160		19
S. C. S. no. 34	54	160		19
S. C. S. no. 45	63	194		19
S. C. S. no. 45 eccentric	54	162		19
S. C. S. no. 105	54	161		19
Sears	55	167		19
Section. (*See* T, Township.)				
Seminoe (U. S. G. S.)	43	134	134	17, 18
Separation (U. S. G. S.)	43	133	133	17
Sharp	27	94	94	9, 10
Shayne (Mont.)	30	101	101	11
Sheep (Fremont County)	57	173		19
Sheep (Lincoln County)	45	138	138	14
Shirley (U. S. G. S.)	43	133	133	17, 18
Sho	63	194		19

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Shoshoni, Chicago & North Western Railway Co., redwood water tank, finial	61	193		19
Shriver (Mont.)	34	108	108	11, 15
66 Mountain	41	129		8
Soil Conservation Service. (*See* S. C. S.)				
South base, Garns Mountain (Idaho)	25	91	91	13
South Dakota-Nebraska:				
Boundary monument (S. Dak.-Nebr.)	21	83	83	8, 9
Boundary monument eccentric (Nebr.)	21	83		8, 9
South Dakota-Wyoming boundary monument (S. Dak.-Wyo.)	21	83	83	8, 9
South Fork	61	193		19
Southeast base, Bozeman (Mont.)	24	88	88	12
Southeast base, Ranchester	29	98	98	10, 11
Southeast corner Montana, boundary monument (Mont.-S. Dak.)	22	84	84	9
Southeast corner Montana, boundary monument eccentric (S. Dak.)	22	84		9
Spence	35	110	110	15
Spire:				
Holland Church, Amsterdam (Mont.)	26	92	92	12
Irving School, Bozeman (Mont.)	26	92		12
Mormon Church, Bedford	25	90		14
Mormon Church, Etna	25	90		14
Presbyterian Church, Belgrade (Mont.)	26	92		12
Split Rock	43	132	132	8, 17
Squaw	35	110	110	15
Squaw (U. S. G. S.) (*see* description of station Squaw)	38	121		15
Stack:				
Bishop-Randell Hospital, SW. corner, Lander	62	194		19
Cement plant, Laramie	47	142		17
Chicago, Burlington & Quincy Railroad Co., Casper	52	155		18
High school, Casper	52	155		18
Holly Sugar Co., Worland	38	121		15
Mountain States Power & Light Co., Casper	52	155		18
Oil refinery east of Casper	52	155		18
Power house, Laramie	47	142		17
Right hand (westerly) of two, Standard Oil Refinery, Laramie	47	142		17
Sugar mill, Mitchell (Nebr.)	45	140		8
University of Wyoming, Laramie	46	142		17
Standard Oil Refinery, stack, right hand (westerly) of two, Laramie	47	142		17
Standpipe, Wheatland	21	82	82	8, 17
Star Peak (U. S. G. S.)	24	90		14
State Capitol, dome, Cheyenne	20	81	81	8
State Prison Farm, tank, Riverton	62	194		19
Station 2, T. 28 N., R. 105 W. (U. S. F. S.)	62	194		19
Steamboat	36	114	114	16
Steeple:				
Church, Third Street, Laramie	46	142		17
Congregational Church, Manville	21	82	82	8, 9
Stinking	49	146	146	18
Stump (U. S. G. S.) (Idaho)	24	89		14
Sublette	45	139	139	14
Sugar mill, stack, Mitchell (Nebr.)	45	140		8
Sugar mill, tank, Mitchell (Nebr.)	45	140		8
Sullivan (S. Dak.)	19	78	78	9
Sullivan (U. S. G. S.) (S. Dak.)	22	83	83	9
Sundance	19	80	80	9
Sussex (U. S. G. S.)	51	152	152	18
Table	36	115	115	16
Tall new house, west gable	21	81	81	8, 17
Tank:				
Medicine Bow (U. S. G. S.)	47	142		17
Morril (Nebr.)	45	140		8
On tall structure, Lyman (Nebr.)	45	140		8
State Prison Farm, Riverton	62	194		19
Sugar mill, Mitchell (Nebr.)	45	140		8
White top, Lyman (Nebr.)	45	140		8
Tatman (U. S. G. S.)	35	109	109	15
Tatman (U. S. G. S.), B. M. (U. S. G. S.) near station	38	120		15
Tatro	58	176		19
Taylor (Mont.)	23	87	87	12, 13

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Tel	59	179		19
Terry (S. Dak.)	19	79	79	9
Terry (U. S. G. S.)	20	81	81	8
Terry, peak south of station (S. Dak.)	22	83	83	9
Teton Peak	25	91	91	14
Thermopolis	55	166		19
Thermopolis, public school, cupola	61	194		19
Tower (see water tank).				
T. 9 S., R. 34 E., sec. 6, quarter-section corner (Mont.)	33	106		10, 11
T. 17 N., R. 68 W., sec. 33, southwest corner, stone post (*see* description of station Whitaker)	21	82	82	8, 17
T. 28 N., R. 105 W., Station 2 (U. S. F. S.)	62	194		19
T. 32 N., R. 95 W., sec. 5, northeast corner	62	194		16, 19
Tps. 34 N., Rs. 81 and 82 W., secs. 19, 30, 24, and 25, G. L. O. section corner	52	155		18
Tps. 48 N., Rs. 63 and 64 W., secs. 1 and 6, closing corner	31	103	103	9
Tulsa	44	137	137	14
Tulsa, beacon west of station	49	144		14
Twin	17	73	73	8
Ucolwy; G. L. O. Station 28 (Wyo.); G. L. O. Station 1 (Colo.); G. L. O. Station 1 (Utah)	41	127	127	16
Uncle	55	164		19
Union Pacific Railroad Co., water tank, Otto	20	81	81	8
U. S. G. S. cairn near station Sage	38	120		11, 15
U. S. G. S. flag (*see* description of station S. C. S. no. 105)	63	194		19
University of Wyoming, stack, Laramie	46	142		17
Wadill	17	73	73	8, 17
Wall	51	151	151	18
Warm Springs fire lookout tower	62	194		19
Warren	17	73	73	8
Washakie Needles, highest point	62	194		19
Water tank:				
Albin	46	141		8
Fort D. A. Russell	20	81	81	8
Manville, Chicago & North Western Railway Co.	21	82	82	8, 9
Near station Midwest	52	155		18
Otto, Union Pacific Railroad Co.	20	81	81	8
Riverton, municipal, finial	62	194		19
Rock River	47	142		17
Shoshoni, Chicago & North Western Railway Co., redwood, finial	61	193		19
Water tower, Ranchester	33	106		10, 11
Wauneta	42	131	131	8
Weamer (Mont.)	30	101	101	11
West base, Cheyenne	17	75	75	8, 17
West base, Provo (S. Dak.)	19	78	78	9
Wheatland, standpipe	21	82	82	8, 17
Whitaker	17	74	74	8, 17
White	55	165		19
Whitmeyer	28	96	96	10
Whitney	55	166		19
Wiggins Peak, cairn	62	194		19
Wildcat (Nebr.)	41	128		8
Wilkins	42	131	131	8
Willow (Fremont County)	59	182		19
Willow (Niobrara County)	18	76	76	8
Wilson (U. S. G. S.)	59	183		19
Wind	53	159		19
Windmill, Ritzke's	21	81	81	8, 17
Wise	59	180		19
Wolf	29	98	98	10, 11
Wolf Mountain (U. S. G. S.)	33	106		10, 11
Worland	35	111	111	15
Worland, Holly Sugar Co., stack	38	121		15
W. W. Wilson, Lease, well no. 1 (Colo.)	41	127		16
Wymonkota (U. S. G. S.) (Mont.)	20	80	80	9
Wyola (Mont.)	29	98	98	10, 11
Wyoming-Colorado boundary milepost:				
44 (Wyo.-Colo.)	20	81	81	8
239; G. L. O. Station 29 (Wyo.); G. L. O. Station 2 (Colo.)	41	127		16

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Wyoming-Nebraska boundary:				
Monument no. 38 (Wyo.-Nebr.)	46	140		8
Monument no. 38 eccentric (Nebr.)	46	140		8
Monument no. 62 (Wyo.-Nebr.)	45	140		8
Monument 123 (Wyo.-Nebr.)	21	82		8, 9
Monument 123 eccentric	21	82	82	8, 9
Wyoming Peak	45	138	138	14
Wyoming-South Dakota boundary monument (Wyo.-S. Dak.)	21	83	83	8, 9
Wyoming State Training School, new building, kitchen, cupola, Lander	62	194		19
Wyopo	59	181		19
Zenobia (Colo.)	37	117	117	16

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