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TRIANGULATION IN UTAH
1871-1934

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J. G. STAACK, Chief Topographic Engineer

INTRODUCTION

Scope of report.—This bulletin contains the results of all triangulation done in Utah by the Geological Survey of the United States Department of the Interior before 1936 and includes those previously published,¹ the work for which was done before 1915.

Precision.—In general, the triangulation described in this report conforms to the specifications for third-order work as now defined by the Federal Board of Surveys and Maps. These specifications, in part, are as follows:

The designations for the several grades of control adopted by the Board of Surveys and Maps January 11, 1921, were precise, primary, secondary, and tertiary, named in order of decreasing accuracy. Prior to that time the terms primary, secondary, and tertiary had been used for the three higher grades of control. The nomenclature adopted in 1921 did not find wide acceptance, and therefore the Board in 1925 adopted the terms first order, second order, third order, and fourth order to designate the four grades of control, first order being applied to the most accurate grade. This brings the nomenclature into better accord with general usage, and it is also easily understood without explanation by one not acquainted with the terms. * * *

Triangulation of the third order is ordinarily used for the immediate control of topographic and hydrographic surveys. Extensions of third-order triangulation or of third-order traverse from triangulation or traverse of a higher order should be made so as to control the entire area to be surveyed. Triangles of third-order triangulation should close with a maximum error of 10 seconds and an average error seldom exceeding 5 seconds. Closures in length on lines of first-order or second-order triangulation, on lines of third-order triangulation previously adjusted, or on base lines, should not exceed one part in 5,000.

Instructions for conducting third-order triangulation surveys that were in force during the execution of the work described in this report are contained in Bulletin 788, entitled "Topographic instructions of the United States Geological Survey." Parts of those instructions are now obsolete. The United States Coast and Geodetic Survey, also, has published a description of the methods employed in triangu-

¹ The results previously published are contained in the following publications of the Geological Survey: 18th, 19th, 20th, and 21st Annual Reports and Bulletins 122, 181, 216, 245, 310, 440, 496, and 644.

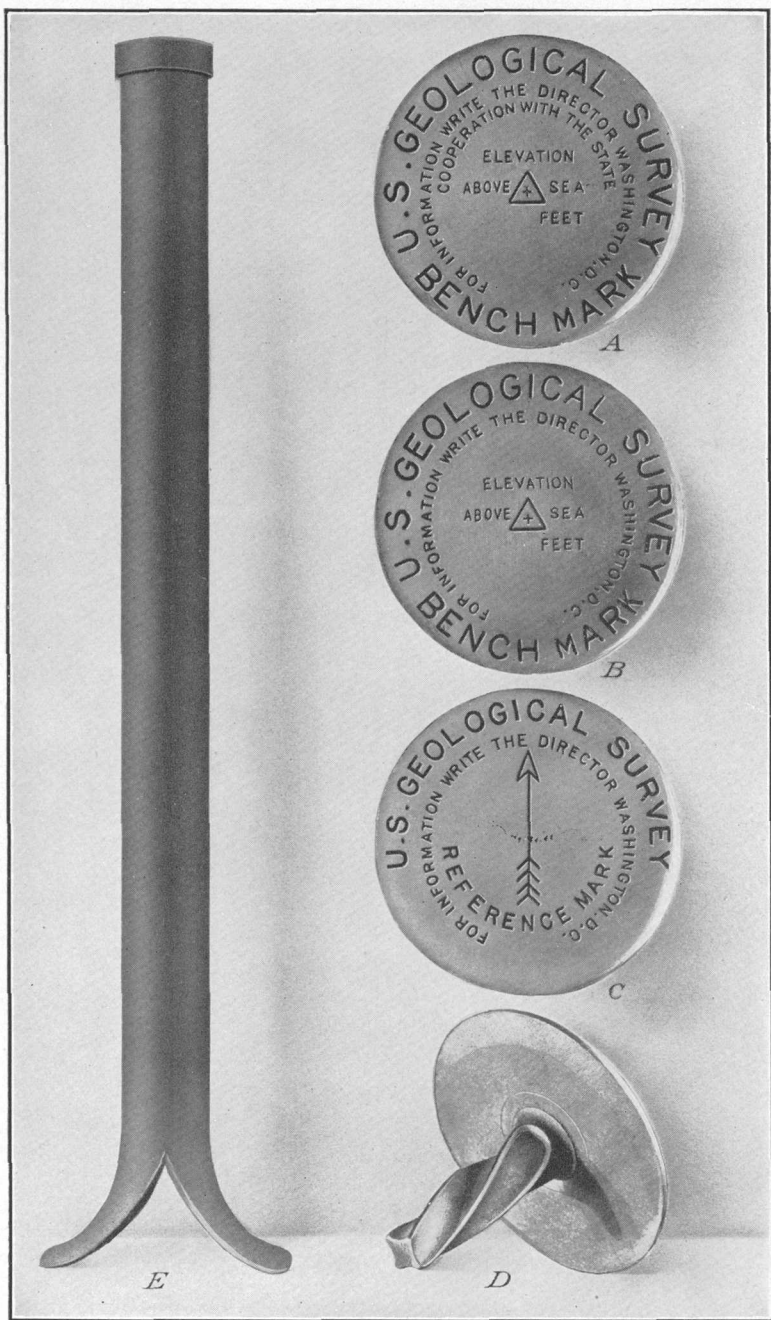
lation and detailed specifications and instructions for the work.² Some of the triangulation projects in Utah were conducted with more care than was given the average project, as is shown by the residuals in the original adjustments by least squares, and their results approached the degree of precision that is expected of second-order triangulation. However, as these results have been readjusted, without regard to their higher precision, in conjunction with results that are of average, or third-order precision, it is logical to assume that the average precision of all the results here published is third-order.

Instruments used.—In the triangulation done before 1928, theodolites of the direction type were used. This type was equipped with a 10-inch circle and two micrometers, each reading to 2-second divisions on a scale on its head. It weighed about 28 pounds without its case, and its tripod weighed about 19 pounds. It was well adapted to making azimuth observations and was frequently put to that use in the earlier years of the work, when the projects extended far from first-order bases. Since 1928 the use of repeating instruments has gradually become common. The type now regarded as the standard is a transit theodolite, with which the angles are measured by the method of repetition. It is equipped with a 7-inch circle and two verniers, each reading to 10 seconds. This instrument weighs about 20 pounds without its case, and its tripod weighs 16 pounds.

Station marks.—The Geological Survey establishes permanent marks at most of its occupied triangulation stations. (See pl. 1.) These are usually of the same form as those used for permanent marks along lines of leveling and transit traverse, such as bronze or aluminum tablets, iron posts, and copper bolts, but they include also drill holes, marks chiseled on rocks, and natural or constructed objects that can be so described that the exact points whose positions have been computed can be unmistakably identified.

The tablets are circular in shape, measure $3\frac{7}{8}$ inches in diameter and taper from a thickness of three-eighths of an inch at the center to about a quarter of an inch near the rounded edge. During a short period in the earlier years of the Survey's triangulation the tablets set were made of aluminum. The softness of this metal, however, made them susceptible to damage, so that aluminum as a material for tablets was soon discarded. The earliest tablets were made of bronze, and bronze is the material now specified for standard tablets. Each tablet is cast with a 3-inch shank extending from the center of its reverse side, by means of which it is cemented into place, and each bears an inscription on its face. The inscriptions on the tablets already placed differ in many details, because of changes in design at various times. The face of every tablet, however, is cast with the words "U. S.

² See Hodgson, C. V., *Manual of first-order triangulation*: U. S. Coast and Geodetic Survey Special Pub. 120, 185 pp., 1926; *Manual of second- and third-order triangulation and traverse*: U. S. Coast and Geodetic Survey Special Pub. 145, 226 pp., 1929.



STANDARD GEOLOGICAL SURVEY STATION MARKS AND BENCH MARKS.

A and *B*, Standard tablets used for triangulation, transit traverse, and leveling where rock or masonry is available to hold them; *A* is used in cooperating States. *C*, Standard reference tablet used in triangulation; the arrow points to the station to which this mark refers. *D*, Under side of *A*, *B*, and *C* showing twisted shank which holds tablet in place. *E*, Standard iron post fitted with bronze cap bearing an inscription similar to that on a standard tablet, formerly used in transit traverse and leveling where no rock was available; superseded by concrete post with tablet set in top.

Geological Survey" and "Elevation above sea" and with a cross whose arms intersect at the center of the tablet, the point of intersection indicating the fiducial point for position or elevation. On the tablets used in the earlier work the cross is large and is the only symbol that appears, but on those now in use it is small and is enclosed in a triangle. On some tablets the inscription indicates that they were set in connection with a project in which a State or other organization cooperated. On most of those already set the inscription includes the warning "250 dollars fine for disturbing this mark," but the latest design omits this phrase and adds the sentence "For information write the Director, Washington, D. C."

The present practice is for the engineer who sets a triangulation tablet to stamp upon it with steel dies the name by which it will be identified in the future, choosing usually the name of some prominent physical feature nearby, preferably the mountain or hill upon which the station is established. Then, to aid in recovering the position of the station in the event the station mark should be destroyed, the engineer sets at least one reference mark nearby. A special tablet is sometimes used for the reference mark, of the same shape and size as the one designed for use as a station mark. On its face is cast an arrow and the following inscription: "U. S. Geological Survey Reference Mark. For information write the Director, Washington, D. C." The reference tablet is so placed that the arrow on its face points to the triangulation station to which it refers. In much of the earlier work of the Geological Survey, station-mark tablets were not stamped, nor were reference marks set, and some of the older stations were identified only by such natural or constructed objects as were found near them or could be easily carried there. In this bulletin the information given for each station includes descriptions of both its identifying mark or object and its reference mark or marks.

The tablets, whether used as station marks or reference marks, are cemented into holes drilled in solid rock, if this is available; if rock is not available they are set in the tops of reinforced concrete posts. Antedating the concrete posts are wrought-iron posts, to the tops of which are riveted bronze caps similar in design to the tablets. No iron posts have been set in recent years. They have proved impracticable, as they are easily disturbed or are often destroyed by rust at the ground level.

Another form of station mark, set only during the early triangulation, is a copper bolt driven into a drill hole in rock and perhaps further secured with lead or cement. The exposed end of the bolt bears an appropriate inscription, stamped upon it with steel dies.

Datum.—All triangulation of the Geological Survey in Utah, with the exception of a few of the more recent projects, was originally

computed with reference to the old North American datum³ or was expanded from local astronomic datums. In 1927, after the trans-continental triangulation had assumed the form of a net of strong closed loops, the Coast and Geodetic Survey made a general readjustment of its first- and second-order arcs comprising the net, thereby establishing new geodetic coordinates defining new positions for all its triangulation stations. All positions determined by or based on that general adjustment are said to be on the North American datum of 1927. The triangulation of the Geological Survey in Utah described in this bulletin has been readjusted consistently so that its points of contact with the first- and second-order triangulation of the Coast and Geodetic Survey shall have the same positions as those determined by that organization. The previously published positions, azimuths, and distances were revised in accordance with this readjustment, and the revised figures are given in this bulletin. A few of the more recent projects were originally computed on the North American datum of 1927 from base stations already on that datum. These projects, therefore, needed no recomputation or readjustment.

Methods of readjustment.—The readjustment of the triangulation done by the Geological Survey in Utah to the North American datum of 1927 was accomplished in 1936 and 1937, the method used varying with the specific conditions to be met in each project.⁴ The triangulation was first separated into sections, or groups, each made up of stations originally computed on the same datum. The relation of each group to the adjacent groups and to the triangulation of the Coast and Geodetic Survey was then studied. At each point of contact with the triangulation of the Coast and Geodetic Survey or with triangulation already on the North American datum of 1927 corrections were derived which, if applied to the previously accepted position of the point, would transfer that position to the North American datum of 1927.

In any group of triangulation in which only two points of contact were found, these two points defined a base to which the group could be fitted without distorting the original adjustment or triangles. The method of readjusting the group consisted in translating, rotating, and correcting the length of the base as computed on the old datum, in order to superimpose the base on its new datum position. Corrections

³The term "North American datum" did not come into use until 1913. Before that time the datum on which the triangulation of the Geological Survey was computed was known as the "United States standard datum." Early in 1913, however, it was decided to coordinate the triangulation of Canada and that of Mexico with the triangulation of the United States, using the "United States standard datum" to bring the results into agreement, and thereafter to designate this datum as the "North American datum." After the establishment of the "North American datum of 1927," resulting from a general readjustment of the triangulation net of the Coast and Geodetic Survey, the datum in use before 1927 became familiarly known as the "old North American datum."

⁴For a detailed description of the methods used in this readjustment see Speert, J. L., Readjustment of Triangulation Datum: Am. Soc. Civil Eng. Trans., vol. 103, p. 1002, 1938.

consistent with the changes forced upon the base were then determined and applied to the positions of all stations in the group.

For a group which had three or more points of contact with triangulation already on the North American datum of 1927, the method of readjustment was as follows: First, a diagram was constructed showing the corrections to the old datum positions at the points of contact. Next, by a special method of graphical interpolation through the area between these points, appropriate corrections to the positions of all other stations in the group were determined. These corrections were then applied to the previously accepted positions so as to place them on the North American datum of 1927, and corrections consistent with them were applied to the azimuths and lengths of the lines connecting the stations in the group so adjusted.

In many of the groups, the original computations left position closures unreconciled at points of contact with other groups. In the readjustment these ties between adjacent groups have been taken into account, and all discrepancies at the points of contact have been removed.

It will be observed that the readjustment to the North American datum of 1927 was based, not upon a complete recomputation from the original field observations, but upon the application of corrections to the originally computed positions. Any faults that may have existed in the original computations, except those that were discovered before the publication of this bulletin, were therefore not removed by this readjustment.

Form of results.—In general, positions determined by third-order triangulation are given in this report to hundredths of seconds of latitude and longitude; azimuths, to the nearest full second; and logarithms of distances, to six decimal places. An exception is made in the positions, azimuths, and distances in the few recent projects originally computed on the North American datum of 1927, which, since they required no readjustment, are given as they were originally computed even though the figures were carried to more decimal places than here specified. The additional decimal places, therefore, do not indicate results of higher precision but merely represent original computations. Figures given to fewer than the specified number of decimal places, however, indicate work of lower precision.

Because of the methods of readjustment used, the last digits of the azimuths and distances between stations as given in this report are dependent in general upon the new positions of the stations. This relation is the reverse of the usual one, in which the positions are computed from the azimuths and distances. Therefore, if any line of this triangulation is to be used as a base from which to expand additional third-order surveys, and if it is desired for the sake of mathematical uniformity in the computations to use figures with more decimal

places than the number here given, the following procedure is suggested: Accept as exact the given positions of the stations, and determine from them by means of an inverse computation the azimuth and distance between the stations to the degree of mathematical precision desired.

All positions, azimuths, and logarithms of distances obtained from the Coast and Geodetic Survey are here given as furnished by that organization.

Arrangement.—The results of triangulation recorded in this report, with the exception of some supplementary positions given in the appendix, have been divided into groups, each of which includes the results of a single project. These groups are arranged chronologically—in the order of the dates of their corresponding projects. For each project there is an introductory statement including, in general, the following items: The name of the chief of party conducting the project; the date of the survey; the base and datum of the original computations; the designation of the report in which the results of the project were previously published; the points of contact with triangulation already on the North American datum of 1927, upon which the readjustment depends; and the relation of the project, if any, to its neighboring projects. Then follows a list of the stations, arranged alphabetically by name. Under each station name is given a description of the station, its position, and a table showing the azimuth, back azimuth, and distance between it and other stations.

In the appendix are listed the condensed descriptions and the positions of stations which were established by surveys of lower precision than third order or which were not sufficiently well marked to be of use as third-order control points.

Descriptions of stations.—If any station described in this bulletin has been described in an earlier publication also, the description of that station is here reprinted as it originally appeared, except that, to conform with the style now in use, certain words have been abbreviated and, in a few descriptions, obvious mistakes that might be misleading have been corrected. These original descriptions, including the few in which minor corrections have been made, are enclosed in quotation marks in order that they may be easily identified. It has seemed desirable to add to the old descriptions notes containing up-to-date information obtained from maps and other sources not available when the original descriptions were written. These supplementary notes, if included for any station, follow the quoted original description. Unless otherwise stated, all distances given in the supplementary notes are in an air line as scaled from maps. If a station that has been previously described has since been recovered one or more times, then a new description combining the perti-

nent information given by all the observers concerned is substituted for the original description. Approximate figures of elevation are given for each station for which they are available. Unless otherwise indicated, these figures were obtained from the records of the Geological Survey, usually as determined by topographic surveys. Figures of elevation determined by the United States Forest Service are indicated by "U. S. F. S.," those determined by the United States Coast and Geodetic Survey by "U. S. C. & G. S.," and those determined by the General Land Office by "G. L. O."

Azimuths and distances.—The azimuth and length of each line, formerly tabulated under the stations at both ends of the line, are now tabulated only at the eastern end of the line. Therefore, at any station only those sights are listed that lie toward the western half of the horizon; that is, the sights whose azimuths are less than 180° . An exception to this practice is made at stations that are near a State boundary, where all sights crossing the boundary line are included. To ascertain which sights are directed from a station into the eastern half of the horizon, it will be necessary, in general, to refer to the map accompanying the project.

Maps.—The index map of Utah (fig. 1) shows the location of the areas covered by the various projects of triangulation in the State in their relation to each other. The maps of individual projects (figs. 2-20) show all the stations in the projects and the lines connecting them. Dashed lines on the map of any one of the projects at its points of contact with another project indicate observations of that other project that are not included in the one represented by the map. Lines crossing the State boundary indicate sights to stations of the project that lie in an adjoining State.

Personnel.—The name of the engineer in charge of the field work for each project is given in the introductory statement that precedes the descriptions of stations established by that project. The original computations and adjustments were usually completed by the same engineer during the winter following the field season. In recent years the original computations for triangulation in Utah have been made in the office of the Pacific division of the topographic branch of the Geological Survey, under the supervision of H. H. Hodgeson, division engineer. The records contained in this bulletin have been readjusted and the material assembled in the section of computing of the topographic branch of the Geological Survey. J. L. Speert was in charge of the researches and computations relating to the readjustment, under the supervision of R. M. Wilson, chief of the section of computing, and under the general direction of J. G. Staack, chief topographic engineer.

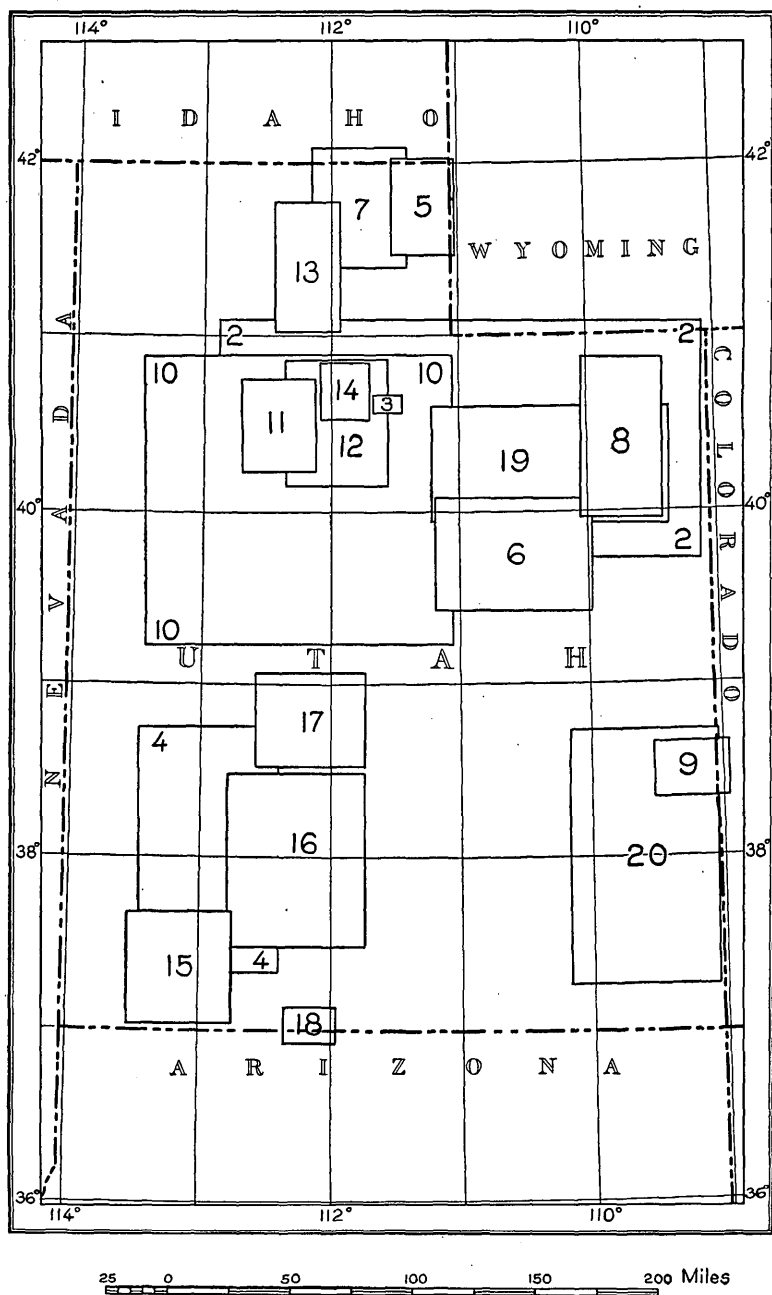


FIGURE 1.—Index map of Utah showing the location of triangulation projects in the State. The numbers given refer to the project maps included in this report (figs. 2-20).

PROJECTS

UINTA FOREST RESERVE, 1897-98

H. L. BALDWIN, Jr., chief of party

The stations of this project were established by an arc of triangulation starting from two stations of the United States Coast and Geodetic Survey, namely, Deseret and Mount Nebo. (See fig. 2.) The arc extends in a northeasterly direction into the Uinta Forest Reserve and then generally east along the forty-first parallel of latitude between the meridians of $109^{\circ}15'$ and $111^{\circ}15'$. Some of the stations of this survey are in Wyoming and therefore are not described in this bulletin.

The results as originally computed were referred to United States standard (old North American) datum⁵ from the Deseret-Mount Nebo base. They were first published in two parts⁶ and afterward republished as a whole.⁷ Other ties to first-order triangulation were later made at Spanish Fork Peak, Strawberry, and Lena stations. All the stations thus far mentioned were used to control the readjustment to the North American datum of 1927, which was further influenced by the work of G. T. Hawkins, in 1907, and that of R. B. Robertson, Jr., in 1908. Hawkins' work tied in at Bridger Butte and Medicine Butte stations, Wyoming, and Robertson's at Lena station, Utah, and Richards Butte and Twin Buttes stations, Wyoming.

The projects of triangulation conducted by the Geological Survey that make contact with the Uinta Forest Reserve project are given in the following table, which includes for each project the name of the engineer in charge, the year, and the point or points of contact between that project and the Uinta Forest Reserve project.

Project	Engineer in charge	Year	Points of contact (stations)
Eastern Utah-----	T. M. Bannon----	1910	{ Strawberry { Indian Head { Grey Head
Uintah County-----	Oscar Jones-----	1913	{ Little Mountain { Marsh Peak { Deseret
Northern Utah-----	C. F. Urquhart----	1915	{ Mount Nebo { Spanish Fork Peak
Tooele County-----	C. F. Urquhart----	1922	{ Deseret
Duchesne quadrangle----	C. N. Mortenson----	1934	{ Strawberry

⁵ See footnote 3, p. 4.

⁶ Wilson, H. M., Renshaw, J. H., Douglas, E. M., and Goode, R. U., Triangulation and spirit leveling: U. S. Geol. Survey 19th Ann. Rept., pt. 1, pp. 183-188, 1898; U. S. Geol. Survey 20th Ann. Rept., pt. 1, pp. 268-277, 1899.

⁷ Wilson, H. M., Renshaw, J. H., Douglas, E. M., and Goode, R. U., Results of primary triangulation and primary traverse, fiscal year 1900-1901; U. S. Geol. Survey Bull. 181, pp. 192-202, 1901.

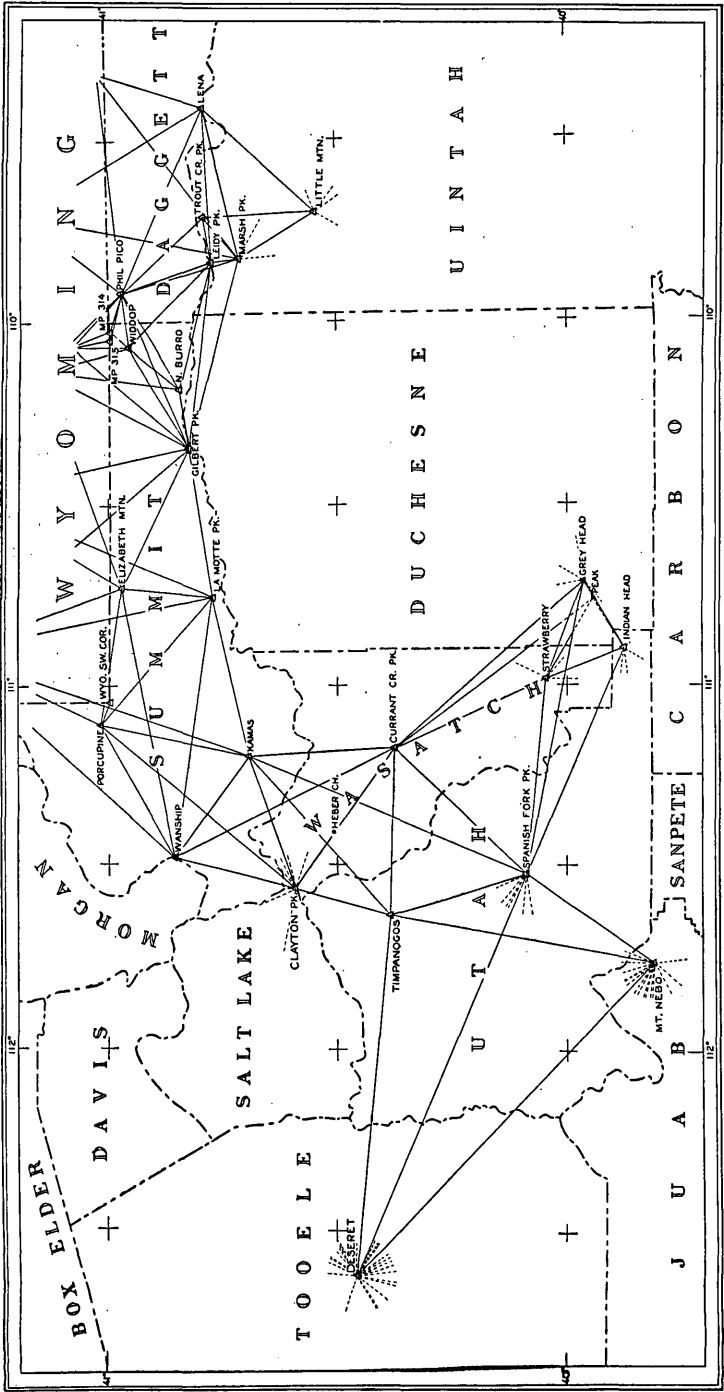


FIGURE 2.—Triangulation for Uinta Forest Reserve, 1897-98.

STATIONS

CLAYTON PEAK, on Salt Lake-Wasatch county line

"On a mountain of the same name, about 6 mi. SW. of Park City." About 0.25 mi. in air line SW. of Lackawaxen Lake and 5 mi. SW. of Park City. T. 3 S., R. 3 E., sec. 1. Elev. 10,728 ft.

Station mark: Copper bolt set in granite rock near highest point.

[Latitude 40°35'26.62"; longitude 111°33'32.87"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Timpanogos.....	15 50 40	195 47 41	4.376665

CURRANT CREEK PEAK, Wasatch County

"On the W. boundary line of the Indian reservation and about 18 mi. S. of E. of Heber." On summit of Currant Peak, about 13 mi. in air line E. of Wallsburg. T. 1 S., R. 11 W., sec. 19. Elev. 10,584 ft.

Station mark: Drill hole 4 in. deep and 1 in. in diam. in hard granite rock on summit.

[Latitude 40°22'41.70"; longitude 111°10'26.89"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Spanish Fork Peak.....	43 04 54	222 51 14	4.643942
Timpanogos.....	91 09 33	270 51 36	4.593276
Clayton Peak.....	125 59 00	305 44 00	4.605060
Wanship.....	154 05 46	333 53 51	4.770483
Kamas.....	176 49 20	356 48 27	4.543115

DESERET, Tooele County

On summit of highest peak of Stansbury Mountains, in Wasatch National Forest, about 13 mi. in air line SW. of Grantsville, 11.5 mi. NW. of St. John, and 4 mi. SW. of South Willow ranger sta. The best camping place on the E. side of the mountain is at Wrathall's ranch, on Box Elder Creek. To reach the sta., go from this ranch over low divide to South Willow Creek, thence up the creek to foot of peak, and thence on foot to summit. Established by U. S. C. & G. S. in 1892; reoccupied by U. S. G. S. in 1897-98, 1915, and 1922. T. 4 S., R. 7 W., sec. 22. Elev. (U. S. C. & G. S.) 11,031 ft.

Station mark: Copper bolt in solid rock between bases of three small piers used for mounting instrument.

Reference marks: Three, at distances and in azimuths from sta. mark as follows— (1) 3.10 meters, 322°53'; (2) 2.18 meters, 88°08'; (3) 2.62 meters, 198°38'. Deseret latitude sta., marked by stone-and-brick pier, is 10.85 meters from sta. mark in azimuth 27°42'.

Signal: Cairn 9 ft. high and 10 ft. in diam. at base built over sta. mark.

Latitude 40°27'34.448"; longitude 112°37'31.880".

ELIZABETH MOUNTAIN, Summit County

"Is a high spur or offshoot from the plateau about 1.5 mi. S. of the Utah-Wyo. State line." About 1.5 mi. in air line S. of Utah-Wyo. boundary monument 351. T. 3 N., R. 11 E., sec. 8. Elev. 10,353 ft.

Station mark: Iron post set 3 ft. in ground a few ft. NW. along ridge from highest point.

Reference marks: Spruce trees at distances and in azimuths from sta. mark as follows—(1) 16.2 ft., 359°44'; (2) 11 ft., 43°24'.

[Latitude 40°58'37.22"; longitude 110°43'47.67"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
La Motte Peak.....	4	33	59	184	33	08	4.354743
Wanship.....	78	10	24	257	40	56	4.810102
Porcupine.....	98	16	14	278	01	18	4.508923
Medicine Butte, Wyo.....	160	25	18	340	18	18	4.646152
Bridger Butte, Wyo.....	212	05	38	32	16	09	4.623228
Sage Creek, Wyo.....	248	57	48	69	21	34	4.734124

GILBERT PEAK, on Duchesne-Summit county line

"On line between Duchesne and Summit Counties. On highest peak in Uinta Mountains.⁸ Elev. about 13,600 ft." T. 1 N., R. 14 E. Elev. 13,422 ft.

Station mark: Aluminum tablet cemented near center of 3- by 5-ft. flat rock nearly N. of cairn that serves as reference mark.

Reference mark: Cairn 8 ft. high and 4 ft. in diam. at base 14.7 ft. from sta. mark in azimuth 9°55'.

[Latitude 40°49'24.63"; longitude 110°20'22.09"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
La Motte Peak.....	81	06	59	260	50	50	4.546377
Elizabeth Mountain.....	117	31	01	297	15	41	4.568832
Medicine Butte, Wyo.....	141	06	32	320	44	08	4.878946
Bridger Butte, Wyo.....	168	49	38	348	44	44	4.729287
Sage Creek, Wyo.....	206	07	18	26	15	39	4.607345
Turtle Bluff, Wyo.....	218	40	51	38	51	44	4.570114

GREY HEAD, Duchesne County

On high grassy-topped hill on ridge between right fork of Indian Canyon and left fork of Lake Canyon, about 17 mi. in air line NE. of Colton. Established in 1898 and reoccupied in 1910 and in 1934. In 1934 a standard tablet was cemented in a rock directly over the nail that was formerly the sta. mark, new reference marks were set, and the best route to sta. noted, as follows: From Duchesne drive up Indian Canyon 10.4 mi., thence up right fork of Indian Canyon 13.5 mi. to mouth of Sterling Canyon, thence up Sterling Canyon 1.2 mi. to end of rd., from which point sta. is about 1 mi. to NE. and about 1,500 ft. higher. T. 10 S., R. 7 W., near cor. secs. 7, 8, 17, and 18. Elev. (U. S. F. S.) 9,531 ft.

Station mark: Standard tablet stamped "Grey Head M 1934" cemented in sandstone rock.

Reference mark 1: Drill hole in sandstone rock 9.55 ft. from sta. mark in azimuth 40°39'.

Reference mark 2: Reference tablet stamped "Grey Head No. 2" cemented in rock 11.95 ft. from sta. mark in azimuth 305°38'.

Signal: Cairn 6 ft. high centered over sta. mark.

[Latitude 39°58'00.48"; longitude 110°42'33.02"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
Indian Head.....	58	46	36	238	39	13	4.282558
Peak.....	60	04	22	240	02	31	3.677212
Spanish Fork Peak.....	101	10	19	280	38	46	4.851799
Strawberry.....	110	53	22	290	42	46	4.399594
Currant Creek Peak.....	139	13	37	318	55	38	4.781492

⁸ This statement is erroneous; Kings Peak (altitude 13,498 ft.), about 2 mi. S. of main divide, is higher.

HEBER CHURCH, Wasatch County (Not occupied)

"Spire on church."

Station mark: None.

Station and signal: Center of spire.

No check on this position.

Latitude 40°30'31.03"; longitude 111°24'47.50".

INDIAN HEAD, Utah County

On Indian Head, a flat-topped mountain on southern boundary of Uinta National Forest, near common corner of Utah, Wasatch, and Duchesne Counties. About 6.5 mi. in air line ENE. of Colton and 4.5 mi. NE. of Kyune. May be reached from Colton by Cat Creek trail and wagon rd. along Reservation Ridge, or from Kyune on Colton-Theodore-Price wagon rd. Established in 1898 and reoccupied in 1910. T. 11 S., R. 9 W., sec. 10. Elev. (U. S. F. S.) 9,837 ft.

Station mark: Iron post set 3 ft. in ground.

[Latitude 39°52'37.76"; longitude 110°54'02.77"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Spanish Fork Peak.....	113 50 12	293 26 04	4.766276
Strawberry.....	159 23 29	339 20 17	4.304464

KAMAS, Summit County

"This sta. is on a peak of the same name, about 2 mi. N. and 4 mi. E. of the town of Kamas." On Hoyt Peak. T. 1 S., R. 7 E., sec. 31. Elev. 10,237 ft.

Station mark: Copper bolt set in sandstone rock and stamped "U S G S."

Reference mark: Arrowhead cut in large sandstone rock, 11.33 ft. from sta. mark in azimuth 333°06'.

[Latitude 40°41'32.16"; longitude 111°11'49.33"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Spanish Fork Peak.....	22 45 49	202 32 59	4.861613
Timpanogos.....	47 32 13	227 15 07	4.703199
Clayton Peak.....	69 54 30	249 40 21	4.513742
Wanship.....	127 18 24	307 07 19	4.476383
Medicine Butte, Wyo.....	198 17 49	18 29 14	4.887989

LA MOTTE PEAK, Summit County

"On high peak of same name, between the E. and middle forks of Bear River." About 2 mi. in air line N. of Summit-Duchesne county line, between East and Stillwater Forks of Bear River. Elev. 12,723 ft.

Station mark: Standard tablet cemented in large rock near center of flat rocky top of mountain.

Reference mark: Cairn 26.6 ft. from sta. mark in azimuth 359°23'.

[Latitude 40°46'25.83"; longitude 110°45'04.51"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Kamas.....	76 37 13	256 19 46	4.588073
Wanship.....	98 37 13	278 08 39	4.793174
Porcupine.....	132 03 14	311 49 09	4.608557
Medicine Butte, Wyo.....	168 31 21	348 25 12	4.816798
Bridger Butte, Wyo.....	202 30 50	22 42 10	4.793954

LEIDY PEAK, Uintah County

"On top of the peak of this name." Near Uintah-Daggett county line. T. 1 S., R. 19 E., sec. 6. Elev. 12,013 ft.

Station mark: Aluminum tablet cemented in large flat rock with rocks piled around and over it.

Reference marks: Cairns at distances and in azimuths from sta. mark as follows—(1) 56.77 ft., 28°16'; (2) 178.1 ft., 149°02'; (3) 228.4 ft., 225°09'. The third of these cairns, which is a little below the summit of a hill, has been intersected by the U. S. C. & G. S.

[Latitude 40°46'06.00"; longitude 109°50'00.48"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Gilbert Peak.....	98	19	48	277	59	58	4. 634901
North Burro.....	106	21	46	286	08	25	4. 475908
Widdop.....	137	21	19	317	12	05	4. 466145
Phil Pico.....	162	03	44	342	00	19	4. 376238

LENA,⁹ Uintah County

"About 35 mi. NW. [NE.] of Vernal, 8 mi. SE. of Lewis Allen horse ranch, on very rough summit of timbered mountain composed of red sandstone and nearly bare on top. The rd. from Vernal to the Lewis Allen horse ranch passes about 3 mi. W. of the sta., which can be seen from many places on this rd." On mountain of same name, about 25 mi. in air line N. of old town of Ashley, on Ashley Creek, and 8 mi. S. of Green River. Elev. (U. S. F. S.) 9,719 ft.

Station mark: Copper bolt cemented in sandstone rock.

Signal: Large dead twin tree 23.1 ft. from sta. mark in azimuth 31°13'.

[Latitude 40°47'12.668"; longitude 109°24'51.590"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Little Mountain.....	41	08	52	220	57	45	4. 563621
Marsh Peak.....	76	34	46	256	18	34	4. 555473
Leidy Peak.....	86	48	38	266	32	13	4. 549529
Phil Pico.....	115	54	05	295	34	13	4. 675426
Twin Buttes, Wyo.....	150	49	42	330	38	18	4. 698359
Richards Butte, Wyo.....	200	05	44	20	10	03	4. 430811

LITTLE MOUNTAIN, Uintah County

"On mountain shown on Hayden map as Obelisk Plateau, locally known as Little Mountain, and near highest point." (Shown on map of Marsh Peak quadrangle as on Little Mountain.) T. 3 S., R. 20 E., sec. 20. Elev. 8,622 ft.

Station mark: Copper bolt, in chiseled triangle, cemented in sandstone and marked "U S G S."

Reference mark: Post, supported by cairn, marking point of Fort Thornburg Military Reservation. It is on the highest point of the mountain, 9.55 ft. from sta. mark in azimuth 30°26'.

[Latitude 40°32'17.63"; longitude 109°41'55.25"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Marsh Peak.....	150	21	37	330	16	34	4. 344076
Trout Creek Peak.....	178	22	02	358	21	40	4. 441009

⁹ This station was first called Mount Lena, under which name a description of it was published in 1899. See Wilson, H. M., and others, Triangulation and spirit leveling: U. S. Geol. Survey 20th Ann. Rept., pt. 1, p. 269.

MARSH PEAK, Uintah County

"On peak of same name on eastern end of that portion of the Uinta Range which rises above timber line." Near heads of N. and E. branches of Dry Fork, which flows into Ashley Creek, about 4 mi. in air line W. of Red Cloud ranger sta. T. 1 S., R. 19 E., near cor. secs. 19, 20, 29, and 30. Elev. 12,219 ft.

Station mark: Aluminum tablet cemented in large flat rock.

Reference mark: Large cairn 15.75 ft. from sta. mark in azimuth 276°53'.

Signal: Cairn built around and over sta. mark.

[Latitude 40°42'39.64"; longitude 109°49'40.53"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Gilbert Peak.....	106 17 57	285 57 54	4.652839
Phil Pico.....	164 57 31	344 53 53	4.477410
Ledy Peak.....	175 47 48	355 47 35	3.805004
Twin Buttes, Wyo.....	191 16 43	11 21 34	4.724353
Richards Butte, Wyo.....	232 26 44	52 47 18	4.744854

MILEPOST 314, on Utah-Wyoming State line

"This point was occupied as an aid to the marking of a point on the thirty-third degree W. from Washington, it being the 314th milepost on the Utah-Wyo. line. It lies on high rolling ground about three-eighths of a mi. W. of Burnt Fork Creek." On Utah-Wyo. boundary at point about 1.5 mi. in air line W. of Summit-Daggett county line, Utah, and 1 mi. E. of Uinta-Sweetwater county line, Wyo.

Station mark: Aluminum tablet cemented in 500-pound water-worn granite boulder.

[Latitude 40°59'50.59"; longitude 110°01'49.23"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Widdop.....	39 24 25	219 22 54	3.708154
Milepost 315.....	89 50 56	269 50 10	3.209243
Turtle Bluff, Wyo.....	164 07 18	344 06 01	4.002127

MILEPOST 315, on Utah-Wyoming State line

"On the Utah-Wyo. State line, and supposed to be 1 mi. W. of milepost 314, but in reality 32 ft. greater. It stands on the side of a hill facing N. and about 312 ft. W. of the county line between Uinta and Sweetwater Counties, Wyo., which line was established by measurement from this milepost and also from milepost 314."

Station mark: Aluminum bolt cemented in top of 500-pound water-worn granite boulder marked "U S G S."

[Latitude 40°59'50.45"; longitude 110°02'58.50"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Turtle Bluff, Wyo.....	173 19 12	353 18 40	3.988372

MOUNT NEBO,¹⁰ Juab County

On southernmost summit of Mount Nebo, in Uinta National Forest, about 8 mi. in air line NNE. of Nephi and 5 mi. E. of Mona. Established by U. S. C. & G. S. in 1887; recovered by U. S. G. S. in 1898 and 1915 and by U. S. C. & G. S. in 1919. T. 11 S., R. 1 E., sec. 36. Elev. (U. S. F. S.) 11,871 ft.

¹⁰ In the earlier publications of the Geological Survey on triangulation this station appears as "Nebo."

Station mark: Copper bolt in drill hole in solid rock.

Reference marks: Drill holes in rock at distances and in azimuths from sta. mark as follows—(1) 2.56 meters, $38^{\circ}01'$; (2) 2.66 meters, $121^{\circ}28'$; (3) 4.25 meters, $204^{\circ}16'$; (4) 3.32 meters, $309^{\circ}39'$. Mount Nebo astronomic sta., marked by brick pier, is 23.25 meters from sta. in azimuth $321^{\circ}35'$.

Signal: Cairn 9 ft. high and 7 ft. in diam. at base centered over sta. mark.

[Latitude $39^{\circ}48'38.316''$; longitude $111^{\circ}45'56.235''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Deseret.....	134 47 24.53	314 14 09.05	5.0118839

NORTH BURRO, Summit County

"On the northern portion of Burro Peak, which has several summits, this not being the highest one. Elev. about 13,000 ft. above sea." On peak of same name, about 2 mi. in air line N. of Summit-Duchesne county line. T. 1 N., R. 16 E., sec. 6. Elev. 12,680 ft.

Station mark: Aluminum bolt cemented in rock and roughly marked "U S G S."

Reference mark: Cairn 3 ft. high 6.23 ft. from sta. mark in azimuth $215^{\circ}30'$.

[Latitude $40^{\circ}50'37.41''$; longitude $110^{\circ}10'25.78''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Gilbert Peak.....	80 55 32	260 49 02	4.150782
Sage Creek, Wyo.....	186 33 47	6 35 38	4.535464

PEAK, Duchesne County (Not occupied)

"This is the summit of a sharp-pointed bare peak and is at head of Indian Creek. Is well located by theodolite intersections." In SW. part of Duchesne County, about 3 mi. in air line SW. of Grey Head.

Station mark: None.

Station and signal: Summit of peak.

[Latitude $39^{\circ}56'43.52''$; longitude $110^{\circ}45'26.65''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Indian Head.....	58 19 04	238 13 33	4.158751
Strawberry.....	120 19 56	300 11 12	4.350167
Currant Creek Peak.....	143 40 45	323 24 38	4.776340

PHIL PICO, Daggett County

"This sta. is on the summit of a mountain known locally by this name, called Mount Corson on some published maps. Summit of mountain is nearly bare of timber." (Shown on map of Marsh Peak quadrangle as Phil Pico Mountain.) About 1.75 mi. in air line S. of Utah-Wyo. State line and about 4 mi. E. of Summit-Daggett county line. T. 3 N., R. 18 E., near line between secs. 8 and 17. Elev. 9,577 ft.

Station mark: Standard tablet cemented in sandstone rock a little W. of top of mountain.

[Latitude 40°58'19.35"; longitude 109°55'13.73"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
North Burro.....	56	21	46	236	11	28	4.409338
Gilbert Peak.....	65	05	46	244	49	19	4.590729
Widdop.....	84	52	10	264	46	20	4.098333
Milepost 315.....	104	32	35	284	27	31	4.050087
Milepost 314.....	106	58	01	286	53	41	3.985180
Turtle Bluff, Wyo.....	136	11	25	316	05	48	4.238221
Sage Creek, Wyo.....	138	51	52	318	43	43	4.421060
Twin Buttes, Wyo.....	218	14	12	38	22	43	4.466859
Richards Butte, Wyo.....	264	33	41	84	57	56	4.716634

PORCUPINE, Summit County

"On the large mountain 3 mi. W. of the SW. corner of Wyo." About 3.5 mi. in air line a little N. of W. of Utah-Wyo. State line at SW. corner of Wyo. T. 3 N., R. 7 E., near line between secs. 1 and 12.

Station mark: Copper bolt stamped "U S G S."

Reference mark: Cairn 14.95 ft. from sta. mark in azimuth 78°.

[Latitude 41°01'05.49"; longitude 111°06'34.82"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Kamas.....	11	31	59	191	28	33	4.567448
Clayton Peak.....	38	46	18	218	28	40	4.783620
Wanship.....	59	59	20	239	44	47	4.556510
Medicine Butte, Wyo.....	204	31	20	24	39	20	4.610958

SPANISH FORK PEAK, Utah County

"On a peak of the same name, NE. of Denver & Rio Grande Ry. and about 8 mi. SE. of Springfield [Springville]." In Uinta National Forest, on highest point in the mountains between Hobbie Creek (tributary to Utah Lake) and North Creek (tributary to Soldier Fork Creek), about 6.25 mi. in air line a little S. of E. of town of Spanish Fork, 5.5 mi. SE. of Springville, and 2.5 mi. NE. of Denver & Rio Grande Western R. R. Established in 1897 by U. S. G. S. In 1887 the U. S. C. & G. S. intersected a sta. of this name at a point 10.3 ft. from the U. S. G. S. sta. in azimuth 134°55' and erected a cairn as a signal for it. The point located by the U. S. C. & G. S. is a sta. on triangulation conducted by C. F. Urquhart in 1915 (Northern Utah project), but it was not occupied. (See p. 73.) T. 8 S., R. 4 E., sec. 30. Elev. (U. S. F. S.) 10,185 ft.

Station mark: Iron post set 2.5 ft. deep in loose rock.

Reference mark: Cairn 6 ft. high and 6 ft. in diam. at base 10.3 ft. from sta. mark in azimuth 134°55'. This cairn is the signal for the unoccupied U. S. C. & G. S. sta. of the same name.

[Latitude 40°05'16.67"; longitude 111°31'36.91"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Mount Nebo.....	33	36	05	213	26	53	4.567442
Deseret.....	114	10	49	293	28	14	5.009216
Timpanogos.....	164	20	04	344	15	51	4.534019

STRAWBERRY, Wasatch County

On high plateau and on SW. and slightly higher one of two main summits of Strawberry Mountains, in Uinta National Forest, about 10 mi. in air line NE. of Soldier Summit (sta. on Denver & Rio Grande Western R. R.) and 14 mi. N. of Colton. Easily reached by wagon rd. from Colton or Soldier Summit to top of Reservation Ridge, thence W. along main ridge. Established in 1908, reoccupied in 1910, and intersected in 1934. T. 5 S., R. 10 W., secs. 14 and 15. Elev. (U. S. F. S.) 10,300 ft.

Station mark: Cross scratched on small rock buried a few inches below ground. It is about 8 in. E. of imaginary line joining two cairns that serve as signals and reference marks. In 1936 the U. S. C. & G. S. re-marked this sta. with a reference disk and made it the azimuth mark for U. S. C. & G. S. sta. Strawberry, which is 1.5 mi. NE. of this mark.

Reference marks: Cairns at distances and in azimuths from sta. mark as follows—(1) 8.23 ft., 45°05'; (2) 15.30 ft., 217°05'.

[Latitude 40°02'49.43"; longitude 110°59'02.10"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Spanish Fork Peak.....	95 46 24	275 25 26	4.667879
Currant Creek Peak.....	156 17 42	336 10 20	4.604015

TIMPANOGOS, Utah County

"On the SE. part of peak of the same name. The lower point was selected as being more accessible. The mountain is best ascended along a ridge leading up the E. side of Dry Canyon." About 5 mi. in air line a little N. of E. of Pleasant Grove, 8 mi. E. of American Fork. T. 5 S., R. 3 E., near line between secs. 7 and 18.

Station mark: Drill hole 1 in. in diam. and 1 in. deep in large sandstone rock.

Reference mark: Cairn 6 ft. high and 4 ft. in diam. at base 4.93 ft. from sta. mark in azimuth 38°03'.

[Latitude 40°23'04.10"; longitude 111°38'08.41"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Mount Nebo.....	9 54 30	189 49 29	4.810709
Deseret.....	95 59 23	275 20 52	4.926442

TROUT CREEK PEAK, Uintah County

"On the sharp-pointed peak (bare on top) at the head of Trout Creek, from which the sta. is named." About 1 mi. in air line S. of Daggett-Uintah county line, about 4 mi. a little N. of W. of Trout Creek ranger sta. T. 1 N., R. 20 E., sec. 30. Elev. 10,509 ft.

Station mark: Aluminum bolt cemented in sandstone rock on highest point of hill.

Reference mark: Small cairn 7.1 ft. from sta. mark in azimuth 16°17'.

[Latitude 40°47'12.24"; longitude 109°42'28.80"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Marsh Peak.....	50 20 18	230 15 36	4.119388
Ledy Peak.....	79 07 17	259 02 22	4.032900
Phil Pico.....	139 02 08	318 53 47	4.435856

WANSHIP, on Summit-Morgan county line

"On the highest mountain, about 4 mi. NW. from Wanship R. R. sta." On county line, about 5 mi. in air line NW. of Wanship and 6 mi. SW. of Coalville. Near line between sec. 34 of T. 2 N. and sec. 3 of T. 1 N., R. 4 E. Elev. 9,308 ft.

Station mark: Copper bolt in solid rock.

Reference mark: Cairn 5.4 ft. from sta. mark in azimuth 198°.

[Latitude 40°51'19.36"; longitude 111°28'46.37"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Clayton Peak.....	12 54 45	192 51 38	4.479257
Medicine Butte, Wyo.....	220 51 57	41 14 32	4.864561

WIDDOP, Summit County

"This sta. is at the summit of a prominent, sharp-pointed mountain, timbered on the N. side, bare on the S. side, about 6 mi. SW. of Burnt Fork post office, Wyo., about 2½ mi. S. of the Wyo. line." About 3.5 mi. in air line W. of Daggett-Summit county line. T. 3 N., R. 16 E., sec. 13. Elev. 9,449 ft.

Station mark: Copper bolt cemented in large rock on NE. end of highest part of hill.

[Latitude 40°57'42.65"; longitude 110°04'07.87"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
North Burro.....	34 01 35	213 57 27	4.199238
Gilbert Peak.....	56 07 24	235 56 46	4.439293
Sage Creek, Wyo.....	166 52 25	346 50 07	4.333129
Turtle Bluff, Wyo.....	182 02 51	2 03 04	4.134190

WYOMING SOUTHWEST CORNER STONE, on Utah-Wyoming State line

At SW. corner of State of Wyo., at head of Chalk Creek, in State corner stone, which is a block of red sandstone projecting 5 ft. above ground with cairn 3 ft. high piled around its base. This corner stone was originally set by A. V. Richards. T. 3 N., R. 8 E., sec. 16. Elev. 7,152 ft.

Station mark: Standard tablet stamped "7150 S Lak Evan" (set by E. W. Hills in 1898 as benchmark on line of leveling extending northeast from Coalville, Utah, into Evanston quadrangle, Wyo.)

[Latitude 40°59'52.59"; longitude 111°02'56.12"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Porcupine.....	112 50 29	292 47 59	3.763834

COTTONWOOD AND PARK CITY SPECIAL QUADRANGLES,
1903

R. H. SARGENT, chief of party

This project of triangulation was developed from station Clayton Peak, established by H. L. Baldwin, Jr., in 1897, and stations Bald and Saddle, established by Pearson Chapman in 1901-2. (See fig.3.)

The triangulation as originally computed was referred to the United States standard (old North American) datum,¹¹ and the results were published in Bulletin 245.¹² Readjustment to the North American

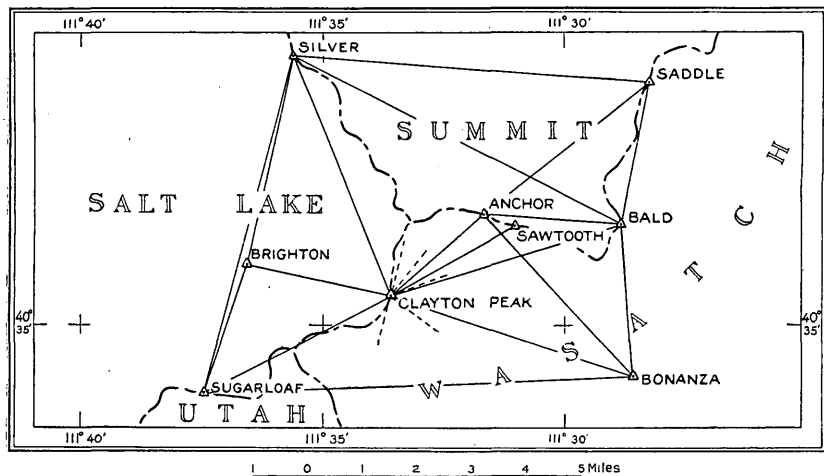


FIGURE 3.—Triangulation for Cottonwood and Park City special quadrangles, 1903.

datum of 1927 depends on a new position for station Clayton Peak, obtained from the readjustment of Baldwin's triangulation (Uinta Forest Reserve project). No change in orientation or length of base is involved.

STATIONS

ANCHOR, on Summit-Wasatch county line

"On ridge just W. of Anchor mine and about three-fourths mi. NW. of Chapman's Sawtooth triangulation sta." About 2.7 mi. in air line SW. of Park City and 0.4 mi. W. of Anchor mine, on northern edge of Bonanza Flat. T. 2 S., R. 4 E., sec. 29.

Station mark: Standard tablet cemented in 8- by 10- by 12-in. rock set in ground.

[Latitude 40°36'43.64''; longitude 111°31'38.03'']

To station—	Azimuth	Back azimuth	Distance
Clayton Peak.....	° ' " 48 39 50	° ' " 228 38 35	Log. meters 3.55585

BALD, on Summit-Wasatch county line

"On a high rocky summit about one-half mi. S. of the Ontario mine." About 2.3 mi. in air line SE. of Park City. T. 2 S., R. 4 E., sec. 34. Elev. 9,353 ft.

Station mark: Standard tablet cemented in rock in place.

¹¹ See footnote 3, p. 4.

¹² Gannett, S. S., Results of primary triangulation and primary traverse, fiscal year 1903-4: U. S. Geol. Survey Bull. 245, pp. 264-267, 1904.

[Latitude 40°36'32.32"; longitude 111°28'47.39"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Clayton Peak.....	73 13 37	253 10 31	3.84581
Anchor.....	94 59 29	274 57 38	3.60493
Silver.....	116 40 04	296 35 39	4.03002

BONANZA, Wasatch County

"On the N. end of the last knob of the spur running S. from Bald Mount, 2 mi. SE. of Bonanza Flat." About 5.5 mi. in air line SE. of Park City, 5.5 mi. NW. of Heber, on ridge between Dutch Hollow on E. and Pine Creek on W. T. 3 S., R. 4 E., sec. 10.

Station mark: Standard tablet cemented in solid rock on N. end of hill.

[Latitude 40°34'14.13"; longitude 111°28'35.37"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Sugarloaf.....	87 41 40	267 35 54	4.09696
Clayton Peak.....	107 45 07	287 41 54	3.86602
Anchor.....	137 03 04	317 01 05	3.79949
Bald.....	176 12 28	356 12 20	3.63062

BRIGHTON, Salt Lake County

"On limestone bluff on divide 1,500 ft. N. of Brighton and Alta trail." About 1.25 mi. in air line NE. of Alta and 0.4 mi. NW. of W. one of twin lakes. T. 2 S., R. 3 E., sec. 33. Elev. 10,472 ft.

Station mark: Standard tablet cemented in solid limestone rock.

[Latitude 40°35'54.59"; longitude 111°36'33.71"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Sugarloaf.....	18 55 10	198 54 36	3.58188

CLAYTON PEAK, on Salt Lake-Wasatch county line

"On a mountain of the same name, about 6 mi. SW. of Park City." About 0.25 mi. in air line SW. of Lackawaxen Lake and 5 mi. SW. of Park City. T. 3 S., R. 3 E., sec. 1. Elev. 10,728 ft.

Station mark: Copper bolt set in granite rock near highest point.

[Latitude 40°35'26.62"; longitude 111°33'32.87"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Sugarloaf.....	63 25 29	243 22 57	3.78830
Brighton.....	101 29 07	281 27 09	3.63744
Silver.....	157 12 05	337 10 45	3.86981

SADDLE, on Summit-Wasatch county line

"On a high bare hill 1 mi. due E. of Park City and one-eighth mi. N. of Heber-Park City wagon rd. where it crosses divide." About 1.25 mi. in air line E. of Park City and just S. of telephone line. T. 2 S., R. 4 E., sec. 14. Elev. 7,629 ft.

Station mark: Standard tablet cemented in shattered rock in place.

[Latitude 40°38'42.30"; longitude 111°28'15.07"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Bald.....	10 43 23	190 43 02	3. 61070
Anchor.....	52 30 47	232 28 35	3. 77897
Silver.....			4. 01562

SAWTOOTH, on Summit-Wasatch county line

"On a rocky hill one-fourth mi. S. of the Daly West mine and one-fourth mi. W. of rd. crossing divide." About 4 mi. in air line SW. of Park City, 0.4 mi. SE. of Anchor mine, on northern edge of Bonanza Flat. T. 2 S., R. 4 E., sec. 32.

Station mark: Standard tablet set in concrete about 6 in. below ground.

[Latitude 40°36'31.14"; longitude 111°31'00.73"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Clayton Peak.....			3. 61210

SILVER, on Salt Lake-Summit county line

"Located on the divide between the Big Cottonwood Creek and Iron Hollow drainages, 2½ mi. N. of the stage rd. from Park City to Silverlake." About 5 mi. in air line due W. of Park City, 0.6 mi. SE. of small lake known as Lake Desolation. T. 2 S., R. 3 E., sec. 10. Elev. 10,011 ft.

Station mark: Standard tablet cemented in solid sandstone rock.

[Latitude 40°39'08.04"; longitude 111°35'35.03"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Brighton.....	13 00 54	193 00 16	3. 78710
Sugarloaf.....	15 17 12	195 15 59	3. 99698

SUGARLOAF, on Salt Lake-Utah county line

"On first point E. of trail from Alta to American Fork." About 9 mi. in air line SW. of Park City, on Bullion Divide, 0.3 mi. SW. of small lake known as Mountain Lake. T. 3 S., R. 3 E., sec. 16. Elev. 11,049 ft.

Station mark: Standard tablet cemented in solid rock.

Reference mark: Cairn 5 ft. high and 4 ft. in diam. at base, 8.33 ft. from sta. mark in azimuth 66°40'.

Latitude 40°33'57.49"; longitude 111°37'26.37".

IRON SPRINGS SPECIAL QUADRANGLE, 1905

FRED McLAUGHLIN, chief of party

The triangulation net for the control of the area designated as the Iron Springs special quadrangle was expanded from United States Coast and Geodetic Survey stations Tushar, in Utah, and Pioche, in Nevada. (See fig. 4.)

The triangulation was originally computed on the United States standard (old North American) datum,¹³ and the results were pub-

¹³ See footnote 3, p. 4.

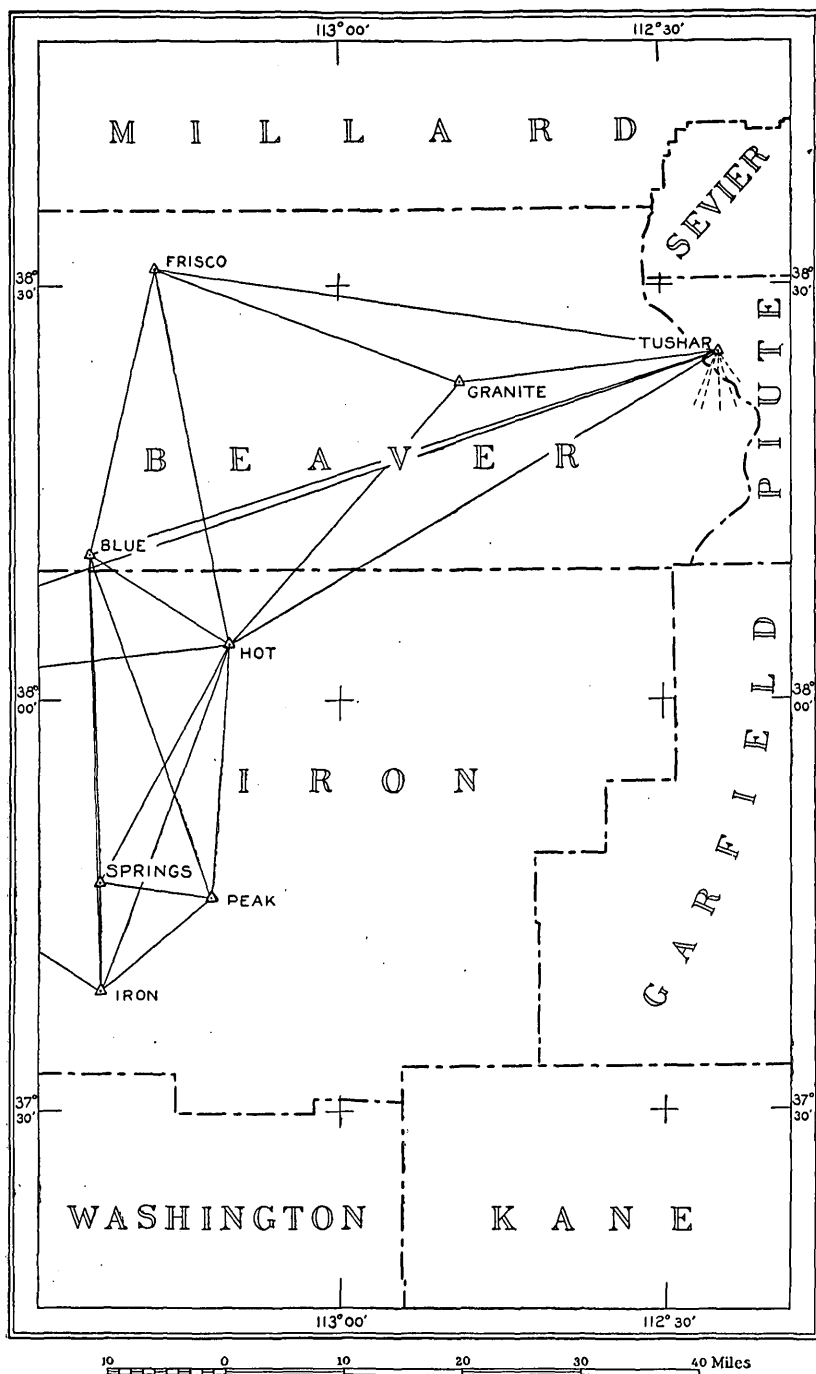


FIGURE 4.—Triangulation for Iron Springs special quadrangle, 1905.

lished in Bulletins 310 and 440.¹⁴ The readjustment of those results to the North American datum of 1927 depends upon new positions for the ends of the original base and the corresponding new azimuth and new length of base.

Triangulation by H. H. Hodgeson in 1929 (Bryce Canyon National Park project) comes in contact with this project at station Tushar.

STATIONS

BLUE, Beaver County

"On the highest and most prominent peak of the Blue Mountains, about 12 mi. N. of Lund R. R. sta." About 8 mi. in air line W. of Union Pacific R. R. sta. at Nada. T. 30 S., R. 14 W.

Station mark: Tablet cemented in solid rock.

Latitude 38°10'32.80"; longitude 113°23'27.61".

FRISCO, Beaver County

"On Quartzite Hill, a high timbered peak 4 mi. N. of Frisco post office." About 4 mi. in air line NE. of Newhouse. Elev. 9,648 ft.

Station mark: Tablet cemented in solid rock.

[Latitude 38°31'13.31"; longitude 113°17'11.42"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Blue.....	13 27 52	193 23 59	4.594674

GRANITE, Beaver County

"On the highest part of a sharp granite range 10 mi. E. of Milford R. R. sta. Can be approached only from the W. About 600 ft. N. of this point is a sharp, isolated, and inaccessible rock, located by the U. S. C. & G. S., called Milford Needle."

Station mark: Tablet cemented in solid rock.

[Latitude 38°22'58.47"; longitude 112°48'50.24"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Hot.....	42 18 02	222 04 34	4.675081
Frisco.....			4.643271

HOT, Iron County

"On the southernmost and most prominent peak of the Hot Springs Mountains, about 15 mi. NE. of Lund R. R. sta." About 8 mi. in air line SE. of Union Pacific R. R. sta. at Nada. T. 32 S., R. 12 W.

Station mark: Tablet cemented in stone.

Signal: Cairn 4 ft. high built over sta. mark.

¹⁴ Gannett, S. S., Results of primary triangulation and primary traverse, fiscal year 1905-6: U. S. Geol. Survey Bull. 310, pp. 226-229, 1907. Results of triangulation and primary traverse for the years 1906, 1907, and 1908; R. B. Marshall, chief geographer: U. S. Geol. Survey Bull. 440, pp. 592-594, 1910.

[Latitude 38°04'01.23"; longitude 113°10'36.83"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Peak.....	3 42 50	183 41 54	4.531331
Iron.....	20 17 21	200 10 07	4.698755
Springs.....	28 51 00	208 43 44	4.556309
Pioche, Nev.....	83 35 58	263 03 40	4.888064
Blue.....	122 48 29	302 40 33	4.348719
Frisco.....	169 14 45	349 10 40	4.709505

IRON, Iron County

"On Iron Mountain, a prominent peak about 16 mi. WSW. from Cedar City post office, on the highest part of a large iron rock. Fifteen ft. W. (true) of the geodetic point a rock cairn 4 ft. high was built over a triangulation tablet set in solid rock." T. 36 S., R. 14 W., sec. 25. Elev. 7,828 ft.

Station mark: Tablet set in solid rock.

Signal: Cairn 4 ft. high built over sta. mark.

[Latitude 37°38'40.26"; longitude 113°22'23.69"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Pioche, Nev.....	122 38 01	302 13 05	4.849494
Springs.....			4.185887
Blue.....			4.770749

PEAK, Iron County

"On the sharpest of the Three Peaks, about 11 mi. W. of Cedar City post office and 2 mi. N. of Iron Springs." About 10 mi. in air line NW. of Cedar City. T. 35 S., R. 12 W., sec. 16. Elev. 6,416 ft.

Station mark: Tablet cemented in solid rock.

Signal: Cairn built over sta. mark.

[Latitude 37°45'41.14"; longitude 113°12'06.77"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Iron.....			4.299254
Springs.....			4.186269
Blue.....	160 11 27	340 04 28	4.689312

SPRINGS, Iron County

"On the easternmost and highest of three peaks about 20 mi. SSW. of Lund R. R. sta." About 18 mi. in air line WNW. of Cedar City. T. 35 S., R. 14 W., sec. 1. Elev. 5,980 ft.

Station mark: Tablet cemented in rock.

Signal: Cairn 4 ft. high built over sta. mark.

[Latitude 37°46'57.90"; longitude 113°22'26.71"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Blue.....	178 03 14	358 02 36	4.639971

TUSHAR, on Beaver-Piute county line

On summit of Belknap Peak, northernmost of the three barren white limestone peaks that are the highest points in the Tushar Mountains, the backbone of which forms the boundary between Beaver and Piute Counties. This peak is about 10 mi. in air line W. of Marysville, a village on upper Sevier River, and 15 mi. NE. of Beaver. To reach from Beaver, go along Puffer Lake rd. 14 mi., then turn to left on Merchant Valley rd. and go about 8 mi. to a sawmill, then take Forest Service trail to foot of peak. The sta. is nearly surrounded by circular wall of rocks 4.5 ft. high with inner diam. of 11 ft. Vertical-circle sta. is 34.12 ft. due N. Established by Coast and Geodetic Survey in 1882. Elev. (U. S. C. & G. S.) 12,132 ft.

Station mark: $\frac{5}{8}$ -in. copper bolt leaded in drill hole in solid rock. Another mark is a drill hole, above the bolt, in a flat rock fitted between the bases of three small brick piers used in mounting the instrument.

Signal (erected in 1929): Cairn 8 ft. high and 6 ft. in diam. at base built over sta. mark.

[Latitude $38^{\circ}25'09.551''$; longitude $112^{\circ}24'42.168''$]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
Hot.....	59	57	41	239	29	16	4.889672
Pioche, Nev.....	71	59	43.76	250	58	53.68	5.1802123
Blue.....							4.953423
Granite.....	83	33	47	263	18	47	4.548623
Frisco.....	98	37	47	278	05	08	4.887410

NORTHEASTERN UTAH, 1909

C. F. URQUHART, chief of party

The stations of this project were established by means of a net of triangulation extended from three stations established by G. T. Hawkins in 1907, namely, Chimney and Nugget, in Wyoming, and Lakeview, in Utah. (See fig. 5.) This net ties also, at stations Swan Creek and Red Spot, to triangulation conducted by H. H. Hodgeson in 1913 (Logan quadrangle project). It includes a few stations in Wyoming, but only those in Utah are described in this bulletin.

The triangulation was originally computed on the United States standard datum,¹⁵ and the results were published in Bulletin 496.¹⁶ The readjustment of the results to the North American datum of 1927, because of the ties cited, was made in conjunction with the readjustment of the results of the Hawkins and Hodgeson projects.

STATIONS**LAKEVIEW, Rich County**

"A sharp peak about 2 mi. E. of Bear Lake and about 4 mi. SW. of the corner of Utah, Idaho, and Wyo. The summit is sharp, bald, and rocky. A good spring, 100 yd. N. of sta. in grove of quaking-asp trees, is accessible to a pack train." About 10 mi. in air line SW. of Utah-Idaho-Wyo. State-boundary corner and

¹⁵ See footnote 3, p. 4.

¹⁶ Results of triangulation and primary traverse for the years 1909 and 1910; R. B. Marshall, chief geographer: U. S. Geol. Survey Bull. 496, pp. 342-356, 1912.

10.5 mi. NE. of Laketown. (Shown on map of Randolph quadrangle as on top of Black Mountain.) T. 14 N., R. 6 E., sec. 11. Elev. 7,696 ft.

Station mark: Aluminum tablet cemented in rock.

Signal: Cairn 6 ft. high and 5 ft. in diam. at base centered over sta. mark.

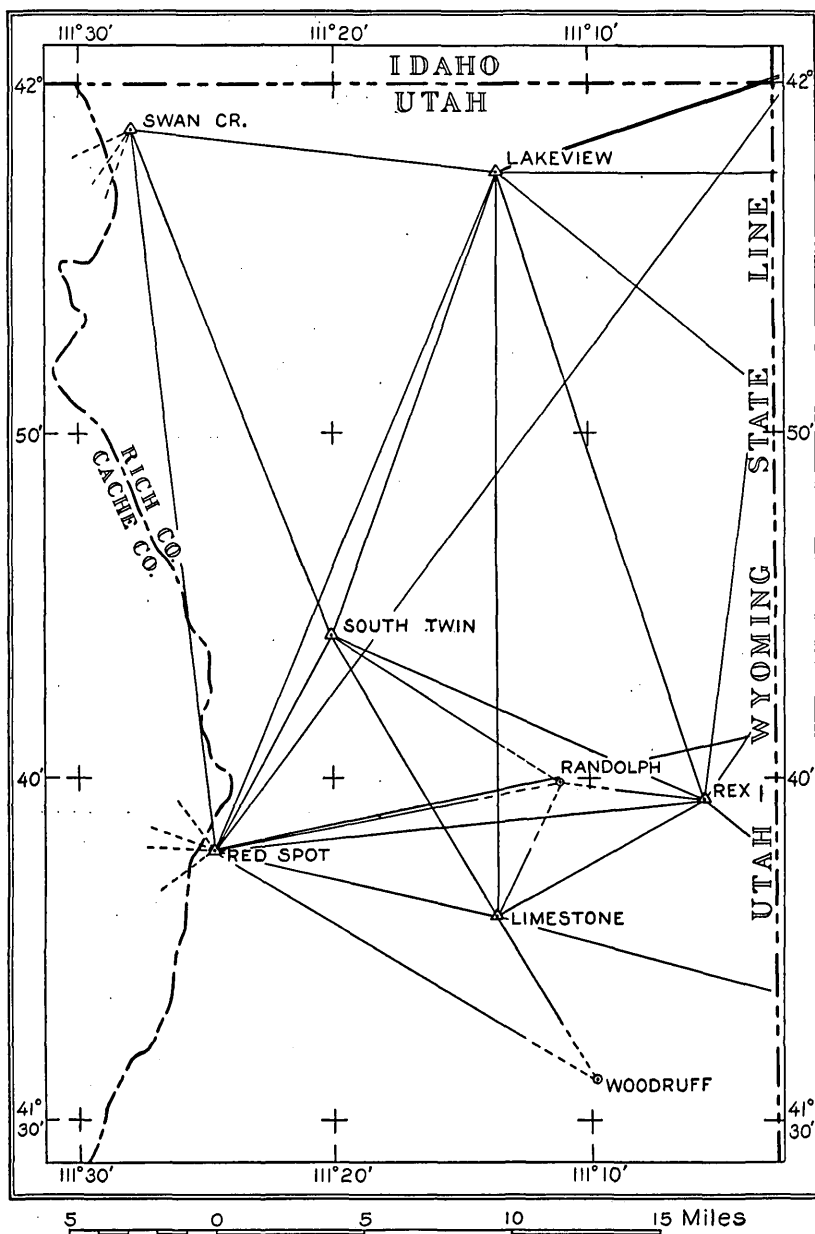


FIGURE 5.—Triangulation in northeastern Utah, 1909.

[Latitude 41°57'37.83"; longitude 111°13'49.61"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
South Twin.....	18 56 08	198 52 00	4.421854
Red Spot.....	22 25 54	202 18 40	4.596386
Swan Creek.....	96 30 44	276 21 20	4.291215
Red, Wyo.....	252 12 41	72 20 32	4.230840
Coke, Wyo.....	252 19 10	72 36 36	4.576790
Rock, Wyo.....	270 29 08	90 45 58	4.541514
Nugget, Wyo.....	308 00 31	128 16 48	4.632879

LIMESTONE, Rich County

"Highest point of a low mountain about 5 or 6 mi. WSW. of the town of Randolph, in Rich County, Utah. One can drive very near the summit." About 6.5 mi. in air line NW. of Woodruff. T. 10 N., R. 6 E., sec. 14. Elev. 7,325 ft. Station mark: Tablet set in rock.

Signal: Cairn 6 ft. high centered over sta. mark.

[Latitude 41°35'59.62"; longitude 111°13'44.85"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Red Spot.....	103 11 58	283 04 43	4.192763
South Twin.....	150 02 56	329 58 46	4.240279
Lakeview.....	179 50 36	359 50 33	4.602631
Chimney, Wyo.....	285 06 44	105 20 19	4.469796

RANDOLPH, Rich County (Not occupied)

"Spire on tabernacle in town of Randolph."

Station mark: None.

Station and signal: Center of spire.

[Latitude 41°39'54.43"; longitude 111°11'04.34"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Limestone.....	27 10 03	207 08 16	3.910696
Red Spot.....	78 59 16	258 50 14	4.284318
South Twin.....	122 16 58	302 11 01	4.166043

RED SPOT, Rich County

"On rather high flat-topped ridge at source of Old Canyon Creek, a stream flowing into Bear River. It is about 12 mi. a little S. of W. of Randolph. The sta. can be reached by rd. up Old Canyon 7 or 8 mi., thence on horseback up the ridge. The ridge is covered with quaking-asf trees, which make passing difficult. The point can also be reached by the Logan rd., or, from the N., by way of the Twin Peaks, on horseback." (Shown on U. S. F. S. map of Cache National Forest as on Red Spur.) The ridge in this locality forms the boundary line between Rich and Cache Counties. T. 10 N., R. 5 E., sec. 5. Elev. 8,885 ft.

Station mark: Tablet set in rock.

Signal: Cairn 6 ft. high, centered over sta. mark, tree in center.

[Latitude 41°37'54.47"; longitude 111°24'40.46"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Swan Creek.....	173 27 02	353 24 54	4. 590574
Red, Wyo.....	216 44 52	36 59 56	4. 716951
Nugget, Wyo.....	258 15 55	78 39 21	4. 698290

REX, Rich County

"On the highest point of Crawford Range, about 3 mi. E. of Mr. Rex's residence on the E. side of Bear River, which is about 2 mi. E. of Randolph. Horses can be ridden to signal from the rd., which is built to a point about 1 mi. from the sta." About 4.5 mi. in air line E. of Randolph. T. 11 N., R. 7 E., sec. 36. Elev. 7,993 ft.

Station mark and signal: Tree in center of small cairn.

Reference mark: Tablet set in rock 1.4 meters S. of cairn.

[Latitude 41°39'22.21"; longitude 111°05'35.73"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Limestone.....	61 08 45	241 03 21	4. 111693
Red Spot.....	84 16 18	264 03 37	4. 425367
Randolph.....	97 28 47	277 25 08	3. 884659
South Twin.....	113 51 35	293 42 00	4. 339507
Lakeview.....	161 24 29	341 19 00	4. 552342
Red, Wyo.....	187 04 20	7 06 41	4. 594202
Rock, Wyo.....	214 59 19	35 10 37	4. 611111
Nugget, Wyo.....	251 55 46	72 06 31	4. 372577
Chimney, Wyo.....	309 11 49	129 19 59	4. 344687

SOUTH TWIN, Rich County

"On the highest point of the most southern of Twin Peaks, well known locally. It can be best reached from Randolph or from Laketown by horseback." About 9 mi. in air line NW. of Randolph and 6 mi. S. of Laketown. Elev. 7,690 ft.

Station mark and signal: Cairn 7 ft. high.

Reference mark: Tablet set in rock 1.6 meters W. of sta. mark.

[Latitude 41°44'07.82"; longitude 111°20'00.53"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Red Spot.....	29 21 55	209 18 49	4. 121010
Swan Creek.....	158 10 39	338 05 23	4. 466707

SWAN CREEK, Rich County

"On highest point of timbered mountain at source of Swan Creek and just above Garden City, [which is] on Bear Lake. There are higher mountains W. of this point." About 4.5 mi. in air line NW. of Garden City. T. 14 N., R. 4 E., near line between secs. 2 and 11. Elev. 9,114 ft.

Station mark: None.

Station and signal: Tree trimmed up.

Reference mark: Tablet set in rock 0.7 meter SSE. from sta.

Latitude 41°58'48.85"; longitude 111°27'53.46".

WOODRUFF, Rich County (Not occupied)

Cupola on school in town of Woodruff.
Station mark: None.
Station and signal: Center of cupola.
No check on this position.

[Latitude 41°31'12.51"; longitude 111°09'45.53"]

To station—	Azimuth			Back azimuth	Distance
	°	'	"	°	'
Red Spot.....	120	58	01	300	48
Limestone.....	147	58	15	327	55
					36
					Log. meters
					4.383067
					4.019134

EASTERN UTAH, 1910

T. M. BANNON, chief of party

The survey that established the following stations, in the coal areas of Carbon County, started from Strawberry, Grey Head, and Indian Head, stations that were occupied by H. L. Baldwin, Jr., in 1897-98,

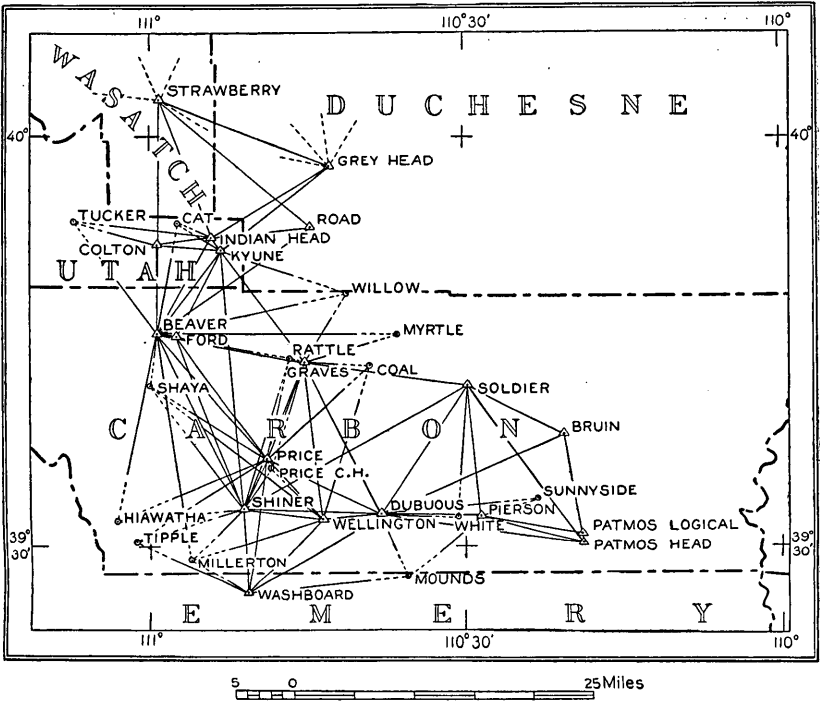


FIGURE 6.—Triangulation in eastern Utah, 1910.

and closed on United States Coast and Geodetic Survey station Patmos Head. (See fig. 6.) The azimuth at Patmos Head was checked by sighting the azimuth mark established by the Coast and Geodetic Survey, which mark was then occupied as a station, called Patmos

Logical, and its position determined. Triangulation by C. N. Mortensen in 1934 (Duchesne quadrangle project) ties to this project at stations Strawberry and Grey Head.

The triangulation was originally computed on the United States standard (old North American) datum,¹⁷ and the results were published in Bulletin 496.¹⁸ Readjustment of these results to the North American datum of 1927 is dependent upon new positions for stations Strawberry and Patmos Head, as determined by the Coast and Geodetic Survey, and for stations Grey Head and Indian Head, as fixed by the readjustment of the results of Baldwin's triangulation (Uinta Forest Reserve project).

STATIONS

BEAVER, Carbon County

"On the highest grassy hill of Ford Ridge, between Beaver and Spring Creeks. The hill is very prominent and is visible from all directions. The view is good from Colton and Price. It is about 7 mi. SE. of Colton, 4 mi. S. of Kyune, and 2 mi. E. of Richardson's sheep ranch on Beaver Creek. The sta. is easily reached from the Kyune or Beaver Creek side." About 5.5 mi. in air line SW. of Kyune. T. 12 S., R. 8 E., sec. 26.

Station mark: Chiseled cross on solid rock.

Reference mark: Chiseled cross on rock set in ground 20.9 ft. from sta. mark in azimuth 236°49'.

Signal: Large cairn built over sta. mark.

[Latitude 39°45'21.43"; longitude 110°59'26.21"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
Shaya.....	6	09	26	186	09	04	3.86920
Hiawatha.....	11	40	13	191	35	55	4.40887
Tucker.....	145	28	03	325	23	07	4.28701
Colton.....	178	38	01	358	37	53	4.09875

BRUIN, Carbon County

"On a high white mountain at the head of Range Creek and the divide between Whitmore Creek and Minnie Maud Creek, about 10 mi. N. of Sunnyside. It is easily reached by wagon rd. up Whitmore Canyon from Sunnyside." About 6 mi. in air line N. of Sunnyside. T. 13 S., R. 14 E., sec. 33. Elev. 10,285 ft.

Station mark: Tablet cemented in rock.

Reference mark: Nail in blazed tree 109.9 ft. N. of sta. mark.

Signal: Large cairn centered over sta. mark.

[Latitude 39°38'39.09"; longitude 110°20'50.80"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
Dubuoux.....	63	57	09	243	46	14	4.436885
Soldier.....	114	35	10	294	29	21	4.158850

¹⁷ See footnote 3, p. 4.

¹⁸ Results of triangulation and primary traverse for the years 1909 and 1910; R. B. Marshall, chief geographer: U. S. Geol. Survey Bull. 496, pp. 342-356, 1912.

CAT, Utah County (Not occupied)

"On the Reservation Ridge at the head of Cat Creek, about 6 mi. by the Cat Creek trail from Colton sta. on the Denver & Rio Grande R. R." About 4.5 mi. in air line NE. of Colton and 4 mi. SE. of White River ranger sta. T. 11 S., R. 9 E., sec. 6.

Station mark: Chiseled cross on flat rock buried flush with ground.

Signal: Small cairn built over sta. mark.

[Latitude 39°53'49.9"; longitude 110°57'30.8"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Beaver.....	9 56 10	189 54 56	4.20200

COAL, Carbon County (Not occupied)

"On high ridge between Price Valley and Emma's Park, between Coal and Soldier Creeks. It is easily reached from the Park rd. (county rd., Price to Colton)." About 11.5 mi. in air line NE. of Price. T. 13 S., R. 11 E., sec. 2. Elev. 8,383 ft.

Station mark: Tablet cemented in solid rock.

Signal: Large cairn built over sta. mark.

[Latitude 39°43'08.7"; longitude 110°38'50.1"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Wellington.....	17 32 45	197 29 46	4.345893
Price.....	49 02 48	228 56 26	4.276578
Graves.....	95 31 53	275 27 49	3.960956

COLTON, Utah County

"On a prominent peak 1 mi. N. of Colton. It is easily reached by taking the Cat Creek trail to the N. side of the hill." About 1.75 mi. in air line NE. of Colton. T. 11 S., R. 8 E., sec. 14.

Station mark: Tablet cemented in ledge.

Signal: Cairn built over sta. mark.

[Latitude 39°52'08.3"; longitude 110°59'39.0"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Tucker.....	107 41 41	287 35 52	4.04948

DUBUOUS, Carbon County

"On the N. one of two sharp isolated peaks on the low cedar ridges E. of Cat Creek. It is 6 mi. E. of Wellington, 13 mi. a little S. of E. of Price, and 15 mi. W. of Sunnyside. The county rd. from Price to Sunnyside passes 1 mi. N. of sta. A wagon can be driven from the 12-mi. post to the top of the ridge, thence along the ridge to a point 500 ft. from the monument." About 5.8 mi. in air line E. of Wellington and 10 mi. SE. of Price. T. 15 S., R. 11 E., sec. 12. Elev. 5,957 ft.

Station mark: Chiseled cross on solid rock 4 in. below ground.

Reference mark: Chiseled cross on flat rock 15 ft. from sta. mark in azimuth 271°59'.

Signal: Large cairn built over sta. mark.

[Latitude 39°32'08.46"; longitude 110°37'59.57"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Washboard.....	61 09 41	241 01 28	4.325083
Wellington.....	84 21 24	264 17 54	3.899396
Shiner.....	93 51 28	273 43 06	4.275817
Price.....	117 14 57	297 08 03	4.240979
Graves.....	154 07 51	334 03 15	4.373138

FORD, Carbon County

"On a prominent grassy hill, with bluff on SE. face, on a ridge between Spring Creek and Price River. It is about 10 mi. NW. of Castlegate and is best reached from the ridges about 2 mi. down Price River from Kyune." About 4.75 mi. in air line NW. of Castlegate and 5.5 mi. S. of Kyune. T. 12 S., R. 9 E., sec. 30.

Station mark: Triangle and letters "U S" chiseled on rock.

Signal: Large cairn built over sta. mark.

[Latitude 39°45'11.4"; longitude 110°57'32.3"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Beaver.....	96 29 01	276 27 48	3.43613

GRAVES, Carbon County

"On the highest point of the long ridge between Emma's Park and Price River Valley. This ridge ends in a bluff on the S. but has a smooth slope on the N. The sta., which is at the head of Summit Creek, a tributary of Willow Creek, can be seen from Price, from which place it is distant about 8 mi. by a very rough route. The best route to the sta. is from the N., along the Price-Colton rd. to the divide between Coal and Willow Creeks, 30 mi. from Price." About 6 mi. in air line E. of Castlegate, 9.5 mi. NE. of Price. T. 13 S., R. 10 E., sec. 1. Elev. 8,790 ft.

Station mark: Chiseled cross on solid rock.

Reference mark: Cross and letters "U S G S" chiseled on flat rock 66.4 ft. from sta. mark in azimuth 47°08'.

Signal: Large cairn built over sta. mark.

[Latitude 39°43'37.14"; longitude 110°45'12.16"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Price Courthouse.....	18 16 12	198 14 07	4.17424
Price.....	21 15 06	201 12 48	4.153730
Shiner.....	23 02 17	202 58 30	4.336880
Rattle.....	96 05 14	276 04 09	3.382985
Beaver.....	99 03 48	278 54 42	4.313611
Kyune.....	142 25 43	322 20 30	4.280098

GREY HEAD, Duchesne County

On high grassy-topped hill on ridge between right fork of Indian Canyon and left fork of Lake Canyon, about 17 mi. in air line NE. of Colton. Established in 1898 and reoccupied in 1910 and in 1934. In 1934 a standard tablet was cemented in a rock directly over the nail that was formerly the sta. mark, new reference marks were set, and the best route to sta. noted, as follows: From Duchesne drive up Indian Canyon 10.4 mi., thence up right fork of Indian Canyon 13.5 mi. to mouth of Sterling Canyon, thence up Sterling Canyon 1.2 mi. to end of rd., from which point sta. is about 1 mi. to NE. and about 1,500 ft. higher. T. 10 S., R. 7 W., near cor. secs. 7, 8, 17, and 18. Elev. (U. S. F. S.) 9,531 ft.

Station mark: Standard tablet stamped "Grey Head M 1934," cemented in sandstone rock.

Reference mark 1: Drill hole in sandstone rock 9.55 ft. from sta. mark in azimuth 40°39'.

Reference mark 2: Reference tablet stamped "Grey Head No 2" cemented in rock 11.95 ft. from sta. mark in azimuth 305°38'.

Signal: Cairn 6 ft. high centered over sta. mark.

[Latitude 39°58'00.48"; longitude 110°42'33.02"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Kyune.....	53 13 21	233 06 25	4.284027
Indian Head.....	58 46 36	238 39 13	4.282558
Strawberry.....	110 53 22	290 42 46	4.399594

HIAWATHA, Carbon County (Not occupied)

"On a high, round-topped grassy hill on the high divide at the head of Miller Creek. It is 3 mi. W. of Hiawatha coal camp and is best reached from the W." About 6.5 mi. in air line NW. of Mohrland, 1.75 mi. W. of Wattis, and 0.6 mi. NW. of Wattis mine. Tram rd. from Wattis to Wattis mine. T. 15 S., R. 8 E., sec. 8. Elev. 9,802 ft.

Station mark: Tablet cemented in rock buried flush with ground.

Signal: Tripod built over sta. mark.

Latitude 39°31'47.3"; longitude 111°03'03.3".

INDIAN HEAD, Utah County

On Indian Head, a flat-topped mountain on southern boundary of Uinta National Forest, near common corner of Utah, Wasatch, and Duchesne Counties. About 6.5 mi. in air line ENE. of Colton and 4.5 mi. NE. of Kyune. May be reached from Colton by Cat Creek trail and wagon rd. along Reservation Ridge, or from Kyune on Colton-Theodore-Price wagon rd. Established in 1898 and reoccupied in 1910. T. 11 S., R. 9 W., sec. 10. Elev. (U. S. F. S.) 9,837 ft.

Station mark: Iron post set 3 ft. in ground.

[Latitude 39°52'37.76"; longitude 110°54'02.77"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Beaver.....	29 47 03	209 43 36	4.190349
Colton.....	83 33 07	263 29 31	3.90530
Tucker.....	97 39 49	277 31 25	4.27489
Cat.....	114 16 12	294 13 58	3.73412
Strawberry.....	159 23 29	339 20 17	4.304464

KYUNE, Utah County

"On the S. end of a prominent white ridge extending S. from the main Reservation Ridge between Horse and Kyune Creeks. It is about 5 mi. NE. of Kyune and 10 mi. NE. of Colton. The sta. is visible all along the wagon rd. from Colton to Price and Theodore and is easily reached by the Cat Creek trail from Colton or from the stone quarry E. of Kyune." About 6.5 mi. in air line E. of Colton and 4 mi. NE. of Kyune. T. 11 S., R. 9 E., sec. 14.

Station mark: Two nails driven in slate rock.

Reference mark: Nail in blazed place on tree on E. slope of ridge 507 ft. from sta. mark in azimuth 270°47'.

Signal: Tripod and small cairn built over sta. mark.

[Latitude 39°51'46.64"; longitude 110°53'21.12"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Ford.....	26 08 08	206 05 28	4.13268
Beaver.....	36 11 58	216 08 04	4.167789
Colton.....	94 17 50	274 13 47	3.95448
Cat.....	122 40 58	302 38 18	3.84806
Indian Head.....	147 52 57	327 52 30	3.269761

MILLERTON, Carbon County (Not occupied)

"On the highest point of a rocky ridge near Millerton siding on the Southern Utah R. R. It is 17 mi. SW. of Price. The R. R. and wagon rd. from Price to Hiawatha and Miller Creek pass the foot of the hill." About 11 mi. in air line SW. of Price, and 4 mi. E. of Hiawatha. T. 15 S., R. 9 E., sec. 32.

Station mark: Tablet cemented in rock.

Signal: Large cairn built over sta. mark.

[Latitude 39°28'52.8"; longitude 110°56'19.8"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Beaver.....	171 43 08	351 41 09	4.48870

MOUNDS, Emery County (Not occupied)

"On the SE. end of a flat mesa point 0.25 mi. N. of Mounds, the junction point of the Sunnyside branch with the main line of the Denver & Rio Grande Western R. R. The sta. is visible from Mounds."

Station mark: Chiseled cross on rock.

Signal: Large cairn built over sta. mark.

[Latitude 39°27'51.3"; longitude 110°35'22.0"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Washboard.....	84 13 24	264 03 32	4.35024
Dubuou.....	154 36 56	334 35 16	3.94352

MYRTLE, Carbon County (Not occupied)

"On a large hill on the divide between The Park and Ninemile Creek; it is 3 mi. NW. of milepost 19, on the Soldier Creek rd. where the Park rd. to Colton forks. Whitmore's horse ranch is at the E. foot of the hill." About 14 mi. in air line E. of Castlegate and about 18 mi. NW. of Sunnyside.

Station mark: Tablet cemented in rock buried flush with ground.

Signal: Large cairn built over sta. mark.

No check on this position.

[Latitude $39^{\circ}45'45.1''$; longitude $110^{\circ}36'12.4''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Graves.....	72 58 53	252 53 08	4.123506
Beaver.....	88 51 54	268 37 02	4.520962

PATMOS HEAD, Carbon County

On Patmos Head, southernmost peak of Patmos Mountain, in range of mountains known as West Tavaputs Plateau, and highest point within several miles. About 5.25 mi. in air line and 9.5 mi. by trail SE. of Sunnyside, 4 mi. SW. of Utah Fuel Pumping sta., and 3 mi. SE. of upper end of Dry Canyon. Best reached by trail E. from Sunnyside up No. Two Canyon to crest of saddle in mountain, then S. 4 mi. by trail along ridge. Established by U. S. C. & G. S. in 1890; reoccupied by U. S. G. S. in 1910 and by U. S. C. & G. S. in 1931, when original sta. mark—a copper bolt—was replaced with a standard disk and new reference marks were set. T. 15 S., R. 14 E., sec. 23.

Station mark: U. S. C. & G. S. standard disk set in concrete.

Reference mark 1: U. S. C. & G. S. reference disk set in drill hole in flat rock buried flush with ground 2.62 meters from sta. mark in azimuth $325^{\circ}35'$.

Reference mark 2: U. S. C. & G. S. reference disk set in drill hole in small stone buried flush with ground 15.15 meters from sta. mark in azimuth $60^{\circ}10'$.

[Latitude $39^{\circ}30'07.840''$; longitude $110^{\circ}18'57.354''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Dubuous.....	97 51 52	277 39 45	4.439907
Pierson.....	104 50 22	284 44 09	4.160792
Soldier.....	144 06 40	323 59 40	4.428456
Patmos Logical.....	168 45 39	348 45 30	3.195945
Bruin.....	170 15 52	350 14 40	4.204048

PATMOS LOGICAL, Carbon County

"On the S. end of Patmos Ridge, about 5 mi. SE. of Sunnyside. It is easily reached by the trail from Sunnyside to the pumping sta. on Range Creek, thence to the top of the ridge and S. along ridge." This sta. is the azimuth mark established by U. S. C. & G. S. for sta. Patmos Head, just described. Elev. 9,845 ft.

Station mark: Copper bolt cemented in solid rock.

Reference mark: Tablet cemented in big flat piece of sandstone 16.9 ft. from sta. mark in azimuth $321^{\circ}22'$.

Signal: Tripod and cairn built over sta. mark.

[Latitude $39^{\circ}30'57.79''$; longitude $110^{\circ}19'10.16''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Pierson.....	98 59 53	278 53 48	4.141840

PIERSON, Carbon County

"On N. side of Sunnyside branch of Denver & Rio Grande [Western] R. R. at Pierson's ranch. It is 200 ft. E. of a white post marked 'Station (White siding) 1 mile,' and 5 mi. W. of Sunnyside. The wagon rd. to Sunnyside, Price, and Mounds passes 300 ft. N. of the sta." About 6 mi. (by R. R.) SW. of Sunnyside. T. 15 S., R. 13 E., sec. 8. Elev. 5,904 ft.

Station mark: Tablet cemented in large boulder buried flush with ground.

Reference mark: Chiseled cross on placed rock 25.9 ft. from sta. mark in azimuth 90°19'.

Signal: Tripod built over sta. mark.

[Latitude 39°32'07.70"; longitude 110°28'43.49"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Mounds.....	50 19 10	230 14 57	4.09259
Dubuous.....	90 09 04	270 03 10	4.123190
Soldier.....	174 25 48	354 25 01	4.257725

PRICE, Carbon County

"On the S. end of a mesa point just E. of the Price city reservoir, 0.8 mi. NW of the courthouse." T. 14 S., R. 10 E., sec. 16.

Station mark: Tablet cemented in large rock.

Reference mark: Chiseled cross on solid rock on point of ridge.

Signal: Tripod and cairn built over sta. mark.

[Latitude 39°36'26.56"; longitude 110°48'48.63"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Washboard.....	9 21 40	189 20 21	4.265343
Shiner.....	26 23 53	206 22 25	3.874651
Tipple.....	57 22 55	237 15 01	4.32458
Hiawatha.....	67 11 21	247 02 17	4.34529
Shaya.....	119 48 14	269 41 06	4.26540
Beaver.....	137 24 35	317 17 48	4.350778
Ford.....	142 25 04	322 19 30	4.31053

PRICE COURTHOUSE, Carbon County (Not occupied)

"On the cupola of the Carbon County courthouse at Price."

Station mark: None.

Station and signal: Statue of "Justice" on cupola.

[Latitude 39°35'57.2"; longitude 110°48'28.4"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Shiner.....	33 17 48	213 16 08	3.84184
Price.....	151 55 34	331 55 21	3.01051

RATTLE, Carbon County (Not occupied)

"On the highest point of a grassy ridge between The Park and Price Valley, on the E. side of Willow Creek canyon. It is easily reached from the Park rd. by following long ridge S. from the rd. crossing of Willow Creek." About 9 mi. in

air line N. of Price, and 4.5 mi. E. of Castlegate. T. 13 S., R. 10 E., sec. 3. Elev. 8,837 ft.

Station mark: Tablet cemented in rock.

Signal: Large cairn built over sta. mark.

[Latitude 39°43'45.4"; longitude 110°46'53.0"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Price.....	11 31 12	191 29 59	4. 140297
Shiner.....	16 44 47	196 42 05	4. 325155
Beaver.....	99 26 30	279 18 28	4. 259426

ROAD, Duchesne County

"On the first hill with scattering trees on the E. side of the Colton-Theodore rd. where it crosses the summit of Reservation Ridge between Indian Creek, on the N., and Willow Creek, on the S. The sta. is situated on the S. end of the highest point, and trees have been cut down and trimmed in order to afford a good view. A closing corner of the reservation line is located on the ridge 439 ft. SE. of the sta. The sta. is approximately 22 mi. from Colton and 7 mi. from Daniel's ranch and can easily be reached by wagon." About 15 mi. in air line E. of Colton and 13 mi. NE. of Castlegate. The reservation line mentioned above is probably what is now the boundary line of the Uinta National Forest, for the sta. is within the area occupied by the forest and just N. of its S. boundary. The paved highway from Castlegate to Duchesne passes about 0.4 mi. S. of sta. T. 7 S., R. 8 W., sec. 11.

Station mark: Nail driven into ground under large stone marked with chiseled cross and buried flush with ground.

Reference mark: Nails driven into blazes on S. side of two trimmed trees 31.35 ft. from sta. mark in azimuth 173°27'. A stone on the forest boundary line is 439.2 ft. from sta. in azimuth 251°42'.

[Latitude 39°53'11.44"; longitude 110°44'42.28"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Beaver.....	55 29 28	235 20 02	4. 407177
Indian Head.....	85 35 25	265 29 25	4. 125764
Strawberry.....	131 13 03	311 03 51	4. 432900

SHAYA, Carbon County (Not occupied)

"On a grassy hill on Wild Cattle [Wildcat?] Ridge, N. of [North Fork of] Gordon Creek. It is about 17 mi. NW. of Price and is best reached from Shaya's ranch on Gordon Creek by means of the wagon rd. from Price to Schofield." At head of Wildcat Canyon, about 3.5 mi. in air line SW. of Standardville and 12 mi. NW. of Price. T. 13 S., R. 8 E., sec. 14. Elev. 8,800 ft.

Station mark: Tablet cemented in rock.

Signal: Cairn built over sta. mark.

Latitude 39°41'22.9"; longitude 110°59'59.6".

SHINER, Carbon County

"On the W. end of a long E.-W. mesa about 5 mi. S. of Price. The wagon rd. and the Southern Utah R. R., from Price to Miller Creek, Hiawatha and Moreland [Mohrland], pass around the NW. foot of ridge." About 4.25 mi. in air line

SW. of Price. The paved highway from Price to Huntington passes about 2 mi. E. of sta. T. 15 S., R. 10 E., sec. 6. Elev. 5,960 ft.

Station mark: Chiseled cross on placed rock.

Reference mark: Tablet cemented in large boulder 15.05 ft. from sta. mark in azimuth 320°53'.

Signal: Large cairn built over sta. mark.

[Latitude 39°32'48.90"; longitude 110°51'08.16"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Millerton.....	45	39	42	225	36	24	4.01765
Tipple.....	72	04	07	251	57	43	4.18151
Hiawatha.....	83	42	55	263	35	20	4.23515
Shaya.....	141	24	06	321	18	27	4.30743
Beaver.....	152	56	54	332	51	35	4.416138
Ford.....	158	14	18	338	10	12	4.39205
Kyune.....	174	51	13	354	49	48	4.546930

SOLDIER, Carbon County

"On a high grassy hill on main divide between Price Valley drainage and Nine-mile Creek, about 10 mi. NE. of Soldier sta. on the Price-Reservation wagon rd. It is best reached by the above rd. to Ninemile Pass, about 21 miles (according to rd. mileposts) from Price, thence up the side of the high ridge on the E. to its summit, and along the backbone of the ridge to the sta." On N. side of Book Cliffs, a long divide between Clark Valley on the SW. and a plateau on the NE. About 12 mi. in air line NW. of Sunnyside and 6 mi. W. of Mount Bartles. T. 13 S., R. 13 E., sec. 18. Elev. 9,049 ft.

Station mark: Chiseled cross on small, narrow stone buried flush with ground.

Reference mark: Cross and letters "U S G S" chiseled on big flat rock over point of hill 143.5 ft. from sta. mark in azimuth 355°40'.

Signal: Large cairn built over sta. mark.

[Latitude 39°41'51.88"; longitude 110°29'57.24"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
White.....	2	52	33	182	52	08	4.259973
Dubuouss.....	32	38	21	212	33	13	4.329531
Shiner.....	61	11	41	240	58	10	4.539473
Graves.....	98	33	15	278	23	31	4.343102

STRAWBERRY, Wasatch County

On high plateau and on SW. and slightly higher one of two main summits of Strawberry Mountains, in Uinta National Forest, about 10 mi. in air line NE. of Soldier Summit (sta. on Denver & Rio Grande Western R. R.) and 14 mi. N. of Colton. Easily reached by wagon rd. from Colton or Soldier Summit to top of Reservation Ridge, thence W. along main ridge. Established in 1908, reoccupied in 1910, and intersected in 1934. T. 5 S., R. 10 W., secs. 14 and 15. Elev. (U. S. F. S.) 10,300 ft.

Station mark: Cross scratched on small rock buried a few inches below ground. It is about 8 in. E. of imaginary line joining two cairns that serve as signals and reference marks. In 1936 the U. S. C. & G. S. re-marked this sta. with a reference disk and made it the azimuth mark for U. S. C. & G. S. sta. Strawberry, which is 1.5 mi. NE. of this mark.

Reference marks: Cairns at distances and in azimuths from sta. mark as follows—(1) 8.23 ft., $45^{\circ}05'$; (2) 15.30 ft., $217^{\circ}05'$.

[Latitude $40^{\circ}02'49.43''$; longitude $110^{\circ}59'02.16''$]

To station—	Azimuth	Back azimuth	Distance
Beaver.....	° ' " 1 01 03	° ' " 181 00 48	Log. meters 4.509569

SUNNYSIDE, Carbon County (Not occupied)

"On a high rocky mountain at the extreme S. end of the ridge W. of Whitmore Canyon. Sunnyside is at the E. and S. foot of the ridge. The point can be reached only on foot." About 1 mi. in air line W. of Sunnyside. T. 14 S., R. 14 E., sec. 31. Elev. 7,944 ft.

Station mark: Tablet cemented in rock.

Signal: Large cairn built over sta. mark.

[Latitude $39^{\circ}33'44.94''$; longitude $110^{\circ}23'23.76''$]

To station—	Azimuth	Back azimuth	Distance
Pierson.....	° ' " 68 34 55	° ' " 248 31 32	Log. meters 3.913918
Dubuious.....	° ' " 81 58 47	° ' " 261 49 30	Log. meters 4.324731

TIPPLE, Carbon County (Not occupied)

"On a prominent rocky hill on a ridge between two forks of Miller Creek, near Hiawatha coal camp. It is about 20 mi. SW. of Price." About 13 mi. in air line SW. of Price and 1.5 mi. NW. of Hiawatha. T. 15 S., R. 8 E., sec. 22. Elev. 8,918 ft.

Station mark: Tablet cemented in rock.

Signal: Large cairn built over sta. mark.

Latitude $39^{\circ}30'16.9''$; longitude $111^{\circ}01'12.9''$.

TUCKER, Utah County (Not occupied)

"On the highest point of the long high ridge between Price River and Soldier [Fork?] Creek. It is about 6 mi. S. of Soldier Summit, 10 mi. SE. of Tucker, and 10 mi. SW. [NW.?] of Colton, all of which are stations on the main line of the Denver & Rio Grande [Western] R. R." About 3.5 mi. in air line SW. of Soldier Summit, 7 mi. NW. of Colton, and 6 mi. SE. of old town of Tucker. T. 10 S., R. 7 E., sec. 34.

Station mark: Tablet cemented in large rock.

Signal: Cairn 6 ft. high built over sta. mark.

Latitude $39^{\circ}53'58.4''$; longitude $111^{\circ}07'08.4''$.

WASHBOARD, Emery County

"On the E. [one] of two sharp peaks in the Washboard district, about 0.5 mi. E. of milepost 12 on the county rd. S. from Price to Huntington. It is 6 mi. NW. of Cleveland. A wagon can be driven to the foot of the hill." About 11 mi. in air line SW. of Price and 7 mi. N. of Cleveland. The paved highway from Price to Huntington passes about 1 mi. W. of sta. T. 16 S., R. 10 E., sec. 7.

Station mark: Chiseled cross on rock in place about 6 in. below ground.

Reference mark: Tablet cemented in rock 11.1 ft. from sta. mark in azimuth 192°31'.

Signal: Tripod and small cairn built over sta. mark.

[Latitude 39°26'37.12"; longitude 110°50'53.94"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Tipple.....	114 39 44	294 33 10	4.21142
Millerton.....	118 15 37	298 12 09	3.94654
Shiner.....	178 18 18	358 18 09	4.059571

WELLINGTON, Carbon County

"On the W. end of a grassy mesa on the S. bank of Price River, about 3 mi. SE. of Wellington. The sta. is easily reached by the Cleveland rd. S. from Wellington across Price River to the top of the divide, thence E. along divide rd. to sta." About 1.25 mi. in air line SE. of Wellington. T. 15 S., R. 11 E., sec. 7. Elev. 5,590 ft.

Station mark: Tablet cemented in rock buried flush with ground.

Reference mark: Chiseled cross on rock, centered under small cairn, 10.9 ft. from sta. mark in azimuth 21°35'.

Signal: Tripod and small cairn built over sta. mark.

[Latitude 39°31'43.04"; longitude 110°43'30.08"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Washboard.....	48 23 21	228 18 36	4.152164
Millerton.....	74 07 43	253 59 33	4.28160
Shiner.....	100 33 29	280 28 37	4.046334
Shaya.....	127 14 04	307 03 33	4.47153
Price Courthouse.....	137 46 01	317 42 51	4.02490
Price.....	139 00 55	318 57 32	4.063975
Graves.....	173 42 02	353 40 57	4.345520

WHITE, Carbon County (Not occupied)

"On the highest point of a low hill on the S. edge of the right-of-way at White siding, on the Sunnyside branch of the Denver & Rio Grande R. R. It is 9 mi. E. of Sunnyside." About 7.75 mi. in air line W. of Sunnyside. T. 15 S., R. 13 E., sec. 7. Elev. 5,812 ft.

Station mark: Chiseled cross on rock.

Signal: Large cairn built over sta. mark.

[Latitude 39°32'02.7"; longitude 110°30'35.5"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Dubuouss.....	91 00 50	270 56 07	4.025607

WILLOW, Carbon County (Not occupied)

"On a white hill with scattering trees on the divide between The Park and Ninemile Creek, about 1 mi. N. of The Park rd. from Colton to Price and about opposite the low divide in The Park separating the drainage of Willow and Coal creeks." About 11 mi. in air line NE. of Castlegate and 17 mi. E. of Colton.

Station mark: Tablet cemented in rock buried flush with ground.

Signal: Tripod built over sta. mark.

[Latitude 39°48'29.1"; longitude 110°41'04.3"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
Graves.....	33	14	15	213	11	36	4.031975
Beaver.....	77	38	51	257	27	06	4.429005
Kyune.....	109	14	04	289	06	12	4.268325

LOGAN QUADRANGLE, 1913

H. H. HODGESON, chief of party

The net of triangulation that includes the Logan quadrangle project is almost wholly in Cache County, Utah, and was extended west-

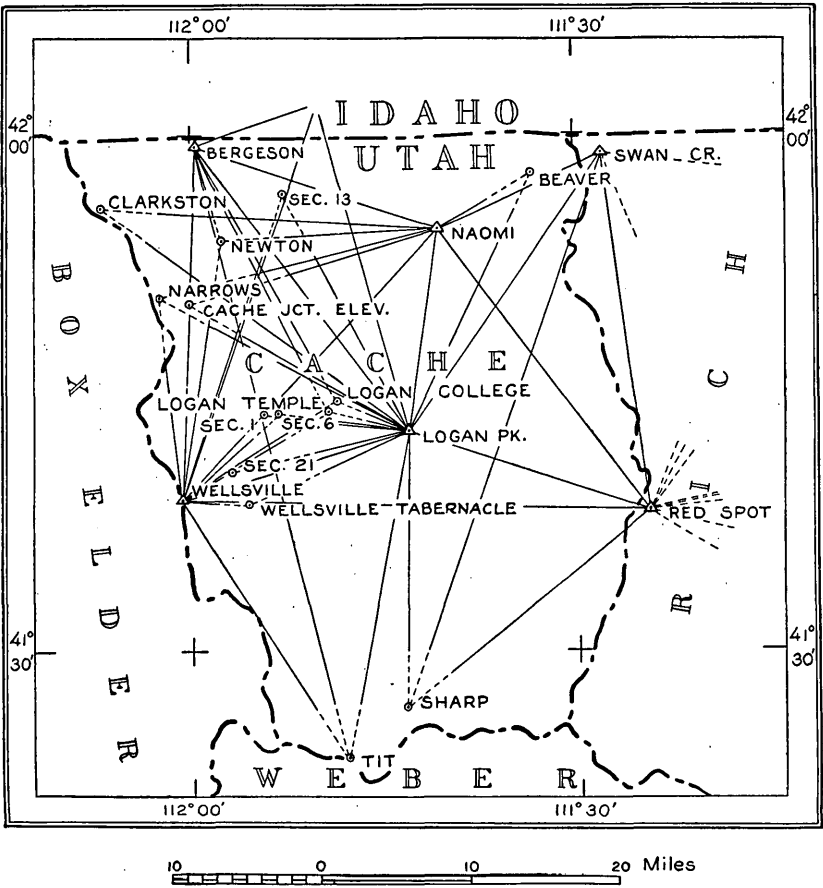


FIGURE 7.—Triangulation for Logan quadrangle, 1913.

ward from stations Swan Creek and Red Spot, established by C. F. Urquhart in 1909. (See fig. 7.) One station in this net is in Idaho and for that reason is not described in this bulletin,

This triangulation was originally computed on the United States standard (old North American) datum,¹⁹ and the results were published in Bulletin 644.²⁰ The readjustment to the North American datum of 1927 was made in conjunction with the readjustment of the results of Urquhart's triangulation (Northeastern Utah project), to which this project ties at the stations above mentioned.

STATIONS

BEAVER, Cache County (Not occupied)

"Summit near point of ridge between Beaver and Logan Creeks and about 0.7 mi. N. from the junction of these creeks." On Beaver Mountain, in Cache National Forest, about 9 mi. in air line W. of Garden City, 3 mi. N. of junction of Beaver and Logan Creeks, and 1.5 mi. NW. of Garden City-Logan rd. T. 14 N., R. 3 E., sec. 13. Elev. 8,845 ft.

Station mark: None.

Station and signal: Summit of Beaver Mountain.

No check on this position.

[Latitude 41°57'49.1"; longitude 111°33'26.4"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Logan Peak.....	25 32 44	205 26 21	4.48849
Naomi.....	59 09 09	239 04 27	4.05429

BERGESON, Cache County

"On summit of bare hill about 3 mi. SW. [NW.] from Cornish R. R. sta. [Union Pacific R. R.], on land belonging to Ephraim Bergeson and locally known as Bergeson Hill. This sta. can be easily reached by rd. and trail from the ranch of Ephraim Bergeson, which is located about 2 mi. S. of Cornish R. R. sta. Can take animals to sta." About 6 mi. in air line NE. of Clarkston and 0.3 mi. S. of Utah-Idaho State line. T. 15 N., R. 1 W., sec. 31. Elev. 5,965 ft.

Station mark: Standard tablet cemented in rock.

Reference marks: Chiseled crosses in quartz rock at distances and in azimuths from sta. mark as follows—(1) 54.7 ft., 124°22'; (2) 69.3 ft., 147°00'. Reference marks 28.3 ft. apart.

Signal: 6-ft. cairn centered over sta. mark.

[Latitude 41°59'37.84"; longitude 111°59'58.41"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Wellsville.....	1 37 50	181 37 18	4.589354
Cache Junction Elevator.....			4.24263
Smart Mountain, Idaho.....			4.17364

CACHE JUNCTION ELEVATOR, Cache County (Not occupied)

"Gray-roofed elevator at Cache Junction [on Union Pacific R. R.]."

Station mark: None.

Station and signal: Center of elevator.

¹⁹ See footnote 3, p. 4.

²⁰ Triangulation and primary traverse, 1913-1915; R. B. Marshall, chief geographer: U. S. Geol. Survey Bull. 644, pp. 104-137, 1916.

[Latitude 41°50'11.3"; longitude 112°00'13.0"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Wellsville.....	2 03 27	182 03 05	4.32970

CLARKSTON, Cache County (Not occupied)

"[In] Clarkston Mountains, about 8 mi. W. from the town of Clarkston." In Cache National Forest, near Cache-Box Elder county line, 5 mi. in air line W. of Clarkston. Elev. 8,245 ft.

Station mark: None.

Station and signal: N. summit of Clarkston Mountains.

No check on this position.

Latitude 41°55'27.6"; longitude 112°07'36.5".

LOGAN COLLEGE, Cache County (Not occupied)

"Spire on main building of Utah State College, at Logan."

Station mark: None.

Station and signal: Center of spire.

[Latitude 41°44'26.9"; longitude 111°48'49.2"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Wellsville.....	57 09 29	237 01 32	4.29551
Bergeson.....			4.50600

LOGAN PEAK, Cache County

"On summit of Logan Peak, on S. side [3 mi. in air line S.] of Logan River and about 7 mi. SE. from the city of Logan. This sta. can easily be reached from Logan River by rd. and log slides up Spring Creek. The nearest water is in the head of Providence Canyon, just S. [SE.] of sta. Can take animals to sta." In Cache National Forest. T. 11 N., R. 2 E., SW. cor. sec. 3. Elev. 9,713 ft.

Station mark: Standard tablet cemented in limestone rock.

Reference marks: Chiseled crosses in limestone rock at distances and in azimuths from sta. mark as follows—(1) 40.7 ft., 261°31'; (2) 46.7 ft., 37°09'.

Signal: Bushy-top pine tree centered over sta. mark and guyed by wires anchored in stone mounds. Limestone cairn built around base of tree.

[Latitude 41°42'48.84"; longitude 111°43'00.85"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Sharp.....	1 38 17	181 37 53	4.47480
Tit.....	9 55 56	189 52 56	4.56013
Wellsville Tabernacle.....	64 45 18	244 36 44	4.29649
Wellsville.....	72 44 37	252 32 49	4.411892
Section Twenty-one.....	76 13 45	256 04 31	4.29770
Section One.....	96 04 40	275 56 57	4.20923
Section Six.....	96 43 26	276 36 29	4.16453
Logan Temple.....	104 01 01	283 56 37	3.97671
Logan College.....	110 38 21	290 34 30	3.93464
Narrows.....	117 40 49	297 27 41	4.48895
Cache Junction Elevator.....	119 53 31	299 42 04	4.43887
Clarkston.....	124 38 25	304 22 00	4.61622
Bergeson.....	143 04 41	322 53 22	4.590929
Section Thirteen.....	150 24 00	330 16 54	4.47416
Smart Mountain, Idaho.....	165 34 15	345 29 55	4.55592

LOGAN TEMPLE, Cache County (Not occupied)

"W. spire on Mormon Temple in city of Logan."

Station mark: None.

Station and signal: Center of spire.

[Latitude $41^{\circ}44'02.6''$; longitude $111^{\circ}49'38.7''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Wellsville.....	57 08 59	237 01 35	4. 26448
Bergeson.....			4. 50770

NAOMI, Cache County

"On highest point of rocky limestone mountain (occupied by the Wheeler Survey) locally known as Naomi Peak. At head of Smithfield and Tony Grove Canyons, about 9 mi. NE. from town of Smithfield. This sta. overlooks Cache Valley. Best route to peak is up Tony Grove Creek (by trail from Tony Grove ranger sta.) to within 1.5 mi. of its head, thence S. into saddle and follow ridge to sta. Can take animals to within half a mi. of sta." A peak of Bear River Range, in Cache National Forest. Elev. 9,980 ft.

Station mark: Standard tablet cemented in limestone rock.

Reference marks: Chiseled crosses in limestone rock at distances and in azimuths from sta. mark as follows—(1) 17.1 ft., $247^{\circ}50'$; (2) 18.2 ft., $353^{\circ}44'$.

Signal: Bushy-top pine tree set in cairn directly over sta. mark. (Cairn was built by Wheeler Survey.)

[Latitude $41^{\circ}54'41.28''$; longitude $111^{\circ}40'28.52''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Logan Peak.....	9 06 08	189 04 26	4. 347523
Wellsville.....	43 34 00	223 20 29	4. 611586
Newton.....	86 19 39	266 08 12	4. 37652
Clarkston.....	92 19 56	272 01 50	4. 57451
Bergeson.....	108 51 55	288 38 53	4. 454169
Cache Junction Elevator.....			4. 45571
Narrows.....			4. 50172
Wellsville Tabernacle.....			4. 57057
Section Twenty-one.....			4. 54540
Section One.....			4. 45028
Section Six.....			4. 43328

NARROWS, Cache County (Not occupied)

"Summit of a rocky hill on N. side of Bear River at Cache Junction Narrows, about 5 mi. NW. of Cache Junction." Elev. about 5,500 ft.

Station mark: None.

Station and signal: Highest point of hill.

Latitude $41^{\circ}50'31.3''$; longitude $112^{\circ}02'44.2''$.

NEWTON, Cache County (Not occupied)

"On bare summit of Newton Hill, about 2 mi. NE. from town of Newton and 2 mi. SW. from town of Trenton." T. 13 N., R. 1 W., sec. 4. Elev. about 5,700 ft.

Station mark: None.

Station and signal: 12-ft. tripod, built of 2- by 4-in. lumber, with targets.

[Latitude 41°53'50.6"; longitude 111°57'38.7"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Wellsville.....	8 46 09	188 44 05	4.45406
Bergeson.....			4.04870

RED SPOT, Rich County

"On rather high flat-topped ridge at source of Old Canyon Creek, a stream flowing into Bear River. It is about 12 mi. a little S. of W. of Randolph. The sta. can be reached by rd. up Old Canyon 7 or 8 mi., thence on horseback up the ridge. The ridge is covered with quaking-aspen trees, which make passing difficult. The point can also be reached by the Logan rd., or, from the N., by way of the Twin Peaks, on horseback." (Shown on U. S. F. S. map of Cache National Forest as on Red Spur.) The ridge in this locality forms the boundary line between Rich and Cache Counties. T. 10 N., R. 5 E., sec. 5. Elev. 8,885 ft.

Station mark: Tablet set in rock.

Signal: Cairn 6 ft. high, centered over sta. mark, tree in center.

[Latitude 41°37'54.47"; longitude 111°24'40.46"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Sharp.....	51 54 03	231 41 29	4.52561
Wellsville.....	91 46 40	271 42 42	4.700214
Logan Peak.....	109 44 13	289 32 01	4.431782
Naomi.....	144 54 21	324 43 49	4.579834
Swan Creek.....	173 27 02	353 24 54	4.590574

SECTION ONE, Cache County (Three-point station)

T. 11 N., R. 1 W., at N. cor. secs. 1 and 2.

Station mark: Section corner stone, an unmarked stone in place.

No check on this position.

[Latitude 41°43'43.8"; longitude 111°54'37.4"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Wellsville.....	42 15 42	222 11 37	4.10345

SECTION SIX, Cache County (Three-point station)

On Salt Lake meridian, at cor. Tps. 11 and 12, Rs. 1 E. and 1 W.

Station mark: Township corner stone, an unmarked stone in place.

No check on this position.

[Latitude 41°43'43.8"; longitude 111°53'28.4"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Wellsville.....	47 10 20	227 05 29	4.14027

SECTION THIRTEEN, Cache County (Three-point station)

On Salt Lake meridian, at crossroads at cor. secs. 13, 18, 19, and 24, T. 14 N., Rs. 1 E. and 1 W.

Station mark: None.

Station: Center of crossroads.

[Latitude $41^{\circ}56'48.1''$; longitude $111^{\circ}53'39.8''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Wellsville.....	16 22 20	196 17 36	4.54413
Bergeson.....			4.00733

SECTION TWENTY-ONE, Cache County (Three-point station)

T. 11 N., R. 1 W., at cor. secs. 21, 22, 27, and 28. No stone in place.

Station mark: None.

Station: Section corner.

No check on this position.

[Latitude $41^{\circ}40'14.9''$; longitude $111^{\circ}56'54.1''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Wellsville.....	61 13 44	241 11 10	3.78718

SHARP, Cache County (Not occupied)

"Sharp, timbered W. summit of mountain off S. edge Logan quadrangle." About 16 mi. in air line SE. of Brigham and 13 mi. N. of Huntsville. T. 8 N., R. 2 E., sec. 9.

Station mark: None.

Station and signal: Sharp summit.

Latitude $41^{\circ}26'42.0''$; longitude $111^{\circ}43'37.6''$.

SWAN CREEK, Rich County

"On highest point of timbered mountain at source of Swan Creek and just above Garden City [which is] on Bear Lake. There are higher mountains W. of this point." About 4.5 mi. in air line NW. of Garden City. T. 14 N., R. 4 E., near line between secs. 2 and 11. Elev. 9,114 ft.

Station mark: None.

Station and signal: Tree trimmed up.

Reference mark: Tablet set in rock 0.7 meter SSE. from sta.

[Latitude $41^{\circ}58'48.85''$; longitude $111^{\circ}27'53.46''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Logan Peak.....	35 20 06	215 10 01	4.559541
Naomi.....	66 21 36	246 13 11	4.278654
Sharp.....			4.80160

TIT, on Cache-Weber county line (Not occupied)

"The timbered W. summit [peak] of a mountain group known in the vicinity of Logan as the Eastern Range." (Shown on U. S. F. S. map of Cache National Forest as James Peak.) About 14 mi. in air line SE. of Brigham and 6.5 mi. N. of Eden. T. 8 N., R. 1 E., sec. 36.

Station mark: None.

Station and signal: Highest point on peak.

[Latitude $41^{\circ}23'29.3''$; longitude $111^{\circ}47'30.6''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Wellsville.....	146 45 51	326 37 03	4.52618
Bergeson.....			4.83950

WELLSVILLE, on Cache-Box Elder county line

"On bare cone (N. summit) of Wellsville Mountains, about 5 mi. W. from town of Wellsville. First summit N. from saddle at head of Brushy Canyon. This sta. can easily be reached by going up Red Point Ridge from the town of Wellsville (this ridge separates Pine and Brushy Canyons) to within 1,000 ft. of the summit. The trail then leads into Brushy Canyon and up the canyon to the saddle, thence N. to sta. Small but excellent springs at head of Brushy. Can take animals to sta." T. 11 N., R. 2 W., sec. 36. Elev. about 9,355 ft.

Station mark: Standard tablet cemented in limestone rock.

Reference marks: Chiseled crosses in limestone rock at distances and in azimuths from sta. mark as follows—(1) 20.15 ft., $303^{\circ}38'$; (2) 109.0 ft., $32^{\circ}51'$.

Signal: 6-ft. cairn centered over sta. mark.

[Latitude $41^{\circ}38'39.24''$; longitude $112^{\circ}00'46.17''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Narrows.....	172 55 52	352 54 33	4.34512
Smart Mountain, Idaho.....	200 04 14	20 11 45	4.65606

WELLSVILLE TABERNACLE, Cache County (Not occupied)

"Spire on Mormon Tabernacle in town of Wellsville."

Station mark: None.

Station and signal: Center of spire.

[Latitude $41^{\circ}38'14.6''$; longitude $111^{\circ}55'54.3''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Wellsville.....	96 28 28	276 25 14	3.83233

UINTAH COUNTY, 1913

OSCAR JONES, chief of party

This project of triangulation was extended southward from stations Little Mountain and Marsh Peak, established by H. L. Baldwin, Jr., in 1898. (See fig. 8.) C. N. Mortenson in 1934 (Duchesne quad-

range project) tied to stations Cone and Roosevelt of this net, and the Coast and Geodetic Survey in 1936 tied to station Roosevelt.

The triangulation was originally computed on the old North American datum,²¹ and the results were published in Bulletin 644.²² Readjustment of those results to the North American datum of 1927 depends upon new positions for stations Little Mountain and Marsh Peak, as determined by the readjustment of the results of Baldwin's triangulation (Uinta Forest Reserve project); a new position for station Roosevelt, as determined by the Coast and Geodetic Survey; and a new position for Geological Survey station Cone, as determined by Mortenson from the nearby Coast and Geodetic Survey station Cone.

STATIONS

B. M., Uintah County (Not occupied)

"On a high bluff [on the] S. side of Green River, 6 mi. NE. of Ouray." About 1 mi. W. of Leota ranch, 500 ft. N. of rd. to ranch, and 7 mi. in air line NE. of Ouray. T. 7 S., R. 21 E., SW $\frac{1}{4}$ sec. 30. Elev. 5,071 ft.

Station mark: Tablet in boulder marked "B M 5071 V A."

[Latitude 40°10'35.60"; longitude 109°36'22.57"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Ouray.....	68 46 04	248 39 56	4.161201
Halfway.....	152 47 51	332 44 41	4.302534

CONE, Uintah County

"On a high, very sharp cone-shaped butte 7 mi. W. of Ouray." Established by U. S. G. S. in 1913. In 1931 the U. S. C. & G. S. also established a sta. on this butte and gave it the same name. In 1934, C. N. Mortenson, of the U. S. G. S., occupied the U. S. C. & G. S. sta. and found the older U. S. G. S. sta. 2.2 ft. distant in azimuth 337°00'. Mortenson's records are added to those relating to the U. S. C. & G. S. sta., as that was the one he occupied. T. 4 S., R. 1 E., in SW $\frac{1}{4}$ sec. 25. Elev. 5,326 ft.

Station mark: 1-in. drill hole in flat sandstone boulder.

Reference mark: U. S. C. & G. S. standard disk stamped "Cone 1931" (occupied by C. N. Mortenson of U. S. G. S. in 1934; see detailed description of U. S. C. & G. S. station Cone, p. 51.)

Signal: Cairn over sta. mark.

[Latitude 40°06'04.811"; longitude 109°50'12.670"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Randlett.....	194 20 51	14 22 37	4.193773
Halfway.....	201 41 02	21 45 47	4.450225
Vernal.....	218 30 19	38 41 32	4.596426
Ouray.....	243 16 25	63 19 12	3.837460
White.....	270 43 52	90 52 50	4.296664
Nipple.....	282 10 35	102 20 53	4.367490

²¹ See footnote 3, p. 4.

²² Triangulation and primary traverse, 1913-1915; R. B. Marshall, chief geographer: U. S. Geol. Survey Bull. 644, pp. 107-111, 1916.

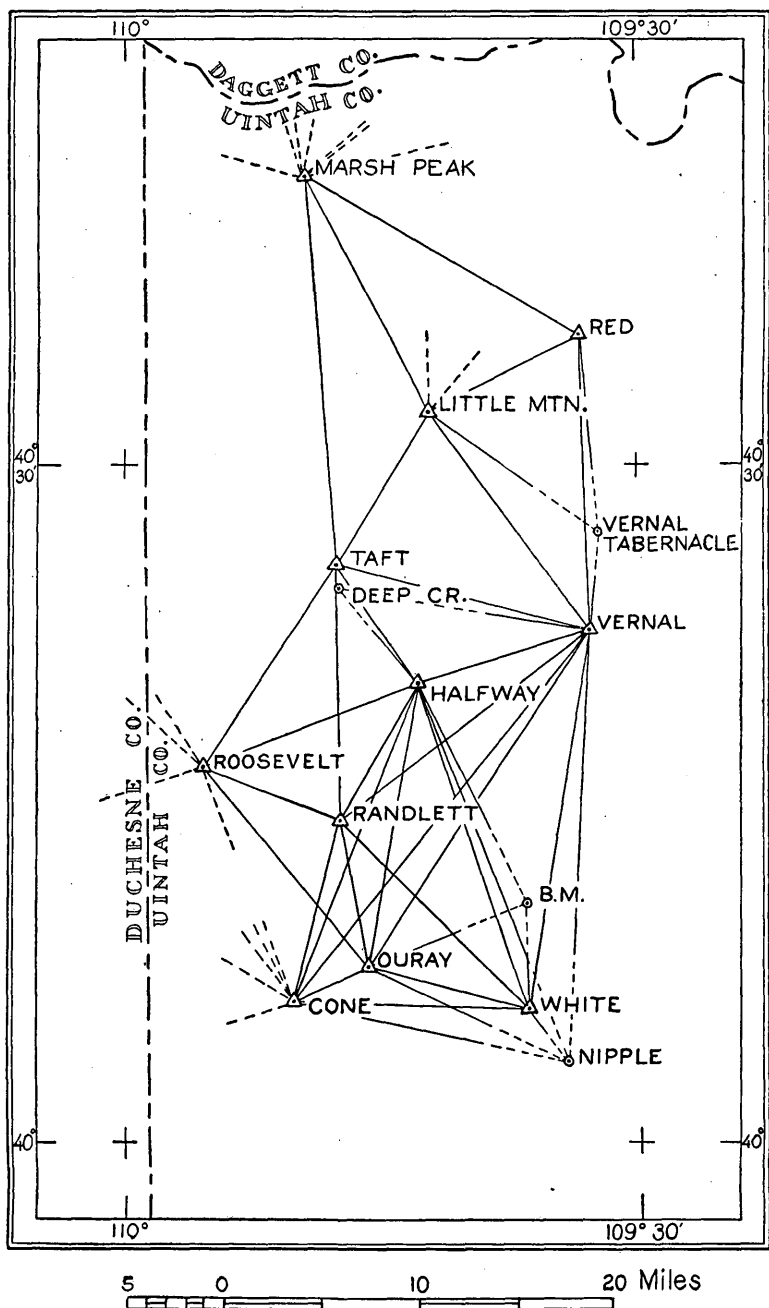


FIGURE 8.—Triangulation in Uintah County, 1913.

CONE (U. S. C. & G. S.), Uintah County

On cone-shaped butte at SE. end of Leland ranch, about 9 mi. S. by W. of Randlett and 7 mi. W. by N. of Ouray. Knoll on which sta. is located is quite small on top and is being rapidly eroded. To reach from SW. corner of Fort Duchesne, go S. on graded dirt rd. 5.8 mi. to bridge over Uinta River, then continue S. 0.2 mi. to fork; turn SE. onto track rd. and go 0.6 mi.; take right fork and go 0.05 mi.; take right fork up hill and go 1.4 mi. to fork; take either fork and continue in southerly direction 0.8 mi. to forks; take middle fork and keep to main track rd. S. and SW. 1.0 mi.; take left fork and go S. and E. on main track rd. 3.95 mi.; take left fork to top of mesa and continue along top of mesa to saddle (total of 1 mi.) to end of truck travel; from here pack easterly 5 minutes down into saddle and then to top of cone and sta. Established in 1931 by U. S. C. & G. S. at point 2.2 ft. from U. S. G. S. sta. mark in azimuth 157°. Recovered by U. S. G. S. (C. N. Mortenson) in 1934, when a tie between the two stations was made. At that time Mortenson reported that the butte was scarcely large enough on top for the observing tent. Recovered by U. S. C. & G. S. in 1936. T. 4 S., R. 1 E., SW¼ sec. 25. Elev. 5,326 ft.

Station mark: U. S. C. & G. S. standard disk stamped "Cone 1931" set in concrete.

Reference mark 1 (1931): U. S. C. & G. S. reference disk set in cement in top of 4-in. galvanized-iron pipe on highest knoll W. of sta., about 0.25 mi. from sta. mark in azimuth 106°28'53". This reference mark was used as the azimuth mark in 1936, when the pipe projected 2 in. above ground.

Reference mark 2 (1931): U. S. C. & G. S. reference disk set in cement in top of 4-in. galvanized-iron pipe on same butte as sta., 16.64 ft. from sta. mark in azimuth 152°02'. In 1936 the pipe projected 2 inches.

Reference mark 1 (1936): U. S. C. & G. S. reference disk set in tile pipe projecting 4 in. above ground, 18.41 ft. from sta. mark in azimuth 37°57'. Distance between reference marks 2 (1931) and 1 (1936) is 29.18 ft.

[Latitude 40°06'04.831"; longitude 109°50'12.679"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
Pariette.....	71	32	10	251	25	15	4.206948
Flat Top.....	120	36	48	300	26	27	4.422600
G. L. O. 2 (U. S. C. & G. S.).....	143	57	33.9	323	45	18.0	4.659071
Neola.....	152	12	11	332	01	59	4.679613
Roosevelt (U. S. C. & G. S.).....	157	57	55.27	337	54	20.48	4.321417
Little No. 2.....	193	14	02	13	19	03	4.679713
Little (U. S. C. & G. S.).....	193	30	56.44	13	36	04.29	4.6805895

DEEP CREEK, Uintah County (Not occupied)

"On SW. end of high ridge 1 mi. NE. of Taft post office, one-fourth mile W. of Deep Creek." On SE. end of high ridge, 1.5 mi. in air line NE. of Taft (abandoned post office). T. 1 S., R. 2 E., E½ sec. 8. Elev. 5,951 ft.

Station mark: Large cairn.

Latitude 40°24'42.10"; longitude 109°47'17.51".

ALFWAY, Uintah County

"On a table-top butte 14 mi. SW. of Vernal, 2 mi. NW. of crossing of Vernal and Fort Duchesne wagon rd. with Halfway Hollow." About 1.2 mi. in air line due W. of Halfway Hollow and 12.5 mi. SW. of Vernal. T. 5 S., R. 20 E., SE¼ sec. 31. Elev. 5,543 ft.

Station mark: Tablet in boulder.

Signal and reference mark: Cairn 3.5 ft. from sta. mark in azimuth 67°11'.

[Latitude 40°20'14.12"; longitude 109°42'51.27"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Ouray.....	10	33	41	190	31	43	4.371105
Cone.....	21	45	47	201	41	02	4.450225
Randlett.....	30	41	17	210	38	18	4.109198
Roosevelt.....	69	45	16	249	36	56	4.289967
Deep Creek.....	142	47	36	322	44	43	4.016250
Taft.....	146	23	15	326	20	02	4.103169

LITTLE MOUNTAIN, Uintah County

"On mountain shown on Hayden map as Obelisk Plateau, locally known as Little Mountain, and near highest point." (Shown on map of Marsh Peak quadrangle as on Little Mountain.) T. 3 S., R. 20 E., sec. 20. Elev. 8,622 ft.

Station mark: Copper bolt, in chiseled triangle, cemented in sandstone and marked "U S G S."

Reference mark: Post, supported by cairn, marking point of Fort Thornburg Military Reservation. It is on the highest point of the mountain, 9.55 ft. from sta. mark in azimuth 30°26'.

[Latitude 40°32'17.63"; longitude 109°41'55.25"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Taft.....	35	21	31	215	17	41	4.158742
Marsh Peak.....	150	21	37	330	16	34	4.344076

MARSH PEAK, Uintah County

"On peak of same name on eastern end of that portion of the Uinta Range which rises above timber line." Near heads of N. and E. branches of Dry Fork, which flows into Ashley Creek, about 4 mi. in air line W. of Red Cloud ranger sta. T. 1 S., R. 19 E., near cor. secs. 19, 20, 29, and 30. Elev. 12,219 ft.

Station mark: Aluminum tablet cemented in large flat rock.

Reference mark: Large cairn 15.75 ft. from sta. mark in azimuth 276°53'.

Signal: Cairn built around and over sta. mark.

Latitude 40°42'39.64"; longitude 109°49'40.53".

NIPPLE, Uintah County (Not occupied)

"A very sharp cone (cannot be occupied) 6 mi. E. of Ouray, 1 mi. S. of White River. Well known as 'Mollie's [Mollys] Nipple.' " About 6.5 mi. in air line SE. of Sheppard ranch, 6 mi. SE. of Ouray, and 0.5 mi. S. of White River. T. 9 S., R. 21 E., NE¼ sec. 8. Elev. 4,914 ft.

Station mark: None.

Station and signal: Summit of cone.

[Latitude 40°03'24.31"; longitude 109°34'11.42"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Cone.....	102	20	53	282	10	35	4.367490
Ouray.....	115	52	28	295	44	56	4.266396
White.....	147	33	08	327	31	47	3.743241
Halfway.....	158	30	13	338	24	37	4.524853

OURAY, Uintah County

"On E. edge of a flat mesa 4 mi. NW. of Ouray, 1 mi. W. of Duchesne River." About 7.5 mi. in air line SSE. of Randlett, 5.5 mi. NW. of Ouray, and 2 mi. W. of Duchesne River. T. 4 S., R. 2 E., in SE¼ sec. 16. Elev. 5,150 ft.

Station mark: Tablet in boulder.

Signal: Cairn built over sta. mark.

[Latitude 40°07'45.02"; longitude 109°45'53.21"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Cone.....	63 19 12	243 16 25	3.837460
Roosevelt.....	139 26 17	319 19 55	4.332851
Randlett.....	169 21 51	349 20 50	4.088320

RANDLETT, Uintah County

"On a very sharp rocky butte one-half mi. E. of Randlett." T. 3 S., R. 2 E., sec. 8. Elev. 5,350 ft.

Station mark: Tablet in large boulder.

Signal and reference mark: Small cairn on top of large boulder, which is highest point of butte, 15.80 ft. from sta. mark in azimuth 13°48'.

[Latitude 40°14'15.51"; longitude 109°47'28.89"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Cone.....	14 22 37	194 20 51	4.193773
Roosevelt.....	110 07 51	290 02 30	4.096804
Taft.....	178 44 16	358 44 03	4.334934

RED, Uintah County

"On summit of Red Mountain, 10 mi. N. of Vernal. Good view in all directions; wagon rd. from Vernal to within one-fourth mi. of sta." About 6.5 mi. in air line ENE. of town of Dry Fork and 2.25 mi. due W. of U. S. Highway 44. On boundary line between T. 3 S., R. 21 E., sec. 3 and T. 2 S., R. 21 E., sec. 34. Elev. 7,776 ft.

Station mark: Tablet in solid rock.

Signal and reference mark: Quadripod with targets 2.5 ft. from sta. mark in azimuth 197°41'.

[Latitude 40°35'38.82"; longitude 109°33'14.32"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Little Mountain.....	63 11 20	243 05 41	4.137862
Marsh Peak.....	119 20 54	299 10 11	4.424193

ROOSEVELT, Uintah County

On south-central rim of largest and easternmost of three small buttes, 3.75 mi. in air line SE. of Roosevelt, 4 mi. SW. of Fort Duchesne, and 1.75 mi. S. of main Roosevelt-Fort Duchesne rd. The ridge is 19 by 150 yd. in size, is flat-topped and bare, and drops off abruptly on all sides. To reach from Roosevelt, go N. on main street to point where U. S. Highway 40 turns E.; follow highway 0.8 mi. E., then turn S. onto graded rd. and go 2.0 mi.; turn E. here on side rd. and go

1.05 mi. to ranch buildings on right and stone garage built in hillside on left; continue straight ahead on main-traveled rd. 1.25 mi. to point where rd. skirts N. end of butte and end of truck travel. From here pack northerly 10 minutes up over rim rock to sta. Established in 1913 and reoccupied in 1934 by U. S. G. S. In 1936 U. S. C. & G. S. recovered this sta. and set two reference marks and an azimuth mark. T. 2 S., R. 1 E., SW $\frac{1}{4}$ sec. 30. Elev. 5,298 ft.

Station mark: Standard tablet in solid rock, set flush with surface, at point 6 ft. NNW. of S. edge of ridge and 51 ft. SSE. of N. edge of ridge.

Reference mark 1: U. S. C. & G. S. reference disk in drill hole in boulder, 44.5 ft. from sta. mark in azimuth 170°18'28".

Reference mark 2: U. S. C. & G. S. reference disk in drill hole in outcropping bedrock 29.48 ft. from sta. mark in azimuth 76°39'02".

Azimuth mark: U. S. C. & G. S. reference disk in drill hole in outcropping bedrock on rocky ridge, about 0.8 mi. from sta. mark in azimuth 325°22'16", 200 ft. W. of point of ridge and 50 ft. S. of base of ridge.

Signal: Cairn built over sta. mark.

Latitude 40°16'34.657"; longitude 109°55'45.540".

TAFT, Uintah County

"On a long bare ridge running NE. [N.-S.] 0.5 mi. W. of Deep Creek, 2 mi. N. of Taft post office." About 2 mi. in air line NE. of Central Liberty School, 3.25 mi. SE. of North Liberty School, and 3 mi. N. of Taft (abandoned post office). T. 1 S., R. 2 E., N $\frac{1}{2}$ sec. 5. Elev. 6,080 ft.

Station mark: Tablet in boulder.

Signal: Quadripod with targets, 3.8 ft. from sta. mark in azimuth 83°35'.

[Latitude 40°25'56.41"; longitude 109°47'49.10"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Roosevelt.....	33 01 19	212 56 10	4. 315022
Marsh Peak.....	175 10 07	355 08 55	4. 492242

VERNAL, Uintah County

"On a range of bare hills 5 mi. S. of Vernal, Vernal and Fort Duchesne wagon rd. crosses ridge 1 mi. W. of sta." On high peak of Asphalt Ridge, which runs NW.-SE., about 3 mi. in air line E. of Lincoln Highway (U. S. Highway 40) and 1.5 mi. SE. of point where Vernal-Fort Duchesne wagon rd. crosses ridge. T. 5 S., R. 21 E., sec. 15. Elev. 6,343 ft.

Station mark: Tablet in boulder.

Signal and reference mark: Large cairn 5 ft. distant from sta. mark in azimuth 304°02'.

[Latitude 40°22'45.29"; longitude 109°32'50.57"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Nipple.....	3 03 47	183 02 55	4. 554607
White.....	8 55 04	188 52 51	4. 498538
Ouray.....	33 44 15	213 35 49	4. 523276
Cone.....	38 41 32	218 30 19	4. 596426
Randlett.....	52 54 47	232 45 19	4. 415423
Halfway.....	71 50 42	251 43 13	4. 173814
Deep Creek.....	100 04 19	279 54 57	4. 317238
Taft.....	105 37 46	285 28 04	4. 342266
Little Mountain.....	144 02 01	323 56 08	4. 338966
Red.....	178 39 33	358 39 17	4. 377783

VERNAL TABERNACLE, Uintah County (Not occupied)

"Spire of Mormon Tabernacle at Vernal."

Station mark: None.

Station and signal: Center of spire.

[Latitude 40°27'11.45"; longitude 109°32'12.39"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Vernal.....	6 15 39	186 15 13	3.916910
Little Mountain.....	124 35 02	304 28 43	4.221699
Red.....	174 40 57	354 40 16	4.196403

WHITE, Uintah County

"On the E. end of a high ridge 5 mi. E. of Ouray, 1 mi. N. of White River; wagon rd. from Watson to Ouray passes one-half mi. S. of sta." About 4 mi. in air line E. of Ouray, 3 mi. SSE. of Sheppard ranch, 2 mi. N. of White River, and 1.5 mi. N. of Watson-Ouray rd. T. 8 S., R. 21 E., NE¼ sec. 30. Elev. 4,945 ft.

Station mark: Tablet in boulder.

Signal: Cairn built over sta. mark.

[Latitude 40°05'55.78"; longitude 109°36'16.83"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Cone.....	90 52 50	270 43 52	4.296664
Ouray.....	103 55 02	283 48 51	4.147958
Randlett.....	134 09 54	314 02 41	4.345309
Halfway.....	160 37 42	340 33 28	4.448229
B. M.....	179 05 53	359 05 49	3.936090

EASTERN UTAH, 1914**C. F. URQUHART, chief of party**

The net of triangulation of which this project is a part lies mostly in western Colorado. (See fig. 9.) Only the three stations that are in Utah are described in this bulletin. The survey was started from or tied to the following United States Coast and Geodetic Survey stations: Tavaputs, Chiquita, Mesa, Mams Peak, and Uncompahgre, in Colorado, and Mount Waas and Mount Peale, in Utah. A project conducted by T. W. Ranta and V. J. Larsen in 1934 (Southeastern Utah project) ties to stations Mount Peale and Mount Waas of this net.

The triangulation was originally computed on the old North American datum,²³ and the results were published in Bulletin 644.²⁴ Readjustment of those results to the North American datum of 1927 depends upon new positions for the seven stations mentioned.

²³ See footnote 3, p. 4.

²⁴ Triangulation and primary traverse, 1913-1915; R. B. Marshall, chief geographer: U. S. Geol. Survey Bull. 644, pp. 104-137, 1916.

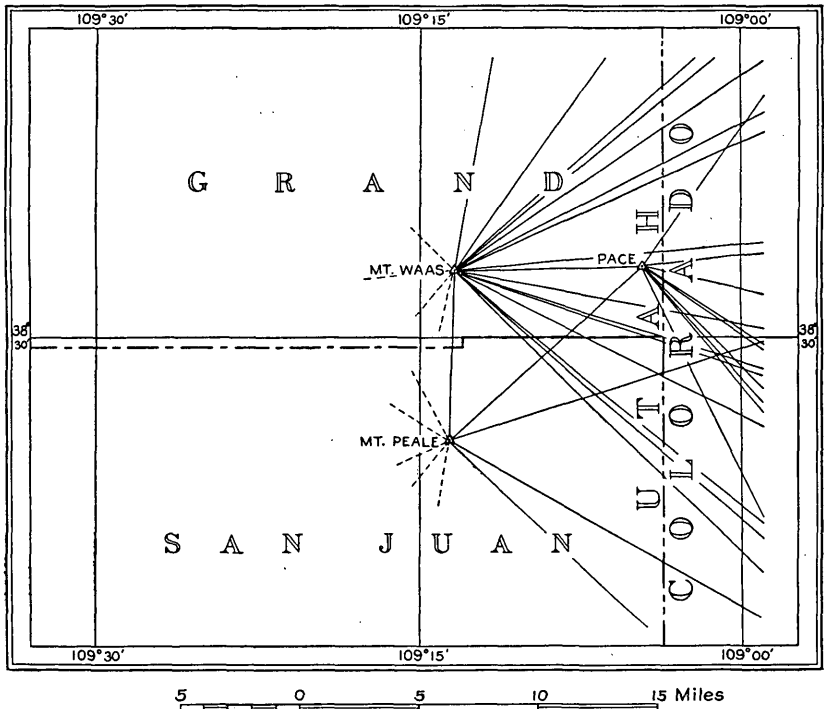


FIGURE 9.—Triangulation in eastern Utah, 1914.

STATIONS

MOUNT PEALE, San Juan County

On highest point of Mount Peale, which is the highest peak in the La Sal Mountains. In La Sal National Forest, about 20 mi. in air line SE. of Moab, 9 mi. NNE. of La Sal, and 7 mi. NW. of La Sal ranger sta. To reach from La Sal, take rd. leading to Paradox (Colo.) for distance of 4 mi., then go N. and NW. on wagon rd. to cowboy cabin of La Sal Livestock Co., then go northwesterly three and three-fourths hours on foot through timber and slide rock to sta.. Originally intersected by U. S. C. & G. S. in 1893. U. S. G. S. intersected cairn on highest point in 1914 and in 1934 established sta. mark and reference marks. T. 27 S., R. 24 E., sec. 24.

Station mark: Standard tablet cemented in boulder and stamped "Mt Peale 1934."

Reference marks: Copper nails and washers cemented in boulders at following distances and azimuths from sta. mark—(1) 14.22 ft., $68^{\circ}15'$; (2) 24.13 ft., $157^{\circ}31'$.

Signal: Cairn centered over sta. mark.

[Latitude $38^{\circ}26'18.493''$; longitude $109^{\circ}13'42.657''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Montpelier, Colo.	253 00 00	73 21 44	4.724443
Coke, Colo.	299 34 28	119 55 10	4.748473
Gypsum, Colo.	312 54 31	133 09 14	4.675237

MOUNT WAAS, Grand County

On highest point of Mount Waas, the third prominent peak from N. end of La Sal Mountains. In La Sal National Forest, about 20 mi. in air line E. of Moab, 6 mi. SE. of Castleton, and 5.5 mi. NE. of Mesa ranger sta. To reach from Castleton, go E. on main-traveled rd. up mountain 8.9 mi. to log cabin on E. side of rd., continue past cabin 1.8 mi., turn right and cross bridge, follow dim rd. 4 mi. to end of truck travel, go W. up side of mountain to N. of Mount Waas, follow ridge and ascend peak from NW. side to sta. site. Established in 1893 by U. S. C. & G. S. and marked with copper bolt set in rock. Reoccupied by U. S. G. S. in 1914 and again by U. S. C. & G. S. in 1931, when copper bolt was replaced with standard disk. T. 26 S., R. 24 E., sec. 13. Elev. 12,310.7 ft.

Station mark: U. S. C. & G. S. standard disk set in concrete block between bases of three small brick piers used for mounting the instrument.

Reference marks (set at time station was first occupied): Drill holes, probably, at following distances and azimuths from sta. mark—(1) 2.24 meters, $3^{\circ}58'$; (2) 2.29 meters, $104^{\circ}19'$; (3) 2.18 meters, $186^{\circ}37'$; (4) 2.21 meters, $275^{\circ}45'$. Mount Waas astronomic sta. (concrete pier) was 28.213 meters from sta. mark in azimuth 329° . In 1934 a reference mark, described as reference mark 2, was recovered (origin unknown) 28.658 meters from sta. mark in azimuth $342^{\circ}59'$.

Signal: Cairn supporting pole with flag centered over sta. mark.

[Latitude $38^{\circ}32'20.856''$; longitude $109^{\circ}13'37.750''$]

To station—	Azimuth			Back azimuth			Distance	
	°	'	"	°	'	"	Log. meters	Miles
Mount Peale.....	0	36	36.9	180	36	33.8	4.048203	6.944
Tavaputs, Colo.....	189	44	40.30	9	53	03.60	5.0520720	70.054
Pinon, Colo.....	215	20	20	35	38	22	4.856029	44.605
Fir, Colo.....	228	48	19	49	04	14	4.689879	30.425
Mams Peak (N. Mam), Colo.....	231	00	51	51	52	13	5.178755	93.779
Grand, Colo.....	235	50	37	56	27	14	5.008249	63.329
Leon, Colo.....	243	02	28	63	54	30	5.128137	83.462
Mesa, Colo.....	245	56	17.4	66	35	38.1	4.998246	61.888
Montpelier, Colo.....	265	06	36	85	28	18	4.705603	31.547
Tree, Colo.....	280	10	39	100	37	43	4.808233	39.956
Skinout, Colo.....	286	51	12	107	01	45	4.411204	16.018
Uncompahgre, Colo.....	288	01	21.49	109	07	01.77	5.2119820	101.237
Nucla, Colo.....	296	13	58	116	39	22	4.822765	41.316
Coke, Colo.....	308	36	54	128	57	34	4.793936	38.062
Lone Cone, Colo.....	310	01	20	130	37	25	5.048023	69.402
North Mountain, Colo.....	313	42	50	134	13	28	5.001784	62.393

PACE, Grand County

"On the E. end of a timber-covered ridge just above and W. of Sinbad Valley. There is a rough wagon rd. from Paradox [Colo.] to Castleton, passing the Buckeye reservoir, Geyser reservoir, Roberson's summer ranch, and the Taylor ranch. Sta. is 2 or 3 mi. NE. of Taylor's ranch. Mr. Pace has a ranch on Roc Creek about 1 mi. below Taylor's, which is S. of sta. There is another rd. (almost abandoned) passing to N. of sta. from the source of Roc Creek to Sinbad Valley and thence to Gateway [Colo.], on the Dolores River. Animals can be ridden to point from any direction." About 13 mi. NW. of Paradox, Colo., 6.5 mi. N. of Buckeye ranger sta., and 1 mi. W. of Utah-Colorado State line. T. 26 S., R. 26 E., sec. 17.

Station mark: None.

Station and signal: Pine tree about 50 ft. high with lower limbs cut off.

Reference mark: Tablet set in solid rock 10.7 ft. from sta. Azimuth from sta. (tree) to reference mark is $88^{\circ}45'$.

[Latitude 38°32'32.11"; longitude 109°04'35.29"]

To station—	Azimuth			Back azimuth			Distance	
	°	'	"	°	'	"	<i>Log. meters</i>	<i>Miles</i>
Mount Peale.....	49	04	28	228	58	47	4.244765	10.917
Mount Waas.....	88	32	00	268	26	22	4.118659	8.166
Fir, Colo.....	216	43	15	36	53	30	4.599200	24.691
Montpelier, Colo.....	264	02	33	84	18	37	4.575851	23.399
Tree, Colo.....	283	14	49	103	36	15	4.711854	32.004
Nucla, Colo.....	302	41	58	123	01	45	4.741991	34.304
Skinout, Colo.....	304	16	10	124	21	06	4.144328	8.663
Lone Cone, Colo.....	315	00	35	135	31	05	5.009599	63.525
Coke, Colo.....	317	56	15	138	11	19	4.723158	32.848
North Mountain, Colo.....	319	39	19	140	04	21	4.962087	56.942
Gypsum, Colo.....	334	00	58	154	10	02	4.687732	30.275

NORTHERN UTAH, 1915

H. H. HODGESON, chief of party

The net of triangulation that includes this project is almost entirely in Idaho, the Utah portion of it having only one station—Doubletop. For this reason no map of the project appears in this bulletin. The net was expanded from stations Henry and Woodall, which were established by the Geological Survey in 1910 and reoccupied in 1915, in which latter year stations bearing the same names were established nearby by the Coast and Geodetic Survey.

The triangulation was originally computed to refer approximately to the old North American datum,²⁵ using positions for Geological Survey stations Henry and Woodall based on preliminary positions determined by the Coast and Geodetic Survey for its stations of the same names. The results of the original computation were published in Bulletin 644.²⁶ The readjustment of those results to the North American datum of 1927 depends on new positions for Geological Survey stations Caribou, Henry, Paris, Soda, and Woodall. These were based, except for Soda, on new positions for the Coast and Geodetic Survey stations of the same names. A new position for Coast and Geodetic Survey station Oxford was also required.

STATIONS

DOUBLETOP, Cache County (Not occupied)

Top of mountain in Bear River Range, about 8 mi. in air line N.E. of Richmond, between North and South Forks of High Creek. T. 14 N., R. 3 E., in NW¼ sec. 7. Elev. 9,872 ft.

Station mark: None.

Station and signal: Summit of mountain.

[Latitude 41°58'33.3"; longitude 111°39'38.2"]

To station—	Azimuth			Back azimuth			Distance	
	°	'	"	°	'	"	<i>Log. meters</i>	<i>Miles</i>
Smart Mountain, Idaho.....	112	44	26	292	37	50	4.16872	9.164
Clifton, Idaho.....	131	51	06	311	39	27	4.50711	19.676
Oneida, Idaho.....	162	01	29	341	56	22	4.51729	20.448
Paris, Idaho.....	200	11	41	20	16	12	4.42927	16.697

²⁵ See footnote 3, p. 4.

²⁶ Triangulation and primary traverse, 1913-1915, inclusive; R. B. Marshall, chief geographer: U. S. Geol. Survey Bull. 644, p. 177, 1916.

NORTHERN UTAH, 1915

C. F. URQUHART, chief of party

This project of triangulation was developed from United States Coast and Geodetic Survey stations Deseret, Granite, Herriman, Lone Peak Needle, Mount Nebo, Onaqui, Salt Creek, Scipio, Spanish Fork

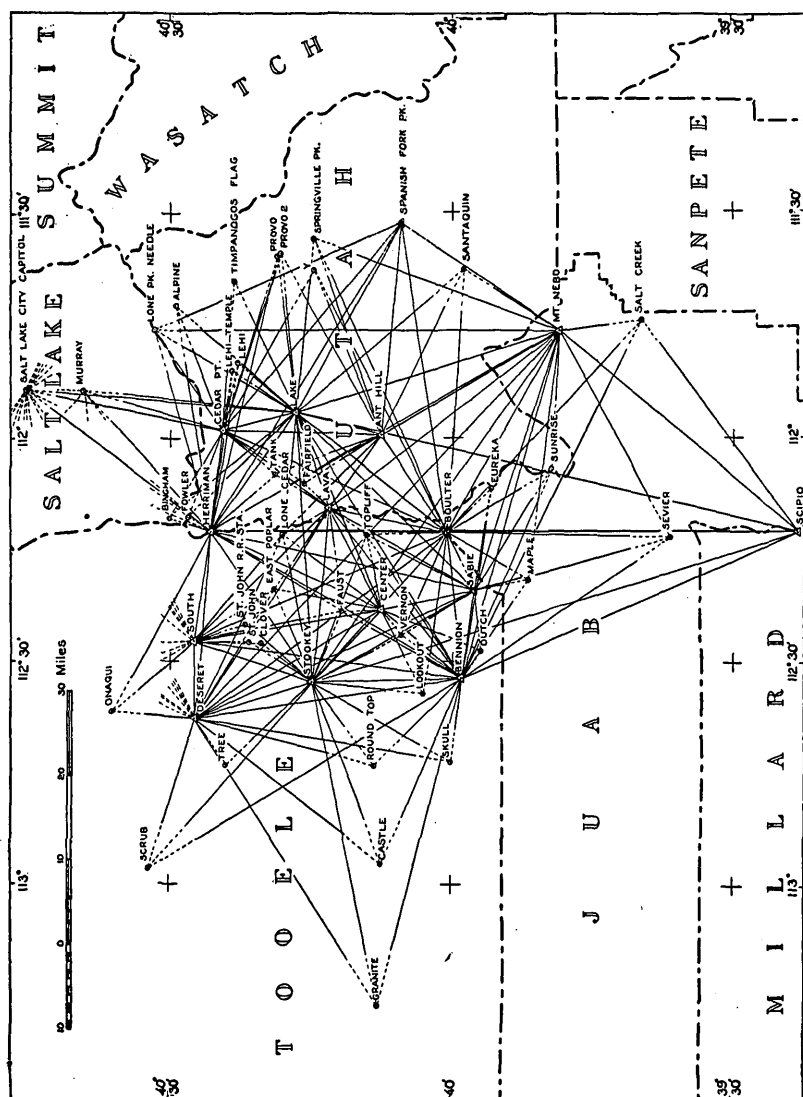


FIGURE 10.—Triangulation in northern Utah, 1915.

Peak, and Springville Peak. (See fig. 10.) Of these, stations Deseret, Herriman, and Mount Nebo were occupied; the others were included by intersection only. Two old stations that had originally been located by the Geological Survey by the three-point method were relocated by this project. They are Mammoth Peak and Bingham, located, re-

spectively, by S. S. Gannett in 1896 and R. U. Goode in 1899. Urquhart changed the name of the former from Mammoth Peak to Eureka, by which name this station has since been identified.

This triangulation was originally computed on the old North American datum²⁷ in accordance with the positions determined on that datum by the Coast and Geodetic Survey for stations Mount Nebo and Deseret, and the results were published in Bulletin 644.²⁸ The readjustment of those results to the North American datum of 1927 depends on new positions for the ten stations of the Coast and Geodetic Survey cited above.

The projects conducted by the Geological Survey that make contact with this triangulation are given in the following table, which includes for each the name of the engineer in charge, the year, and the points of contact between that project and the Urquhart project in northern Utah.

Project	Engineer in charge	Year	Points of contact (stations)
Uinta Forest Reserve---	H. L. Baldwin, Jr..	1897-98	{Deseret Mount Nebo
Tooele County-----	C. F. Urquhart----	1922	{Deseret Herriman South Cedar Point Lake
Salt Lake County-----	C. F. Urquhart----	1922	{Lehi Lehi Temple Murray
Fort Douglas Military Reservation.	A. K. Andrews----	1925	{Salt Lake City Capitol Salt Lake City Capitol

STATIONS

ALPINE, Utah County (Not occupied)

"The highest point of mountain peak about 5 or 6 mi. N. of Alpine. It is about 4 mi. SE. of Lone Peak Needle and not so high, but very prominent." In Wasatch National Forest, about 3 mi. in air line NW. of South Fork ranger sta., and 5.5 mi. NE. of Alpine. T. 4 S., R. 2 E., sec. 11.

Station mark: None.

Station and signal: Highest point of peak.

[Latitude 40°29'24.11"; longitude 111°41'43.79"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Lake-----	42	31	29	222	21	49	4.495800
Cedar Point-----	70	56	20	250	45	13	4.409193
Herriman-----	80	38	31	260	18	58	4.635626

²⁷ See footnote 3, p. 4.

²⁸ Triangulation and primary traverse, 1913-1915, inclusive; R. B. Marshall, chief geographer: U. S. Geol. Survey Bull. 644, pp. 111-129, 1916.

ANT HILL, Utah County

"On a sagebrush hill about 10 mi. SE. of Fairfield and about 15 mi. NNW. from Goshen. . . . Can be easily reached on horseback from any direction." About 12.5 mi. in air line NW. of Goshen, 2 mi. W. of Mosida, a settlement on W. edge of Utah Lake, and 1 mi. S. of Fairfield-Goshen rd. at point where it crosses divide between Cedar and Goshen Valleys.

Station mark: Standard tablet set in solid rock.

Signal: Cairn 7 ft. high and 6 ft. in diam. at base centered over sta. mark.

[Latitude 40°07'54.54"; longitude 111°59'46.03"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Boulder.....	50 12 18	230 04 35	4.346905
Lava.....	126 21 36	306 15 33	4.216896
Lone Cedar.....	136 15 02	316 06 41	4.422875
Fairfield.....	148 42 12	328 38 10	4.231579
Herriman.....	152 19 03	332 11 13	4.566637
Tank.....	162 14 32	342 11 33	4.330944

BENNION, Tooele County

"On the summit of a high rocky peak at the source of Pine Canyon. There are two peaks to the N. of it with about the same elevation. There is no local name for this mountain. It is about 10 mi. in an air line SSW. of Vernon and about 4 mi. SW. of Israel Bennion's ranch. Can be reached on horseback by going up Pine Canyon. There is a spring in Pine Canyon about a mile below signal, but there is very little feed on the mountain. A party may camp at Mr. Bennion's ranch." In Wasatch National Forest. T. 9 S., R. 6 W., sec. 32.

Station mark: None.

Station and signal: Spruce tree supported by small cairn in cleft in solid rock.

Reference mark: Tablet set in top of high rock on N. end of peak, 1.5 ft. from sta. in azimuth 3°.

[Latitude 39°59'04.43"; longitude 112°32'22.57"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Skull.....	98 03 11	277 56 08	4.197405
Granite.....	104 34 51	284 06 30	4.808521
Castle.....	113 49 43	293 33 38	4.589000
Round Top.....	136 12 56	316 05 38	4.367421
Scrub.....	149 28 02	329 11 27	4.853413
Deseret.....	172 08 00	352 04 40	4.726301
Stookey.....	179 28 50	359 28 43	4.467269

BINGHAM, Salt Lake County (Not occupied)

On summit of West Mountain (E. one of two peaks), in Oquirrh Range, 2.5 mi. in air line SW. of town of Bingham Canyon and about 0.25 mi. S. of wagon rd. leading from Bingham Canyon by way of United States mine to Middle Fork (Middle Canyon?) and crossing main divide of Oquirrh Range. Located by three-point method in 1899 and relocated by intersection in 1915. T. 4 S., R. 3 W., near line between secs. 3 and 4.

Station mark and signal: Cairn.

[Latitude 40°30'00.60"; longitude 112°10'30.39"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Herriman.....	13 10 59	193 10 06	3.929276

BOULTER, on Tooele-Juab county line

On W. one "of two high bald peaks about 6 mi. [in air line] E. of Lofgreen, a sta. on the San Pedro, Los Angeles & Salt Lake [Union Pacific] R. R., and about 6 mi. NW. of Eureka. The mountains are locally known as the Boulter Mountains. Can be reached on horseback from any direction, but the mountain is rather rocky. A party may camp at Lofgreen or Eureka."

Station mark: Tablet set in solid rock.

Signal: Cairn 6 ft. high and 6 ft. in diam. at base centered over sta. mark; spruce tree in center of cairn.

[Latitude 40°00'12.65"; longitude 112°11'46.06"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Sciplo.....	0	44	52	180	44	28	4.831400
Sevier.....	2	41	21	182	40	27	4.633634
Maple.....	34	56	15	214	51	27	4.270013
Sabie.....	71	46	26	251	40	51	4.114532
Bennion.....	86	00	29	265	47	14	4.468483
Lookout.....	99	38	25	279	23	43	4.518003
Vernon.....	116	41	18	296	32	09	4.354432
Stookey.....	132	46	11	312	32	47	4.603932
Deseret.....	144	19	19	324	02	41	4.795522
South.....	156	55	56	336	45	57	4.746448
Topliff.....	175	18	47	355	18	09	4.230489
Herriman.....	179	48	42	359	48	38	4.670931

CASTLE, Tooele County (Not occupied)

"On low but very prominent mountain in Skull Valley. All the country nearby is desert." About 16 mi. WNW. of Indian Springs.

Station mark: None.

Station and signal: Highest point of mountain.

Latitude 40°07'30.17"; longitude 112°57'22.13".

CEDAR POINT, Utah County

On point of low bare ridge, about 7 mi. in air line WNW. of Lehi and 9 mi. NE. of Cedar Valley, 2 mi. from junction of Cedar Valley-Lehi and Riverton-Lehi rds. Can be easily reached on horseback from any direction. Established in 1915 and reoccupied in 1922. T. 5 S., R. 1 W., sec. 5.

Station mark: Standard tablet set in solid rock.

Signal: Cairn 5 ft. high and 5 ft. in diam. at base centered over sta. mark.

[Latitude 40°24'51.20"; longitude 111°58'52.31"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Ant Hill.....	2	19	22	182	18	47	4.496699
Boulter.....	21	55	56	201	47	36	4.691416
Fairfield.....	31	05	06	211	00	29	4.292421
Lava.....	33	57	47	213	51	09	4.415417
Tank.....	35	28	20	215	24	45	4.128624
Herriman.....	94	01	09	273	52	43	4.265740
Fowler.....	109	17	27	289	10	07	4.228981
Bingham.....	120	11	08	300	03	35	4.279125

CENTER, Tooele County

"On a bald hill about 4 mi. NE. of Vernon and about 5 mi. S. of Faust, a sta. on San Pedro, Los Angeles & Salt Lake [Union Pacific] R. R. Can be easily reached on horseback from any direction. A party may camp at Vernon or at a ranch near Faust."

Station mark: Standard tablet.

Signal: Cairn 7 ft. high and 6 ft. in diam. at base centered over sta. mark.

[Latitude 40°07'38.26"; longitude 112°22'50.36"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Dutch.....	23	53	56	203	50	07	4.320091
Bennion.....	40	36	26	220	30	18	4.319287
Vernon.....	51	04	15	231	02	14	3.759477
Lookout.....	63	42	31	243	34	56	4.271437
Stookey.....	134	22	20	314	16	04	4.285363
Deseret.....	150	38	32	330	29	02	4.627004
South.....	170	37	03	350	34	13	4.580383
Faust.....	174	26	23	354	26	04	3.858272

CLOVER, Tooele County (Not occupied)

"Cupola on church at Clover, a post office in Rush Valley."

Station mark: None.

Station and signal: Center of cupola.

No check on this position.

[Latitude 40°20'21.29"; longitude 112°27'37.70"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Stookey.....	34	50	37	214	47	25	4.088117

DESERET, Tooele County

On summit of highest peak of Stansbury Mountains, in Wasatch National Forest, about 13 mi. in air line SW. of Grantsville, 11.5 mi. NW. of St. John, and 4 mi. SW. of South Willow ranger sta. The best camping place on the E. side of the mountain is at Wrathall's ranch, on Box Elder Creek. To reach the sta., go from this ranch over low divide to South Willow Creek, thence up the creek to foot of peak, and thence on foot to summit. Established by U. S. C. & G. S. in 1892; reoccupied by U. S. G. S. in 1897-98, 1915, and 1922. T. 4 S., R. 7 W., sec. 22. Elev. (U. S. C. & G. S.) 11,031 ft.

Station mark: Copper bolt in solid rock between bases of three small piers used for mounting instrument.

Reference marks: Three, at distances and in azimuths from sta. mark as follows—

(1) 3.10 meters, 322°53'; (2) 2.18 meters, 88°08'; (3) 2.62 meters, 198°38'. Deseret latitude sta., marked by stone-and-brick pier, is 10.85 meters from sta. mark in azimuth 27°42'.

Signal: Cairn 9 ft. high and 10 ft. in diam. at base built over sta. mark.

[Latitude 40°27'34.448"; longitude 112°37'31.880"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Skull.....	9	17	00	189	13	15	4.709426
Round Top.....	13	45	53	193	41	52	4.568127
Castle.....	37	13	39	217	00	49	4.668239
Tree.....	53	29	14	233	25	18	4.028614
Granite.....	56	20	04.1	235	55	03.1	4.819697
Scrub.....	106	41	17	286	27	58	4.480632

DUTCH, Tooele County (Not occupied)

"Highest point of prominent mountain locally known as Dutch Peak, about 10 mi. a little W. of S. from Vernon." In Wasatch National Forest, 5.5 mi. W. of Little Valley ranger sta. T. 10 S., R. 6 W., sec. 14.

Station mark: None.

Station and signal: Highest point of mountain.

[Latitude 39°57'18.65"; longitude 112°28'47.03"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Bennion.....	122 33 02	302 30 44	3.782964

EAST POPLAR, Tooele County (Not occupied)

"The eastern one of two very prominent trees on Bates Creek, about a mile below Bates ranch. The road from Fairfield to Stockton passes on the E. side of point and by the Bates ranch. This is the only ranch between Fairfield and Stockton." About 9 mi. in air line S. of Stockton and 6 mi. SW. of Ophir. T. 6 S., R. 4 W., sec. 7.

Station mark: None.

Station and signal: Tree.

[Latitude 40°18'56.75"; longitude 112°20'15.06"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Center.....	9 57 57	189 56 17	4.327293
Stookey.....	66 57 06	246 49 09	4.278178
Deseret.....	123 14 12	303 03 00	4.465480
South.....	149 18 57	329 14 26	4.286142

EUREKA, Juab County (Not occupied)

On summit of Mammoth Peak, the highest point in Tintic mining region, 1.8 mi. in air line SE. of town of Eureka and 0.5 mi. E. of Mammoth mine. Located by three-point method in 1896 and given the name Mammoth Peak. Relocated by intersection in 1915, when name was changed to Eureka. This sta. should not be confused with the sta. known as Eureka Peak, about 1 mi. in air line to the NW., which was also located by the three-point method in 1896 and which has not been relocated. (See p. 161.) Elev. 8,104 ft.

Station mark and signal: Cairn on summit.

[Latitude 39°55'54.37"; longitude 112°06'10.33"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Bennion.....	99 04 02	278 47 13	4.577210
Sabie.....	100 53 22	280 44 12	4.316076
Boulter.....	135 01 25	314 57 49	4.051795

FAIRFIELD, Utah County (Not occupied)

"Smokestack on an old mill on W. side of village of Fairfield, about 10 mi. SE. [14.8 mi. in air line SW.] of Lehi." T. 6 S., R. 2 W., near SW. cor. sec. 29.

Station mark: None.

Station and signal: Smokestack.

[Latitude 40°15'46.57"; longitude 112°06'00.73"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Lava.....	42 34 20	222 32 20	3.814157

FAUST, Tooele County (Not occupied)

"Water tank at Faust sta. on the San Pedro, Los Angeles & Salt Lake [Union Pacific] R. R. There is no town at this sta."

Station mark: None.

Station and signal: Center of tank.

[Latitude 40°11'31.10"; longitude 112°23'19.92"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Bennion.....	29 13 11	209 07 22	4.421185
Stookey.....	115 43 36	295 37 39	4.162313
South.....	169 43 09	349 40 38	4.489349

FWLER, on Salt Lake-Utah county line (Not occupied)

"Rock cairn built by Mr. Fowler on the E. side of the range and about 3 mi. NNE. of Herriman triangulation sta." About 5 mi. in air line S. of town of Bingham Canyon and 0.2 mi. SE. of common corner of Salt Lake, Tooele, and Utah Counties. T. 4 S., R. 3 W., near NW. cor. sec. 22. Elev. 9,303 ft.

Station mark and signal: Cairn.

[Latitude 40°27'52.11"; longitude 112°10'11.07"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Herriman.....	29 02 31	209 01 25	3.692330

GRANITE, Tooele County (Not occupied)

"On highest point of Granite Mountain, a well-known peak." About 30 mi. in air line W. of Indian Springs and 20 mi. NE. of Fish Springs. Intersected by U. S. C. & G. S. in 1884. Elev. (G. L. O.) 9,779 ft.

Station mark: None.

Station and signal: Highest point of mountain.

Latitude 40°07'41.358"; longitude 113°16'12.747".

HERRIMAN, on Utah-Tooele county line

"A point [Lowe Peak] located by the U. S. C. & G. S. on which there was no signal. It is one of the highest points of the Oquirrh Range, but probably lower than the Flat Top Mountain, NW. of Cedar Valley. It is on the line between Utah and Tooele Counties and about 2 mi. S. of Salt Lake County. Both the N. and S. forks of creek known as West Canyon head at the peak and flow E. The source of Bates Creek is also at this peak; the creek flows W. The best way to reach the point on horseback is up the S. fork of West Canyon. It can also be reached from the W. up Bates Creek." On Lowe Peak, about 8.5 mi. in air line NW. of Cedar Valley post office. Intersected in 1884 by U. S. C. & G. S.; occupied and marked in 1915 and intersected in 1922 by U. S. G. S. T. 4 S., R. 3 W., sec. 32. Elev. 10,572 ft.

Station mark: Standard tablet set in solid rock.

Signal: Cairn 6 ft. high and 6 ft. in diam. at base centered over sta. mark.

[Latitude 40°25'32.365"; longitude 112°11'52.597"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
Scipio.....	0	21	50	180	21	31	5.059551
Sabie.....	13	28	38	193	23	06	4.719232
Center.....	25	11	19	205	04	14	4.563401
Bennion.....	30	49	03	210	35	49	4.755605
Faust.....	32	05	15	211	57	51	4.485808
Stokey.....	56	15	35	236	02	11	4.547505
Deseret.....	96	03	53.8	275	47	15.2	4.561955
South.....	101	34	12	281	24	15	4.345374
Onaqui.....	119	14	54	298	58	40	4.606385

LAKE, Utah County

"On the northernmost high point of the Lake Mountains, a range on the W. side of Utah Lake. It is about 10 mi. in an air line SW. of Lehi and about 9 mi. E. of Fairfield. The summit, about a mile S., is a little higher than point on which sta. is situated. It can be easily reached on horseback." Established in 1915 and recovered in 1922.

Station mark: Standard tablet set in solid rock.

Signal: Leaning cedar tree with lower branch removed; top of tree centered over sta. mark.

[Latitude 40°16'54.84"; longitude 111°56'39.88"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
Scipio.....	12	52	52	192	42	48	5.005379
Ant Hill.....	14	48	56	194	46	56	4.236444
Boulter.....	34	50	25	214	40	41	4.575472
Sabie.....	44	07	44	223	52	24	4.687044
Bennion.....	57	08	07	236	45	06	4.781935
Center.....	65	20	06	245	03	12	4.611910
Lava.....	68	42	32	248	34	29	4.277972
Fairfield.....	81	01	18	260	55	16	4.127667
Stokey.....	86	02	53	265	39	41	4.707816
Lone Cedar.....	96	13	05	276	02	44	4.358696
Herriman.....	126	37	32	306	27	41	4.428282
Fowler.....	136	43	26	316	34	41	4.445279
Bingham.....	141	07	47	320	58	49	4.493630
Cedar Point.....	168	00	10	347	58	44	4.176724

LAVA, on Tooele-Utah county line

"On a peak in a low range of mountains dividing the counties of Tooele and Utah, and about 1 mi. S. of Fivemile Pass on rd. between Fairfield and Rush Valley. It is about 4 mi. in air line SW. of Fairfield. Can be reached on horseback from any direction."

Station mark: Tablet set in buried rock.

Signal: Cairn 6 ft. high and 6 ft. in diam. at base centered over sta. mark.

[Latitude 40°13'10.89"; longitude 112°09'07.24"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
Boulter.....	8	55	11	188	53	29	4.385539
Sabie.....	29	53	27	209	46	09	4.510201
Topliff.....	36	06	36	216	04	16	3.941273
Bennion.....	51	49	05	231	34	06	4.624457
Center.....	62	17	40	242	08	49	4.342677
Lookout.....	63	00	41	242	44	15	4.609506
Faust.....	81	23	54	261	14	44	4.309614
Stokey.....	95	39	18	275	24	10	4.523832
Deseret.....	123	39	29	303	21	06	4.683520
East Poplar.....	124	07	13	304	00	02	4.279823
South.....	136	52	18	316	40	35	4.573342
Lone Cedar.....	151	35	38	331	33	20	4.026467

LEHI, Utah County (Not occupied)

"Large chimney at sugar factory about 1 mi. SE. of Lehi." Located in 1915 and relocated in 1922 by intersection.

Station mark: None.

Station and signal: Center of chimney.

[Latitude 40°22'42.24"; longitude 111°49'58.52"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Lake.....	41	31	11	221	26	50	4.155442
Herriman.....	99	43	47	279	29	35	4.497332
Cedar Point.....	107	35	00	287	29	14	4.120648

LEHI TEMPLE, Utah County (Not occupied)

"Steeple on Mormon Temple in the town of Lehi." Located in 1915 and relocated in 1922 by intersection.

Station mark: None.

Station and signal: Center of steeple.

[Latitude 40°23'25.60"; longitude 111°50'53.81"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
Lake.....	34	09	30	214	05	46	4.163167
Herriman.....	97	37	05	277	23	29	4.476220
Cedar Point.....	103	12	46	283	07	35	4.064030

LONE CEDAR, Tooele County (Not occupied)

"A pine tree near the summit of ridge between Cedar Valley and Mercur Canyon. Wagon rd. passes this point. It was not occupied and the tree resembled a cedar from other stations. Later it was discovered to be a pine tree." About 7 mi. in air line WNW. of Fairfield, 1.2 mi. S. of Mercur and about 1 mi. W. of Tooele-Utah county line. T. 6 S., R. 3 W., near line between secs. 17 and 18. Elev. 7,842 ft.

Station mark: None.

Station and signal: Center of tree.

[Latitude 40°18'13.93"; longitude 112°12'41.34"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
Center.....	36	21	08	216	14	35	4.386090
Stookey.....	77	50	05	257	37	14	4.459864
Deseret.....	116	19	07	296	03	01	4.593069
South.....	131	09	15	310	59	50	4.436082

LONE PEAK NEEDLE, on Utah-Salt Lake county line (Not occupied)

"This point is about 11 mi. in an air line from Lehi. * * * It is the highest point in the vicinity and very prominent." Summit of Lone Peak, in Wasatch National Forest, about 6 mi. in air line E. of Draper. Intersected by U. S. C. & G. S. in 1884. T. 3 S., R. 2 E., sec. 29. Elev. about 11,100 ft.

Station mark: None.

Station and signal: Highest point of peak.

[Latitude 40°31'37.116"; longitude 111°45'19.150"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Mount Nebo.....	0 38 07.6	180 37 43.7	4.900605
Lake.....	30 35 44	210 28 22	4.499618
Cedar Point.....	56 54 16	236 45 28	4.359549
Herriman.....	73 27 29	253 10 14	4.593112

LOOKOUT, Tooele County (Not occupied)

"On the highest point of Lookout Peak, about 8 mi. a little S. of W. from Vernon." (Shown on U. S. F. S. map as on Red Pine Mountain.) In Wasatch National Forest. T. 9 S., R. 7 W., sec. 12.

Station mark: None.

Station and signal: Highest point of peak.

Latitude 40°03'09.36"; longitude 112°34'37.02".

MAPLE, Juab County (Not occupied)

"Highest point of very prominent mountain locally known as Maple Peak. It is about 10 mi. [12 mi. in air line] SW. of Eureka, near Cherry Creek settlement."

Station mark: None.

Station and signal: Highest point of peak.

[Latitude 39°51'57.46"; longitude 112°19'14.75"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Bennion.....	125 12 44	305 04 18	4.359425
Sable.....	171 16 57	351 16 11	4.053932

MOUNT NEBO,¹⁰ Juab County

On southernmost summit of Mount Nebo, in Uinta National Forest, about 8 mi. in air line NNE. of Nephi and 5 mi. E. of Mona. Established by U. S. C. & G. S. in 1887; recovered by U. S. G. S. in 1898 and 1915 and by U. S. C. & G. S. in 1919. T. 11 S., R. 1 E., sec. 36. Elev. (U. S. F. S.) 11,071 ft.

Station mark: Copper bolt in drill hole in solid rock.

Reference marks: Drill holes in rock at distances and in azimuths from sta. mark as follows—(1) 2.56 meters, 38°01'; (2) 2.66 meters, 121°28'; (3) 4.25 meters, 204°16'; (4) 3.32 meters, 309°39'. Mount Nebo astronomic sta., marked by brick pier, is 23.25 meters from sta. in azimuth 321°35'.

Signal: Cairn 9 ft. high and 7 ft. in diam. at base centered over sta. mark

[Latitude 39°48'38.316"; longitude 111°45'56.235"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Scipio.....	39 20 54.81	219 04 03.29	4.7773551
Sevier.....	61 10 26	240 53 02	4.648366
Sunrise.....	92 13 46	272 02 03	4.416603
Maple.....	97 32 33	277 11 12	4.680458
Bennion.....	106 30 42	286 00 55	4.838550
Sable.....	109 35 27	289 13 19	4.717383
Boulter.....	120 19 30	300 02 55	4.629294
Stookey.....	126 29 57	305 59 57	4.915149
Deseret.....	134 47 24.53	314 14 09.05	5.0118839
Lava.....	144 07 54	323 53 00	4.749227
Ant Hill.....	151 09 59	331 01 06	4.609983
Herriman.....	151 47 00.2	331 30 17.4	4.880852
Lake.....	163 48 05	343 41 11	4.736431

¹⁰ In earlier publications of the Geological Survey on triangulation this station appears as "Nebo."

MURRAY, Salt Lake County (Not occupied)

Older and smaller of two large chimneys at smelter in town of Murray, about 8 mi. in air line S. of Salt Lake City. Located in 1915 and relocated in 1922 by intersection.

Station mark: None.

Station and signal: Center of chimney.

[Latitude 40°39'25.57"; longitude 111°53'26.77"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Lake.....	6 14 56	186 12 50	4.622326
Cedar Point.....	15 53 17	195 49 45	4.447734
Herriman.....	45 27 27	225 15 28	4.563180

ONAKUI, Tooele County (Not occupied)

"A prominent peak in the Onaqui Range [Stansbury Mountains]. * * * It is about 10 mi. W. of Grantsville." In Wasatch National Forest, about 7 mi. in air line W. of Grantsville. Intersected by U. S. C. & G. S. in 1887. T. 2 S., R. 7 W., sec. 34.

Station mark: None.

Station and signal: Highest point of peak.

[Latitude 40°36'09.626"; longitude 112°36'51.866"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Deseret.....	3 23 43.0	183 23 17.0	4.201907

PROVO, Utah County (Not occupied)

"Small rock cairn on the northern of two peaks on S. side of Provo River, 8 or 10 mi. SE. [NE.] of Provo." In Uinta National Forest, 6.5 mi. in air line NE. of Provo and 3.5 mi. E. of Olmstead. T. 6 S., R. 3 E., sec. 10.

Station mark and signal: Cairn.

[Latitude 40°18'42.99"; longitude 111°35'17.56"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Lava.....	78 07 34	257 45 42	4.690556
Herriman.....	103 54 00	283 30 19	4.726764
Cedar Point.....	108 55 02	288 39 45	4.547285

PROVO NO. 2, Utah County (Not occupied)

"Southern of two peaks on the S. side of Provo River, 8 or 10 mi. NE. of Provo." In Uinta National Forest, 6 mi. in air line NE. of Provo and 3.5 mi. E. of Olmstead. T. 6 S., R. 3 E., sec. 10.

Station mark: None.

Station and signal: Peak.

[Latitude 40°18'25.22"; longitude 111°35'15.19"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Ant Hill.....	60 54 46	240 38 56	4.600413
Lake.....	84 51 58	204 38 07	4.483882
Cedar Point.....	109 43 31	289 28 13	4.550160

ROUND TOP, Tooele County (Not occupied)

"On the highest point of a group of hills in Skull Valley, about 15 or 20 mi. W. [16 mi. in air line WNW.] of Vernon, a post office in Rush Valley."

Station mark: None.

Station and signal: Highest point of hills.

Latitude 40°08'09.35"; longitude 112°43'43.68".

SABIE, Tooele County

"A lone peak covered with mahogany brush about 4 mi. [3 mi. in air line] SW. of Lofgreen, a sta. on the San Pedro, Los Angeles & Salt Lake [Union Pacific] R. R. The trees were cut from the summit. A party can camp at Lofgreen. * * * The mountain is locally known as Sabie Peak and can be easily reached on horseback from any direction."

Station mark and signal: Mahogany tree 10 ft. high supported by cairn 5 ft. high and 6 ft. in diam. at base.

Reference mark: Tablet set in solid rock 4.5 ft. from sta. mark in azimuth 289°32'.

[Latitude 39°58'00.31"; longitude 112°20'27.05"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Dutch.....	83	51	53	263	46	32	4.076865
Bennion.....	96	42	27	276	34	47	4.232833
Vernon.....	151	02	42	330	59	08	4.210792
Stookey.....	151	15	37	331	07	49	4.452954
Deseret.....	156	12	17	336	01	15	4.777042
Center.....	169	13	22	349	11	50	4.258787

ST. JOHN, Tooele County (Not occupied)

"Cupola on school building at St. John post office, in Rush Valley."

Station mark: None.

Station and signal: Center of cupola.

No check on this position.

[Latitude 40°21'22.44"; longitude 112°27'17.84"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Stookey.....	32	01	35	211	58	10	4.148669

ST. JOHN RAILROAD STATION, Tooele County (Not occupied)

"Chimney in center of R. R. sta. at St. John, on the San Pedro, Los Angeles & Salt Lake [Union Pacific] R. R."

Station mark: None.

Station and signal: Chimney.

No check on this position.

[Latitude 40°21'59.44"; longitude 112°24'35.02"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Stookey.....	40	52	29	220	47	19	4.237852
South.....	161	12	01	341	10	18	4.064402

SALT CREEK, Juab County (Not occupied)

"On a prominent mountain on S. side of Salt Creek near the point where the creek enters Juab Valley." On Salt Creek Peak, in Uinta National Forest, about 5.5 mi. in air line SE. of Nephi. Intersected in 1884 by U. S. C. & G. S. T. 13 S., R. 2 E., sec. 30. Elev. (U. S. F. S.) 9,991 ft.

Station mark and signal: Cairn.

[Latitude 39°39'53.856"; longitude 111°44'32.758"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Scipio.....	52 59 30.4	232 41 47.3	4.699431
Bennion.....	117 43 37	297 13 59	4.886053
Boulder.....	134 12 35	313 55 09	4.732787
Mount Nebo.....	173 00 05.8	352 59 12.4	4.212097

SALT LAKE CITY CAPITOL, Salt Lake County

"Dome on State Capitol in Salt Lake City." Intersected in 1915 and occupied in 1922 and 1925.

Station mark: None.

Station and signal: Center of dome.

[Latitude 40°46'38.80"; longitude 111°53'14.71"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Lake.....	5 02 02	184 59 49	4.742241
Cedar Point.....	11 09 53	191 05 13	4.613921
Herriman.....	34 02 06	213 49 59	4.672863

SANTAQUIN, Utah County (Not occupied)

"On highest point of high mountain about 10 mi. [9 mi.] in an air line E. of the town of Santaquin, on the Utah Central [Denver & Rio Grande Western and Union Pacific Railroads]." T. 9 S., R. 3 E., sec. 32.

Station mark: None.

Station and signal: Highest point of mountain.

[Latitude 39°59'00.13"; longitude 111°37'22.75"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Mount Nebo.....	32 30 20	212 24 50	4.356577
Boulder.....	92 48 02	272 25 55	4.690193
Ant Hill.....	117 29 29	297 15 05	4.554503
Lake.....	140 31 52	320 19 26	4.633496

SCIPIO, Millard County (Not occupied)

Established in 1884 and recovered in 1919 by U. S. C. & G. S., whose description of it follows: ³⁰ "On the highest peak of Canyon Mountains, E. of the town of Oak City and NW. of the town of Scipio. The sta. is on the highest part of the summit, about 10 or 12 ft. from the edge of the abrupt slope on the eastern and northeastern side of the peak. It is best reached from Leamington by Fools Creek Canyon." In Fishlake National Forest. T. 16 S., R. 3 W., sec. 29. Elev. (U. S. C. & G. S.) 9,719.1 ft.

³⁰ See Avers, H. G., Triangulation in Utah (1927 datum): U. S. Coast and Geodetic Survey Special Pub. 209, p. 108, 1937.

Station mark: Copper bolt set in drill hole in solid rock, about 15 in. below drill hole in flat stone embedded in top of low masonry pier used for mounting instrument.

Reference marks: Drill holes in solid rock at distances and in azimuths from sta. mark as follows—(1) 2.74 meters, $177^{\circ}55'$; (2) 2.77 meters, $284^{\circ}55'$; (3) 2.94 meters, $41^{\circ}33'$; (4) 2.47 meters, $126^{\circ}51'$.

[Latitude $39^{\circ}23'33.581''$; longitude $112^{\circ}12'23.046''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Bennion.....	156 36 01	336 23 15	4.855299
Deseret.....	163 18 20.17	343 02 11.77	5.0925789

SCRUB, Tooele County (Not occupied)

"Highest point on prominent peak about 20 mi. a little N. of E. [NW.] of Deseret triangulation sta. There is scrub timber on the mountain, probably a summit of Cedar Mountains." About 15 mi. in air line due W. of Iosepa and 30 mi. WNW. of Deseret triangulation sta.

Station mark: None.

Station and signal: Highest point of peak.

Latitude $40^{\circ}32'14.19''$; longitude $112^{\circ}58'02.85''$.

SEVIER, Juab County (Not occupied)

"On the highest of three rather prominent peaks. It is on the N. side of the San Pedro, Los Angeles & Salt Lake [Union Pacific] R. R. and about 16 mi. in an air line N. of Scipio triangulation sta." About 7 mi. in air line NE. of Leamington. T. 14 S., R. 3 W., sec. 7.

Station mark: None.

Station and signal: Tree or cairn.

[Latitude $39^{\circ}36'59.41''$; longitude $112^{\circ}13'10.67''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Bennion.....	146 15 26	326 03 09	4.691991
Sabie.....	165 05 23	345 00 44	4.604766

SKULL, Tooele County (Not occupied)

"Rather sharp peak in group of hills about 10 mi. W. of Bennion triangulation sta.; a flat-topped mountain N. of peak is a little higher." About 4 mi. in air line SW. of Indian Springs.

Station mark: None.

Station and signal: Highest point of peak.

Latitude $40^{\circ}00'15.47''$; longitude $112^{\circ}43'20.21''$.

SOUTH, Tooele County

"On the westernmost summit of a low range of mountains connecting the Oquirrh Mountains and the Onaqui [Stansbury] Range, about 6 mi. W. of Stockton, 6 mi. S. of Grantsville, and 10 mi. N. of St. John. The rd. from St. John to Grantsville passes about 1.5 mi. W. of sta. at point where it crosses the divide. Can be easily reached on horseback from any direction." In range of low mountains called South Mountain, about 6 mi. in air line W. of Stockton, 9.5 mi. S.

of Grantsville, and 7.5 mi. N. of St. John. T. 4 S., R. 5 W., sec. 18. Elev. 6,605 ft.

Station mark: Tablet set in solid rock.

Signal: Cairn 7 ft. high and 6 ft. in diam. at base centered over sta. mark.

[Latitude 40°27'55.38"; longitude 112°27'13.67"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Saint John.....	0 27 54	180 27 51	4. 083522
Clover.....	2 19 07	182 18 51	4. 146674
Bennion.....	7 49 01	187 45 42	4. 731475
Stookey.....	17 27 29	197 24 02	4. 401757
Deseret.....	87 31 05	267 24 24	4. 163742
Onaqui.....	138 17 59	318 11 43	4. 310375

SPANISH FORK PEAK (U. S. C. & G. S.), Utah County (Not occupied)

"On the highest point of mountains between Hobbie Creek and North Creek and about 6 mi. in an air line SE. of Springville." In Uinta National Forest, on highest point in the mountains between Hobbie Creek (tributary to Utah Lake) and North Creek (tributary to Soldier Fork Creek), about 6.25 mi. in air line a little S. of E. of town of Spanish Fork, 5.5 mi. SE. of Springville, and 2.5 mi. NE. of Denver & Rio Grande Western R. R. Intersected by U. S. C. & G. S. in 1887. In 1897 the U. S. G. S. established a sta. of the same name on this peak and marked it with an iron post. The U. S. G. S. sta. is 10.3 ft. from the U. S. C. & G. S. sta. in azimuth 315°05'. It is on triangulation conducted by H. L. Baldwin, Jr., in 1897 (Uinta Forest Reserve project). (See p. 17.) T. 8 S., R. 4 E., sec. 30. Elev. (U. S. F. S.) 10,185 ft.

Station mark: None.

Station and signal: Cairn 6 ft. high and 6 ft. in diam. at base. This cairn serves as a reference mark for the nearby U. S. G. S. sta. of the same name.

[Latitude 40°05'16.745"; longitude 111°31'37.006"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Mount Nebo.....	33 35 46.4	213 26 34.7	4. 567452
Boulter.....	80 53 19	260 27 29	4. 762471
Ant Hill.....	97 05 18	276 47 10	4. 605267
Lake.....	121 20 03	301 03 53	4. 618729
Herriman.....	123 30 50	303 04 50	4. 834404
Cedar Point.....	133 17 32	312 59 55	4. 724040
Lone Peak Needle.....	158 21 26	338 12 34	4. 719904

SPRINGVILLE PEAK, Utah County (Not occupied)

"On highest point of peak, about 5 mi. E. of Provo." (Shown on U. S. F. S. map as on Provo Peak.) Just E. of W. boundary of Uinta National Forest. Intersected in 1884 by U. S. C. & G. S. Elev. (U. S. F. S.) 11,054 ft.

Station mark: None.

Station and signal: Cairn.

[Latitude 40°14'39.691"; longitude 111°33'22.225"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Mount Nebo.....	20 26 08.0	200 18 02.9	4. 710697
Boulter.....	64 05 28	243 40 43	4. 783566
Ant Hill.....	71 41 50	251 24 48	4. 596547
Lake.....	97 19 09	277 04 06	4. 522291

STOOKEY, Tooele County

"On the highest point of the Stansbury Mountains, south of Clover Creek, about 8 mi. in an air line SW. of Clover post office. The nearest water and forage is at Alonzo S. Stookey's ranch, about 1 mi. W. of Clover post office. There is a rd. and trail from this ranch to summit of peak. There is a small spring three-quarters of a mi. W. of the peak, but grass is scarce on the mountain."

Station mark: Tablet set in solid rock.

Signal: Cairn 7 ft. high and 6 ft. in diam. at base supporting spruce tree centered over sta. mark.

[Latitude 40°14'55.24"; longitude 112°32'33.81"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Lookout.....	7 38 25	187 37 06	4.341755
Skull.....	29 28 57	209 22 00	4.493507
Round Top.....	51 44 55	231 37 41	4.305226
Castle.....	68 49 53	248 33 58	4.577373
Granite.....	78 02 44	257 34 34	4.801964
Scrub.....	131 45 47	311 29 17	4.683433
Tree.....	137 33 26	317 26 17	4.364290
Deseret.....	163 18 29	343 15 16	4.388293

SUNRISE, on Juab-Utah county line (Not occupied)

"The highest point of a prominent, long mountain at the W. end of Mead Valley and probably on county line between Juab and Tooele [Utah] Counties." About 7 mi. in air line SE. of Silver City.

Station mark: None.

Station and signal: Highest point of mountain.

[Latitude 39°49'09.79"; longitude 112°04'12.71"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Bennion.....	114 42 17	294 24 13	4.644768
Sabie.....	125 20 28	305 10 03	4.452512
Boulter.....	152 15 52	332 11 02	4.363726

TANK, Utah County (Not occupied)

"Water tank on R. R. between Lehi Junction and Topliff, about 2 mi. E. of Cedar Fort." On Union Pacific R. R. near Cedar Fort sta., about 2 mi. SE. of village of Cedar Fort (Cedar Valley post office).

Station mark: None.

Station and signal: Center of tank.

[Latitude 40°18'56.02"; longitude 112°04'22.80"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Lava.....	32 17 30	212 14 26	4.100001
Herriman.....	139 04 54	319 00 02	4.209201

TIMPANOGOS FLAG, Utah County (Not occupied)

"Metal flag near summit of Timpanogos Mountain, a very high mountain about 12 mi. E. of Lehi. Flag was established by citizens of Pleasant Grove." About 11 mi. in air line E. of Lehi and 5 mi. NE. of Pleasant Grove. T. 5 S., R. 3 E., secs. 7 and 18.

Station mark: None.

Station and signal: Metal flag.

No check on this position.

[Latitude 40°23'27.05"; longitude 111°38'42.64"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Lake.....	64 39 13	244 27 36	4.449610
Cedar Point.....	95 18 30	275 05 26	4.457026

TOPLIFF, Tooele County (Not occupied)

"Derrick near water tank at R. R. sta. and post office." At Topliff sta. on Union Pacific R. R.

Station mark: None.

Station and signal: Center of derrick.

[Latitude 40°09'22.03"; longitude 112°12'44.76"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Sabie.....	27 33 52	207 28 54	4.374921
Bennion.....	55 47 32	235 34 53	4.528799
Center.....	77 28 07	257 21 36	4.166988
Stookey.....	110 10 54	289 58 07	4.476271

TREE, Tooele County (Not occupied)

Prominent tree on ranch at Indian reservation in Skull Valley. T. 5 S., R. 8 W., sec. 11.

Station mark: None.

Station and signal: Tree.

No check on this position.

Latitude 40°24'08.25"; longitude 112°43'35.92".

VERNON, Tooele County (Not occupied)

"Cupola on Mormon Church at Vernon, a post office in Rush Valley."

Station mark: None.

Station and signal: Center of cupola.

[Latitude 40°05'41.13"; longitude 112°25'59.11"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Bennion.....	36 38 48	216 34 42	4.183059
Stookey.....	151 22 52	331 18 38	4.289503

Y, Utah County (Not occupied)

"Bottom of large Y placed on side of mountain by students of Brigham Young University in Provo. It is just above the town of Provo." About 2 mi. in air line NE. of Provo.

Station mark: None.

Station: Bottom of Y.

Signal: Y.

[Latitude $40^{\circ}14'53.62''$; longitude $111^{\circ}37'13.52''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Boulter.....	61 12 43	240 50 28	4.748915.
Ant Hill.....	68 07 21	247 52 48	4.537900.
Cedar Point.....	121 07 49	300 53 49	4.553560.

TOOELE COUNTY, 1922

C. F. URQUHART, chief of party

The net of triangulation designated as the Tooele County project was developed from three stations of the Northern Utah project conducted

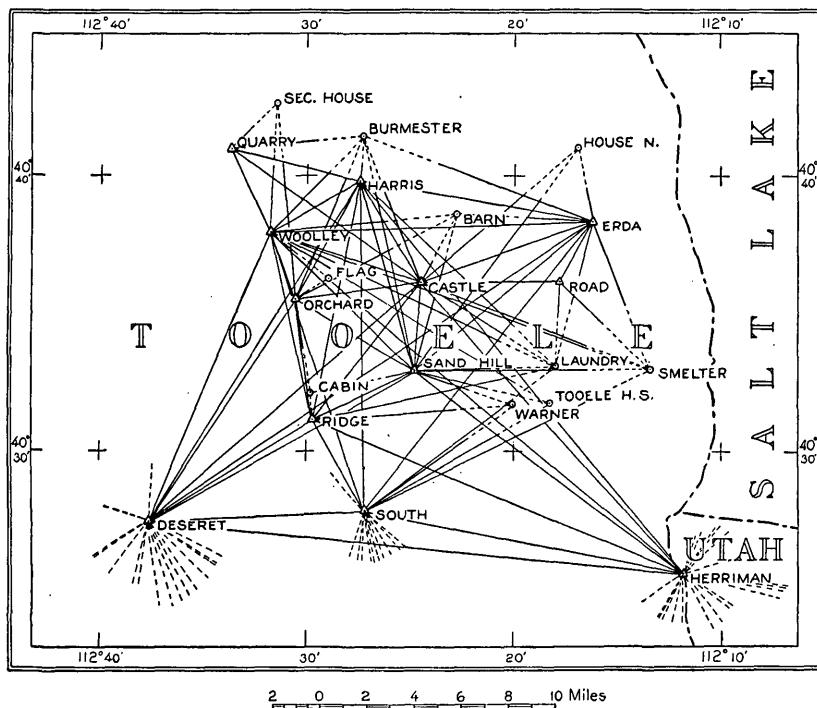


FIGURE 11.—Triangulation in Tooele County, 1922.

by the same engineer in 1915, namely, Coast and Geodetic Survey stations Deseret and Herriman and Geological Survey station South.. (See fig. 11.)

This triangulation was originally computed on the old North American datum,³¹ and the results thus obtained were later readjusted to the North American datum of 1927 in conjunction with the results of the triangulation from which the project was developed (Northern Utah project, 1915). These results are published for the first time in this bulletin.

STATIONS

BARN, Tooele County (Not occupied)

Large barn 5.5 mi. in air line NE. of Grantsville, 2.2 mi. N. of Lincoln Highway (same here as Victory Highway), and 0.8 mi. S. of Great Salt Lake. To reach, go from Grantsville E. along highway to point 0.8 mi. E. of Marshall, then take rd. N. to sta. (Western Pacific R. R. crosses highway at Marshall.)

Station mark: None.

Station and signal: W. end of barn.

[Latitude 40°38'36.55"; longitude 112°22'40.19"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Sand Hill.....	15 24 21	195 23 00	4. 042166
Castle.....	27 53 40	207 52 31	3. 727548
Orchard.....	62 07 03	242 01 56	4. 098386
Woolley.....	84 06 56	264 01 01	4. 110561

BURMESTER, Tooele County (Not occupied)

Water tank on northern edge of town of Burmester, on Western Pacific R. R.

Station mark: None.

Station and signal: Center of tank.

[Latitude 40°41'32.40"; longitude 112°27'15.73"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Harris.....	5 09 56	185 09 48	3. 473225
Orchard.....	22 11 11	202 09 04	4. 086364
Woolley.....	43 15 18	223 12 22	3. 967317
Quarry.....	84 28 30	264 24 23	3. 950068

CABIN, Tooele County (Not occupied)

Cabin on Grantsville-St. John rd. about 5 mi. in air line and 6 mi. by rd. S. of Grantsville. T. 3 S., R. 6 W., sec. 26.

Station mark: None.

Station and signal: E. end of cabin.

[Latitude 40°32'03.83"; longitude 112°29'48.98"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Orchard.....	170 51 55	350 51 27	3. 800710

³¹ See footnote 3, p. 4.

CASTLE, Tooele County

At dilapidated building called Wineburg Castle, on Lincoln Highway (same here as Victory Highway) at its junction with Grantsville-Erda rd., 3.2 mi. along highway due E. of Grantsville.

Station mark: Tablet in concrete post set in ground at center of castle.

Signal: The castle.

[Latitude 40°36'03.53"; longitude 112°24'26.45"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Sand Hill.....	4	08	16	184	08	04	3. 772292
Ridge.....	39	08	27	219	05	00	4. 073092
Deseret.....	49	43	33	229	35	03	4. 384805
Orchard.....	82	22	48	262	18	51	3. 937731
Woolley.....	108	10	50	288	06	03	4. 036508
Quarry.....	125	52	34	305	46	38	4. 200184
Harris.....	149	25	46	329	23	48	3. 921390
Burmester.....	158	36	23	338	34	33	4. 037277

DESERET, Tooele County

On summit of highest peak of Stansbury Mountains, in Wasatch National Forest, about 13 mi. in air line SW. of Grantsville, 11.5 mi. NW. of St. John, and 4 mi. SW. of South Willow ranger sta. The best camping place on the E. side of the mountain is at Wrathall's ranch, on Box Elder Creek. To reach the sta., go from this ranch over low divide to South Willow Creek, then up the creek to foot of peak, and then on foot to summit. Established by U. S. C. & G. S. in 1892; reoccupied by U. S. G. S. in 1897-98, 1915, and 1922. T. 4 S., R. 7 W., sec. 22. Elev. (U. S. C. & G. S.) 11,031 ft.

Station mark: Copper bolt in solid rock between bases of three small piers used for mounting instrument.

Reference marks: Three, at distances and azimuths from sta. mark as follows—(1) 3.10 meters, 322°53'; (2) 2.18 meters, 88°08'; (3) 2.62 meters, 198°38'. Deseret latitude sta., marked by stone-and-brick pier, is 10.85 meters from sta. mark in azimuth 27°42'.

Signal: Cairn 9 ft. high and 10 ft. in diam. at base built over sta. mark.

Latitude 40°27'34.448"; longitude 112°37'31.880".

ERDA, Tooele County

On bald ridge scattered with large rocks, about 2 mi. in air line SW. of Morris and 1.2 mi. N. of Erda, stations on Union Pacific R. R., and about 0.5 mi. E. of R. R. tracks.

Station mark: Post.

Signal: 14-ft. pole with targets.

[Latitude 40°38'23.51"; longitude 112°16'06.53"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Laundry.....	14	34	35	194	33	24	4. 009557
Road.....	25	36	41	205	35	42	3. 691464
South.....	39	04	27	218	57	13	4. 396820
Sand Hill.....	50	02	50	229	57	13	4. 201471
Deseret.....	56	36	48	236	22	52	4. 559549
Castle.....	69	52	10	249	46	45	4. 097569
Woolley.....	87	40	13	267	30	01	4. 344414
Barn.....	92	31	33	272	27	16	3. 966564
Harris.....	100	13	18	280	05	54	4. 210709
Burmester.....	110	23	57	290	16	41	4. 224381
House N.....	166	17	00	346	18	25	3. 722054

FLAG, Tooele County (Not occupied)

On Lincoln Highway (same here as Victory Highway) about 0.75 mi. in air line and 1.2 mi. by rd. W. of Grantsville, near point where highway turns NW., at first benchmark W. of Grantsville (iron post stamped "1922 H 54"). Elev. 4,349 ft.

Station mark: None.

Station and signal: Pole with flag.

[Latitude 40°36'09.38"; longitude 112°28'55.68"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Orchard.....	59 24 46	239 23 44	3.418552
Woolley.....	128 40 29	308 38 38	3.710315

HARRIS, Tooele County

At fence corner on E. side of Burmester-Grantsville rd. about 1.75 mi. in air line S. of Burmester (sta. on Western Pacific R. R.) and 4.5 mi. N. of Grantsville. On E. side of rd. there is no fence to the S., and on W. side of rd. there is no fence to the N. Elev. 4,221 ft.

Station mark: None.

Station and signal: Electric-power pole with white cloth wrapped around it for a distance of 4 ft. starting about 5 ft. above ground.

Reference mark: Iron post stamped "1922 H 51" at point 3.54 ft. from sta. in azimuth 116°.

[Latitude 40°39'56.40"; longitude 112°27'27.13"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Ridge.....	11 07 08	191 05 39	4.222116
Orchard.....	27 29 54	207 27 54	3.973014
Deseret.....	31 55 19	211 48 45	4.430519
Woolley.....	58 04 02	238 01 13	3.855729
Quarry.....	103 43 52	283 39 53	3.947338

HERRIMAN, on Utah-Tooele county line

"A point [Lowe Peak] located by the U. S. C. & G. S. on which there was no signal. It is one of the highest points of the Oquirrh Range, but probably lower than the Flat Top Mountain, NW. of Cedar Valley. It is on the line between Utah and Tooele Counties and about 2 mi. S. of Salt Lake County. Both the N. and S. forks of creek known as West Canyon head at the peak and flow E. The source of Bates Creek is also at this peak; the creek flows W. The best way to reach the point on horseback is up the S. fork of West Canyon. It can also be reached from the W. up Bates Creek." On Lowe Peak, about 8.5 mi. in air line NW. of Cedar Valley post office. Intersected in 1884 by U. S. C. & G. S.; occupied and marked in 1915 and intersected in 1922 by U. S. G. S. T. 4 S., R. 3 W., sec. 32. Elev. 10,572 ft.

Station mark: Standard tablet set in solid rock.

Signal: Cairn 6 ft. high and 6 ft. in diam. at base centered over sta. mark.

[Latitude 40°25'32.365"; longitude 112°11'52.597"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Deseret.....	96 03 53.8	275 47 15.2	4.561955
South.....	101 34 12	281 24 15	4.345374
Ridge.....	112 16 34	292 04 58	4.435355
Sand Hill.....	126 47 34	306 39 12	4.355724
Woolley.....	129 14 13	309 01 17	4.558897
Castle.....	137 42 54	317 34 44	4.420676
Harris.....	140 33 27	320 23 20	4.538481

HOUSE N, Tooele County (Not occupied)

House on southern edge of Great Salt Lake, just N. of rd. that follows shore line, 0.6 mi. SE. of Western Pacific R. R. tracks and about 3 mi. SW. of Lake Point sta. of Union Pacific R. R. T. 1 S., R. 4 W., sec. 34.

Station mark: None.

Station and signal: Smokestack on house.

[Latitude 40°41'09.57"; longitude 112°16'59.77"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Sand Hill.....	35 29 45	215 24 43	4.275016
Castle.....	48 04 15	227 59 24	4.149728

LAUNDRY, Tooele County (Not occupied)

Old building, used for laundry, on W. side of Tooele-Salt Lake City highway, 1.5 mi. in air line N. of county courthouse at Tooele.

Station mark: None.

Station and signal: Cupola of old building.

[Latitude 40°33'02.75"; longitude 112°17'55.86"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
South.....	54 13 29	234 07 27	4.209458
Ridge.....	77 51 13	257 43 32	4.231613
Sand Hill.....	88 05 00	268 00 35	3.983320
Woolley.....	114 43 55	294 34 55	4.332112
Castle.....	121 17 30	301 13 16	4.031276
Harris.....	133 35 06	313 28 54	4.267753

ORCHARD, Tooele County

In sloping country about 2.5 mi. in air line SW. of Grantsville, 20 ft. N. of rd. that leads from Grantsville to ranch known locally as "The Orchard." T. 3 S., R. 6 W., sec. 3.

Station mark: Post set at base of signal.

Signal: 12-ft. pole with targets.

[Latitude 40°35'26.12"; longitude 112°30'31.65"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Deseret.....	34 14 59	214 10 26	4.245338
Woolley.....	158 54 24	338 53 35	3.687234
Section House.....	174 51 02	354 50 28	4.132017

QUARRY, Tooele County

On highest point of low mountain about 5.5 mi. in air line W. of Burmester and 8 mi. NW. of Grantsville, just NW. of spur line of Western Pacific R. R. that leaves main-line tracks at first section house W. of Burmester and runs S. to rock quarry.

Station mark and signal: Cairn about 5 ft. high on highest point of mountain. Latitude $40^{\circ}41'04.40''$; longitude $112^{\circ}33'33.57''$.

RIDGE, Tooele County

On first ridge crossed by Grantsville-St. John rd. S. of Grantsville, about 6 mi. in air line S. of Grantsville and 11 mi. N. of St. John. About 0.25 mi. SE. of main rd., near old rd. that runs SW. along the ridge, which is very narrow at this point. The main divide is about 4 mi. farther S.

Station mark: Post set in ground at base of signal.

Signal: 18-ft. pole with cross targets.

[Latitude $40^{\circ}31'05.87''$; longitude $112^{\circ}29'43.74''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Deseret.....	59 26 18	239 21 14	4.107530
Woolley.....	167 06 20	347 05 01	4.110373
Orchard.....	172 00 43	352 00 12	3.908818
Cabin.....	176 03 22	356 03 18	3.253351

ROAD, Tooele County

On Tooele-Salt Lake City highway (which leads N. to Lincoln Highway) at point 235 yd. S. of its intersection with Grantsville-Erda rd., 5 mi. in air line N. of Tooele, about at fence line on W. side of highway. Elev. 4,434 ft.

Station mark: Iron post stamped "1922 H 64" set in ground at base of signal.

Signal: 14-ft. pole with targets.

[Latitude $40^{\circ}35'59.83''$; longitude $112^{\circ}17'36.87''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Laundry.....	4 40 36	184 40 24	3.738809
Castle.....	90 42 55	270 38 29	3.983657

SAND HILL, Tooele County

On small sand hill about 4.5 mi. in air line SE. of Grantsville and 6 mi. a little N. of W. of Tooele. To reach from Grantsville go E. and SE. 3.5 mi. along rd. to Tooele, thence S. along fairly good rd. to point 0.25 mi. E. of sta. T. 3 S., R. 5 W., sec. 21. Elev. 4,534 ft.

Station mark: Iron post stamped "1922 H 58" set at base of signal.

Signal: 14-ft. pole with targets.

[Latitude $40^{\circ}32'52.11''$; longitude $112^{\circ}24'44.60''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Deseret.....	61 35 44	241 27 26	4.312861
Ridge.....	65 03 58	245 00 44	3.890185
Cabin.....	78 16 54	258 13 36	3.864276
Orchard.....	120 13 36	300 09 50	3.975203
Woolley.....	133 10 50	313 06 16	4.133112
Harris.....	163 44 22	343 42 36	4.134617
Burmester.....	167 31 58	347 30 20	4.215823

SECTION HOUSE, Tooele County (Not occupied)

Section house on Western Pacific R. R. 4 mi. W. of Burmester.

Station and signal: Chimney of house.

[Latitude 40°42'43.70"; longitude 112°31'23.47"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Woolley.....	3 24 33	183 24 18	3.952942
Quarry.....	44 55 53	224 54 28	3.636045

SMELTER, Tooele County (Not occupied)

Very tall chimney at smelter about 4 mi. in air line NE. of Tooele.

Station mark: None.

Station and signal: Chimney.

[Latitude 40°32'59.62"; longitude 112°13'25.56"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
South.....	64 22 22	244 13 24	4.335226
Sand Hill.....	89 13 53	269 06 31	4.203569
Woolley.....	109 23 28	289 11 31	4.438086
Castle.....	110 06 29	289 59 20	4.218732
Road.....	133 15 45	313 13 01	3.909249
Erda.....	159 15 54	339 14 09	4.028711

SOUTH, Tooele County

"On the westernmost summit of a low range of mountains connecting the Oquirrh Mountains and the Onaqui [Stansbury] Range, about 6 mi. W. of Stockton, 6 mi. S. of Grantsville, and 10 mi. N. of St. John. The rd. from St. John to Grantsville passes about 1.5 mi. W. of sta. at point where it crosses the divide. Can be easily reached on horseback from any direction." In range of low mountains called South Mountain, about 6 mi. in air line W. of Stockton, 9.5 mi. S. of Grantsville, and 7.5 mi. N. of St. John. T. 4 S., R. 5 W., sec. 18. Elev. 6,605 ft.

Station mark: Tablet set in solid rock.

Signal: Cairn 7 ft. high and 6 ft. in diam. at base centered over sta. mark.

[Latitude 40°27'55.38"; longitude 112°27'13.67"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Deseret.....	87 31 05	267 24 24	4.163742
Ridge.....	148 59 15	328 57 38	3.836116
Woolley.....	160 51 16	340 48 19	4.290622
Harris.....	179 11 09	359 11 01	4.347185

TOOELE HIGH SCHOOL, Tooele County (Not occupied)

Cupola on high school in town of Tooele.

Station mark: None.

Station and signal: Center of cupola.

[Latitude 40°31'44.80"; longitude 112°18'15.32"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
South.....	60 52 42	240 46 52	4.161924
Sand Hill.....	102 48 07	282 43 43	3.972852
Woolley.....	120 52 15	300 43 27	4.346379

WARNER, Tooele County (Not occupied)

Chimney on R. R. sta. at Warner (Tooele Valley Ry. and Union Pacific R. R.)

Station mark: None.

Station and signal: Center of chimney.

[Latitude 40°31'41.87"; longitude 112°19'53.03"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
South.....	56 05 19	236 00 33	4.097219
Ridge.....	85 29 17	265 22 53	4.144543
Sand Hill.....	107 33 06	287 29 57	3.957078

WOOLLEY, Tooele County

On a rocky foothill that is the E. end of a ridge extending E. from the Stansbury Mountains. About 3.5 mi. in air line NW. of Grantsville, 0.75 mi. SW. of Lincoln Highway (same here as Victory Highway), and slightly N. of W. of the old Woolley ranch.

Station mark and signal: Cairn 6 ft. high.

[Latitude 40°37'53.32"; longitude 112°31'46.17"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Deseret.....	23 06 46	203 03 01	4.317023
Quarry.....	156 50 18	336 49 08	3.806960

SALT LAKE AND UTAH COUNTIES, 1922**C. F. URQUHART, chief of party**

This triangulation was extended from two stations of the project conducted in northern Utah by the same engineer in 1915, namely, Coast and Geodetic Survey station Herriman and Geological Survey station Cedar Point. (See fig. 12.) It ties, also, to five other stations of that project, namely, Lake, Lehi, Lehi Temple, Murray, and Salt Lake City Capitol, all of which were established by the Geological Survey, and to station East Temple,³² whose position was determined by the Coast and Geodetic Survey, although the station was not occupied. Triangulation conducted by A. K. Andrews in 1925 (Fort Douglas Military Reservation project) is tied to this project at stations Dry, Salt Lake City Capitol, and Lone Tree.

³² The United States Coast and Geodetic Survey lists this station as "Salt Lake City Temple, east spire."

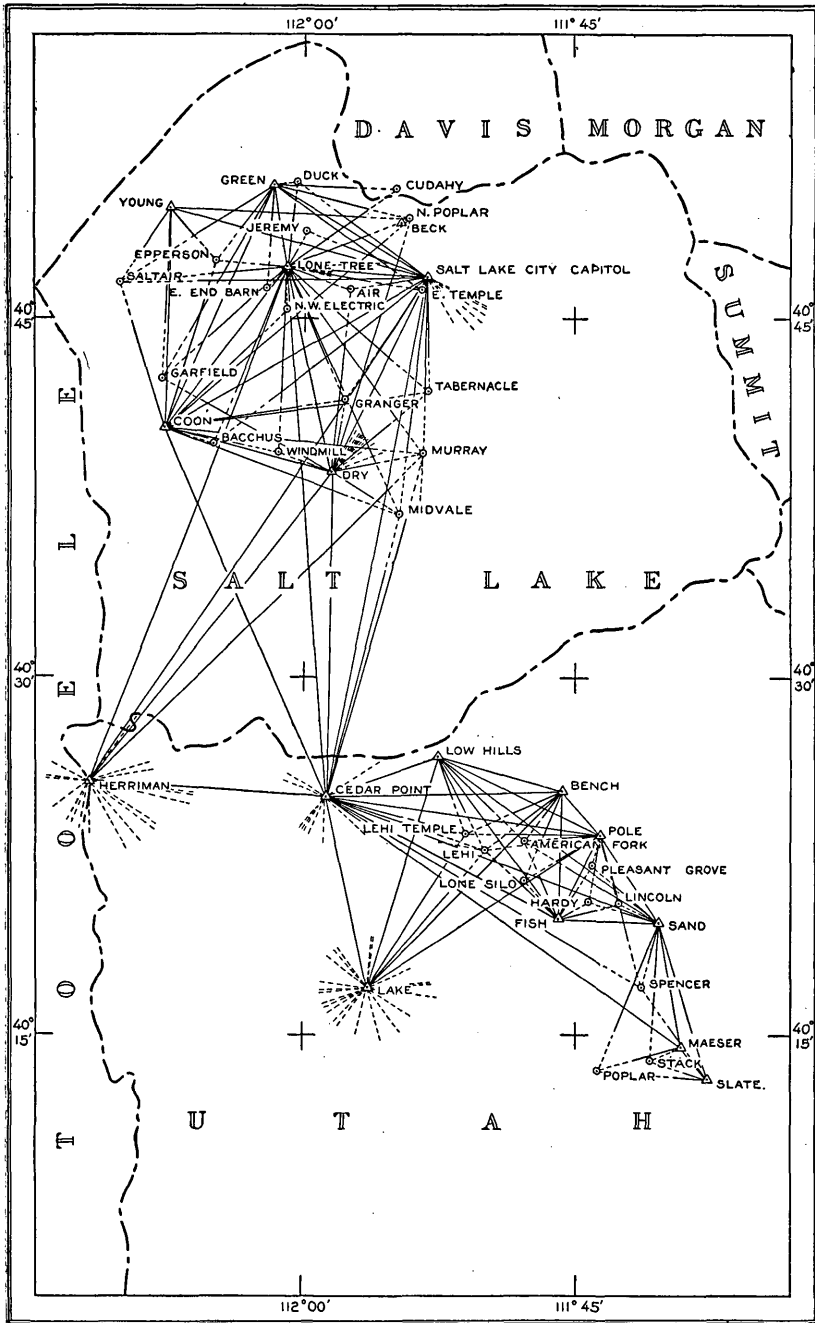


FIGURE 12.—Triangulation in Salt Lake and Utah Counties, 1922.

This triangulation was originally computed on the old North American datum.³³ Readjustment of the results obtained depends on new positions for stations Herriman and East Temple, as determined by the Coast and Geodetic Survey, and for stations Cedar Point, Lake, Lehi, Lehi Temple, and Murray, obtained by the readjustment of the Urquhart project in northern Utah. The published results appear for the first time in this bulletin.

STATIONS

AIR, Salt Lake County (Not occupied)

On sta. building at Salt Lake airport, near W. boundary of Salt Lake City, 3.7 mi. in air line W. of State Capitol.

Station mark: None.

Station and signal: Flagpole.

[Latitude 40°46'19.48"; longitude 111°57'31.98"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Dry.....	5 53 30	185 52 50	4.153533
Lone Tree.....	107 32 27	287 30 14	3.700950

AMERICAN FORK, Utah County (Not occupied)

On large brick school on N. side of town of American Fork.

Station mark: None.

Station and signal: Chimney.

[Latitude 40°23'10.57"; longitude 111°47'48.37"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Low Hills.....	133 06 35	313 03 32	3.959181

BACCHUS, Salt Lake County (Not occupied)

Large steel water tank in Bacchus, a small town 13 mi. in air line SW. of Salt Lake City.

Station mark: None.

Station and signal: Center of tank.

[Latitude 40°39'51.49"; longitude 112°05'07.62"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Coon.....	110 09 41	290 07 58	3.598997

BECK, Salt Lake County

In Salt Lake City, about 0.5 mi. S. of city limits, on bluff 0.5 mi. E. of Beck Hot Springs, 4 mi. along Ogden highway N. from North Temple Street. T. 1 N., R. 1 W., sec. 14.

³³ See footnote 3, p. 4.

Station mark: Tablet set in rock.

Signal: 12-ft. pole with targets, set in ground just above rocky edge of bench at sta. mark.

Latitude $40^{\circ}49'02.00''$; longitude $111^{\circ}54'49.74''$.

BENCH, Utah County

On plateau extending W. from mountains about 1 mi. in air line S. of American Fork River, 3.5 mi. a little E. of N. of Pleasant Grove, and 4.5 mi. NE. of American Fork. A few trees and some brush are scattered over the plateau, but these are not high enough to prevent sights from the sta.

Station mark: Tablet set in rock.

Signal: 12-ft. pole with cross targets at sta. mark.

[Latitude $40^{\circ}25'11.77''$; longitude $111^{\circ}45'35.64''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Fish.....	1 07 58	181 07 52	3.991736
Lone Silo.....	20 27 54	200 26 43	3.871986
American Fork.....	39 58 06	219 56 40	3.688157
Lake.....	45 42 09	225 34 59	4.340914
Lehi.....	53 22 20	233 19 29	3.887969
Lehi Temple.....	66 26 52	246 23 26	3.913067
Cedar Point.....	88 08 14	267 59 37	4.273998
Low Hills.....	104 16 03	284 11 34	4.003763

CEDAR POINT, Utah County

On point of low bare ridge, about 7 mi. in air line WNW. of Lehi and 9 mi. NE. of Cedar Valley, 2 mi. from junction of Cedar Valley-Lehi and Riverton-Lehi rds. Can be easily reached on horseback from any direction. Established in 1915 and reoccupied in 1922. T. 5 S., R. 1 W., sec. 5.

Station mark: Standard tablet set in solid rock.

Signal: Cairn 5 ft. high and 5 ft. in diam. at base centered over sta. mark.

[Latitude $40^{\circ}24'51.20''$; longitude $111^{\circ}58'52.31''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Herriman.....	94 01 09	273 52 43	4.265740
Coon.....	156 43 02	336 37 15	4.501502
Lone Tree.....	175 58 14	355 56 53	4.616504

COON, Salt Lake County

On high foothill about 13 mi. in air line WSW. of Salt Lake City. To reach, go S. from Salt Lake City on State Street to 33rd Street, thence W. on Lincoln Highway about 11 mi. to point where highway turns N., thence S. on rd. to Bacchus (which is in plain view) and go to point 0.5 mi. N. of Bacchus, thence W. to dwelling of Walter Coon, thence on horseback W. about 2 mi. and 1,000 ft. above valley to sta., which is on first summit. Saddle horses can be hired from Mr. Coon.

Station mark: None.

Station and signal: Cairn 6 ft. high and about 5 ft. in diam. at base.

[Latitude 40°40'35.84"; longitude 112°07'46.38"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Saltair.....	161 33 05	341 31 25	4.057774

CUDAHY, Davis County (Not occupied)

Water tank at Cudahy plant, on Ogden highway, 5 or 6 mi. N. of Salt Lake City.
Station mark: None.

Station and signal: Center of tank.

[Latitude 40°50'32.55"; longitude 111°55'02.90"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Lone Tree.....	52 47 42	232 43 51	4.017108
Green.....	93 03 55	272 59 31	3.974012

DRY, Salt Lake County

In abandoned fence line on ridge sloping from W. and on land formerly used for dry farming, about 3 mi. in air line NW. of West Jordan and 2 mi. WNW. of Bennion, stations on Salt Lake & Utah [Elec.] R. R. Can be reached by motor. Established in 1922 and recovered in 1925. T. 2 S., R. 1 W., sec. 17.

Station mark: Standard iron post with bronze cap.

Signal: 14-ft. pole with black and white cross targets at sta. mark.

[Latitude 40°38'40.24"; longitude 111°58'34.20"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Cedar Point.....	0 57 25	180 57 13	4.407826
Herriman.....	37 46 59	217 38 20	4.487410
Coon.....	105 25 13	285 19 13	4.128801
Windmill.....	111 25 20	291 23 31	3.625540
Garfield.....	118 17 04	298 10 58	4.174702
Lone Tree.....	168 00 26	347 58 53	4.204891

DUCK, Salt Lake County (Not occupied)

On building at "Duck" [Rudy Gun Club], about 8 mi. in air line NW. of Salt Lake City. T. 1 N., R. 1 W., sec. 6.

Station mark: None.

Station and signal: Chimney.

[Latitude 40°50'48.21"; longitude 112°00'07.34"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Lone Tree.....	9 36 12	189 35 40	3.837179
Green.....	90 22 33	270 21 30	3.350823

EAST END BARN, Salt Lake County (Not occupied)

Large barn about 6 mi. in air line W. of Salt Lake City and just N. of Salt Lake, Garfield & Western [Elec.] Ry. T. 1 N., R. 2 W., S½ sec. 35.

Station mark: None.

Station and signal: E. end of barn.

Latitude 40°46'14.66"; longitude 112°02'04.73".

EAST TEMPLE, Salt Lake County (Not occupied)

On Mormon Temple in Salt Lake City. Intersected in 1893 by U. S. C. & G. S. and given the name "Salt Lake City Temple, east spire." Intersected by U. S. G. S. in 1922.

Station mark: None.

Station and signal: East spire.

[Latitude 40°46'13.753"; longitude 111°53'27.054"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Lone Tree.....	99 08 59	279 04 06	4.028080
Green.....	126 04 49	305 59 24	4.158850

EPPERSON, Salt Lake County (Not occupied)

On dwelling at Epperson ranch, about 8 mi. in air line W. of Salt Lake City and 0.4 mi. N. of Saltair Speedway. T. 1 N., R. 2 W., E½ sec. 29.

Station mark: None.

Station and signal: Chimney.

[Latitude 40°47'24.38"; longitude 112°04'59.77"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Coon.....	17 15 03	197 13 14	4.120392
Young.....	140 48 09	320 46 32	3.743610

FISH, Utah County

At old fish canning plant, on Denver & Rio Grande Western R. R. About 0.2 mi. N. of Geneva siding and about 8 mi. in air line NW. of Provo.

Station mark: None.

Station and signal: Smokestack.

[Latitude 40°19'53.73"; longitude 111°45'43.86"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Cedar Point.....	116 19 36	296 11 05	4.316822
Lehi.....	130 52 47	310 50 02	3.900100
Lone Silo.....	139 36 32	319 35 26	3.570419
Low Hills.....	142 04 10	321 59 46	4.192796
American Fork.....	154 10 14	334 08 54	3.829026

GARFIELD, Salt Lake County (Not occupied)

On prominent hill SE. of Garfield, a small town on Western Pacific R. R.

Station mark: None.

Station and signal: Flagpole.

Latitude 40°42'29.55"; longitude 112°07'55.11".

GRANGER, Salt Lake County (Not occupied)

On Granger church [or hall] on Lincoln Highway, about 7 mi. in air line SW. of Salt Lake City.

Station mark: None.

Station and signal: Cupola.

[Latitude 40°41'47.31"; longitude 111°57'58.71"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Dry.....	8 13 23	188 13 00	3.765687
Coon.....	80 58 34	260 52 11	4.145347
Lone Tree.....	157 12 46	337 10 50	4.031313

GREEN, Salt Lake County

At Utah Gun Club, about 8 mi. in air line NW. of Salt Lake City, in flat, swampy country about 2 mi. SE. of Great Salt Lake, on W. side of slough in which tall rushes are growing, at NW. one of two cabins and shed belonging to club. Cabin is painted green. To reach: From fence corner on S. side of Saltair Speedway at point 1.7 mi. W. of Surplus Canal go N. along rd. about 2 mi., passing three wells on the way, to point where rd. forks, thence along rd. N. about 1.9 mi., crossing four automobile bridges over slough, to rd. fork; then follow rd. N. to sta. T. 1 N., R. 2 W., sec. 2.

Station mark: None.

Station and signal: Stovepipe on cabin.

[Latitude 40°50'48.68"; longitude 112°01'44.42"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
East End Barn.....	3 13 30	183 13 17	3.927690
Coon.....	24 13 05	204 09 09	4.316455
Garfield.....	29 28 55	209 24 53	4.247504
Epperson.....	36 00 50	215 58 42	3.891514
Saltair.....	56 20 27	236 14 50	4.162594

HARDY, Utah County (Not occupied)

At beet loading plant at Hardy siding, about 2 mi. from Pleasant Grove, along lower highway to Provo.

Station mark: None.

Station and signal: Center of red water tank.

[Latitude 40°20'25.44"; longitude 111°44'19.89"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Fish.....	63 44 49	243 43 55	3.344455

HERRIMAN, on Utah-Tooele county line

"A point [Lowe Peak] located by the U. S. C. & G. S. on which there was no signal. It is one of the highest points of the Oquirrh Range, but probably lower than the Flat Top Mountain, NW. of Cedar Valley. It is on the line between Utah and Tooele Counties and about 2 mi. S. of Salt Lake County. Both the N. and S. forks of creek known as West Canyon head at the peak and flow E. The source of Bates Creek is also at this peak; the creek flows W. The best way to reach the point on horseback is up the S. fork of West Canyon. It can also be reached from the W. up Bates Creek." On Lowe Peak, about 8.5 mi. in air line NW. of Cedar Valley post office. Intersected in 1884 by U. S. C. & G. S.; occupied and marked in 1915 and intersected in 1922 by U. S. G. S. T. 4 S., R. 3 W., sec. 32. Elev. 10,572 ft.

Station mark: Standard tablet set in solid rock.

Signal: Cairn 6 ft. high and 6 ft. in diam. at base centered over sta. mark.

Latitude $40^{\circ}25'32.365''$; longitude $112^{\circ}11'52.597''$.

JEREMY, Salt Lake County (Not occupied)

On Jeremy dwelling, about 5 mi. in air line NW. of Salt Lake City. T. 1 N., R. 1 W., N $\frac{1}{2}$ sec. 19.

Station mark: None.

Station and signal: Chimney.

[Latitude $40^{\circ}48'45.07''$; longitude $111^{\circ}59'54.13''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Lone Tree.....	26 03 20	206 02 40	3.520567

LAKE, Utah County

"On the northernmost high point of the Lake Mountains, a range on the W. side of Utah Lake. It is about 10 mi. in an air line SW. of Lehi and about 9 mi. E. of Fairfield. The summit, about a mi. S., is a little higher than point on which sta. is situated. It can be easily reached on horseback." Established in 1915 and recovered in 1922.

Station mark: Standard tablet set in solid rock.

Signal: Leaning cedar tree with lower branch removed; top of tree centered over sta. mark.

[Latitude $40^{\circ}16'54.84''$; longitude $111^{\circ}56'39.88''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Cedar Point.....	168 00 10	347 58 44	4.176724

LEHI, Utah County (Not occupied)

Large chimney at sugar factory about 1 mi. SE. of Lehi." Located in 1915 and relocated in 1922 by intersection.

Station mark: None.

Station and signal: Center of chimney.

[Latitude $40^{\circ}22'42.24''$; longitude $111^{\circ}49'58.52''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Lake.....	41 31 11	221 26 50	4.155442
Cedar Point.....	107 35 00	287 29 14	4.120648
Low Hills.....	153 12 47	333 11 09	3.900101

LEHI TEMPLE, Utah County (Not occupied)

"Steeple on Mormon Temple in the town of Lehi." Located in 1915 and relocated in 1922 by intersection.

Station mark: None.

Station and signal: Center of steeple.

[Latitude 40°23'25.60"; longitude 111°50'53.81"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Lake.....	34 09 30	214 05 46	4. 163167
Cedar Point.....	103 12 46	283 07 35	4. 064030
Low Hills.....	158 24 26	338 23 23	3. 791613

LINCOLN, Utah County (Not occupied)

On Linden School, on E. side of U. S. Highway 91, 2.5 mi. S. of Pleasant Grove.

Station mark: None.

Station and signal: Flagpole.

[Latitude 40°20'18.74"; longitude 111°42'50.97"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Fish.....	79 18 54	259 17 02	3. 618391
Pole.....	165 46 03	345 45 26	3. 741842

LONE SILO, Utah County (Not occupied).

Silo about 3 mi. in air line a little S. of W. of Pleasant Grove. No house nearby. T. 5 S., R. 1 E., sec. 25.

Station mark: None.

Station and signal: Center of silo.

Latitude 40°21'25.55"; longitude 111°47'25.99".

LONE TREE, Salt Lake County

Tall cottonwood tree with large top and trimmed lower limbs about 200 yd. N. of Saltair Speedway, 1.2 mi. in air line W. of Surplus Canal and about 7 mi. W. of State Street in Salt Lake City. A well, the source of a small stream, is just W. of tree. Two other small trees near abandoned cabin are about 200 yd. to N. Established in 1922 and recovered in 1925. T. 1 N., R. 2 W., sec. 25. Elev. 4,224 ft.

Station mark: None.

Station and signal: Trunk of tree.

Reference mark: Iron post stamped "1922 H 43" 1.23 meters from sta. in azimuth 329°40'.

[Latitude 40°47'08.50"; longitude 112°00'56.25"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Windmill.....	2 24 16	182 24 00	4. 150725
Herriman.....	21 09 51	201 02 44	4. 631998
Bacchus.....	23 39 30	203 36 46	4. 167751
Coon.....	38 30 27	218 26 00	4. 189503
East End Barn.....	44 02 23	224 01 39	3. 363678
Garfield.....	48 49 54	228 45 20	4. 115996
Saltair.....	84 32 13	264 26 05	4. 123630
Epperson.....	94 55 25	274 52 46	3. 758208
Green.....	170 34 59	350 33 28	3. 837907

LOW HILLS, Utah County

On low rocky point about 4 mi. in air line NNW. of Lehi.

Station mark: None.

Station and signal: Cairn 5 ft. high.

[Latitude 40°26'32.16"; longitude 111°52'30.45"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Lake.....	18 18 41	198 16 00	4.273104
Cedar Point.....	70 57 06	250 52 59	3.978858

MAESER, Utah County

Beehive on top of Maeser Memorial Building at Brigham Young University, in Provo. Sta. can be occupied.

Station mark: None.

Station and signal: Center of beehive.

[Latitude 40°14'43.41"; longitude 111°39'10.10"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Stack.....	62 42 35	242 41 32	3.417488
Poplar.....	72 20 43	252 17 43	3.839292
Cedar Point.....	123 59 49	303 47 04	4.526596
Sand.....	169 34 57	349 34 12	3.956554

MIDVALE, Salt Lake County (Not occupied)

At smelter in Midvale, about 11 mi. in air line S. of Salt Lake City.

Station mark: None.

Station and signal: Center of large brick chimney.

[Latitude 40°36'57.80"; longitude 111°54'50.01"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Cedar Point.....	14 18 05	194 15 26	4.364114
Coon.....	110 18 31	290 10 05	4.288740
Dry.....	120 58 24	300 55 58	3.788418
Lone Tree.....	155 30 00	335 26 01	4.316122

MURRAY, Salt Lake County (Not occupied)

Older and smaller of two large chimneys at smelter in town of Murray, about 8 mi. in air line S. of Salt Lake City. Located in 1915 and relocated in 1922 by intersection.

Station mark: None.

Station and signal: Center of chimney.

[Latitude 40°39'25.57"; longitude 111°53'26.77"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Cedar Point.....	15 53 17	195 49 45	4.447734
Herriman.....	45 27 27	225 15 28	4.563180
Dry.....	79 04 20	259 00 59	3.866696
Coon.....	96 12 18	276 02 57	4.307649
Lone Tree.....	143 35 10	323 30 17	4.249288

NORTH POPLAR, Salt Lake County (Not occupied)

About 1 mi. WNW. of Beck Hot Springs and about 3 mi. NNW. of State Capitol in Salt Lake City. T. 1 N., R. 1 W., sec. 13.

Station mark: None.

Station and signal: Poplar tree—northernmost of two such trees on mountain.

[Latitude 40°49'11.57"; longitude 111°54'08.92"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Dry.....	17 45 02	197 42 08	4.360582
Coon.....	50 23 51	230 14 57	4.396497
Lone Tree.....	68 21 18	248 16 52	4.011780
Young.....	93 05 08	272 56 24	4.273690
Green.....	105 43 15	285 38 17	4.044728

NORTHWEST ELECTRIC, Salt Lake County (Not occupied)

At Utah Power & Light Co. transformer sta., about 5 mi. in air line W. of Salt Lake City and just N. of Denver & Rio Grande Western R. R.

Station mark: None.

Station and signal: NW. corner of plant.

[Latitude 40°45'22.60"; longitude 112°00'25.65"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Coon.....	49 30 16	229 25 28	4.133857
Lone Tree.....	167 37 54	347 37 34	3.524340

PLEASANT GROVE, Utah County (Not occupied)

On district school building in Pleasant Grove.

Station mark: None.

Station and signal: Cupola.

[Latitude 40°21'56.71"; longitude 111°43'59.01"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Fish.....	33 07 42	213 06 34	3.655996

POLE, Utah County

At highest point along electric power line on hill about 1.5 mi. in air line a little E. of N. of Pleasant Grove. T. 5 S., R. 2 E., sec. 16.

Station mark: Tablet set in rock.

Signal: Power-line pole beside sta. mark with white cloth wrapped around it to height of 7 ft.

[Latitude 40°23'12.17"; longitude 111°43'48.50"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Pleasant Grove.....	6 05 03	186 04 56	3.369316
Hardy.....	8 11 54	188 11 34	3.715637
Fish.....	23 59 18	203 58 03	3.825984
Lone Silo.....	57 21 52	237 19 31	3.784930
Lake.....	57 29 01	237 20 41	4.334659
Lehi.....	83 59 47	263 55 47	3.943340
American Fork.....	89 31 20	269 28 45	3.752845
Lehi Temple.....	92 24 14	272 19 38	4.001735
Cedar Point.....	98 14 15	278 04 29	4.333076
Low Hills.....	116 40 12	296 34 34	4.138796
Bench.....	145 36 08	325 34 58	3.650445

POPLAR, Utah County (Not occupied)

Lone poplar tree with small willows growing around it, near bank of Utah Lake and about 4 mi. in air line a little S. of W. of Provo.

Station mark: None.

Station and signal: Poplar tree.

Latitude $40^{\circ}13'35.43''$; longitude $111^{\circ}43'48.38''$.

SALTAIR, Salt Lake County (Not occupied)

At Saltair, a resort 15 mi. in air line W. of Salt Lake City.

Station mark: None.

Station and signal: Highest cupola in resort. (This cupola was destroyed by fire sometime before 1925.)

Latitude $40^{\circ}46'27.09''$; longitude $112^{\circ}10'20.52''$.

SALT LAKE CITY CAPITOL, Salt Lake County

"Dome on State Capitol in Salt Lake City." Intersected in 1915 and occupied in 1922 and 1925.

Station mark: None.

Station and signal: Center of dome.

[Latitude $40^{\circ}46'38.80''$; longitude $111^{\circ}53'14.71''$]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Murray.....	1	12	51	181	12	43	4.126021
Midvale.....	7	07	28	187	06	26	4.256735
Cedar Point.....	11	09	53	191	06	13	4.613921
East Temple.....	20	31	48	200	31	40	2.916517
Dry.....	26	57	38	206	54	10	4.218994
Herriman.....	34	02	06	213	49	59	4.672863
Granger.....	36	34	07	216	31	01	4.048890
Bacchus.....	53	09	40	233	01	55	4.320644
Coon.....	61	23	09	241	13	40	4.367720
Air.....	84	22	50	264	20	02	3.782659
Saltair.....	89	13	58	269	02	48	4.381268
Lone Tree.....	94	52	51	274	47	50	4.035865
Young.....	105	57	37	285	48	19	4.318598
Jeremy.....	112	37	18	292	33	02	4.006111
Green.....	122	52	38	302	47	05	4.152813
Duck.....	128	32	26	308	27	56	4.091945

SAND, Utah County

On sandy plateau extending from mountains, about 1 mi. in air line W. of Provo River, 6 mi. N. of Provo and 4.5 mi. SE. of Pleasant Grove. T. 6 S., R. 2 E., sec. 1.

Station mark: Tablet set in rock.

Signal: 14-ft. pole with targets above sta. mark.

[Latitude $40^{\circ}19'31.92''$; longitude $111^{\circ}40'19.40''$]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Stack.....	3	53	06	183	52	47	4.005237
Spencer.....	11	53	58	191	53	30	3.682451
Poplar.....	24	12	01	204	09	46	4.081098
Fish.....	95	02	58	274	59	28	3.885872
Hardy.....	106	14	11	286	11	35	3.771728
Cedar Point.....	110	39	35	290	27	34	4.447819
Lincoln.....	111	59	33	291	57	55	3.586398
American Fork.....	122	30	51	302	26	00	4.099018
Low Hills.....	126	59	52	306	51	58	4.333895
Pleasant Grove.....	130	46	13	310	43	51	3.835163
Pole.....	144	01	40	323	59	24	3.924080

SLATE, Utah County

On slope extending from mountains just below Slate Creek, about 1.5 mi. in air line SE. of center of Provo and near city limits. First rd. E. below cemetery leads to sta.

Station mark: Tablet set in rock.

Signal: 14-ft. pole with target above sta. mark.

[Latitude 40°13'19.52"; longitude 111°37'49.79"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Poplar.....	93 20 44	273 16 52	3.929035
Stack.....	108 12 48	288 10 52	3.647889
Maeser.....	143 44 24	323 43 32	3.506410
Spencer.....	145 41 33	325 39 28	3.906997
Sand.....	162 54 32	342 52 55	4.079826

SPENCER, Utah County (Not occupied)

On church E. of Spencer School, on E. side of U. S. Highway 91, about 4.5 mi. in air line N. of Provo.

Station mark: None.

Station and signal: Center of spire.

[Latitude 40°16'55.66"; longitude 111°41'02.39"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Cedar Point.....	120 14 54	300 03 21	4.465404
Pole.....	161 21 33	341 19 46	4.088389

STACK, Utah County (Not occupied)

At canning plant in Provo, near intersection of Center Street and Denver & Rio Grande Western R. R.

Station mark: None.

Station and signal: Center of tall smokestack.

Latitude 40°14'04.53"; longitude 111°40'48.41".

TABERNACLE, Salt Lake County (Not occupied)

On Tabernacle at intersection of Lincoln Highway and U. S. Highway 91, about 5.5 mi. in air line S. of State Capitol, in Salt Lake City.

Station mark: None.

Station and signal: Cupola.

[Latitude 40°42'00.98"; longitude 111°53'12.78"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Dry.....	50 40 08	230 36 39	3.959611
Coon.....	82 46 59	262 37 29	4.315562
Lone Tree.....	131 08 33	311 03 31	4.159262
Salt Lake City Capitol.....	179 42 25	359 42 23	3.932975

WINDMILL, Salt Lake County (Not occupied)

At ranch, about 11 mi. in air line SW. of Salt Lake City and 0.5 mi. SW. of Garfield branch of Denver & Rio Grande Western R. R. T 2 S R. 2 W., SW¼ sec. 12.

Station mark: None.

Station and signal: Prominent windmill.

[Latitude 40°39'30.20"; longitude 112°01'21.51"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Coon.....	102 39 31	232 35 20	3.966794

YOUNG, Salt Lake County

Near shore of Great Salt Lake at point nearest to Antelope Island, about 5 mi. in air line NE. of Saltair and 3.5 mi. NW. of Epperson ranch. To reach: From fence corner on S. side of Saltair Speedway at point 1.7 mi. W. of Surplus Canal, go along rd. N. about 2 mi. to rd. fork, thence along W. rd. fork 2.2 mi. northwestward to another fork, thence along S. rd. fork about 3 mi. westward to cabin owned by Mrs. Young. The route described is the only traveled rd. in this vicinity; there is no rd. by which sta. may be reached from Epperson ranch. T. 1 N., R. 3 W., SE¼ sec. 12. Elev. 4,210 ft.

Station mark: None.

Station and signal: Ventilator on W. end of cabin.

Reference mark: Standard tablet stamped "1922 H 46" set in concrete post 10 ft. S.37°W. from sta. (This tablet is a standard benchmark.)

[Latitude 40°49'43.57"; longitude 112°07'29.23"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Coon.....	1 21 57	181 21 46	4.227885
Garfield.....	2 35 53	192 35 36	4.127154
Saltair.....	33 32 31	213 30 40	3.861537

NORTHERN UTAH, 1923

E. R. MARTIN, chief of party

This project of triangulation was extended from Coast and Geodetic Survey stations Promontory and Salt Lake Northwest Base. (See fig. 13.) It was computed on the old North American datum.³⁴ Readjustment of the results to the North American datum of 1927 depends on new positions for the base stations, as determined by the Coast and Geodetic Survey, and a new azimuth and length for the base. This report is the first to contain the published results of this project.

STATIONS**AMALGAMATED STACK, Weber County (Not occupied)**

About 2.5 mi. in air line W. of Ogden and 0.4 mi. NW. of Wilson School. May be reached by going W. on Wilson Lane from Ogden to Wilson School, thence NW. to stack. T. 6 N., R. 2 W., NE¼ sec. 26. Elev. at base of stack, about 4,272 ft.

Station mark: None.

Station and signal: Center of stack.

³⁴ See footnote 3, p. 4.

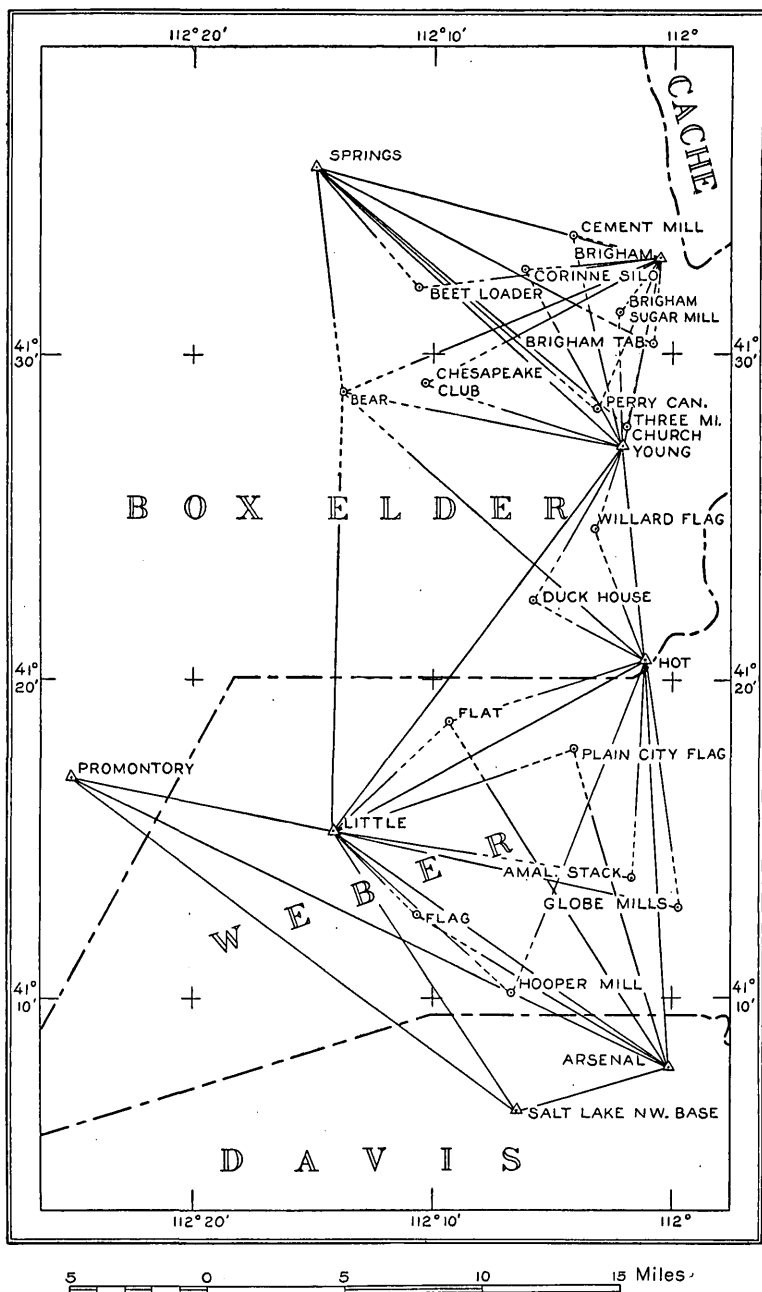


FIGURE 13.—Triangulation in northern Utah, 1923.

[Latitude 41°13'50.8"; longitude 112°01'41.6"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Little.....	98 42 28	278 34 10	4.25032

ARSENAL, Davis County

On roof of concrete water tank about 12 ft. above ground level in Government reservation for storage arsenal, about 0.5 mi. E. of headquarters building, near Salt Lake-Ogden rd. T. 5 N., R. 2 W., NE¼ sec. 36. Elev. at base of tank about 4,750 ft.

Station mark: Tablet set in cement on roof at point 9.1 ft. N. of its center.

Signal: Tank.

[Latitude 41°07'53.18"; longitude 112°00'28.11"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Salt Lake Northwest Base.....	74 56 30	254 52 26	3.952229
Promontory.....	118 20 28	298 02 12	4.592595
Flag.....	121 38 17	301 31 33	4.22507
Little.....	125 26 05	305 16 59	4.374526
Flat.....	148 08 52	328 03 00	4.371815
Plain City Flag.....	162 10 25	342 07 38	4.28413
Hot.....	177 43 26	257 43 00	4.373891

BEAR, Box Elder County (Not occupied)

At Bear River clubhouse on S. bank of Bear River, which flows westward to bay of same name, about 2 mi. in air line NE. of bay, 3 mi. W. of Chesapeake Gun Club, and 11 mi. W. of Brigham. T. 9 N., R. 3 W., SW¼ sec. 30. Elev. 4,207 ft.

Station mark: Not described.

[Latitude 41°28'57.13"; longitude 112°13'52.74"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Little.....	1 17 09	181 16 53	4.402857
Springs.....	173 14 19	353 13 36	4.107303

BEET LOADER, Box Elder County (Not occupied)

Beet loader about 3 mi. in air line W. of Corinne, 9 mi. WNW. of Brigham, and 2 mi. S. of Stokes. T. 10 N., R. 3 W., NE¼ sec. 9. Elev. 4,220 ft.

Station mark: Not described.

[Latitude 41°32'04.6"; longitude 112°10'43.3"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Springs.....	139 36 12	319 33 23	3.95914

BRIGHAM, Box Elder County

On small bench—part of shore of old glacial Lake Bonneville and now covered sparsely with large quartzite rocks—about 1.5 mi. in air line N. of northern boundary of city of Brigham, 0.6 mi. due E. of Utah Idaho Central [Elec.] R. R., directly

in line with cement works and mountain W. of town of Corinne. Just below quartzite outcrop 10 ft. in thickness on whose top is small cedar tree. T. 9 N., R. 2 W., NE¼ sec. 1. Elev. about 4,350 ft.

Station mark: Cross in center of triangle, both chiseled in rock.

Reference marks: Chiseled arrows described as follows—(1) In S. side of above-mentioned outcrop at point 3 ft. above ground and 21.3 ft. in slope distance from sta. mark; (2) 41.8 ft. SE. of sta. mark; (3) 36.6 ft. W. of sta. mark; (4) 21.95 ft. N. of sta. mark.

[Latitude 41°33'01.57"; longitude 112°00'36.50"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Brigham Tabernacle.....	3	54	06	183	53	56	3. 69798
Young.....	10	32	53	190	31	58	4. 028087
Three Mile Church.....	11	11	28	191	10	34	3. 98768
Perry Cannery.....	18	08	55	198	07	17	4. 04102
Brigham Sugar Mill.....	33	36	09	213	35	13	3. 54914
Chesapeake Club.....	62	32	55	242	26	28	4. 18394
Bear.....	67	51	23	247	42	35	4. 299807
Beet Loader.....	82	55	50	262	49	09	4. 15145
Corinne Silo.....	86	23	17	266	19	34	3. 89220
Springs.....	104	36	41	284	27	09	4. 314167
Cement Mill.....	105	42	44	285	40	25	3. 70423

BRIGHAM SUGAR MILL, Box Elder County (Not occupied)

Stack at sugar mill NW. from center of city of Brigham, at NW. corner of R. R. yard. T. 9 N., R. 2 W., N½ sec. 14. Elev. 4,257 ft.

Station mark: None.

Station and signal: Middle stack.

Latitude 41°31'25.9"; longitude 112°02'01.1".

BRIGHAM TABERNACLE, Box Elder County (Not occupied)

Tabernacle on Salt Lake-Yellowstone highway (N.-S.) which runs through center of city of Brigham.

Station mark: Not described.

[Latitude 41°30'20.3"; longitude 112°00'51.2"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Springs.....	117	25	21	297	15	59	4. 34437

CEMENT MILL, Box Elder County (Not occupied)

Cement mill about 4 mi. in air line NW. of Brigham, and 2 mi. NE. of Corinne. T. 10 N., R. 2 W., sec. 33.

Station mark: None.

Station and signal: Center of south stack on mill.

Latitude 41°33'45.9"; longitude 112°04'06.8".

CHESAPEAKE CLUB, Box Elder County (Not occupied)

At Chesapeake Gun Club, about 0.8 mi. in air line NW. of Bear River, 3 mi. E. of Bear River Club, and 8 mi. W. of Brigham. T. 9 N., R. 3 W., W½ sec. 27. Elev. 4,211 ft.

Station mark: Not described.

Latitude 41°29'12.9"; longitude 112°10'20.8".

CORINNE SILO, Box Elder County (Not occupied)

Silo in or near town of Corinne.

Station mark: None.

Station and signal: Center of silo.

Latitude $41^{\circ}32'45.5''$; longitude $112^{\circ}06'12.5''$.

DUCK HOUSE, Box Elder County (Not occupied)

Duck house at Willard Bay.

Station mark: Not described.

Latitude $41^{\circ}22'29.5''$; longitude $112^{\circ}05'51.2''$.

FLAG, Weber County (Not occupied)

At mouth of Weber River.

Station mark: None.

Station and signal: Flag.

[Latitude $41^{\circ}12'38.2''$; longitude $112^{\circ}10'42.7''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Little.....	134 25 42	314 23 20	3.84649

FLAT, Weber County

About 3.5 mi. W. of Plain City. Ground here is subject to overflow and is marshy below surface. T. 7 N., R. 3 W., S½ sec. 26. Elev. 4,208 ft.

Station mark: None.

[Latitude $41^{\circ}18'41.01''$; longitude $112^{\circ}09'22.17''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Little.....	47 35 02	227 31 47	0.968526

GLOBE MILLS, Weber County (Not occupied)

At Globe Mills, near western boundary of city of Ogden.

Station mark: None.

Station and signal: Flagpole.

[Latitude $41^{\circ}12'54.3''$; longitude $111^{\circ}59'51.0''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Little.....	102 25 36	282 16 05	4.31495
Hot.....	172 51 05	352 50 14	4.16009

HOOPER MILL, Weber County (Not occupied)

At Hooper Mill, about 1 mi. in air line N. of Weber-Davis county line. T. 5 N., R. 2 W., sec. 18.

Station mark: None.

Station and signal: Center of south stack at mill.

[Latitude 41°10'04.7"; longitude 112°06'46.2"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Little.....	132 28 26	312 31 59	4.15422

HOT, Box Elder County

On SW. slope of hill covered with large white boulders, 0.8 mi. in air line NE. of Utah Hot Springs, almost under E.-W. power line, 31.4 ft. from first pole to W. of pole on top of ridge, in azimuth 213°. T. 7 N., R. 2 W., W½ sec. 13.

Station mark: Shallow drill hole enclosed in chiseled triangle in very hard flinty rock outcropping about 2 in. above surface of ground.

Reference marks: Arrows cut in rock at distances and in azimuths from sta. mark as follows—(1) 13.7 ft., 28°; (2) 21.6 ft., 157°; (3) 14.8 ft., 235°.

Signal: Small cairn built over sta. mark.

[Latitude 41°20'39.31"; longitude 112°01'08.51"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Amalgamated Stack.....	3 29 54	183 29 32	4.10126
Hooper Mill.....	21 54 50	201 51 07	4.32429
Little.....	61 39 18	241 30 46	4.319320
Flat.....	72 24 35	252 19 09	4.080860
Duck House.....	117 23 12	297 20 05	3.86900
Bear.....	130 56 20	310 47 54	4.370531
Willard Flag.....	159 15 40	339 14 17	3.91432
Young.....	174 25 52	354 25 18	4.095852

LITTLE, Weber County

On top of small ridge extending NE. from point on Great Salt Lake where Lucin cut-off of Southern Pacific R. R. starts across lake, about 8 mi. in air line SE. of Plain City and 14 mi. W. of Ogden. (Ridge trends NE. to its summit, thence N.) Old mine hole is 7 ft. SW. of sta., in line with rock island in lake. T. 6 N., R. 3 W., W½ sec. 31.

Station mark: Standard tablet set in rock in ground directly above chiseled cross on rock set 18 in. below ground.

Reference marks: Arrows cut in rock at distances and in azimuths from sta. mark as follows—(1) 163.5 ft., 105°; (2) 139.0 ft., 125°; (3) 122.7 ft., 200°.

[Latitude 41°15'17.55"; longitude 112°14'17.12"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Promontory.....	107 35 22	287 28 12	4.201465

PERRY CANNERY, Box Elder County (Not occupied)

At Perry Cannery, about 3 mi. in air line SW. of center of Brigham, 4 mi. N. of Willard, and 1 mi. W. of U. S. Highway 91. T. 9 N., R. 2 W., sec. 34.

Station mark: None.

Station and signal: South stack.

[Latitude 41°28'23.0"; longitude 112°03'04.1"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Springs.....	133 23 56	313 16 02	4.35710

PLAIN CITY FLAG, Weber County (Not occupied)

On beet dump near Plain City.

Station mark: None.

Station and signal: Flag.

[Latitude $41^{\circ}17'46.7''$; longitude $112^{\circ}04'41.2''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Little.....	71 05 58	250 59 38	4.15142

PROMONTORY, Box Elder County

On the southeasternmost summit of Promontory Mountains, on Promontory Peninsula, which extends into Great Salt Lake from the N. The summit is very rocky and rough, being composed of bare, sharp, stratified rocks, with the dip nearly vertical. Nearly surrounded by ring wall of rocks 4 ft. high and 12 ft. in inner diam. Established by U. S. C. & G. S. in 1892; recovered by U. S. G. S. in 1923.

Station mark: Cross on copper bolt set in solid rock and surrounded by hollow brick pier 32 in. square supporting red sandstone cap, which bears a second copper bolt directly above first and is inscribed with triangle and legend "U S C & G Survey 1892."

Reference marks: Drill holes in solid rock just outside ring wall at distances and in azimuths from sta. mark as follows—(1) 2.50 meters, $213^{\circ}32'$; (2) 2.44 meters, $314^{\circ}08'$; (3) 2.71 meters, $70^{\circ}48'$.

Promontory latitude sta., marked by stone and brick pier, is 16.61 meters from sta. in azimuth $88^{\circ}41'$. Azimuth of vertical-circle sta., $10^{\circ}11'$.

Latitude $41^{\circ}17'52.813''$; longitude $112^{\circ}25'08.673''$.

SALT LAKE NORTHWEST BASE, Davis County

About 1.5 mi. N. of Syracuse Grove (terminus of Syracuse branch of Union Pacific R. R.), in field SE. of rd. crossing, on property of Cato Love and about 350 ft. W. of his dwelling, NE. across rd. from dwelling of Gilbert Parker and SE. across rd. from dwelling of J. W. Singleton, 51 meters from fence to N., and 63 meters from fence to W. Established by U. S. C. & G. S. in 1896; recovered by U. S. G. S. in 1923. T. 4 N., R. 2 W., center of sec. 6. Elev. 4,231 ft.

Station mark: Cross in copper bolt set in 2-ft. by 2-ft. by 10-in. sandstone block set about 2.5 ft. below surface of ground. Surface mark exactly like underground mark is embedded in center pier at ground surface.

Signal: Brick pier 9 ft. high and 4 ft. square at base, with opening at ground surface to give access to surface mark, built over sta. mark.

[Latitude $40^{\circ}06'37.570''$; longitude $112^{\circ}06'38.872''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Promontory.....	128 57 21.62	308 45 10.54	4.5211932
Little.....	146 23 07	326 18 05	4.284904

SPRINGS, Box Elder County

On top of isolated hill—the highest and westernmost peak of the mountain—just N. of Balfour sta. on Southern Pacific R. R., about 7 mi. in air line W. of Corinne and 22 mi. SW. of Logan City. T. 10 N., R. 4 W., sec. 13.

Station mark: Cross in center of triangle, both chiseled in hard gray limestone set level with surface of ground.

Signal: Cairn built over sta. mark.

Latitude $41^{\circ}35'49.23''$; longitude $112^{\circ}14'57.83''$.

THREE MILE CHURCH, Box Elder County (Not occupied)

Spire on church about 2 mi. in air line S. of Brigham, and 4 mi. N. of Willard on U. S. Highway 91. T. 8 N., R. 2 W., sec. 2. Elev. 4,358 ft.

Station mark: None.

Station and signal: Center of spire.

[Latitude $41^{\circ}27'52.5''$; longitude $112^{\circ}01'57.9''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Springs.....	129 11 21	309 02 43	4.36757

WILLARD FLAG, Box Elder County (Not occupied)

Flag about 0.5 mi. NW. of Oregon-Washington R. R. & Navigation Co. R. R. sta. at Willard, at W. end of first lane N. of sta., in W. fence line, 234 ft. N. of NE. corner of cistern on top of hill at NE. corner of peach orchard.

Station mark: None.

Signal: Flag.

Latitude $41^{\circ}24'48.1''$; longitude $112^{\circ}03'13.7''$.

YOUNG, Box Elder County

On N. side of ravine on property of T. C. Young, 4.6 ft. N. of fence line, 67.3 ft. E. of fence corner, 0.25 mi. E. of Ogden-Brigham rd. [U. S. Highway 91], 0.5 mi. E. of South Perry sta. on Utah Idaho Central [Elec.] R. R., 3 mi. N. of Willard, 3 mi. S. of Brigham. Top of spire of Mormon Tabernacle in Brigham barely visible over hill. Azimuths to points mentioned as follows—(1) Brigham Tabernacle, 47° ; (2) peak of barn roof, 232° ; (3) Perry Cannery, 254° ; (4) Threemile Creek Ward Meetinghouse (Mormon), 345° . T. 8 N., R. 2 W., sec. 2.

Station mark: Standard tablet set in 1- by 1- by 2.5-ft. concrete block set flush with ground directly over chiseled cross on rock.

[Latitude $41^{\circ}27'21.60''$; longitude $112^{\circ}02'00.65''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Willard Flag.....	19 41 56	199 41 08	3.70148
Duck House.....	30 43 13	210 40 41	4.02043
Little.....	37 32 06	217 23 59	4.449368
Bear.....	100 10 41	280 02 49	4.224914
Chesapeake Club.....	106 31 54	286 26 23	4.08289
Springs.....	131 04 01	310 55 26	4.377906
Corinne Silo.....	149 42 56	329 40 10	4.06350
Cement Mill.....	166 09 11	346 07 48	4.08681
Brigham Sugar Mill.....	179 55 37	359 55 37	3.87729

FORT DOUGLAS MILITARY RESERVATION, 1925

A. K. ANDREWS, chief of party

This project (fig. 14) was developed from two stations established by C. F. Urquhart in 1922 (Salt Lake and Utah Counties project), namely, Dry and Lone Tree, and from station Salt Lake City Capitol, located

by Urquhart in 1915 (Northern Utah project) and again in 1922 (Salt Lake and Utah Counties project). It is made up of third- and fourth-order triangulation. The three stations named were occupied, as was also station Cottonwood, and the quadrilateral was adjusted as third-order triangulation. The remaining stations of the project were

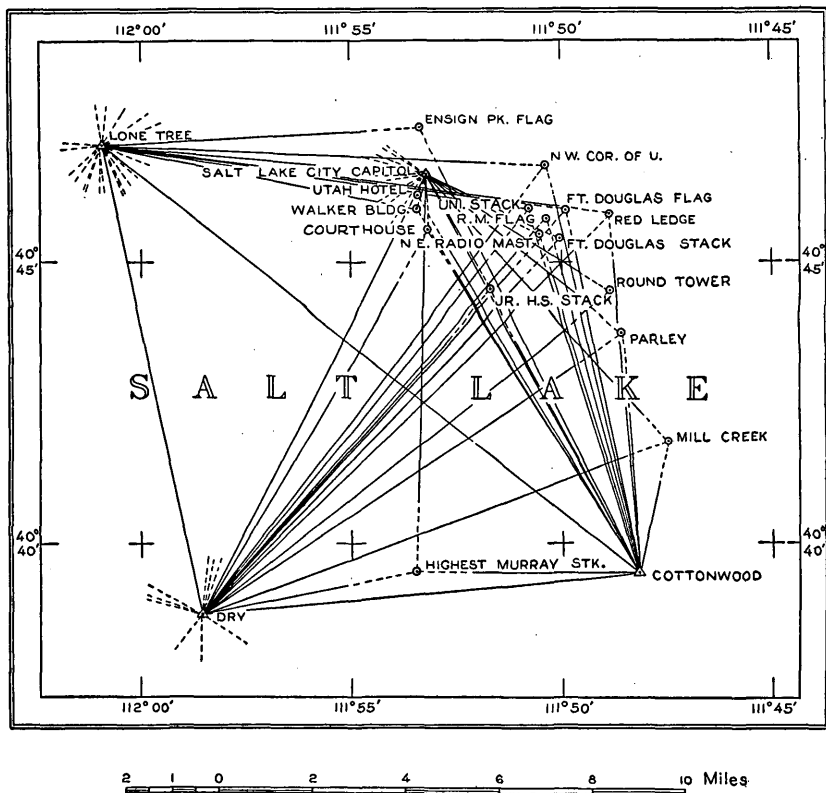


FIGURE 14.—Triangulation for Fort Douglas Military Reservation, 1925.

located by intersection and their positions were not adjusted. They therefore represent fourth-order triangulation.

The project was originally computed on the old North American datum,³⁵ and the results were readjusted to the North American datum of 1927 in conjunction with the readjustment of the Salt Lake and Utah Counties project, conducted by Urquhart in 1922. They are published for the first time in this bulletin.

STATIONS

COTTONWOOD, Salt Lake County

On spur of ridge between Mill Creek and Big Cottonwood Canyon, about 4.5 mi. in air line E. of Murray, 75 yd. E. of Wasatch Boulevard and county rock crusher, 10 ft. E. of W. break of bench, 450 ft. above floor of valley and 200 ft.

³⁵ See footnote 3, p. 4.

higher than ground level of Wasatch Boulevard. T. 2 S., R. 1 E., sec. 11. Elev. 5,148 ft.

Station mark: Standard tablet set in 6- by 6-in. concrete post.

Signal: 28-ft. pole with four targets and flag centered over sta. mark.

[Latitude 40°39'28.74"; longitude 111°48'10.94"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Dry.....	84 13 24	264 06 38	4.167887
Highest Murray Stack.....	89 43 23	269 39 57	3.871836
Lone Tree.....	128 21 48	308 13 29	4.359558
Salt Lake City Courthouse.....	148 10 40	328 07 25	4.123405
Walker Building.....	148 23 35	328 20 26	4.146244
Utah Hotel.....	149 30 40	329 27 16	4.159063
Salt Lake City Capitol.....	151 46 16	331 42 58	4.177839
Ensign Peak Flag.....	154 11 40	334 08 16	4.226197
Junior High School Stack.....	158 47 11	338 45 28	4.003002
University Stack.....	162 28 18	342 26 33	4.099264
Northeast Radio Mast.....	163 16 13	343 14 40	4.064770
Reference Mark Flag.....	164 33 47	344 32 18	4.082198
Fort Douglas Stack.....	166 33 49	346 32 34	4.051790
Northwest Corner of U.....	167 17 46	347 16 22	4.141249
Fort Douglas Flag.....	168 10 04	348 08 55	4.085084
Red Lodge.....	174 51 04	354 50 34	4.076217
Parley.....	176 18 01	356 17 45	3.904621

DRY, Salt Lake County

In abandoned fence line on ridge sloping from W. and on land formerly used for dry farming, about 3 mi. in air line NW. of West Jordan and 2 mi. WNW. of Bennion, stations on Salt Lake & Utah [Elec.] R. R. Can be reached by motor. Established in 1922 and recovered in 1925. T. 2 S., R. 1 W., sec. 17.

Station mark: Standard iron post with bronze cap.

Signal: 14-ft. pole with black and white cross-targets at sta. mark.

[Latitude 40°38'20.24"; longitude 111°53'34.23"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Lone Tree.....	168 00 26	347 58 53	4.204891

ENSIGN PEAK FLAG, Salt Lake County (Not occupied)

On small gray foothill 1.2 mi. in air line N. of State Capitol, in Salt Lake City. T. 1 N., R. 1 E., NW¼ sec. 30. Elev. 5,410 ft.

Station mark: None.

Station and signal: Flagpole.

No check on this position.

[Latitude 40°47'39.95"; longitude 111°53'23.53"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Lone Tree.....	84 49 11	264 44 15	4.027693

FORT DOUGLAS FLAG, Salt Lake County (Not occupied)

Post flagstaff at Fort Douglas.

Station mark: None.

Station and signal: Flagstaff.

[Latitude 40°45'54.70"; longitude 111°49'57.28"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Dry.....	42 12 27	222 06 50	4.257174
Lone Tree.....	98 26 18	278 19 04	4.193684

FORT DOUGLAS STACK, Salt Lake County (Not occupied)

Iron stack of incinerator plant at Fort Douglas.

Station mark: None.

Station and signal: Center of stack.

[Latitude 40°45'23.99"; longitude 111°50'02.53"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Dry.....	44 00 43	223 55 10	4.238129
Salt Lake City Capitol.....	117 07 42	297 05 36	3.704470

HIGHEST MURRAY STACK, Salt Lake County (Not occupied)

Highest brick stack of American Smelter Co., in Murray.

Station mark: None.

Station and signal: Center of stack.

[Latitude 40°39'27.45"; longitude 111°53'27.83"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Dry.....	78 35 16	258 31 57	3.865870

JUNIOR HIGH SCHOOL STACK, Salt Lake County (Not occupied)

Red brick stack on junior high school [Uinta School] near SW. corner of Fort Douglas Military Reservation and just N. of Thirteenth Street South, Salt Lake City.

Station mark: None.

Station and signal: Center of stack.

[Latitude 40°44'33.03"; longitude 111°50'46.23"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Dry.....	45 19 06	225 14 01	4.189333
Salt Lake City Capitol.....	138 05 55	318 04 18	3.717120

LONE TREE, Salt Lake County

Tall cottonwood tree with large top and trimmed lower limbs about 200 yd. N. of Saltair Speedway, 1.2 mi. in air line W. of Surplus Canal and about 7 mi. W. of State Street in Salt Lake City. A well, the source of a small stream, is just W. of tree. Two other small trees near abandoned cabin are about 200 yd. to N. Established in 1922 and recovered in 1925. T. 1 N., R. 2 W., sec. 25. Elev. 4,224 ft.

Station mark: None.

Station and signal: Trunk of tree.

Reference mark: Iron post stamped "1922 H 43" 1.23 meters from sta. in azimuth 329°40'.

Latitude 40°47'08.50"; longitude 112°00'56.25".

MILL CREEK, Salt Lake County (Not occupied)

On low bare ridge, 0.25 mi. E. of Pleasant View addition to Salt Lake City, 0.2 mi. N. of Mill Creek rd. (Thirty-fifth South Street), 0.5 mi. SSW. of John Park Reservoir, on property of Mrs. E. L. Cummings, 35 ft. N. of drain with high-cut bank (drainage floors W.). T. 1 S., R. 1 E., SE¼ sec. 26i

Station mark: Standard iron post with bronze cap.

Signal: 14-ft. pole with crossed targets and flag centered over sta. mark.

[Latitude 40°41'48.74"; longitude 111°47'53.38"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Cottonwood.....	5 28 32	185 28 22	3.637268
Dry.....	68 56 21	248 49 23	4.207831
Salt Lake City Capitol.....	139 54 03	319 50 33	4.068264

NORTHEAST RADIO MAST, Salt Lake County (Not occupied)

NE. radio mast at Fort Douglas.

Station mark: None.

Station and signal: Top of mast.

No check on this position.

[Latitude 40°45'29.12"; longitude 111°50'33.39"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Salt Lake City Capitol.....	119 37 04	299 35 19	3.638000

NORTHWEST CORNER OF U, Salt Lake County (Not occupied)

Large concrete letter U, 0.25 mi. N. of Dry Canyon and 1.2 mi. NE. of University of Utah. T. 1 N., R. 1 E., NE¼ sec. 33.

Station mark: None.

Station and signal: NW. corner of U.

[Latitude 40°46'46.53"; longitude 111°50'20.77"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Dry.....	37 43 06	217 37 44	4.277638
Lone Tree.....	92 39 42	272 32 44	4.173661

PARLEY, Salt Lake County (Not occupied)

On main spur between Parleys and Emigration Canyons, near SE. limits of Salt Lake City, 0.35 mi. in air line NE. of right-angle turn in Parleys Canyon rd. (U. S. Highway 40), at top of first steep break, at elevation 600 ft. above floor of valley. Top of spur is covered with oak brush. Ground slopes W., N., and S. from sta. T. 1 S., R. 1 E., SW¼ sec. 14. Elev. 5,459 ft.

Station mark: Standard iron post with bronze cap.

Signal: 28-ft. pole with four targets centered over sta. mark.

[Latitude 40°43'48.47"; longitude 111°48'33.00"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Dry.....	56 05 40	235 59 08	4.230965
Salt Lake City Capitol.....	128 30 46	308 27 42	3.926473

RED LEDGE, Salt Lake County (Not occupied)

On prominent red sandstone ledge on spur of red butte, 0.2 mi. SW. of and 600 ft. lower than main butte, about 1 mi. in air line E. of Fort Douglas, between Red Butte Creek and Emigration Canyon, on top of steep break to W. T. 1 S., R. 1 E., NE¼ sec. 3. Elev. 5,768 ft.

Station mark: Standard tablet cemented in rock.

Signal: Small cairn supporting 14-ft. pole with crossed targets and flag centered over sta. mark.

[Latitude 40°45'53.56"; longitude 111°48'56.54"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Dry.....	45 27 59	225 21 42	4.279683
Lone Tree.....	97 51 40	277 43 47	4.231355

REFERENCE MARK FLAG, Salt Lake County (Not occupied)

On grassy mound on golf course in Fort Douglas Military Reservation, about 0.5 mi. SW. of post flag and 500 yd. E. of University of Utah.

Station mark: Standard tablet set in top of concrete post.

Signal: 14-ft. pole with crossed targets and flag centered over sta. mark.

No check on this position.

[Latitude 40°45'46.32"; longitude 111°50'28.07"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Dry.....	41 00 45	220 55 28	4.240706

ROUND TOWER, Salt Lake County (Not occupied)

Gate tower of new Catholic school (St. Mary of the Wasatch), 2 mi. in air line SE. of Fort Douglas. T. 1 S., R. 1 E., SW¼ sec. 11.

Station mark: None.

Station and signal: W. window of tower.

No check on this position.

[Latitude 40°44'31.60"; longitude 111°48'50.41"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Dry.....	51 43 11	231 36 51	4.242397
Salt Lake City Capitol.....	122 21 14	302 18 22	3.865515

SALT LAKE CITY CAPITOL, Salt Lake County

"Dome on State Capitol in Salt Lake City." Intersected in 1915 and occupied in 1922 and 1925.

Station mark: None.

Station and signal: Center of dome.

[Latitude 40°46'38.80"; longitude 111°53'14.71"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Highest Murray Stack.....	1 19 35	181 19 26	4.124138
Walker Building.....	9 04 30	189 04 24	3.133593
Utah Hotel.....	12 56 31	192 56 27	2.935912
Dry.....	26 57 38	206 54 10	4.218994
Lone Tree.....	94 52 51	274 47 50	4.035865

SALT LAKE CITY COURTHOUSE, Salt Lake County (Not occupied)

Clock tower on courthouse (city and county building), at State and Fifth South Streets, Salt Lake City.

Station mark: None.

Station and signal: Center of tower.

[Latitude 40°45'34.62"; longitude 111°53'09.61"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Dry.....	30 49 54	210 46 22	4.172631
Salt Lake City Capitol.....	176 32 40	356 32 35	3.297384

UNIVERSITY STACK, Salt Lake County (Not occupied)

Round gray stack at University of Utah heating plant, Salt Lake City.

Station mark: None.

Station and signal: Center of stack.

[Latitude 40°45'57.23"; longitude 111°50'52.33"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Dry.....	38 51 16	218 46 15	4.238021
Lone Tree.....	98 52 26	278 45 49	4.156306

UTAH HOTEL, Salt Lake County (Not occupied)

On Utah Hotel, at Main and South Temple Streets, Salt Lake City.

Station mark: None.

Station and signal: Flagpole in center of hive-shaped structure on top of building.

[Latitude 40°46'11.55"; longitude 111°53'22.97"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Dry.....	27 43 09	207 39 46	4.196505

WALKER BUILDING, Salt Lake County (Not occupied)

Walker Brothers Bank building at Main and Second South Streets, Salt Lake City.

Station mark: None.

Station and signal: Flagpole on top of building.

[Latitude 40°45'55.26"; longitude 111°53'23.86"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Lone Tree.....	102 03 49	281 58 54	4.035294

ZION NATIONAL PARK, 1928

H. H. HODGESON, chief of party

This project (fig. 15) was developed from Coast and Geodetic Survey stations Burger and Brian and in 1929 contact was made with the

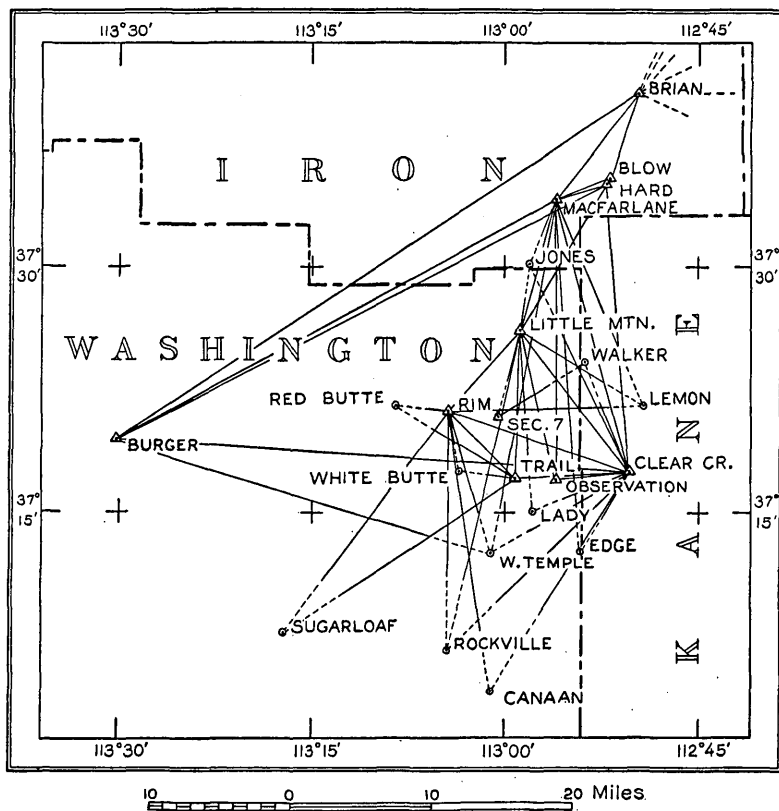


FIGURE 15.—Triangulation for Zion National Park, 1928.

Bryce Canyon National Park project through station Brian. The same engineer conducted both parties.

This triangulation has been computed on the North American datum of 1927 only. It was not adjusted by least squares, and some of the azimuths and distances given were obtained by averaging the azimuths and distances from two or more triangles.

The computed results of this project are published in this report for the first time.

STATIONS

BLOW, Iron County

On summit of yellowish-earth bluff at N. end of cirque on W. side of Blowhard Mountain, in Dixie National Forest, about 12.5 mi. in air line SE. of Cedar City, 0.75 mi. N. of Cedar City-Navajo Lake motor rd. Broad view to W. from sta.; can

see nothing to E. because of timber and rising ground. T. 37 S., R. 9 W., sec. 16.

Station mark: None.

Station and signal: Green timber quadripod covered with white cloth.

Reference marks: Three spikes arranged in triangular form and driven into blazed surface on spruce trees at distances and in azimuths from sta. as follows—
(1) 51.0 ft., 153°30'; (2) 28.4 ft., 244°25'.

[Latitude 37°35'36.24"; longitude 112°52'16.49"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Hard.....	9 37 47	189 37 44	2.84296
Macfarlane.....	64 56 56	244 54 32	3.80618

BRIAN, Iron County

On summit of Brian Head, highest peak of Cedar Mountains, about 14 mi. in air line E. of Cedar City, on brink of cliff facing SW. May be reached from Cedar City or Parowan by taking rd. to Cedar Breaks, well-known national monument. At point about 1 mi. N. of small hotel go along rd. E. to old Mitchell sawmill, thence to spring at SE. base of peak proper, thence about 0.5 mi. NW. to summit. Truck may be driven as far as spring. Cliff is eroding rapidly and sta. will soon be lost. Reference marks are on solid ground to NE. well back from brink of cliff. Established by U. S. C. & G. S. in 1925 and reoccupied by U. S. G. S. in 1928 and 1929.

Station mark: U. S. C. & G. S. standard disk set in rock.

Reference marks: U. S. C. & G. S. reference disks set in rock at distances and in azimuths from sta. mark as follows—(1) 80.38 ft., 249°31'34"; (2) 72.87 ft., 305°18'35".

Signal: Octagonal framework 10 ft. high and 3 ft. in diam. at base covered with white cloth centered over sta. mark.

[Latitude 37°40'52.495"; longitude 112°49'49.901"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Blow.....	20 14 47	200 13 17	4.01669
Macfarlane.....	37 01 27	216 57 33	4.19321
Burger.....	56 31 10.32	236 06 42.12	4.8523888

BURGER, Washington County

On small, steep rock knob on summit of one of highest peaks on southern end of Pine Valley Mountains, about 15 mi. in air line N. of St. George, 9 mi. by trail SE. of Pine Valley. May be reached from Pine Valley by Forest Service trail to top of Forsythe Canyon where trail becomes level, thence left to summit of rocky peak. Established by U. S. C. & G. S. in 1925; reoccupied by U. S. G. S. in 1928. Elev. (U. S. F. S.) 10,324 ft.

Station mark: U. S. C. & G. S. standard disk set in rock.

Reference mark: U. S. C. & G. S. reference disk set in solid rock 27.76 ft. from sta. mark in azimuth 95°56'. Arrow on disk points directly away from sta.

Signal: Octagonal framework 10 ft. high and 3 ft. in diam. at base covered with white cloth centered over sta. mark.

Latitude 37°19'31.849"; longitude 113°30'01.481".

CANAAN, Washington County (Not occupied)

Rocky cone on mesa, about 6 mi. in air line S. of Rockville and 2 mi. N. of Canaan ranch.

Station mark: None.

Station and signal: Highest point of cone.

[Latitude 37°04'02.12"; longitude 113°01'02.49"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Rim.....	170 53 49	350 51 42	4.51503

CLEAR CREEK, Kane County

On W. point of Clear Creek Mountain, between Clear Creek and Orderville Gulch, 3 mi. in air line E. of Zion National Park, 12 mi. W. of Orderville. From cabin 2 mi. SW. of sta., where there is water and a fenced pasture, a route can be selected for the ascent. Animals may be taken along ridge to point about 300 yd. W. of sta., which is about 4 hours' ride from The Lodge, in Zion National Park. T. 40 S., R. 9 W., sec. 33. Elev. 8,087 ft.

Station mark: Point 2 ft. above ground in center of triangle formed by three wire nails driven into E. side of trunk of large cedar tree.

Signal: Flagpole at top of tree centered directly over sta. mark.

[Latitude 37°17'32.98"; longitude 112°50'51.92"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Edge.....	27 44 32	207 42 35	4.01006
Canaan.....	31 07 20	211 01 11	4.46513
Rockville.....	46 08 52	226 00 28	4.45516
West Temple.....	59 25 37	239 19 22	4.24864
Lady.....	67 49 56	247 45 40	4.05054
Observation.....	83 12 14	263 08 58	3.90676
Trail.....	85 51 52	265 46 53	4.08591
Burger.....	93 49 18	273 25 34	4.76325
Rim.....	109 59 28	289 51 10	4.33245
Little Mountain.....	144 33 12	324 28 17	4.31372
Jones.....	155 30 43	335 26 20	4.40877
Walker.....	159 53 44	339 51 51	4.12315
Macfarlane.....	165 36 35	345 33 20	4.50080
Hard.....	176 09 46	356 08 52	4.51565

EDGE, Washington County (Not occupied)

Brushy cone on white sandstone base, on E. edge of Zion National Park, at point 3 mi. in air line N. of its SE. corner, just W. of Washington-Kane county line, about 1 mi. S. of Zion-Mount Carmel highway.

Station mark: None.

Station and signal: Highest point of cone.

[Latitude 37°12'39.11"; longitude 112°54'05.12"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Macfarlane.....	175 29 38	355 28 20	4.60061

HARD, Iron County

On summit of reddish-earth bluff at S. end of cirque on W. side of Blowhard Mountain, in Dixie National Forest, about 12.5 mi. in air line SE. of Cedar City and 0.5 mi. N. of Cedar City-Navajo Lake rd. Wide expanse of country is visible to S., W., and N., but not to E. because of timber and rising ground. T. 37 S., R. 9 W., sec. 16.

Station mark: None.

Station and signal: Octagonal framework 10 ft. high and 3 ft. in diam. at base covered with white cloth and supported by guy wires.

Reference marks: Triangles formed by groups of three spikes each driven into blazed surface of pine trees at distances and in azimuths as follows—(1) 42.3 ft., 302°45', at edge of bluff; (2) 44.5 ft., 336°51'.

[Latitude 37°35'13.97"; longitude 112°52'21.30']

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Little Mountain.....	31 26 48	211 22 47	4.27137
Burger.....	62 35 14	242 12 20	4.79715
Macfarlane.....	70 23 53	250 21 32	3.78039

JONES, Iron County (Not occupied)

On N. and highest end of small mountain, the direction of whose longest axis is approximately N.-S., 1 mi. in air line W. of L. W. Jones ranch, just N. of Iron-Washington county line, 9 mi. N. of Zion National Park and 13 mi. SE. of Cedar City.

Station mark and signal: Cairn on highest point of mountain.

[Latitude 37°30'09.41"; longitude 112°58'04.46']

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Little Mountain.....	11 18 20	191 17 48	3.82480

LADY, Washington County (Not occupied)

On E. end and summit of Lady Mountain, in Zion National Park, about 0.5 mi. in air line NW. of The Lodge and 8 mi. NE. of Rockville. Can be reached from The Lodge by foot trail. Elev. 6,940 ft.

Station mark: None.

Station: Center of base of gnarled and broken juniper tree on highest point of mountain.

Reference mark: Triangle formed by three spikes driven into blazed surface of piñon tree 29.2 ft. S. of sta.

Signal: Tripod covered with white cloth centered over sta.

[Latitude 37°15'15.26"; longitude 112°57'54.09']

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Little Mountain.....	175 44 32	355 43 53	4.32370

LEMON, Kane County (Not occupied)

On timbered summit—point of ridge above rim rock—on divide between North Fork of Virgin River and Orderville Gulch, 3 mi. NW. of ranch of John Lemon, 4 mi. E. of NE. corner of Zion National Park and about 12 mi. in air line NW. of Orderville. Lemon ranch may be reached with animals by way of Clear Creek rd. T. 40 S., R. 9 W., sec. 3.

Station mark: None.

Station and signal: Bush on highest point of ridge.

[Latitude 37°21'38.57"; longitude 112°49'42.40"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Rim.....	89	26	02	269	17	02	4.34080
Little Mountain.....	123	59	56	303	54	20	4.21660
Macfarlane.....	157	29	35	337	25	38	4.39833

LITTLE MOUNTAIN, Washington County

On high point of ridge which is the steep W. side of mesa extending southward from Little Mountain and which forms E. boundary of Oak Valley, about 16 mi. in air line SE. of Cedar City, 2 mi. SW. of Crystal Spring, and 5 mi. NE. of Blue Spring.

Station mark: Drill hole in sandstone rock.

Reference mark: Reference tablet stamped "Little Mtn" cemented in sandstone rock, 137.1 ft. from sta. mark in azimuth 128°03'48".

Signal: Flagpole covered with white cloth and supported by 4 poles centered over sta. mark.

[Latitude 37°26'36.88"; longitude 112°53'57.73"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Trail.....	0	36	38	180	36	33	4.24691
Rockville.....	13	12	03	193	08	33	4.57450
Section Seven.....	13	18	57	193	17	59	4.00982
Rim.....	41	09	18	221	05	54	4.09812

MACFARLANE, Iron County

On summit of Volcanic or Black Mountain, about 10 mi. in air line SE. of Cedar City and 2 mi. SW. of the Wood ranch, on property of John C. Macfarlane. Can be reached with animals by rd. and trail from Wood ranch.

Station mark: Standard tablet stamped "Macfarlane" cemented in rock on S. side of summit.

Reference mark: Reference tablet stamped "Macfarlane" cemented in rock 19.8 ft. from sta. mark in azimuth 171°28'.

Signal: Octagonal framework 10 ft. high and 3 ft. in diam. at base covered with white cloth centered over sta. mark.

[Latitude 37°34'08.27"; longitude 112°56'12.75"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Observation.....	0	11	45	180	11	42	4.50027
West Temple.....	10	29	18	190	26	17	4.60623
Little Mountain.....	16	14	54	196	13	14	4.16118
Jones.....	20	26	27	200	25	19	3.89531
Burger.....	61	43	20	241	22	46	4.75371

OBSERVATION, Washington County

On shell-rock limestone summit, 0.4 mi. N. of Observation Point, 5.5 mi. N. of The Lodge, in Zion National Park, about 10 mi. NE. of Rockville. Can be reached with animals by rd. and trail from The Lodge. Elev. 6,708 ft.

Station mark: Standard tablet stamped "Observation" cemented in sandstone rock set flush with ground.

Reference mark: Reference tablet stamped "Observation" cemented in limestone ledge 29.5 ft. from sta. mark in azimuth $135^{\circ}45'$.

Signal: Flagpole in cedar tree, 27.2 ft. from sta. mark in azimuth $315^{\circ}46'$.

[Latitude $37^{\circ}17'01.88''$; longitude $112^{\circ}56'17.13''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Little Mountain.....	167 26 39	347 25 01	4.25916

RED BUTTE, Washington County (Not occupied)

On red sandstone butte on divide between Dry and Hop Valley Creeks, 12 mi. in air line SE. of New Harmony post office and 8 mi. E. of the Batty homestead.

Station mark: None.

Station and signal: Highest point of butte.

Latitude $37^{\circ}21'45.37''$; longitude $113^{\circ}08'45.22''$.

RIM, Washington County

On bare summit of small lava ridge on upper Kolob Plateau, about 12 mi. in air line NE. of Virgin City, 3 mi. SW. of Blue Spring and just N. of Blue Spring-Virgin City rd. Summit overlooks low country to W. of plateau. T. 39 S., R. 11 W., sec. 34. Elev. 7,888 ft.

Station mark: Stone drill driven flush with surface of ground.

Reference mark: Reference tablet stamped "Rim" cemented in lava rock 11.1 ft. from sta. mark in azimuth $185^{\circ}28'$.

Signal: Flagpole covered with white cloth and supported by 4 poles centered over sta. mark.

[Latitude $37^{\circ}21'30.61''$ longitude $113^{\circ}04'32.94''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Rockville.....	0 37 35	180 37 28	4.45316
Sugarloaf.....	37 38 45	217 30 43	4.50786
Red Butte.....	94 12 44	274 10 11	3.79410

ROCKVILLE, Washington County (Not occupied)

On summit of Rockville Mountain, about 4 mi. in air line SW. of Rockville.

Station mark: None.

Station and signal: Highest point of mountain.

Latitude $37^{\circ}06'51.20''$; longitude $113^{\circ}04'44.95''$.

SECTION SEVEN, Washington County (Not occupied)

On Salt Lake Meridian, at W. cor. secs. 1, 6, 7, and 12, T. 40 S., Rs. 10 and 10½. All trees used as bearings were found in place. Elev. 7,275 ft.

Station mark: Section corner stone.

Reference mark and signal: Flagpole centered over base of tree used to sec. 12 as bearing 98.3 ft. from sta. mark in azimuth $80^{\circ}10'$.

No check on this position.

Latitude $37^{\circ}21'14.00''$; longitude $113^{\circ}00'33.45''$.

SUGARLOAF, Washington County (Not occupied)

On sharp volcanic cone on N. point of Hurricane Ridge and W. side of Little Creek, about 4 mi. in air line S. of town of Hurricane. Cone is known as Sugarloaf Butte.

Station mark: None.

Station and signal: Highest point of cone.

No check on this position.

Latitude $37^{\circ}07'42.81''$; longitude $113^{\circ}17'49.70''$.

TRAIL, Washington County

On top and at SW. corner of first small mesa on Horse Pasture Plateau, about 200 yd. S. of West Rim Trail, about $2\frac{1}{2}$ hrs.' ride along West Rim Trail from The Lodge in Zion National Park, and 10 mi. in air line NE. of Rockville.

Station mark: None.

Station and signal: Flagpole in top of pine tree whose base is reference mark 1.

Reference mark 1: Center of triangle formed by three spikes driven into surface of tree at base and on its E. side. Center of trunk of tree at ground is 4.0 ft. from sta. in azimuth $82^{\circ}46'$. Tree is 60 ft. high and 2 ft. in diam. and is blazed on 4 sides.

Reference mark 2: Reference tablet stamped "Trail" cemented in limestone rock, 72.5 ft. from sta. in azimuth $274^{\circ}10'27''$.

[Latitude $37^{\circ}17'04.18''$; longitude $112^{\circ}59'05.37''$]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
Sugarloaf.....	58	07	20	237	56	00	4.51432
White Butte.....	100	31	52	280	29	10	3.82629
Red Butte.....	121	18	49	301	12	57	4.22278
Rim.....	135	32	57	315	29	38	4.06113

WALKER, Kane County (Not occupied)

Small pillar projecting from point of rim rock on high timbered ridge 3 mi. in air line N. of NE. corner of Zion National Park and 4 mi. NW. of Levi Walker ranch, just E. of Kane-Washington county line and Box Canyon. The Walker ranch is on North Fork of Virgin River.

Station mark: None.

Station and signal: Center of pillar.

[Latitude $37^{\circ}24'17.41''$; longitude $112^{\circ}53'57.50''$]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
Section Seven.....	59	54	07	239	50	07	4.05167
Little Mountain.....	120	14	42	300	11	40	3.93162

WEST TEMPLE, Washington County (Not occupied)

Large pine tree on summit of West Temple Mountain, highest peak in Zion National Park, about 4 mi. in air line N. of Rockville. Peak is inaccessible. Tree, if viewed from E. or W., appears to be largest single pine tree and the one farthest S. of several on top of mountain. Elev. 7,795 ft.

Station mark: None.

Station and signal: Center of pine tree.

[Latitude 37°12'40.04"; longitude 113°01'10.90"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Burger.....	106 43 30	286 26 02	4.64826
Rim.....	163 05 37	343 03 35	4.23292

WHITE BUTTE, Washington County (Not occupied)

On South Guardian Angel Peak—a white sandstone butte on red sandstone base about 10 mi. in air line NE. of Virgin City, just E. of W. border of Zion National Park, on divide between Right and Left Forks of North Creek. This is the most prominent of the buttes at Guardian Angel Pass, near mouth of Great West Canyon. Elev. (U. S. F. S.) 7,160 ft.

Station mark: None.

Station and signal: Highest point of butte.

[Latitude 37°17'43.84"; longitude 113°03'32.94"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Rim.....	168 04 28	348 03 52	3.85402

BRYCE CANYON NATIONAL PARK, 1929**H. H. HODGESON, chief of party**

This net of triangulation (fig. 16) was developed from Coast and Geodetic Survey stations Brian and Tushar, at which points it comes into contact with two other projects in Utah—at Brian, with Zion National Park project, conducted by the same engineer in 1928; at Tushar with Iron Springs special quadrangle project, conducted by Fred McLaughlin in 1905. The chief of party was assisted in the project by W. R. Broaddus.

This triangulation was originally computed on the North American datum of 1927 and therefore requires no readjustment. In the computation the azimuths between principal stations were carried to hundredths of seconds and logarithms of distance in meters to seven decimal places. For unadjusted lines to secondary stations the azimuths were computed either to whole seconds or to tenths of seconds, and the logarithms of distance in meters to only six decimal places. The results have been tabulated accordingly.

The present report is the first in which the results of this project have been published.

ADAMS, Garfield County

On naked crag at eastern edge of Adams Head, a conspicuous subtabular-timbered eminence on Sevier Plateau, 14.5 mi. in air line NNE. from Panguitch. Crag can be seen from high points in its vicinity but not from valley of Sevier

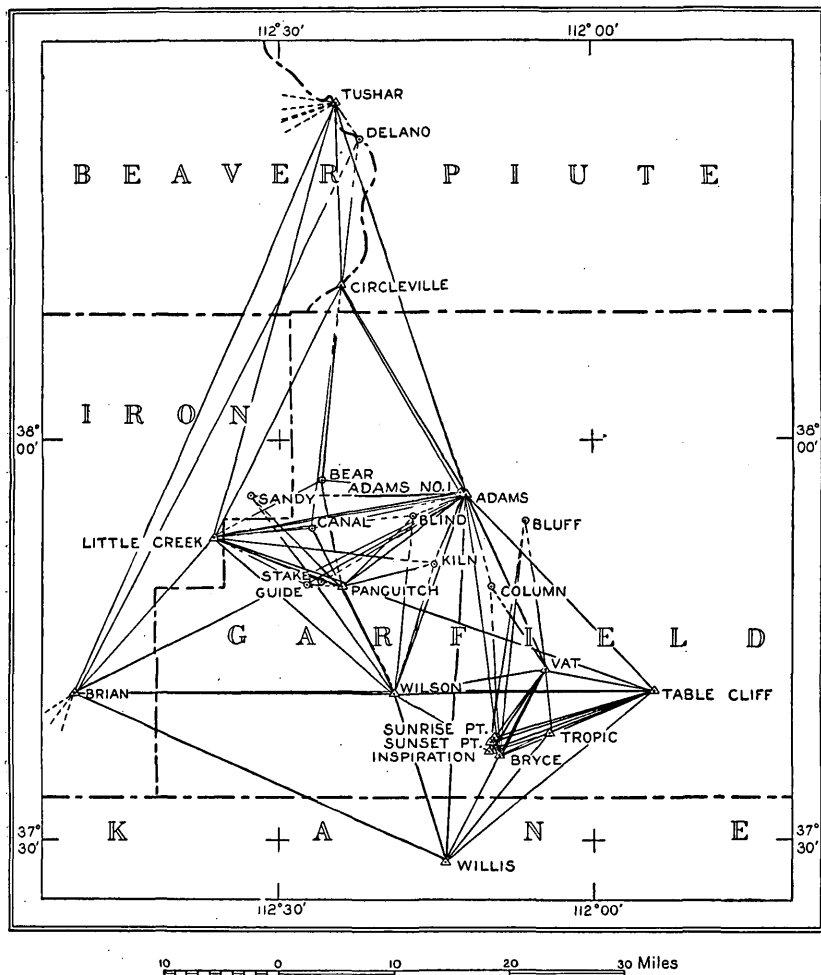


FIGURE 16.—Triangulation for Bryce Canyon National Park, 1929.

River. Can be reached with animals by trail from Cottonwood ranger sta. Established in 1874; reoccupied in 1929, when reference mark was set. T. 33 S., R. 3 W., near line between secs. 14 and 15. Elev. about 10,360 ft.

Station mark and signal: Cairn.

Reference mark: Reference tablet stamped "Adams" cemented in rock, 21.0 ft. from sta. mark in azimuth $211^{\circ}32'$.

[Latitude 37°55'56.70"; longitude 112°12'17.91"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Willis.....	3 29 00.17	183 27 43.44	4. 7053675
Wilson.....	19 36 27.86	199 32 20.64	4. 4690523
Kila.....	22 54 06	202 52 26	4. 01018
Panguitch.....	53 48 39.48	233 41 17.74	4. 3385680
Stake.....	58 56 22.5	238 47 57.9	4. 370424
Guide.....	59 34 39.1	239 25 37.5	4. 398404
Brian.....	63 21 03.32	242 58 02.83	4. 7905720
Blind.....	67 34 20	247 31 22	3. 88432
Canal.....	77 53 47.0	257 44 45.9	4. 342628
Little Creek.....	81 02 40.74	260 47 42.34	4. 5584197
Sandy.....	88 46 21	268 33 49	4. 47541
Adams No. 1.....	103 25 29.22	283 25 22.42	2. 4435515
Circleville.....	149 37 05.59	329 29 49.84	4. 5315157
Tushar.....	161 31 59.11	341 24 19.08	4. 7558775

ADAMS NO. 1, Garfield County

On summit of Adams Head (for description see station Adams), on ground underneath platform of Forest Service observation tower. T. 33 S., R. 3 W., near line between secs. 14 and 15. Elev. about 10,360 ft.

Station mark: Standard tablet stamped "Adams No 1" cemented in rock set flush with ground and within base of observation tower.

Reference mark: Reference tablet stamped "Adams No 1" cemented in rock, 24.8 ft. from sta. mark in azimuth 242°10'.

Signal: Conical piece of green timber, covered with white cloth, supported upon platform of observation tower and centered over sta. mark.

[Latitude 37°55'58.79"; longitude 112°12'28.97"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Little Creek.....	80 52 26.81	260 37 35.20	4. 5553281
Bear.....	95 12 32.5	275 04 19.6	4. 293507
Circleville.....	149 57 21.32	329 50 12.39	4. 5290614

BEAR, Garfield County (Three-point station)

On Salt Lake meridian, at SE. cor. sec. 8, T. 33 S., R. 5 W., 300 yd. W. of Homesteader's cabin, about 8 mi. in air line due N. of Panguitch, 0.5 mi. W. of U. S. Highway 89, 1 mi. S. of Bear Creek. This sta. is probably not visible from any stations listed, as large eccentric distance was used in obtaining the sights.

Station mark: Section corner stone, an unmarked stone in place.

[Latitude 37°56'55.91"; longitude 112°25'50.73"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Little Creek.....	64 38 58.2	244 32 19.1	4. 244588

BLIND, Garfield County (Not occupied)

On summit of Blind Springs Peak, about 10 mi. in air line NE. of Panguitch, 5 mi. SW. of Adams Head, and 8 mi. E. of Spry. T. 33 S., R. 4 W., near line between secs. 26 and 27.

Station mark: None.

Station and signal: Highest point of prominent rock.

[Latitude 37°54'21.79"; longitude 112°17'07.81"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Wilson.....	6 23 16	186 22 06	4.39750
Panguitch.....	46 31 50	226 27 26	4.16074
Little Creek.....	84 33 04	264 21 03	4.45910

BLUFF, Garfield County (Not occupied)

On prominent rocky summit on ridge between Prospect and Rock Creeks, with decided bluff on S. side, about 8 mi. in air line NW. of Widtsoe and 20 mi. NE. of Panguitch. T. 33 S., R. 2½ W., near line between secs. 26 and 35.

Station mark: None.

Station and signal: Highest point of ridge.

This position is weak.

[Latitude 37°53'51.48"; longitude 112°06'51.12"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Bryce.....	6 37 10	186 35 36	4.51376
Inspiration.....	8 36 02	188 34 04	4.50357

BRIAN, Iron County

On summit of Brian Head, highest peak of Cedar Mountains, about 14 mi. in air line E. of Cedar City, on brink of cliff facing SW. May be reached from Cedar City or Parowan by taking rd. to Cedar Breaks, well-known national monument. At point about 1 mi. N. of small hotel go along rd. E. to old Mitchell sawmill, thence to spring at SE. base of peak proper, thence about 0.5 mi. NW. to summit. Truck may be driven as far as spring. Cliff is eroding rapidly and sta. will soon be lost. Reference marks are on solid ground to NE., well back from brink of cliff. Established by U. S. C. & G. S. in 1925 and reoccupied by U. S. G. S. in 1928 and 1929.

Station mark: U. S. C. & G. S. standard disk set in rock.

Reference marks: U. S. C. & G. S. reference disks set in rock at distances and in azimuths from sta. mark as follows—(1) 80.38 ft., 249°31'34"; (2) 72.87 ft., 305°18'35".

Signal: Octagonal framework 10 ft. high and 3 ft. in diam. at base covered with white cloth centered over sta. mark.

Latitude 37°40'52.495"; longitude 112°49'49.901".

BRYCE, Garfield County

On Bryce Point, 125 ft. S. of acute angle in cliff and slightly higher than cliff level, about 21 mi. in air line SE. of Panguitch and 4 mi. WSW. of Tropic. T. 37 S., R. 3 W., N½ sec. 7. Elev. 8,294 ft.

Station mark: Standard tablet stamped "Bryce" cemented in rock in place.

Reference mark: Reference tablet stamped "Bryce" cemented in rock in place 53.0 ft. from sta. mark in azimuth 330°45'.

Signal: Conical piece of green timber covered with white cloth and centered over sta. mark.

[Latitude 37°36'19.80"; longitude 112°09'24.52"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Inspiration.....	131 41 47.19	311 41 22.16	3.1294261
Sunset Point.....	158 40 28.4	338 40 09.9	3.809409
Sunrise Point.....	169 24 36.8	349 24 25.0	3.409595
Adams.....	173 20 37.99	353 18 51.78	4.5626668
Column.....	178 02 26	358 02 06	4.36951

CANAL, Garfield County (Three-point station)

On Salt Lake meridian, at cor. secs. 5, 6, 31, and 32, Tps. 33 and 34 S., R. 5 W., about 200 ft. E. of irrigation canal, 5 mi. in air line N. of Panguitch and 0.7 mi. W. of U. S. Highway 89.

Station mark: Section corner stone, an unmarked stone in place.

[Latitude 37°53'26.09"; longitude 112°26'58.67"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Little Creek.....	85 45 36.9	265 39 39.7	4.153818

CIRCLEVILLE, on Beaver-Plute county line

On summit of Circleville Mountain, about 7 mi. in air line NW. of Circleville. Can be reached after four hours' travel by trail with animals from Circleville. Sta. of same name, located by U. S. C. & G. S. in 1919 for U. S. F. S., is about 0.5 mi. N. T. 30 S., R. 5 W., near line between secs. 14 and 15. Elev. about 11,300 ft.

Station mark: Standard tablet stamped "Circleville" cemented in rock.

Reference mark: Reference tablet stamped "Circleville" cemented in rock 30.6 ft. from sta. mark in azimuth 185°50'.

Signal: Conical piece of green timber covered with white cloth 10.0 ft. from sta. mark in azimuth 60°54'.

[Latitude 38°11'47.50"; longitude 112°24'04.64"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Bear.....	5 22 57.8	185 21 52.4	4.441081
Canal.....	7 08 15.0	187 06 27.9	4.534316
Little Creek.....	27 48 39.94	207 40 54.38	4.5974191
Tushar.....	177 53 30.41	357 53 07.15	4.3935162

COLUMN, Garfield County (Not occupied)

On highest columnar rock at SE. point of broad hill between E.-W. forks of Hunt Creek, about 9 mi. in air line a little S. of W. from Widtsoe, and 14 mi. E. of Panguitch. T. 34 S., Rs. 2½ and 3 W., near line between secs. 25 and 30.

Station mark: None.

Station and signal: Highest point of rock column.

[Latitude 37°48'58.86"; longitude 112°09'57.25"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Adams.....	165 04 14	345 02 47	4.12493

DELANO, on Beaver-Plute county line (Not occupied)

On summit of Delano Peak, highest point of Tushar Mountains, on S. side of head of Bullion Canyon, about 16 mi. in air line NE. of Beaver. Can be reached with animals by rd. and trail from Marysville, which is about 9 mi. NE. of sta. A sta. of same name located by U. S. C. & G. S. in 1919 for U. S. F. S. is nearby. T. 28 S., R. 5 W., sec. 13.

Station mark: None.

Station and signal: Cairn on highest point of peak.

[Latitude 38°22'09.22"; longitude 112°22'14.28"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Circleville.....	7 58 29	187 57 21	4.28683
Brian.....	28 00 44	207 43 44	4.93642
Tushar.....	147 10 20	327 08 48	3.82071

GUIDE, Garfield County (Three-point station)

On Salt Lake Meridian, at SW. cor. sec. 29, T. 34 S., R. 5 W., on point of hill overlooking Panguitch, about 0.4 mi. S. and 0.8 mi. W. from Panguitch post office, about 200 yd. W. of Panguitch Creek, at W. end of and in line with center lane.

Station mark: Section corner stone.

Signal: Pole and flag centered over sta. mark.

[Latitude 37°49'04.74"; longitude 112°27'00.25"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Little Creek.....	116 17 57.4	296 12 01.5	4.198899

INSPIRATION, Garfield County

In central part of hexagonal lookout-house on Inspiration Point, in Bryce Canyon National Park, about 20 mi. in air line SE. of Panguitch, and 18 mi. SW. of Widtsoe. Elev. 8,315 ft.

Station mark: Standard tablet in concrete floor directly under peak of roof.

Signal: Peak of roof directly over sta. mark.

[Latitude 37°36'48.87"; longitude 112°10'05.53"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Wilson.....	120 14 33.21	300 09 06.01	4.1816569

KILN, Garfield County (Not occupied)

On highest part of sharp, cone-shaped timbered peak on divide between Hunt and Lime Kiln Creeks, from which columnar rock is plainly visible, about 10 mi. N. of E. from Panguitch and 14 mi. in air line W. of Widtsoe. T. 34 S., R. 3 W., sec. 17.

Station mark: None.

Station and signal: Highest point of rock column.

[Latitude 37°50'50.80"; longitude 112°15'00.85"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Wilson.....	17 49 40	197 47 12	4.28413
Panguitch.....	75 46 22	255 40 41	4.14749
Little Creek.....	96 47 41	276 34 24	4.50485

LITTLE CREEK, Iron County

On S. end of summit of Little Creek Peak, about 11 mi. in air line E. of Paragonah and 12 mi. NW. of Panguitch. Starting from ranch of Samuel Abbott, animals can be taken on N. side of peak to within 200 yd. of top, from which point climb to sta. is about 500 ft.

Station mark: Standard tablet stamped "Little Creek" cemented in rock.

Reference mark: Reference tablet stamped "Little Creek" cemented in rock.

Signal: Conical piece of green timber covered with white cloth built around cairn that was former sta. mark 16.3 ft. from sta. mark in azimuth $31^{\circ}22'$.

[Latitude $37^{\circ}52'51.52''$; longitude $112^{\circ}36'40.18''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Brian.....	41 08 51.51	221 00 47.70	4.4684760

PANGUITCH, Garfield County

On Salt Lake Meridian, in NW¼ sec. 34, T. 34 S., R. 5 W., on Roller Mill Hill, about 1.6 mi. E., thence 0.7 mi. S. from Panguitch post office, 780 ft. S. of Panguitch-Bryce Canyon highway.

Station mark: Standard tablet stamped "Panguitch" cemented in top of red boulder.

Reference mark: Reference tablet stamped "Panguitch" cemented in boulder 86.0 ft. from sta. mark in azimuth $38^{\circ}51'$.

Signal: Octagonal framework 10 ft. high and 3 ft. in diam. at base covered with white cloth and centered over sta. mark.

[Latitude $37^{\circ}48'58.48''$; longitude $112^{\circ}24'17.42''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Guide.....	92 47 08.1	272 45 28.3	3.600683
Stake.....	106 56 59.3	286 55 56.5	3.417886
Little Creek.....	111 38 57.97	291 31 22.22	4.2906872
Sandy.....	134 46 53	314 41 44	4.23885
Bear.....	171 12 07.5	351 11 10.2	4.173048

SANDY, Iron County (Not occupied)

On N. summit of Sandy [Bear Valley] Peak, about 9 mi. in air line NW. of Panguitch and 16 mi. NE. of Parowan. T. 33 S., R. 6 W., sec. 20. Elev. about 9,550 ft.

Station mark: None.

Station and signal: Highest point of summit.

Latitude $37^{\circ}55'34.18''$; longitude $112^{\circ}32'41.14''$.

STAKE, Garfield County (Not occupied)

On tall, thin spire of Panguitch Stake Church, in town of Panguitch.

Station mark: None.

Station and signal: Center of spire.

[Latitude $37^{\circ}49'23.22''$; longitude $112^{\circ}25'59.79''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Little Creek.....	112 21 29.3	292 14 56.3	4.228452

SUNRISE POINT, Garfield County

In central part of hexagonal lookout-house on Sunrise Point, in Bryce Canyon National Park, about 20 mi. in air line SE. of Panguitch and 16 mi. SSW. of Widtsoe. Elev. 8,017 ft.

Station mark: Standard tablet in concrete floor directly under peak of roof.

Signal: Peak of roof directly over sta. mark.

[Latitude 37°37'41.68"; longitude 112°09'43.76"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Sunset Point.....	23 21 19.0	203 21 12.3	2.832680

SUNSET POINT, Garfield County

In central part of hexagonal lookout-house on Sunset Point, in Bryce Canyon National Park, about 20 mi. in air line SE. of Panguitch and 16 mi. SSW. of Widtsoe. Elev. 7,999 ft.

Station mark: Standard tablet in concrete floor directly under peak of roof.

Reference mark: G. L. O. iron post witness corner to Tps. 36 and 37 S., Rs. 3 and 4 W., 35.6 ft. from sta. mark in azimuth 130°39'.

Signal: Peak of roof directly over sta. mark.

[Latitude 37°37'21.42"; longitude 112°09'54.76"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Inspiration.....	14 44 46.8	194 44 40.3	3.016127

TABLE CLIFF, Garfield County

On extreme southward salient of high plateau separating Panguitch Hayfields from Potato Valley, about 17 mi. in air line WSW. of Escalante and 30 mi. ESE. of Panguitch. Only approach is from N. Animals can be taken by trail from Pine Lake to sta. T. 36 S., R. 1 W., sec. 9.

Station mark: Standard tablet stamped "Table Cliff" cemented in rock and set flush with ground at probable center of sta. mark of Powell Survey.³⁶

Reference marks: Triangles formed by group of three spikes each driven into blazed sides of trees at distances and in azimuths from sta. mark as follows—(1) pine, 67.6 ft., 191°49'; (2) spruce, 80.3 ft., 234°53'.

Signal: Conical piece of green timber covered with white cloth and centered over sta. mark.

[Latitude 37°41'11.57"; longitude 111°54'05.79"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Willis.....	52 04 52.82	231 52 30.22	4.5789130
Bryce.....	68 18 27.35	248 09 06.20	4.3847604
Tropic.....	69 19 38.26	249 13 19.58	4.2106371
Inspiration.....	71 05 09.50	250 55 23.25	4.3958875
Sunset Point.....	73 07 03.8	252 57 24.0	4.385959
Sunrise Point.....	74 21 38.3	254 12 05.2	4.378116
Wilson.....	89 24 44.63	269 09 30.45	4.5640079
Brian.....	89 52 22.02	269 18 17.70	4.9135076
Vat.....	100 07 37.55	280 01 10.17	4.1975951
Little Creek.....	109 15 50.79	288 49 45.71	4.8203740
Adams.....	135 42 07.40	315 30 57.87	4.5819347

³⁶ See Gannett, Henry, Results of primary triangulation: U. S. Geol. Survey Bull. 122, p. 394, 1894. It was reported by H. H. Hodgeson in 1929 that the Powell Survey sta. mark had been destroyed.

TROPIC, Garfield County

On cone summit at NE. corner of low bare hill, about 0.5 mi. NE. of Tropic and 0.25 mi. E. of Panguitch-Tropic rd. T. 36 S., R. 1 W., sec. 9.

Station mark: Standard tablet stamped "Tropic" cemented in rock set flush with ground.

Reference mark: Reference tablet stamped "Tropic" cemented in rock set flush with ground 98.9 ft. from sta. mark in azimuth 33°56'.

Signal: Conical piece of timber 3 ft. high and 2 ft. in diam. at base covered with white cloth and centered over sta. mark.

[Latitude 37°38'05.13"; longitude 112°04'25.56"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Bryce.....	66	08	11.90	246	05	09.41	3.9040609
Inspiration.....	74	16	46.87	254	13	19.33	3.9376286
Vat.....	177	44	31.54	357	44	23.17	3.9290927
Willis.....	39	51	01.73	219	44	57.34	4.3602843

TUSHAR, on Beaver-Plute county line

On summit of Belknap Peak, northernmost of the three barren white limestone peaks that are the highest points in the Tushar Mountains, the backbone of which forms the boundary between Beaver and Piute Counties. This peak is about 10 mi. in air line W. of Marysvale, a village on upper Sevier River, and 15 mi. NE. of Beaver. To reach from Beaver, go along Puffer Lake rd. 14 mi., then turn to left on Merchant Valley rd. and go about 8 mi. to a sawmill, then take Forest Service trail to foot of peak. The sta. is nearly surrounded by circular wall of rocks 4.5 ft. high with inner diam. of 11 ft. Vertical-circle sta. is 34.12 ft. due N. Established by Coast and Geodetic Survey in 1882. Elev. (U. S. C. & G. S.) 12,132 ft.

Station mark: ½-in. copper bolt leaded in drill hole in solid rock. Another mark is a drill hole, above the bolt, in a flat rock fitted between the bases of three small brick piers used in mounting the instrument.

Signal (erected in 1929): Cairn 8 ft. high and 6 ft. in diam. at base built over sta. mark.

[Latitude 38°25'09.551"; longitude 112°24'42.168"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Little Creek.....	16	22	11.86	196	14	48.32	4.7942037
Brian.....	24	17	48.10	204	02	18.79	4.9532372

VAT, Garfield County

On S. point of ridge timbered on W. slope and which breaks off abruptly into pink cliff on E. slope, on divide between East Sevier and Paria Rivers, about 9 mi. in air line SSW. of Widtsoe, 21 mi. ESE. of Panguitch, 3 mi. SW. of Dipping Vat Spring and 1 mi. E. of Panguitch-Widtsoe rd. T. 35 S., R. 3 W., SE¼ sec. 35.

Station mark: Standard tablet stamped "Vat" set 4 in. below surface of ground.

Reference mark: Triangle formed by spikes set in blazed side of pine tree 38.5 ft. from sta. mark in azimuth 127°51'.

Signal: Conical piece of green timber covered with white cloth 24.1 ft. from sta. mark in azimuth 216°04'.

[Latitude 37°42'40.99"; longitude 112°04'39.25"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Willis.....	28	48	11.83	208	42	15.48	4.4740667
Bryce.....	30	46	36.48	210	43	42.20	4.1359188
Inspiration.....	36	24	21.23	216	21	01.98	4.1298006
Sunrise Point.....	38	59	25.9	218	56	19.8	4.074369
Wilson.....	81	25	10.45	261	16	23.38	4.3295965
Column.....	146	16	46	326	13	32	4.14647
Adams.....	155	27	58.69	335	23	17.43	4.309664
Bluff.....	171	08	28	351	07	08	4.32061

WILLIS, Kane County

On extreme N. angle of white cap rock, about 200 ft. thick, on summit of Pink Cliffs, at head of Willis Canyon and Podunk Creek, about 26 mi. in air line SSE. of Panguitch and 27 mi. SW. of Widdtsoe. Can be reached with animals by rd. and trail up East Sevier River and Podunk Creek. At point about 2 mi. from mouth of Podunk Creek take Bull Valley trail to highest point, then follow ridge NW. 0.25 mi. to sta. T. 38 S., R. 4 W., NW¼ sec. 29.

Station mark: Standard tablet stamped "Willis" cemented in rock set flush with ground.

Reference mark: Reference tablet stamped "Willis" cemented in rock set flush with ground 28.7 ft. from sta. mark in azimuth 40°38'.

Signal: Conical piece of green timber covered with white cloth and centered over sta. mark.

[Latitude 37°28'33.86"; longitude 112°14'23.38"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Brian.....	113	45	25.00	293	23	48.12	4.7553547
Wilson.....	163	26	52.98	343	24	03.54	4.3783201

WILSON, Garfield County

On bare, pink summit on N. rim of Wilson Canyon, about 11 mi. in air line SSE. of Panguitch, 20 mi. SW. of Widdtsoe, and 3 mi. E. of Wilson ranch.

Station mark: Standard tablet stamped "Wilson" cemented in rock in place.

Reference mark: Reference tablet stamped "Wilson" cemented in rock in place 21.0 ft. from sta. mark in azimuth 237°05'.

Signal: Conical piece of green timber covered with white cloth and centered over sta. mark.

[Latitude 37°40'56.74"; longitude 112°19'01.20"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Brian.....	89	59	28.42	269	40	38.34	4.6560972
Little Creek.....	130	28	02.26	310	17	13.45	4.5316978
Sandy.....	143	30	48	323	22	25	4.52733
Panguitch.....	152	29	47.59	332	26	33.99	4.2239773
Canal.....	153	12	52.4	333	07	59.9	4.413112

FISHLAKE NATIONAL FOREST, 1931

B. H. YOAKUM, chief of party

This project was expanded from Coast and Geodetic Survey stations Monroe 2 and Mount Catherine and Forest Service stations Nos. 6, 8, M-3, and M-7, the four latter of which were located by the Coast and Geodetic Survey for the Forest Service. (See fig. 17.)

The original computation of this triangulation was based on preliminary positions for the stations above cited as referred approxi-

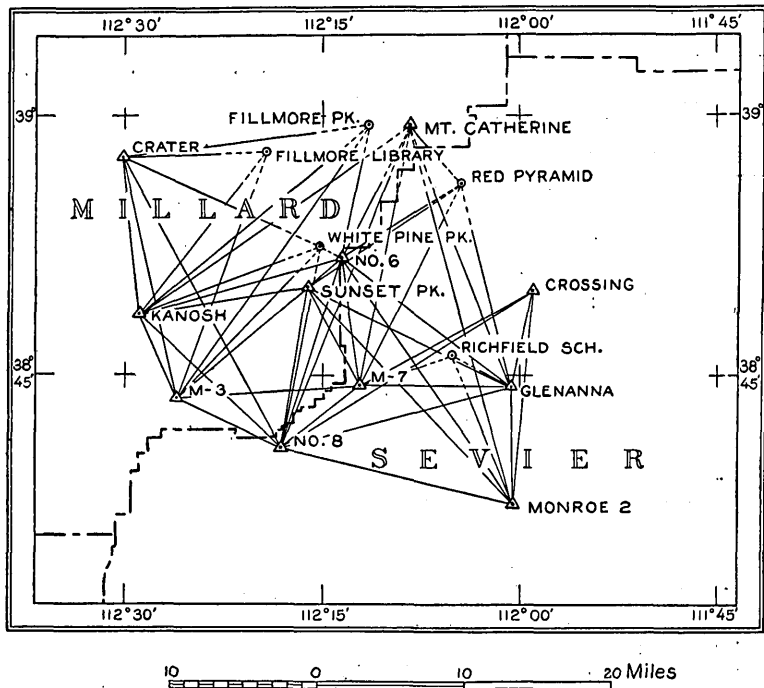


FIGURE 17.—Triangulation for Fishlake National Forest, 1931.

mately to the North American datum of 1927. Readjustment of the results of that computation to the North American datum of 1927 depends on adjusted positions for these base stations.

The published results of this project appear for the first time in this bulletin.

STATIONS

CRATER, Millard County

On highest part of rim of extinct volcanic crater 10 mi. in air line W. of Fillmore. Foot of crater is 12 mi. by rd. from Fillmore. T. 21 S., R. 6 W., near NE. cor. sec. 27.

Station mark: Standard tablet stamped "Y 1931" cemented in volcanic rock.

Reference mark: Reference tablet cemented in ledge of volcanic rock, 15.78 ft. from sta. mark in azimuth $191^{\circ}36'10''$.

Signal: Flag on center pole of quadripod of lumber covered with white cloth centered over sta. mark.

Latitude $38^{\circ}57'48.51''$; longitude $112^{\circ}30'14.36''$.

CROSSING, Sevier County

At center of crossing of Denver & Rio Grande Western R. R. and U. S. Highway 89, 6 mi. in air line NE. of Richfield and 1.3 mi. SW. of Sigurd.

Station mark: Copper nail with washer driven in crossing plank.

Signal: Crossing signpost, 61.4 ft. from sta. in azimuth $68^{\circ}49'$.

[Latitude $38^{\circ}49'52.92''$; longitude $111^{\circ}59'15.81''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Monroe 2.....	5 55 01	185 53 59	4.361514
Glenanna.....	12 08 58	192 08 00	4.031065
No. 8.....	58 17 21	238 05 27	4.510732
M-7.....	61 25 42	241 17 33	4.331665

FILLMORE LIBRARY, Millard County (Not occupied)

On cupola of public library in Fillmore.

Station mark: None.

Station and signal: Center of painted dome-shaped roof of cupola. (In 1931, roof was red.)

[Latitude $38^{\circ}58'01.24''$; longitude $112^{\circ}19'23.60''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
M-3.....	20 30 16	200 25 58	4.453227
Kanosh.....	38 06 16	218 00 12	4.355357
Crater.....	88 37 17	268 30 28	4.195125

FILLMORE PEAK, Millard County (Not occupied)

Prominent cone-shaped, brush-covered peak on W. slope of Pavant Range, about 7 mi. in air line E. and 2 mi. N. of Fillmore.

Station mark: None.

Station and signal: Highest point of peak.

[Latitude $38^{\circ}59'38.2''$; longitude $112^{\circ}11'42.6''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
No. 6.....	12 18 06	192 16 45	4.164687
M-3.....	35 29 36	215 20 28	4.560010
Kanosh.....	50 22 05	230 11 12	4.513258
Crater.....	82 53 46	262 42 07	4.430929

GLENANNA, Sevier County

On highest point and near W. edge of low peak on E. side of Sevier Valley, about midway between towns of Annabella and Glenwood. Old Annabella-Glenwood rd. passes over divide about 0.5 mi. to E. Probably best reached from Annabella side.

Station mark: Standard tablet cemented in malapais rock and stamped "Y 1931."

Reference mark: Reference tablet cemented in large malapais boulder, 33 ft. from sta. mark in azimuth $329^{\circ}20'$.

Signal: White flag on center pole of quadripod of lumber covered with white cloth centered over sta. mark.

[Latitude 38°44'12.38"; longitude 112°00'49.41"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Monroe 2.....	0 29 22	180 29 19	4.092232
No. 8.....	75 30 14	255 19 19	4.417385
M-7.....	90 47 59	270 40 49	4.219830
Sunset Peak.....	116 05 04	295 55 29	4.391660
Richfield School.....	119 59 14	299 56 33	3.856517
No. 6.....	127 09 20	307 01 09	4.374117
Mount Catherine.....	159 11 19	339 06 36	4.485042
Red Pyramid.....	165 56 24	345 54 00	4.357647

KANOSH, Millard County

On highest part of rim of extinct volcanic cone, known as Black Rock Volcano, about 2.5 mi. in air line W. of town of Kanosh. At W. edge of small flat area and about 2 ft. lower than highest rock on summit. Rd. leads from Kanosh to foot of peak.

Station mark: Standard tablet cemented in ledge of lava rock stamped "Y 1931."

Reference mark: Reference tablet cemented in highest ledge of rock on summit, 15.86 ft. from sta. mark in azimuth 321°48'20".

Signal: White flag on center pole of quadripod of lumber covered with white cloth centered over sta. mark.

[Latitude 38°48'22.47"; longitude 112°29'03.26"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Crater.....	174 23 57	354 23 12	4.243994

M-3, Millard County

On highest point of high ridge, about 4 mi. in air line S. of Kanosh, 6 mi. N. of Pavant ranger sta., 1 mi. NW. of Red Ridge, between Dry Wash on the W. and First Creek on the E. Located by U. S. C. & G. S. in 1919 for U. S. F. S.; reoccupied in 1931 by U. S. G. S. T. 24 S., R. 5 W., near line between secs. 10 and 11. Elev. (U. S. F. S.), 8,261.1 ft.

Station mark: Drill hole in shelf of rock.

Reference mark 1: Bolt set in crevice of shale rock 4 in. W. of sta. mark.

Reference mark 2: Cross and letters "C G S" chiseled on stone 40.11 ft. from sta. mark in azimuth 1°25'.

Reference mark 3: Cross, letter "M" and figure "3" chiseled on stone 38.06 ft. from sta. mark in azimuth 81°36'.

Reference mark 4: Cross and letters "C G S" 13.30 ft. from sta. mark in azimuth 235°27'.

Signal: Pole centered over sta. mark with cairn about 4 ft. high built around its base.

[Latitude 38°43'38.568"; longitude 112°26'15.345"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Kanosh.....	155 10 00	335 08 15	3.984402
Crater.....	167 37 03	347 34 33	4.428704

M-7, Sevier County

On low but prominent point on main divide, about 6.5 mi. in air line SW. of Richfield and 5 mi. NW. of Elsinore. Kanosh-Elsinore rd. passes about 0.5 mi. S. of sta. Located by U. S. C. & G. S. in 1919 for U. S. F. S.; reoccupied by U. S. G. S. in 1931, when signal was recovered although station was not found. Elev. (U. S. F. S.) 8,230 ft.

Station mark: Bolt set in rock with cement.

Signal: Pole braced in trimmed mountain mahogany tree above sta. mark.

[Latitude 38°44'19.322"; longitude 112°12'16.223"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
No. 8.....	52 02 46.2	231 59 00.8	4.043245
M-3.....	86 31 30.0	266 22 44.9	4.307641
Sunset Peak.....	152 16 43	332 14 19	4.077902
No. 6.....	170 41 46.0	350 40 46.1	4.153648

MONROE 2, Sevier County

On highest point of rocky ledge on peak known locally as "Gunnison Peak," about 11 mi. in air line NW. of Koosharem and 6 mi. E. of Monroe. It is easily reached from Koosharem by way of Koosharem ranger sta., thence across Magleby's pasture and up mountain trail by way of old sawmill clearing, thence up old trail to top of ridge. Established by U. S. C. & G. S. in 1919; reoccupied by U. S. G. S. in 1931 and again by U. S. C. & G. S. in 1934. Elev. (U. S. F. S.) 11,215 ft.

Station mark: U. S. C. & G. S. standard disk in concrete.

Reference marks: At distances and in azimuths from sta. mark as follows—
(1) 12.05 ft., 305°21'; (2) 48.16 ft., 238°09'.

[Latitude 38°37'31.357"; longitude 112°00'53.773"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
No. 8.....	103 00 08.2	282 49 16.9	4.412802
Sunset Peak.....	136 29 12	316 19 41	4.505018
No. 6.....	144 52 15.5	324 44 08.6	4.513160
Richfield School.....	159 01 12	338 58 34	4.232753
Mount Catherine.....	165 16 57	345 12 17	4.626475

MOUNT CATHERINE, Millard County (Not occupied)

Near steep eastern face of bare knoll at head of canyon opening near Herbert's ranch, about 10 mi. in air line E. of Fillmore and 1 mi. S. of Pioneer ranger sta. Best reached by poor wagon rd. up Willow Creek Canyon from Salina; faint wagon rd. leads northward to sta. from ridge above Willow Creek. Established by U. S. C. & G. S. in 1919 and intersected by U. S. G. S. in 1931.

Station mark: U. S. C. & G. S. standard disk.

Reference mark 1: U. S. C. & G. S. reference disk 17.53 ft. from sta. mark in azimuth 0°39'.

Reference mark 2: U. S. C. & G. S. reference disk 19.45 ft. from sta. mark in azimuth 91°28'.

Reference mark 3: Cairn 80.41 ft. from sta. mark in azimuth 75°01'.

[Latitude 38°59'38.294"; longitude 112°08'20.470"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
M-7.....	11 21 44	191 19 16	4.460928
No. 8.....	22 18 21	202 12 08	4.579376
No. 6.....	29 13 24.4	209 09 56.3	4.213755
Kanosh.....	55 16 31	235 03 31	4.562119

NO. 6, Millard County

On eastern and lower summit of White Pine Peak, about 8 mi. in air line SE. of Fillmore and 4 mi. SW. of Solitude ranger sta. Located by U. S. C. & G. S. in 1919 for U. S. F. S.; reoccupied by U. S. G. S. in 1931. Elev. (U. S. F. S.) 10,225.7 ft.

Station mark: Bolt cemented in rock.

Reference mark 1: Cross and arrow chiseled on stone in place 26.73 ft. from sta. mark in azimuth 303°31'.

Reference mark 2: Cross, letters "MW," and figure "6" chiseled on stone 20.65 ft. from sta. mark in azimuth 79°12'.

Reference mark 3: Cross, letters "MW," and figure "6" chiseled on stone in cairn 36.67 ft. from sta. mark in azimuth 152°22'.

Signal: Pole braced with tripod centered over sta. mark.

[Latitude 38°51'55.180"; longitude 112°13'51.744"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
No. 8.....	17 03 56.9	197 01 11.1	4.338729
Sunset Peak.....	43 15 16	223 13 51	3.677594
Kanosh.....	73 27 59	253 18 28	4.360639
White Pine Peak.....	116 19 14	296 18 25	3.320683

NO. 8, Sevier County

On high point on Indian Mountain covered with aspen, about 6 mi. in air line NW. of Joseph, 1 mi. E. of Rockwood Peak, 0.5 mi. N. of rd. from Joseph to Rockwood ranger sta. Located by U. S. C. & G. S. in 1919 for U. S. F. S.; reoccupied by U. S. G. S. in 1931. T. 24 S., R. 4½ W., sec. 25. Elev. (U. S. F. S.) 9,318.9 ft.

Station mark: Bolt cemented in rock.

Reference marks (three): Cross, letters "MW," and figure "8" chiseled on each of three stones at distances from sta. mark and in azimuths from E. side of house on Belknap Peak as follows—(1) 20.9 ft., 55°32'; (2) 18.85 ft., 148°20'; (3) 16.35 ft., 300°46'.

Signal: Pole braced with tripod centered over sta. mark.

[Latitude 38°40'38.830"; longitude 112°18'16.579"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
M-3.....	115 38 21.5	295 33 22.1	4.108157
Kanosh.....	132 31 36	312 24 52	4.325787
Crater.....	151 27 21	331 19 51	4.558298

RED PYRAMID, Sevier County (Not occupied)

Red pyramid-shaped peak on E. slope of Pavant Range, about 12 mi. due N. of Richfield, 8 mi. W. of Aurora, and 6 mi. NE. of Solitude ranger sta. Tip of peak is covered with timber. Sta. "Beehive" located by intersection in 1919 by U. S. C. & G. S. for U. S. F. S. and renamed Red Pyramid; reoccupied in 1931 by U. S. G. S. Elev. (U. S. F. S.) 9,033 ft.

Station mark: None.

Station and signal: Highest point of peak.

[Latitude 38°56'09.091"; longitude 112°04'39.187"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
M-7.....	26 46 18	206 41 32	4.389262
Sunset Peak.....	55 47 13	235 40 01	4.302342
No. 6 (U. S. C. & G. S.).....	59 35 28.4	239 29 41.4	4.188831
Mount Catherine (U. S. C. & G. S.).....	140 28 07.6	320 25 48.4	3.922546

RICHFIELD SCHOOL, Sevier County (Not occupied)

Cupola or belfry on public school building in Richfield.

Station mark: None.

Station and signal: Center of ornament on top of roof of cupola.

[Latitude 38°46'08.78"; longitude 112°05'07.24"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
M-7.....	71 59 23	251 54 55	4.037205

SUNSET PEAK, Millard County

On high peak, about 16 mi. by rd. and trail NW. of Richfield, 5 mi. by rd. and trail NW. of Redview ranger sta., 3.5 mi. N. of Crazy Hollow pasture, between heads of Walker Creek and Sunset Canyon. Trail to Crazy Hollow pasture, which leaves rd. on top of ridge about 3 mi. N. of Redview ranger sta., passes along E. slope of peak, about 0.25 mi. from sta., which is on highest point.

Station mark: Standard tablet cemented in conglomerate outcrop and stamped "Y 1931."

Reference mark: Reference tablet cemented in large flat rock 32.1 ft. (inclined distance) from sta. mark in azimuth 92°16'.

Signal: Small pine tree, braced with four poles; centered over sta. mark and surrounded by small rock monument.

[Latitude 38°50'02.74"; longitude 112°16'06.98"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
No. 8.....	10 12 48	190 11 27	4.247181
M-3.....	51 09 34	231 03 13	4.275704
Kanosh.....	80 41 32	260 33 26	4.278315

WHITE PINE PEAK, Millard County (Not occupied)

On highest peak of White Pine Mountain, the highest mountain in Pavant Range, on divide between Meadow Creek and Pine Creek, about 7 mi. in air line SE. of Fillmore, and 1.3 mi. N. of W. of U. S. F. S. sta. No. 6 and on same ridge. Peak is covered with timber except at extreme highest point.

Station mark: None.

Station and signal: Highest point of peak.

[Latitude 38°52'25.3"; longitude 112°15'09.6"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
No. 8.....	11	43	30	191	41	32	4.347257
M-3.....	44	44	51	224	37	54	4.358791
Kanosh.....	69	38	58	249	30	15	4.331541
Crater.....	114	39	09	294	29	41	4.379641

SOUTHERN UTAH, 1933-34

B. H. YOAKUM and A. K. ANDREWS, chiefs of party

This project of triangulation (fig. 18) is part of a net that is almost entirely in Arizona and that covers, for the most part, the area set aside as the Grand Canyon National Monument. The Utah part of this net comprises only two stations—Boundary and Red Cap—and they are therefore the only stations in the net described in this bulletin. The net was extended north from stations Phillips and Millett around the northern end of the Kaibab Plateau to the two Utah stations, thence east and south and back into Arizona, where it closes on stations Cane and North Canyon.

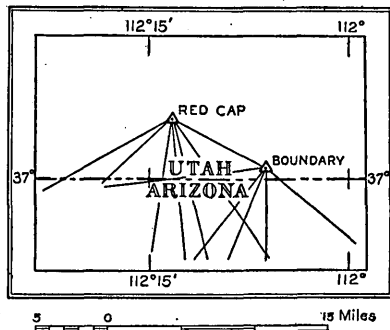


FIGURE 18.—Triangulation in southern Utah, 1933-34.

The triangulation of the net of which this project is a part was adjusted rigidly within itself, irrespective of its ties to other nets. The positions were computed on a datum approximate to the North American datum of 1927, based on an arbitrarily adjusted position for station Phillips and an azimuth and length for the Phillips-Millett base obtained by J. T. Stewart in 1903. Readjustment to the North American datum of 1927 depends on adjusted positions determined by the Coast and Geodetic Survey for the numerous stations of the net that have been recovered by that organization.

The results of this project are published in this report for the first time.

STATIONS

BOUNDARY, Kane County

On top of ridge just N. of head of Pine Hollow, about 3 mi. S. and 25 mi. E. from Kanab, 0.75 mi. N. of Utah-Arizona State-line milepost 108. To reach from Kanab, follow N. rd. ("Winter route") to Grand Canyon Bridge to point 2 mi. SE. of its junction with Paria rd.; then go E. 3 mi. along rd. leading to Whitney McDonald ranch house, thence E. along dim rd. across White Sage Flats to foot of plateau, thence N. along dim rd. at foot of plateau to first crossroads, thence eastward up grade to rd. fork on top of plateau, thence E. about 300 yd. to good camping place, which is about 350 yd. southward from sta.

Station mark: Standard tablet stamped "Boundary 1933" cemented in limestone outcrop.

Reference mark 1: Copper nail with washer in blaze on 4-in. juniper tree, 75.25 ft. from sta. in azimuth 149°19'.

Reference mark 2: Cairn, partly fallen, 20.8 ft. from sta. mark in azimuth 196°26'.

Reference mark 3: Copper nail with washer in blaze on 3-in. juniper tree 64.36 ft. from sta. mark in azimuth 215°10'.

Signal: Quadripod of poles covered with white cloth and with black cross targets on center pole, over sta. mark.

[Latitude 37°00'42.13"; longitude 112°06'33.04"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
Houserock, Ariz.	0	19	49	180	19	46	4.346214
Pinon, Ariz.	23	23	24	203	21	06	4.155867
North Road, Ariz.	38	47	55	218	44	23	4.145061
Johnson, Ariz.	83	21	45	263	14	10	4.274592
Red Cap.	118	21	48	298	17	42	4.068942
Duffer, Ariz.	309	31	17	129	34	45	4.044650

RED CAP, Kane County

On small, rock-capped butte isolated from main cliffs, 22 mi. by rd. E. of Kanab, 4.3 mi. N. of Utah-Arizona State-line post 100, just W. of head of Johnson (or White Sage) Creek, 3 mi. N. of Whitney McDonald ranch house, on top of butte and near its SW. end, about 10 ft. S. of edge of rock cliff. (Top of butte is 300 ft. long and 40 ft. wide.) To reach from Kanab, go 17.3 mi. along N. rd. to Grand Canyon Bridge, thence E. along rd. leading to McDonald's ranch house to point 2 mi. W. of that house, thence through gate at W. end of shed, thence N. and W. along old rd. about 0.5 mi., thence N. along low divide leading toward butte, which can be plainly seen.

Station mark: 1-in. drill hole in center of triangle chiseled in flat rock top of butte.

Reference marks 1 and 2: Reference tablets stamped, respectively, "No 1 Red Cap 1933" and "No 2 Red Cap 1933," cemented in flat rock top of butte at distances and in azimuths from sta. mark as follows—(1) 14.87 ft., 234°47'; (2) 10.39 ft., 288°51'.

Signal: 2- by 4-ft. pole with white cross targets and flag centered over sta. mark and surrounded by cairn.

[Latitude 37°03'38.45"; longitude 112°13'20.97"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	<i>Log. meters</i>
LeFever, Ariz.	9	19	39	189	17	54	4.425050
Johnson, Ariz.	48	26	57	228	23	28	4.060631
Shinarump, Ariz.	62	05	35	241	57	33	4.350867
Cedar Tree, Ariz.	324	56	33	145	00	02	4.174966
Pinon, Ariz.	346	37	35	166	39	22	4.280912
North Road, Ariz.	355	16	53	175	17	26	4.214293

DUCHESNE QUADRANGLE, 1934

C. N. MORTENSON, chief of party

This project of triangulation (fig. 19) was extended from Coast and Geodetic Survey stations Cone, G. L. O. 2, and Little, although, because of the poor visibility to the west, station Little was not occupied. To obtain better visibility, an auxiliary station—Little No. 2—was established 835.24 ft. to the southwest. The project ties to Geological

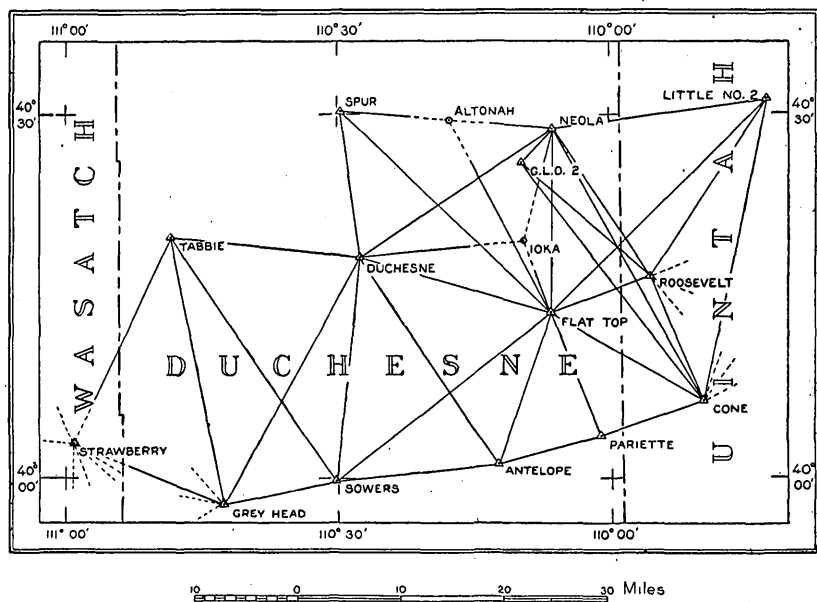


FIGURE 19.—Triangulation for Duchesne quadrangle, 1934.

Survey stations Roosevelt, established by Oscar Jones in 1913 (Uintah County project), and Grey Head, established by H. L. Baldwin, Jr., in 1897-98 (Uinta Forest Reserve project). At station Grey Head it comes into contact, also, with triangulation done by T. M. Bannon in 1910 (Eastern Utah project).

The original computation of this triangulation was referred approximately to the North American datum of 1927 and was based on preliminary positions for Coast and Geodetic Survey stations Cone and Little. Readjustment of the results to the North American datum of 1927 depends on new positions for the three Coast and Geodetic Survey stations from which the project was extended—Cone, G. L. O. 2, and Little—and for the following five Geological Survey stations: Altonah, Antelope, Roosevelt, and Spur, which were recovered by the Coast and Geodetic Survey in 1936, and Grey Head, whose new position was obtained from the readjustment of Baldwin's triangulation (Uinta Forest Reserve project).

The results of the Duchesne quadrangle project are published in this bulletin for the first time.

STATIONS

ALTONAH, Duchesne County (Not occupied)

On top of E. one of two N.-S. bare ridges about 6 mi. in air line N. of Altonah (which is in T. 1 S., R. 4 W.) and about 0.5 mi. apart. To reach from Altonah go N. along rd. that passes through W. edge of town 2.2 mi. to rd. fork just beyond crossing of irrigation canal; then take left (W.) rd. and continue generally N. about 1.5 mi. to sharp turn in rd. to NE.; continue NE. along same rd. to its intersection with graded rd. coming down hill from E., then go generally SW. along graded rd. to its junction with N.-S. rd., thence N. along latter rd. to point 0.3 mi. from sta., which is on ridge to E. Intersected in 1934. In 1936 U. S. C. & G. S. established a sta. of the same name 3.103 meters distant in azimuth $91^{\circ}47'$.

Station mark: Standard tablet stamped "Altonah M 1934" cemented in large rock.

Signal: Cairn over sta. mark. [In 1936 this cairn was partially torn down.]

[Latitude $40^{\circ}29'22.653''$; longitude $110^{\circ}17'38.088''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Spur.....	94 31 54	274 24 00	4.236511

ANTELOPE, Duchesne County

On small bare knoll with scattering junipers around edges about midway between Wells Draw and Antelope Canyon, about 6 mi. W. and 13.5 mi. S. from Myton and 14 mi. SE. of Duchesne. There are many similar knolls to W. and S. and higher ground to S. To reach from Myton, go 1.8 mi. SW. along U. S. Highway 40, thence S. along Price rd. 6.9 mi. to its junction with rd. SW., thence generally SW. along latter rd. 7.4 mi. to point where rd. enters junipers; leave rd. here and go W. along slope of hill to N. side of creek bottom, which is 0.75 mi. from top of knoll and sta. site. U. S. C. & G. S. occupied sta. in 1936 and set two reference marks.

Station mark: Standard tablet stamped "Antelope M 1934" cemented in flat rock buried flush with ground.

Reference marks: U. S. C. & G. S. reference disks set in concrete posts at distances and in azimuths from sta. mark as follows—(1) 49.03 ft., $39^{\circ}46'56''$; (2) 48.01 ft., $113^{\circ}07'01''$.

Signal: 6-ft. cairn centered over sta. mark.

[Latitude $40^{\circ}01'05.770''$; longitude $110^{\circ}12'44.102''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Sowers.....	84 26 32	264 15 23	4.394845
Duchesne.....	146 33 50	326 24 21	4.577389

CONE (U. S. C. & G. S.), Uintah County

On cone-shaped butte at SE. end of Leland ranch, about 9 mi. S. by W. of Randlett and 7 mi. W. by N. of Ouray. Knoll on which sta. is located is quite small on top and is being rapidly eroded. To reach from SW. corner of Fort Duchesne, go S. on graded dirt rd. 5.8 mi. to bridge over Uinta River; continue S. 0.2 mi. to fork, then turn SE. onto track rd. and go 0.6 mi.; take right fork and go 0.05 mi.; take right fork up hill and go 1.4 mi. to fork; take either fork and continue in southerly direction 0.8 mi. to fork; take middle fork and keep to main track rd. S. and SW. 1.0 mi.; take left fork and go S. and E. on main track rd. 3.95 mi.; take left fork to top of mesa and continue along top of mesa to saddle (total of 1 mi.) to end of truck travel; from here pack easterly 5 minutes down into saddle and then to top of cone and sta. Established in 1931 by U. S. C. & G. S. at point 2.2 ft. from U. S. G. S. sta. mark in azimuth 157°. Recovered by U. S. G. S. (C. N. Mortenson) in 1934, when a tie between the two stations was made. At that time Mortenson reported that the butte was scarcely large enough on top for the observing tent. Recovered by U. S. C. & G. S. in 1936 T. 4 S., R. 1 E., SW¼ sec. 25. Elev. 5,326 ft.

Station mark: U. S. C. & G. S. standard disk stamped "Cone 1931" set in concrete.

Reference mark 1 (1931): U. S. C. & G. S. reference disk set in cement in top of 4-in. galvanized-iron pipe on highest knoll W. of sta., about 0.25 mi. from sta. mark on azimuth 106°28'53". This reference mark was used as the azimuth mark in 1936, when the pipe projected 2 in. above ground.

Reference mark 2 (1931): U. S. C. & G. S. reference disk set in cement in top of 4-in. galvanized-iron pipe on same butte as sta., 16.64 ft. from sta. mark in azimuth 152°02'. In 1936 the pipe projected 2 in.

Reference mark 1 (1936): U. S. C. & G. S. reference disk set in tile pipe projecting 4 in. above ground, 18.41 ft. from sta. mark in azimuth 37°57'. Distance between reference marks 2 (1931) and 1 (1936) is 29.18 ft.

[Latitude 40°06'04.831"; longitude 109°50'12.679"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
Pariette.....	71	32	10	251	25	15	4. 206948
Flat Top.....	120	36	48	300	26	27	4. 422600
G. L. O. 2.....	143	57	33.9	323	45	18.0	4. 659071
Neola.....	152	12	11	332	01	59	4. 679613
Roosevelt.....	157	57	55.27	337	54	20.48	4. 3214147
Little.....	193	30	56.44	13	36	04.29	4. 6805895

DUCHESNE, Duchesne County

On S. edge of prominent mesa, about 10 mi. in air line NNW. of Duchesne, 3 mi. SW. of Talmage, on N. side of Duchesne River and E. of Rock Creek. To reach from Talmage go 1.2 mi. S. to rd. fork, thence along poor rd. (right fork) SW. through sagebrush 2.2 mi. to foot of mesa, then walk 0.5 mi. SW. to sta.

Station mark: Standard tablet stamped "Duchesne M 1934," cemented in large boulder.

Reference marks: Reference tablets stamped, respectively, "Duchesne No 1" and "Duchesne No 2," cemented in boulders at distances and in azimuths from sta. mark as follows—(1) 47.04 ft., 19°31'; (2) 14.42 ft., 243°41'.

Signal: Mast with cross targets centered over sta. and nailed to butt of tree which overhangs sta. mark. Also 10-ft. tripod made of sawed timbers centered around sta.

[Latitude 40°18'07.32"; longitude 110°27'25.83"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Sowers.....	6 22 06	186 30 23	4.533543
Grey Head.....	30 03 57	209 54 13	4.633211
Tabbie.....	96 37 32	276 24 03	4.473205
Spur.....	171 25 11	351 23 39	4.350713

FLAT TOP, Duchesne County

On top of flat-topped, most prominent butte in vicinity, about 3 mi. in air line NW. of Myton. To reach from Myton, go 0.7 mi. N. along U. S. Highway 40, then drive along rd. W. 2.2 mi., and from this point walk to sta., which is 0.5 mi. N. and about 500 ft. higher.

Station mark: Standard tablet stamped "Flat Top M 1934," cemented in large boulder.

Reference marks: Reference tablets stamped, respectively, "Flat Top No 1" and "Flat Top No 2," cemented in boulders at distances and in azimuths from sta. mark as follows—(1) 17.98 ft., 47°01'; (2) 13.68 ft., 165°21'.

Signal: Cone-shaped frame 6 ft. in diam. at base covered with white cloth and centered over sta. mark.

[Latitude 40°13'20.61"; longitude 110°06'15.82"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Antelope.....	22 06 56	202 02 46	4.388431
Sowers.....	53 34 12	233 18 51	4.624844
Duchesne.....	106 31 58	286 18 18	4.405355
Spur.....	133 04 36	312 49 21	4.658208
Altonah.....	151 34 44	331 27 22	4.528399
Ioka.....	159 06 36	339 04 37	4.084909

G. L. O. 2, Duchesne County

On crest and at point 15 meters W. of sharp edge of bluff, about 6.5 mi. W. of Neola. To reach from Roosevelt, go N. along main rd. to Neola, thence 1.4 mi. W., 0.6 mi. S., 3.2 mi. W., 0.55 mi. S., and 3.4 mi. W. and NW. to top of mesa; follow woods rd. N. about 0.4 mi. and go E. (cutting through scrub cedar) to crest of bluff. Station Cone can be seen in clear weather. Witness mark is lone 8-in. cedar tree painted with green and white bands used to mark Uinta Indian Reservation boundary. This cedar tree was left standing while all other trees were cleared for the lines. Located in 1931 by U. S. C. & G. S.

Station mark: Standard General Land Office sta. disk set in concrete at $\frac{1}{4}$ cor. T. 1 N., R. 2 W., Uinta principal meridian.

Reference marks: U. S. C. & G. S. reference disks cemented in concrete at distances and in azimuths from sta. mark as follows—(1) 19.196 meters, 222°37'08.8"; (2) 23.570 meters, 137°47'53.8".

Latitude 40°25'59.018"; longitude 110°09'11.198".

GREY HEAD, Duchesne County

On high grassy-topped hill on ridge between right fork of Indian Canyon and left fork of Lake Canyon, about 17 mi. in air line NE. of Colton. Established in 1898 and reoccupied in 1910 and again in 1934. In 1934 a standard tablet was cemented in a rock directly over the nail that was formerly the sta. mark, new reference marks were set, and the best route to sta. noted, as follows: From Duchesne drive up Indian Canyon 10.4 mi., thence up right fork of Indian Canyon

13.5 mi. to mouth of Sterling Canyon, thence up Sterling Canyon 1.2 mi. to end of rd., from which point sta. is about 1 mi. to NE. and about 1,500 ft. higher. T. 10 S., R. 7 W., near cor. secs. 7, 8, 17, and 18. Elev. (U. S. F. S.) 9,531 ft.

Station mark: Standard tablet stamped "Grey Head M 1934" cemented in sandstone rock.

Reference mark 1: Drill hole in sandstone rock 9.55 ft. from sta. mark in azimuth 40°39'.

Reference mark 2: Reference tablet stamped "Grey Head No 2" cemented in rock 11.95 ft. from sta. mark in azimuth 305°38'.

Signal: Cairn 6 ft. high centered over sta. mark.

[Latitude 39°58'00.48"; longitude 110°42'33.02"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Strawberry.....	110 53 22	290 42 46	4.399594
Tabbie.....	188 41 36	348 37 54	4.617033

IOKA, Duchesne County (Not occupied)

On top of most prominent hill in vicinity, about 9 mi. W., thence 2 mi. N. from Roosevelt. To reach from Roosevelt, go 1.8 mi. N. along Neola rd. to rd. fork, thence along rd. 2.1 mi. NW. and W., thence 0.5 mi. N., thence 6 mi. W. to point where rd. passes through low saddle and about 0.5 mi. S. to sta.

Station mark: None.

Station and signal: 6-ft. cairn on highest point of hill.

[Latitude 40°19'28.87"; longitude 110°09'19.47"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Duchesne.....	84 29 49	264 18 06	4.411191

LITTLE NO. 2, Uintah County

On S. end of Little Mountain, about 10 mi. in air line NW. of Vernal and 3 mi. SW. of Dry Fork. May be reached from Dry Fork by way of dim rough trail up and over N. rim of mountain toward S. end, a distance of about 4 mi. Horses at Dry Fork. U. S. C. & G. S. sta. "Little 1931" is 835.24 ft. from sta. mark in azimuth 261°11'46".

Station mark: None.

Station and signal: Cairn.

[Latitude 40°31'14.14"; longitude 109°42'27.53"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Cone.....	13 19 03	193 14 02	4.679713
Roosevelt.....	34 49 21	214 40 44	4.518722
Flat Top.....	45 37 46	225 22 21	4.674336
Neola.....	82 47 06	262 31 49	4.525326
Little.....	261 11 46	81 11 53	2.405827

NEOLA, Duchesne County

On S. end of prominent bench about 5 mi. in air line NW. of Neola. To reach from Neola, drive N. 2 mi., thence W. 1.7 mi. to rd. fork; take right (NW.) rd. and continue NW. 3 mi.; from here walk to sta., which is about 0.5 mi. N. and 700 ft. higher.

Station mark: Standard tablet stamped "Neola M 1934" cemented in boulder.

Reference marks: Reference tablets stamped, respectively, "Neola No 1" and "Neola No 2," cemented in boulders at distances and in azimuths from sta. mark as follows—(1) 10.17 ft., $47^{\circ}02'$; (2) 18.75 ft., $283^{\circ}17'$.

Signal: Hexagonal frame 4.5 ft. in diam. at base covered with white cloth 7 ft. from sta. mark in azimuth $143^{\circ}11'$.

[Latitude $40^{\circ}28'55.25''$; longitude $110^{\circ}05'59.48''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Flat Top.....	0 46 05	180 45 54	4.459861
Ioka.....	15 07 31	195 05 22	4.257560
G. L. O. 2.....	39 44 40	219 42 36	3.849284
Duchesne.....	56 44 30	236 30 37	4.560260
Altonah.....	93 00 09	272 52 35	4.216837
Spur.....	93 50 56	273 35 28	4.527771

PARIETTE, Duchesne County

On top of small rocky peak locally known as Castle Peak, about 10 mi. in air line and 13 mi. by rd. SSE. of Myton. To reach, go 1.8 mi. W. along U. S. Highway 40 from Myton, thence 1.8 mi. S. on Prince rd. to rd. fork, take left fork to Pariette Mine and continue 2.7 mi.; at this point sta. is on peak 0.25 mi. W. of rd.

Station mark: Standard tablet cemented in solid rock and stamped "Pariette M 1934."

Reference marks: Reference tablets stamped, respectively, "Pariette No 1" and "Pariette No 2," cemented in solid rock at distances and in azimuths from sta. mark as follows—(1) 16.64 ft., $151^{\circ}08'$; (2) 11.00 ft., $259^{\circ}27'$.

Signal: 6-ft. cairn centered over sta. mark.

[Latitude $40^{\circ}03'18.96''$; longitude $110^{\circ}00'57.16''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Antelope.....	76 17 27	256 09 52	4.236957
Flat Top.....	157 54 20	337 50 54	4.301706

ROOSEVELT, Uintah County

On south-central rim of largest and easternmost of three small buttes, 3.75 mi. in air line SE. of Roosevelt, 4 mi. SW. of Fort Duchesne, and 1.75 mi. S. of main Roosevelt-Fort Duchesne rd. The ridge is 19 by 150 yd. in size, is flat-topped and bare, and drops off abruptly on all sides. To reach from Roosevelt, go N. on main street to point where U. S. Highway 40 turns E.; follow highway 0.8 mi. E., then turn S. onto graded rd. and go 2.0 mi.; turn E. here on side rd. and go 1.05 mi. to ranch buildings on right and stone garage built in hillside on left; continue straight ahead on main-traveled rd. 1.25 mi. to point where rd. skirts N. end of butte and end of truck travel. From here pack northerly 10 minutes up over rim rock to sta. Established in 1913 and reoccupied in 1934 by U. S. G. S. In 1936 U. S. C. & G. S. recovered this sta. and set two reference marks and an azimuth mark. T. 2 S., R. 1 E., SW $\frac{1}{4}$ sec. 30. Elev. 5,298 ft.

Station mark: Standard tablet in solid rock, set flush with surface, at point 6 ft. NNW. of S. edge of ridge and 51 ft. SSE. of N. edge of ridge.

Reference mark 1: U. S. C. & G. S. reference disk in drill hole in boulder, 44.5 ft. from sta. mark in azimuth $170^{\circ}18'28''$.

Reference mark 2: U. S. C. & G. S. reference disk in drill hole in outcropping bedrock 29.48 ft. from sta. mark in azimuth 76°39'02''.

Azimuth mark: U. S. C. & G. S. reference disk in drill hole in outcropping bedrock on rocky ridge, about 0.8 mi. from sta. mark in azimuth 325°22'16'', 200 ft. W. of point of ridge and 50 ft. S. of base of ridge.

Signal: Cairn built over sta. mark.

[Latitude 40°16'34.657''; longitude 109°55'45.540'']

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Flat Top.....	68 10 00	248 03 13	4. 205586
G. L. O. 2.....	132 32 59	312 24 17	4. 411237
Neola.....	147 40 50	327 34 12	4. 432119

SOWERS, Duchesne County

On Uinta special base meridian, near SW. cor. T. 5 S., R. 5 W., on top of small hill on ridge between Sowers and Tabby Canyons, about 11 mi. in air line SSW. of Duchesne. To reach from Duchesne, go E. 10.7 mi. along U. S. Highway 40, thence S. 14.5 mi. along Antelope Canyon and Sowers Canyon rd.; turn sharp right (N.) and go 0.9 mi. to top of ridge between Sowers and Cottonwood Canyons, thence SW. 9 mi.; at this point, sta. is about 1 mi. SE. across Tabby Canyon.

Station mark: Standard tablet stamped "Sowers M 1934" cemented in flat rock buried 1 ft. under ground and covered with rocks.

Reference marks: Reference tablets stamped, respectively, "Sowers No 1" and "Sowers No 2," cemented in sandstone rocks at distances and in azimuths from sta. mark as follows—(1) 24.22 ft., 310°05'; (2) 26.15 ft., 219°03'.

Signal: Hexagonal frame 7 ft. high and 4.5 ft. in diam. at base covered with white and black cloth 5.5 ft. from sta. mark in azimuth 29°32'.

[Latitude 39°59'46.52''; longitude 110°30'05.56'']

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Grey Head.....	79 37 05	259 29 05	4. 256103
Tabbie.....	145 25 03	325 13 19	4. 656942

SPUR, Duchesne County

On Uintah-Ouray Indian Reservation, at S. end and near top of high ridge between Pigeon and Lake Fork Creeks, 6.5 mi. in air line N. of town of Mountain Home, 27 mi. N. of Duchesne. To reach from Mountain Home, go 1.3 mi. W. to rd. fork; take right fork and follow well-traveled rd. 5.9 mi. NW. to dim rd. to right of ravine; drive up ravine short distance to sheep corral, thence up steep ravine 2.1 mi.; from here walk to sta. on E. one of two small spur ridges, visible about 2 mi. to NW. and about 1,500 ft. higher. In 1936 U. S. C. & G. S. occupied sta. and set additional reference mark. T. 1 N., R. 5 W., sec. 7.

Station mark: Standard tablet stamped "Spur M 1934" cemented in boulder.

Reference mark 1: U. S. C. & G. S. reference disk in drill hole set in boulder 13.52 ft. from sta. mark in azimuth 81°57'02''.

Reference mark 2: Reference tablet stamped "Spur No 2 M 1934" cemented in boulder 24.80 ft. from sta. mark in azimuth 308°08'.

Reference mark 3: 20-penny spike in signal tree.

Signal: Trimmed 14-in. pine tree with pentagonal frame covered with white cloth 39.5 ft. from sta. mark in azimuth 80°07'.

Latitude 40°30'06.169''; longitude 110°29'47.918''.

STRAWBERRY, Wasatch County

On high plateau and on SW. and slightly higher one of two main summits of Strawberry Mountains, in Uinta National Forest, about 10 mi. in air line NE. of Soldier Summit (sta. on Denver & Rio Grande Western R. R.) and 14 mi. N. of Colton. Easily reached by wagon rd. from Colton or Soldier Summit to top of Reservation Ridge, thence W. along main ridge. Established in 1908, reoccupied in 1910, and intersected in 1934. T. 5 S., R. 10 W., secs. 14 and 15. Elev. (U. S. F. S.) 10,300 ft.

Station mark: Cross scratched on small rock buried a few inches below ground. It is about 8 in. E. of imaginary line joining two cairns that serve as signals and reference marks. In 1936 the U. S. C. & G. S. re-marked this sta. with a reference disk and made it the azimuth mark for U. S. C. & G. S. sta. Strawberry, which is 1.5 mi. NE. of this mark.

Reference marks: Cairns at distances and in azimuths from sta. mark as follows—(1) 8.23 ft., $45^{\circ}05'$; (2) 15.30 ft., $217^{\circ}05'$.

Latitude $40^{\circ}02'49.43''$; longitude $110^{\circ}59'02.10''$.

TABBIE, Duchesne County

On top of spur ridge extending S. from Tabbie Mountain, about 2 mi. S. of top of main mountain and 300 ft. lower in elevation, 8 mi. in air line N. of Fruitland, 5 mi. WSW. of Tabiona. To reach from Fruitland post office, take rd. N. up Red Creek 11 mi. to trail leading E. to Tabbie Mountain, then follow trail on to mountain and around S. edge about 5 mi. to point near sta.

Station mark: Standard tablet stamped "Tabbie M 1934" cemented in large boulder.

Reference mark 1: Reference tablet stamped "Tabbie No 1" cemented in boulder 24.5 ft. from sta. mark in azimuth $113^{\circ}47'$.

Reference mark 2: Short rock drill cemented in boulder 26.45 ft. from sta. mark in azimuth $183^{\circ}48'$.

Signal: 7-ft. cairn centered over sta. mark.

[Latitude $40^{\circ}19'56.66''$; longitude $110^{\circ}48'16.90''$]

To station—	Azimuth	Back azimuth	Distance
Strawberry.....	° ' " 25 46 44	° ' " 205 39 48	Log. meters 4.546145

SOUTHEASTERN UTAH, 1934

T. W. RANTA and V. J. LARSEN, chiefs of party

The net of triangulation designated as the Southeastern Utah project (fig. 20) was expanded southwestward from two stations of the Coast and Geodetic Survey and tied to a third; it was expanded from Mount Waas and Mount Peale and tied to Mount Waas Azimuth Mark. Of these three stations, the Coast and Geodetic Survey occupied and marked only one, Mount Waas, locating the other two by intersection.

The triangulation was originally computed to refer approximately to the North American datum of 1927. Readjustment of the results to the datum of 1927 depends on new positions for the three stations mentioned and for Geological Survey stations Bears Ears, Abajo

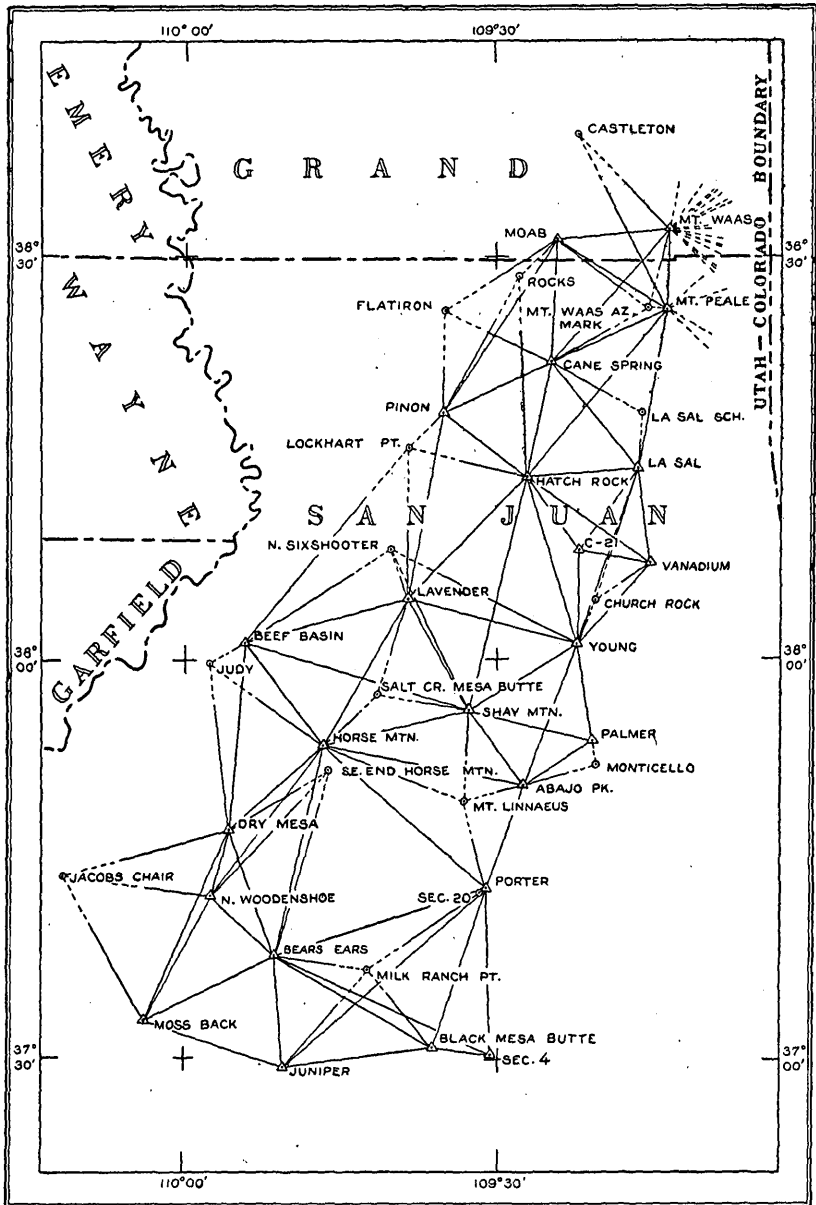


FIGURE 20.—Triangulation in southeastern Utah, 1934.

Peak, and North Woodenshoe, all of which were recovered by the Coast and Geodetic Survey in 1936.

This bulletin is the first report to contain the published results of this project.

STATIONS

ABAJO PEAK, San Juan County

On highest point of Abajo Peak of Blue Mountains in La Sal National Forest, about 7 mi. in air line WSW. of Monticello. To reach from Redd store in Monticello, go W. 9.25 mi. on graded rd. to summit of saddle in mountains and end of truck travel, thence S. along Forest Service trail toward Jackson Camp, thence SE. down hill and nearly parallel to rd. about 100 yd.; bear right along hillside in timber, follow this trail S. up steep slope 0.5 mi. to log corral in saddle of main ridge, bear left from corral SE. up to point partly timbered and open hillside meadow near summit, bear left along ridge to saddle at ruins of old cabin, and continue E. up ridge 300 yd. to sta. site. About 1½ hours' hike. In 1936 U. S. C. & G. S. reoccupied sta. and set two reference disks and an azimuth mark. T. 34 S., R. 22 E., sec. 12. Elev. 11,357 ft.

Station mark: Standard tablet stamped "Abajo Peak 1934" cemented in boulder.

Reference marks 1 and 2: U. S. C. & G. S. reference disks in drill holes in boulders at distances and in azimuths from sta. mark as follows—(1) 6.396 meters, 212°23'24"; (2) 4.943 meters, 51°48'19".

Reference marks 3, 4, 5, and 6: Copper nails and washers in trunks of various trees, at distances and in azimuths from sta. mark as follows—(3) in 10-in. balsam pine, 62.45 ft., 74°10'; (4) in 8-in. balsam, 36.06 ft., 105°15'; (5) in 6-in. balsam, 40.43 ft., 169°30'; (6) in 4-in. pine, 22.84 ft., 307°47'.

Azimuth mark: U. S. C. & G. S. reference disk in drill hole in outcrop of bed-rock 0.3 mi. from sta. in azimuth 58°58'21.6".

Signal: Cairn supporting pole with flag centered over sta. mark.

[Latitude 37°50'22.316"; longitude 109°27'42.295"]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
Porter.....	21	37	50	201	35	33	4.173771
Mount Linnaeus.....	76	49	04	256	45	42	3.918923
Horse Mountain.....	101	03	05	280	51	15	4.459581
Shay Mountain.....	144	30	54	324	27	43	4.117384

BEARS EARS, San Juan County

On top of eastern end of most easterly and higher of two mountain peaks locally known as "Bears Ears," about 21 mi. in air line W. of Blanding and 32 mi. SW. of Monticello. To reach from Utah Oil Refining Sta. in Blanding, go W. 28.1 mi. along Natural Bridges rd. to Kigalia ranger sta., thence 4 mi. along same rd. to point on slope of mountain about 0.15 mi. NE. of cattle guard; turn left and climb mountain SE. 0.6 mi. to top and sta. site. There are no trees in immediate vicinity of sta. and long line has been cleared over top of mountain to NW. In 1936 U. S. C. & G. S. reoccupied sta. and set an azimuth mark. T. 36 S., R. 19 E., sec. 29. Elev. 9,059 ft.

Station mark: Standard tablet stamped "Bears Ears 1934" cemented in sandstone boulder flush with ground.

Reference marks 1 and 2: Reference tablets cemented in sandstone boulders buried flush with ground at distances and in azimuths from sta. mark as follows—(1) 18.39 ft., 105°18'; (2) 15.11 ft., 204°20'.

Reference marks 3 and 4: Copper nails and washers in trunks of trees, about 3 ft. above ground, at distances and in azimuths from sta. mark as follows—(1) in 8-in. juniper, 66.56 ft., 99°54'; (4) in 18-in. juniper, 74.18 ft., 166°26'.

Azimuth mark: U. S. C. & G. S. disk in top of 4-in. terra cotta pipe filled with concrete 1.5 mi. from sta. mark in azimuth $153^{\circ}41'49.2''$.

Signal: Pole with cross targets centered over sta. mark.

[Latitude $37^{\circ}37'36.626''$; longitude $109^{\circ}51'17.721''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Moss Back.....	65 01 32	244 53 51	4.311374
North Woodenshoe.....	133 00 29.91	312 56 36.76	4.1065780
Dry Mesa.....	159 13 51	339 11 03	4.279400

BEEF BASIN, San Juan County

On second prominent butte from NW. of series of four prominent buttes on ridge bearing SE.-NW., about 32 mi. in air line WNW. of Monticello and 15 mi. NW. of Gooseberry ranger sta. A broad valley known as "Ruin Park" lies SE. of sta. To reach from Gooseberry ranger sta., take Beef Basin forest trail past Horse Mountain to Beef Basin.

Station mark: Standard tablet stamped "Beef Basin 1934" cemented in bedrock.

Reference marks: Reference tablets cemented in bedrock at distances and in azimuths from sta. mark as follows—(1) 17.54 ft., $223^{\circ}29'$; (2) 29.11 ft., $297^{\circ}02'$.

Signal: Pole with cross targets in small cairn centered over sta. mark.

[Latitude $38^{\circ}01'26.29''$; longitude $109^{\circ}54'04.25''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Dry Mesa.....	5 48 19	185 47 12	4.421969
Judy.....	62 11 52	242 09 38	3.777391

BLACK MESA BUTTE, San Juan County

On highest point of Black Mesa Butte, about 10 mi. in air line SW. of Blanding. To reach from Blanding, go 6.6 mi. S. along State Highway 47, thence W. along rd. 2.2 mi.; from this point go W. by foot (nearly 2 hours' hike) or horse to sta. Elev. 6,015 ft.

Station mark: Standard tablet stamped "Black Mesa Butte 1934" cemented in bedrock.

Reference marks: Reference tablets cemented in bedrock at distances and in azimuths from sta. mark as follows—(1) 11.59 ft., $114^{\circ}47'$; (2) 10.99 ft., $226^{\circ}30'$.

Signal: Pole with cross targets centered over sta. mark.

[Latitude $37^{\circ}31'00.04''$; longitude $109^{\circ}36'23.14''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Juniper.....	81 47 28	261 38 55	4.320299
Bears Ears.....	119 11 27	299 02 21	4.400156
Milk Ranch Point.....	139 01 42	318 58 00	4.135234

C-21, San Juan County

On top of long hill, about 18.8 mi. N. along U. S. Highway 450 from Monticello courthouse, 0.9 mi. S. of junction of highway with rd. leading to International Vanadium Corp. mine, 60 ft. E. of center line of highway, 2 ft. N. of pole, and

2 ft. higher than highway. Established as U. S. C. & G. S. benchmark in 1933. Elev. (U. S. C. & G. S.) 6,077.445 ft.

Station mark: U. S. C. & G. S. standard disk set in top of concrete post and stamped "C 21 1933."

[Latitude 38°08'02.46"; longitude 109°22'04.43"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Young.....	1 41 56	181 41 46	4. 097226
Hatch Rock.....	143 42 38	323 39 23	4. 112877

CANE SPRING, San Juan County

On southeastern extremity of mesa directly above Cane Spring, about 10 mi. in air line NW. of La Sal. To reach from La Sal, go W. along rd. to U. S. Highway 450, thence NW. along highway to junction of dim rd. E. (old Moab-Monticello rd.) just S. of Nipples, thence along latter rd. to Block Canyon, beyond which point car cannot be driven; cross canyon and follow ridge (about 1½ hours' hike) NW. to sta.

Station mark: Standard tablet stamped "Cane Spring 1934" cemented in large boulder projecting about 6 in. above surface of ground.

Reference mark 1: Reference tablet cemented in rocky ledge 14.84 ft. from sta. mark in azimuth 55°23'.

Reference marks 2 and 3: Copper nails and washers in trunks of trees at distances and in azimuths from sta. mark as follows—(2) in 8-in. juniper, 51.36 ft., 189°44'; (3) in 12-in. juniper, 29.93 ft., 286°11'.

Signal: 12-ft. post with cross targets centered over sta. mark.

[Latitude 38°22'08.43"; longitude 109°24'51.66"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Hatch Rock.....	12 59 38	192 58 06	4. 205362
Pinon.....	64 15 22	244 08 52	4. 228238
Flatiron.....	115 33 18	295 26 43	4. 233208

CASTLETON, Grand County (Not occupied)

At southern end of butte, on N. rim of valley, about 5 mi. in air line NW. of Castleton post office.

Station mark: None.

Station and signal: Center of lone column of rock.

No check on this position.

Latitude 38°39'00.0"; longitude 109°22'00.0".

CHURCH ROCK, San Juan County (Not occupied)

In La Sal National Forest about 14 mi. in air line N. of Monticello, 0.5 mi. W. of U. S. Highway 450. T. 31 S., R. 23 E., sec. 25.

Station mark: None.

Station and signal: Center of highest rock.

[Latitude 38°04'26.31"; longitude 109°20'40.45"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Young.....	22 30 09	202 29 08	3. 800789

DRY MESA, San Juan County

On NW. side of large hill NW. of Reservoir Canyon reservoir in La Sal National Forest, about 32 mi. in air line W. of Monticello, 9.5 mi. NW. of Kigalia ranger sta. To reach from Kigalia ranger sta., go S. 0.5 mi. to Natural Bridges rd., thence SW. 2.5 mi. to Twin Springs rd., thence W. and N. about 5 mi. to Twin Springs cowboy camp and end of truck travel; follow trail N. from camp by way of Brushy Mountain to Dry Mesa. Elev. 8,838 ft.

Station mark: Standard tablet stamped "Dry Mesa 1934" cemented in large boulder in place and projecting about 8 in. above surface of ground.

Reference marks: Reference tablets cemented in bedrock at distances and in azimuths from sta. mark as follows—(1) 24.73 ft., 89°38'; (2) 21.16 ft., 225°04'.
Signal: Pole with cross targets centered over sta. mark.

[Latitude 37°47'13.63"; longitude 109°55'53.46"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
North Woodenshoe.....	15 56 11	195 55 08	3.974898
Moss Back.....	24 02 23	203 57 29	4.461816
Jacobs Chair.....	75 07 39	254 57 57	4.381833
Judy.....	173 36 19	353 35 13	4.373660

FLATIRON, San Juan County (Not occupied)

On small flat mesa, about 20 mi. in air line NW. of La Sal and 10 mi. SSW. of Moab.

Station mark: None.

Station and signal: Center of mesa.

Latitude 38°26'07.30"; longitude 109°35'28.05".

HATCH ROCK, San Juan County

On highest part of summit of isolated butte known locally as "Hatch Rock," about 12 mi. in air line SW. of La Sal and 5 mi. SW. of Looking Glass Rock. To reach from La Sal, go W. along rd. 10 mi. to La Sal Junction, thence S. 9 mi. along fairly good rd. to butte. Ascent possible only from S. side near W. end of circular rocky point.

Station mark: Standard tablet stamped "Hatch Rock 1934" cemented in bedrock, buried 18 in. below surface of ground.

Reference mark 1: Reference tablet cemented in rock outcrop 15.41 ft. from sta. mark in azimuth 38°09'.

Reference mark 2: Copper nail and washer in root on SW. side of 12-in. piñon tree 45.08 ft. from sta. mark in azimuth 169°39'.

Reference mark 3: Copper nail and washer in root on S. side of juniper tree 25.23 ft. from sta. mark in azimuth 304°19'.

Signal: 12-ft. post with cross targets centered over sta. mark.

[Latitude 38°13'41.32"; longitude 109°27'20.00"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Shay Mountain.....	14 05 39	194 02 13	4.524674
Lavender.....	45 04 15	224 57 07	4.377296
Lockhart Point.....	104 06 04	283 59 05	4.229435
Pinon.....	125 27 32	305 22 35	4.154689
Rocks.....	177 29 21	357 28 50	4.438140

HORSE MOUNTAIN, San Juan County

On ridge at NW. end of Horse Mountain, in La Sal National Forest, about 24 mi. in air line W. of Monticello, 4.5 mi. N. of Gooseberry ranger sta. To reach from Gooseberry ranger sta., go N. along trail to Horse Mountain, thence along stock trail up S. side of mountain. Elev. 9,202 ft.

Station mark: Standard tablet stamped "Horse Mtn 1934" cemented in bedrock.

Reference marks: Reference tablets cemented in bedrock at distances and in azimuths from sta. mark as follows—(1) 8.36 ft., $352^{\circ}18'$; (2) 12.52 ft., $123^{\circ}40'$.

Signal: Cairn supporting large pole with cross targets centered over sta. mark.

[Latitude $37^{\circ}53'19.88''$; longitude $109^{\circ}46'59.56''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Bears Ears.....	12 16 56	192 14 17	4.473628
North Woodenshoe.....	37 35 38	217 29 05	4.409708
Dry Mesa.....	49 11 18	229 05 51	4.237071
Judy.....	127 57 26	307 50 52	4.298010
Beef Basin.....	145 22 41	325 18 20	4.260827

JACOBS CHAIR, San Juan County (Not occupied)

On prominent rock having appearance of side and end of a wall, looking from SE. and NE., respectively; about 40 mi. in air line W. of Blanding and 20 mi. WNW. of Bears Ears Peaks.

Station mark: None.

Station and signal: Center of rock.

Latitude $37^{\circ}43'52.06''$; longitude $110^{\circ}11'44.07''$.

JUDY, San Juan County (Not occupied)

On white ridge N. of large white butte and N. of Beef Basin drainage, about 34 mi. in air line WNW. of Monticello and 16 mi. NW. of Gooseberry ranger sta. Elev. 6,805 ft.

Station mark: None.

Station and signal: Center of white conical rock about 50 ft. in height.

Latitude $37^{\circ}59'55.62''$; longitude $109^{\circ}57'41.40''$.

JUNIPER, San Juan County

On eastern end of second small mesa S. of Bears Ears Peaks, W. of N.-S. ridge, E. of Grand Gulch, about 1 mi. SW. of Holstein Spring in small box canyon, 23 mi. in air line WSW. of Blanding, 13 mi. S. of Kigalia ranger sta. To reach from Kigalia ranger sta., go 0.5 mi. S. to Natural Bridges rd., thence 5.3 mi. S. to Jashua trail and end of truck travel; follow Jashua trail to Mormon trail, thence to U. S. G. S. temporary benchmark painted 6576.3 on blazed pine tree, thence E. about 0.5 mi. past sagebrush flat and SE. along ridge to small white mesa. Elev. 6,500 ft.

Station mark: Standard tablet stamped "Juniper 1934" cemented in bedrock.

Reference marks: Reference tablets cemented in bedrock at distances and in azimuths from sta. mark as follows—(1) 17.12 ft., $92^{\circ}30'$; (2) 16.94 ft., $303^{\circ}49'$.

Signal: Pole with cross targets centered over sta. mark.

[Latitude $37^{\circ}29'22.38''$; longitude $109^{\circ}50'25.46''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Moss Back.....	108 22 20	288 14 07	4.320475
Bears Ears.....	175 11 34	355 11 02	4.184443

LA SAL, San Juan County

On E. edge of rim, about 5 mi. in air line S. of La Sal and 0.5 mi. W. of American Smelting and Refining Co. copper mine. To reach from La Sal, take rd. leading to American Smelting and Refining Co. copper mine, which is 5.4 mi. S. of La Sal. At this point follow small drainage W. to sta.

Station mark: Standard tablet stamped "La Sal 1934" cemented in bedrock.

Reference mark 1: Reference tablet cemented in bedrock 23.33 ft. from sta. mark in azimuth 29°51'.

Reference mark 2: 20-penny nail cemented in bedrock 12.04 ft. from sta. mark in azimuth 120°23'.

Reference mark 3: Copper nail and washer in 5-in. piñon tree 2.5 ft. above surface of ground, 38.18 ft. from sta. mark in azimuth 204°37'.

Signal: 12-ft. post with cross targets centered over sta. mark.

[Latitude 38°14'16.87"; longitude 109°16'20.70"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Church Rock.....	19 10 31	199 07 51	4.285008
Young.....	20 00 23	199 56 46	4.408043
C-21.....	35 57 21	215 53 48	4.154035
Hatch Rock.....	86 08 49	266 02 00	4.206076
Cane Spring.....	139 33 02	319 27 44	4.281469

LA SAL SCHOOL, San Juan County (Not occupied)

On schoolhouse about 1 mi. in air line W., thence 0.5 mi. S. of La Sal post office.

Station mark: None.

Station and signal: Chimney.

No check on this position.

[Latitude 38°18'15.24"; longitude 109°16'17.78"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
La Sal.....	0 33 13	180 33 11	3.866286
Cane Spring.....	119 59 28	299 54 09	4.158467

LAVENDER, San Juan County

On very small top of westernmost one of two rocky points on rocky butte which has walls several hundred feet high, between Lavender and Davis Creeks, about 22 mi. in air line NW. of Monticello and 5 mi. W. of Dugout ranch which is on Indian Creek. To reach from Monticello, go N. 14.3 mi. along U. S. Highway 450, thence generally W. 24 mi. to Dugout ranch. At this point follow old oil well rd. W. 3.0 mi. to Indian Creek; then go up (N.) Indian Creek to mouth of Davis Creek, from which point go to mouth of small canyon just N. of Lavender Butte. [Under favorable conditions car can be driven 6 mi. upstream to point where rd. approaches Indian Creek.] The only way to get on top of mesa is up small canyon just N. of butte. Observing party left 20-ft. ladder at one of most difficult points. Top of butte can best be reached up small crack in rocks on SW. side with aid of rope.

Station mark: Standard tablet stamped "Lavender 1934" cemented in bedrock.

Signal: 12-ft. post with cross targets centered over sta. mark.

[Latitude 38°04'34.70"; longitude 109°38'52.47"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Salt Creek Mesa Butte.....	17 58 28	197 56 37	4. 154329
Horse Mountain.....	29 46 56	209 41 57	4. 379527
Beef Basin.....	75 26 00	255 16 38	4. 361301
North Sixshooter.....	166 05 37	346 04 54	3. 845416

LOCKHART POINT, San Juan County (Not occupied)

On rocky peak about 21 mi. in air line W. of La Sal and on E. rim of Colorado River.

Station mark: None.

Station and signal: Highest point of peak.

[Latitude 38°15'54.80"; longitude 109°38'36.63"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Lavender.....	1 03 18	181 03 08	4. 321654
Beef Basin.....	40 13 42	220 04 07	4. 544475

MILK RANCH POINT, San Juan County (Not occupied)

On barren ledge on easternmost end of mesa between Arch and Milk Ranch Canyons, about 13 mi. in air line W. of Blanding. Elev. 7,275 ft.

Station mark: None.

Station and signal: Cairn supporting pole.

[Latitude 37°36'34.27"; longitude 109°42'28.13"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Juniper.....	41 23 20	221 18 29	4. 248860
Bears Ears.....	98 27 54	278 22 30	4. 118253

MOAB, Grand County

On northernmost point of high mesa between North Fork Mill and Mill Creeks, about 9 mi. in air line SE. of Moab. To reach from Moab, go S. 9.1 mi. along U. S. Highway 450, then follow U. S. F. S. rd. 16.4 mi. to ranch of V. A. Green; continue past ranch house 1.3 mi. to lower end of field and end of car travel, then hike NW. about ½ hour through sagebrush and small timber to sta.

Station mark: Standard tablet stamped "Moab 1934" cemented in rock outcrop.

Reference mark 1: Reference tablet cemented in rock outcrop 32.31 ft. from sta. mark in azimuth 196°12'.

Reference marks 2 and 3: Copper nails and washers cemented in rock outcrop and boulder, respectively, at distances and in azimuths from sta. mark as follows—(2) 19.41 ft., 255°04'; (3) 38.61 ft., 309°09'.

Signal: Pole with cross targets centered over sta. mark.

[Latitude 38°31'28.42"; longitude 109°24'04.76"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Cane Spring.....	3 46 21	183 45 52	4. 238153
Pinon.....	33 38 12	213 31 14	4. 470709
Rocks.....	47 09 43	227 07 11	3. 908077
Flatiron.....	59 11 10	239 04 05	4. 285468

MONTICELLO, San Juan County (Not occupied)

On Latter Day Saints Church in Monticello.

Station mark: None.

Station and signal: Steeple of church.

No check on this position.

[Latitude 37°52'13.49"; longitude 109°20'28.50"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Abajo Peak.....	72 07 32	252 03 05	4.047070
Palmer.....	166 01 18	346 00 58	3.508549

MOSS BACK, San Juan County

About 100 yd. NW. of SE. end of easternmost butte of Moss Back Mesa, about 32 mi. in air line W. of Blanding and 15.5 mi. SW. of Kigalia ranger sta. To reach from Kigalia ranger sta., take rd. S. 0.5 mi. to Natural Bridges rd.; then go SW. 18.3 mi. along latter rd. to Cow Tank-Clay Hill rd., thence W. 0.3 mi. to White Canyon rd.; at this point go NW. 1.2 mi., thence 0.2 mi. W. up small wash, thence W. about 2 hours on foot to sta. Ascent can be made up northeastern side of butte.

Station mark: Standard tablet stamped "Moss Back 1934" cemented in solid rock.

Reference marks: Reference tablets cemented in solid rock at distances and in azimuths from sta. mark as follows—(1) 31.83 ft., 118°26'; (2) 25.47 ft., 248°51'.

Signal: 12-ft. pole with cross targets centered over sta. mark.

[Latitude 37°32'55.45"; longitude 110°03'54.10"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Jacobs Chair.....	150 23 28	330 18 41	4.367220

MOUNT LINNAEUS, San Juan County (Not occupied)

On Mount Linnaeus, in La Sal National Forest, about 12 mi. in air line WSW. of Monticello and 5 mi. W. of Abajo Peak. Elev. 10,955 ft.

Station mark: None.

Station and signal: Cairn supporting pole on highest point.

[Latitude 37°49'20.82"; longitude 109°33'12.60"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Horse Mountain.....	110 06 06	289 57 38	4.332798

MOUNT PEALE, San Juan County

On highest point of Mount Peale, which is the highest peak in the La Sal Mountains. In La Sal National Forest, about 20 mi. in air line SE. of Moab, 9 mi. NNE. of La Sal, and 7 mi. NW. of La Sal ranger sta. To reach from La Sal, take rd. leading to Paradox (Colo.) for distance of 4 mi., then go N. and NW. on wagon rd. to cowboy cabin of La Sal Livestock Co., thence northwesterly 3¾ hours on foot through timber and slide rock to sta. Originally intersected by U. S. C. & G. S. in 1893. U. S. G. S. intersected cairn on highest point in 1914

and in 1934 established sta. mark and reference marks. T. 27 S., R. 24 E., sec. 24.

Station mark: Standard tablet cemented in boulder and stamped "Mt. Peale 1934."

Reference marks: Copper nails and washers cemented in boulders at following distances and azimuths from sta. mark—(1) 14.22 ft., $68^{\circ}15'$; (2) 24.13 ft., $157^{\circ}31'$.

Signal: Cairn centered over sta. mark.

[Latitude $38^{\circ}26'18.493''$; longitude $109^{\circ}13'42.657''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
La Sal.....	9 48 04	189 46 26	4.353700
Hatch Rock.....	40 26 42	220 18 15	4.486359
Cane Spring.....	64 39 03	244 32 07	4.254570
Mount Waas Azimuth Mark.....	92 26 45	272 25 36	3.427781
Moab.....	122 25 09	302 18 42	4.251687
Castleton.....	152 57 11	332 52 00	4.423954

MOUNT WAAS, Grand County

On highest point of Mount Waas, the third prominent peak from N. end of La Sal Mountains. In La Sal National Forest, about 20 mi. in air line E. of Moab, 6 mi. SE. of Castleton, and 5.5 mi. NE. of Mesa ranger sta. To reach from Castleton, go E. on main-traveled rd. up mountain 8.9 mi. to log cabin on E. side of rd., continue past cabin 1.8 mi., turn right and cross bridge, follow dim rd. 4 mi. to end of truck travel, go W. up side of mountain to N. of Mount Waas, follow ridge and ascend peak from NW. side to sta. site. Established in 1893 by U. S. C. & G. S. and marked with copper bolt set in rock. Reoccupied by U. S. G. S. in 1914 and again by U. S. C. & G. S. in 1931, when copper bolt was replaced with standard disk. T. 26 S., R. 24 E., sec. 13. Elev. 12,310.7 ft.

Station mark: U. S. C. & G. S. standard disk set in concrete block between bases of three small brick piers used for mounting the instrument.

Reference marks (set when station was first occupied): Drill holes, probably, at following distances and azimuths from sta. mark—(1) 2.24 meters, $3^{\circ}58'$; (2) 2.29 meters, $104^{\circ}19'$; (3) 2.18 meters, $186^{\circ}37'$; (4) 2.21 meters, $275^{\circ}45'$. Mount Waas astronomic sta. (concrete pier) was 28.213 meters from sta. mark in azimuth 329° . In 1934 a reference mark, described as reference mark 2, was recovered (origin unknown) 28.658 meters from sta. mark in azimuth $342^{\circ}59'$.

Signal: Cairn supporting pole with flag centered over sta. mark.

[Latitude $38^{\circ}32'20.856''$; longitude $109^{\circ}13'37.750''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Mount Peale.....	0 36 36.88	180 36 33.82	4.048203
Mount Waas Azimuth Mark.....	14 10 50.8	194 09 39.1	4.057152
Cane Spring.....	40 55 44	220 48 45	4.397455
Moab.....	83 58 40	263 52 09	4.183921
Castleton.....	135 38 54	315 33 39	4.241429

MOUNT WAAS AZIMUTH MARK, San Juan County (Not occupied)

On highest point of Mount Tukuhnikivatz, in La Sal National Forest, about 9 mi. in air line N. of La Sal and 1.5 mi. W. of Mount Peale. Located by intersection in 1893 by U. S. C. & G. S. T. 27 S., R. 24 E., sec. 22.

Station mark: None.

Station and signal: Easternmost one of two cairns.

[Latitude 38°26'22.184"; longitude 109°15'32.972"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Cane Spring.....	60 03 21	239 57 34	4.194570
Moab.....	127 19 22	307 14 04	4.192841

NORTH SIXSHOOTER, San Juan County (Not occupied)

At point NW. of junction of Davis and Indian Creeks, about 25 mi. in air line SW. of La Sal and 7 mi. NW. of Dugout ranch on Indian Creek. T. 30 S., R. 21 E., sec. 31.

Station mark: None.

Station and signal: Center of highest point.

[Latitude 38°08'15.24"; longitude 109°40'01.61"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Beef Basin.....	58 31 25	238 22 45	4.381992

NORTH WOODENSHOE, San Juan County

On highest and easternmost point on northernmost of two buttes locally known as Woodenshoe Buttes, on W. boundary of La Sal National Forest, about 35 mi. in air line WSW. of Monticello, 27 mi. WNW. of Blanding, and 7 mi. WNW. of Kigalia ranger sta. From Kigalia ranger sta. take rd. 0.5 mi. S. to Natural Bridges rd., then go 2.5 mi. SW. to Twin Springs rd.; follow latter rd. 2.0 mi. NW. to large pole corral on N. side of which is U. S. F. S. sign reading "Woodenshoes" and "J. N. Pasture"; at this point follow left fork 1.8 mi. as indicated by sign, then go 1.6 mi. along ridge to small reservoir and end of truck travel. Pack NNW. from N. side of reservoir on plain cow trail, skirting E. slope of South Woodenshoe 2.0 mi. to broad saddle between two buttes and from saddle at N. end of South Woodenshoe continue on main trail NW. across low ridges 1.0 mi. to point 0.5 mi. SW. of sta.; leave trail and follow brushy ridge NE. to sta. Horses may be taken to top of ridge and sta. site. (About 3 hours' pack.) In 1936, U. S. C. & G. S. occupied sta. and set an azimuth mark. T. 35 S., R. 18 E., sec. 29. Elev. 8,891 ft.

Station mark: Standard tablet stamped "North Woodenshoe 1934" cemented in sandstone boulder buried flush with ground.

Reference marks 1 and 2: Reference tablets cemented in sandstone boulders buried flush with ground at distances and in azimuths from sta. mark as follows—(1) 13.89 ft., 43°44'; (2) 17.38 ft., 302°29'.

Reference mark 3: Copper nail and washer in limb of piñon tree about 3 ft. above ground, 47.53 ft. from sta. mark in azimuth 103°07'.

Azimuth mark: U. S. C. & G. S. standard disk in pipe projecting 8 in. above ground, 5 ft. NE. of 30-in. pine tree with large square blaze, 3.0 mi. SE. from sta. mark in azimuth 322°39'41'.

Signal: Pole with cross targets centered over sta. mark.

[Latitude 37°42'19.240"; longitude 109°57'39.274"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Moss Back.....	27 54 06	207 50 17	4.293630
Jacobs Chair.....	97 56 45	277 48 08	4.319883

PALMER, San Juan County

On ridge N. of drain in pasture, on property of J. Ward Palmer, 0.25 mi. W. of residence, about 2.2 mi. in air line N. of Monticello.

Station mark: Standard tablet stamped "Palmer 1934" cemented in boulder buried in ground.

Reference marks: Reference tablets cemented in boulders buried in ground at distances and in azimuths from sta. mark as follows—(1) 15.43 ft., $184^{\circ}58'$; (2) 19.72 ft., $281^{\circ}34'$.

Signal: 12-ft. pole with cross targets centered over sta. mark.

[Latitude $37^{\circ}53'55.00''$; longitude $109^{\circ}21'00.39''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Abajo Peak.....	56 18 38	236 14 32	4.072278
Shay Mountain.....	103 19 45	283 12 27	4.252928
Young.....	171 55 29	351 54 40	4.135642

PINON, San Juan County

On top of small knoll sparsely covered with piñon trees on gently rolling mesa E. of Colorado River, about 0.25 mi. SW. of rd., 17 mi. in air line W. of La Sal and 18 mi. S. of Moab. To reach from La Sal take rd. W. 10 mi. to La Sal Junction, thence S. along rd. 20 mi.

Station mark: Standard tablet stamped "Pinon 1934" cemented in boulder buried flush with ground.

Reference mark: Reference tablet cemented in boulder buried 2 in. below surface 15.91 ft. from sta. mark in azimuth $43^{\circ}42'$.

Reference marks 2 and 3: Copper nails and washers in trunks of 14-in. and 18-in. piñon trees, respectively, 1 ft. above ground at distances and in azimuths from sta. mark as follows—(2) 47.83 ft., $173^{\circ}08'$; (3) 35.50 ft., $276^{\circ}53'$.

Signal: 12-ft. pole with cross targets centered over sta. mark.

[Latitude $38^{\circ}18'09.70''$; longitude $109^{\circ}35'18.66''$]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Lavender.....	11 43 02	191 40 49	4.409286
Lockhart Point.....	49 10 27	229 08 24	3.803476
Flatiron.....	179 06 50	359 06 44	4.168140

PORTER, San Juan County

On summit of hill 0.1 mi. NE. of cultivated field on Porter farm, about 7 mi. in air line NNW. of Blanding. To reach from Blanding, take rd. N. past high school 8 mi. to sta. Elev. 7,200 ft.

Station mark: Standard tablet stamped "Porter 1934" cemented in large buried boulder projecting about 5 in. above ground.

Reference mark 1: Reference tablet cemented in large conglomerate boulder in place 19.71 ft. from sta. mark in azimuth $64^{\circ}39'$.

Reference mark 2: Reference tablet cemented in buried boulder flush with ground 14.78 ft. from sta. mark in azimuth $307^{\circ}45'$.

Signal: 12-ft. pole with cross targets centered over sta. mark.

[Latitude 37°42'52.40"; longitude 109°31'26.84"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Black Mesa Butte.....	18 20 02	198 17 01	4.364225
Juniper.....	48 17 48	228 06 13	4.573646
Section Twenty.....	71 48 38	251 48 38	2.515060
Milk Ranch Point.....	54 19 49	234 13 05	4.300273
Bears Ears.....	71 39 15	251 27 07	4.488072
Horse Mountain.....	130 22 16	310 12 45	4.475892
Mount Linnaeus.....	167 48 43	347 47 39	4.088196

ROCKS, San Juan County (Not occupied)

On S. end of jagged ridge W. of Spanish Valley, about 8 mi. in air line SE. of Moab.

Station mark: None.

Station and signal: Highest of two most prominent peaks.

[Latitude 38°28'29.91"; longitude 109°28'09.56"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Pinon.....	28 36 29	208 32 02	4.337954

SALT CREEK MESA BUTTE, San Juan County (Not occupied)

On small butte (Cathedral Butte) with vertical sides, about 20 mi. in air line WNW. of Monticello and 3 mi. NW. of Cottonwood ranger sta. Elev. 7,908 ft.

Station mark: None.

Station and signal: Cylindrical projection of rock above butte.

[Latitude 37°57'14.52"; longitude 109°41'52.81"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Horse Mountain.....	46 01 51	225 58 41	4.017652

SECTION FOUR, San Juan County

T. 38 S., R. 22 E., at cor. secs. 4, 5, 8, and 9, about 9 mi. in air line SSW. of Blanding. To reach from Blanding, go S. 8.2 mi. along Bluff Highway to Ruin Spring rd., thence 1.5 mi. W. and S. to sta. Elev. 5,505 ft.

Station mark: Standard G. L. O. brass cap on 2-in. iron pipe stamped "T 39 S, R 22 E, secs 4, 5, 8, and 9." (Cap should be stamped "T 38 S.")

Signal: 12-ft. pole with cross targets centered over sta. mark.

[Latitude 37°30'17.96"; longitude 109°30'42.01"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	Log. meters
Black Mesa Butte.....	98 49 57	278 46 30	3.928283
Bears Ears.....	114 08 19	293 55 46	4.521205
Porter.....	177 17 50	357 17 23	4.367077

SECTION TWENTY, San Juan County (Not occupied)

T. 35 S., R. 22 E., at $\frac{1}{4}$ cor. secs. 20 and 29, about 8 mi. in air line NNW. of Blanding.

Station mark: Standard G. L. O. iron pipe stamped " $\frac{1}{4}$, 20, 29 T 35 S, R 22 E."

No check on this position.

Latitude $37^{\circ}42'49.08''$; longitude $109^{\circ}31'39.54''$.

SHAY MOUNTAIN, San Juan County

On top of peak locally known as Shay Mountain, in La Sal National Forest, about 12 mi. in air line WNW. of Monticello [8 mi. in air line NW.], and 5 mi. E. of Cottonwood ranger sta. To reach from Monticello go W. along rd. 6 mi. to Buckboard Flat, thence along Cottonwood ranger sta. trail to foot of Shay Mountain, thence N. along trail to sta. Elev. 9,987 ft.

Station mark: Standard tablet stamped "Shay Mtn 1934" cemented in large boulder buried in ground.

Reference mark 1: Reference tablet cemented in boulder 31.75 ft. from sta. mark in azimuth $323^{\circ}08'$.

Reference mark 2: Copper nail and washer cemented in bedrock 7.66 ft. from sta. mark in azimuth $78^{\circ}36'$.

Signal: Cairn supporting pole with flag centered over sta. mark.

[Latitude $37^{\circ}56'08.26''$; longitude $109^{\circ}32'53.77''$]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
Mount Linnaeus.....	2	05	56	182	05	44	4.099359
Horse Mountain.....	75	58	00	255	49	20	4.328427
Salt Creek Mesa Butte.....	98	52	01	278	46	29	4.124470
Beef Basin.....	107	39	24	287	36	22	4.512145
Lavender.....	150	45	44	330	42	03	4.252855
North Sixshooter.....	155	04	31	335	00	08	4.393104

SOUTHEAST END HORSE MOUNTAIN, San Juan County (Not occupied)

On white ledge about 1 mi. SE. of summit of Horse Mountain, in La Sal National Forest, 24 mi. in air line W. of Monticello and 3 mi. N. of Gooseberry ranger sta. Elev. 9,033 ft.

Station mark: None.

Station and signal: Pine tree on top of ledge.

[Latitude $37^{\circ}51'59.55''$; longitude $109^{\circ}46'08.20''$]

To station—	Azimuth			Back azimuth			Distance
	°	'	"	°	'	"	Log. meters
Bears Ears.....	15	55	31	195	52	21	4.441889
North Woodenshoe.....	43	26	39	223	19	35	4.391253
Dry Mesa.....	58	25	21	238	19	22	4.225573

VANADIUM, San Juan County

On westernmost extremity of high mesa locally known as Deer Neck between Big Indian Wash and East Canyon, about 14 mi. in air line S. of La Sal. To reach from Monticello, go N. 19.4 mi. along U. S. Highway 450, thence E. 7.3 mi. to International Corporation mine. Sta. is about $1\frac{1}{2}$ hours' hike up drain which is just W. of mine.

Station mark: Standard tablet stamped "Vanadium 1934" cemented in bedrock.

Reference mark 1: Reference tablet cemented in bedrock 26.58 ft. from sta. mark in azimuth $203^{\circ}28'$.

Reference mark 2: Copper nail and washer in trunk of 10-in. piñon tree 1 ft. above ground, 32.68 ft. from sta. mark in azimuth 263°49'.

Reference mark 3: Copper nail and washer in bedrock 16.65 ft. from sta. mark in azimuth 302°17'.

Signal: 12-ft. pole with cross targets centered over sta. mark.

[Latitude 38°07'09.38"; longitude 109°15'20.87"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Young.....	43 14 04	223 09 46	4.173429
Church Rock.....	57 10 15	237 06 58	3.966952
C-21.....	99 29 04	279 24 55	3.998358
Hatch Rock.....	124 41 11	304 33 46	4.327740
La Sal.....	173 42 38	353 42 02	4.122586

YOUNG, San Juan County

On northeastern extremity of mesa, about 10 mi. in air line N. of Monticello and 4 mi. SSW. of Church Rock. To reach from Monticello, go N. 11.7 mi. along U. S. Highway 450, thence W. 1.1 mi. through alfalfa field and follow drain to end of car travel, from which point it is about 1½ hours' hike up drain SW. to sta.

Station mark: Standard tablet stamped "Young 1934" cemented in bedrock.

Reference mark 1: Reference tablet cemented in bedrock 20.21 ft. from sta. mark in azimuth 41°53'.

Reference marks 2 and 3: Copper nails and washers cemented in bedrock at distances and in azimuths from sta. mark as follows—(2) 15.98 ft., 90°13'; (3) 20.80 ft., 306°59'.

Signal: 12-ft. pole with cross targets centered over sta. mark.

[Latitude 38°01'16.89"; longitude 109°22'19.64"]

To station—	Azimuth	Back azimuth	Distance
	° ' "	° ' "	<i>Log. meters</i>
Abaño Peak.....	21 21 20	201 18 02	4.335759
Shay Mountain.....	58 28 14	238 21 44	4.259296
Lavender.....	104 13 34	284 03 22	4.397317
North Sixshooter.....	116 34 50	296 23 55	4.461175
Hatch Rock.....	162 20 48	342 17 42	4.381846

APPENDIX

Five triangulation projects of the Geological Survey in Utah are lower in accuracy than third order and for that reason have not been included in the main body of this bulletin. They are here grouped together as an appendix and are arranged chronologically according to the dates of the projects. Only brief descriptions of the stations are given, and these are assembled in tabular form. Not all the stations in each project are included.

POWELL SURVEY, 1871-78 (in part)

A. H. THOMPSON and G. K. GILBERT, chiefs of party

This triangulation is of fourth-order accuracy and includes some of the stations located in Utah by the Powell Survey. Many of the stations located by that survey have been recovered or tied to by later triangulation of a higher order of accuracy, and these do not appear in this appendix, being included under the appropriate projects in the main body of the bulletin.

The original computation of this triangulation was dependent upon base lines measured locally and astronomic determinations of positions for the base stations. The results were published in Bulletin 122.³⁷ Readjustment of those results to the North American datum of 1927 depends on the new positions determined on that datum for the stations of this survey that have been tied to or recovered by later projects.

³⁷ Gannett, Henry, Results of primary triangulation: U. S. Geol. Survey Bull. 122, pp. 383-401, 1894.

Station	Latitude			Longitude			Approximate elevation
Bare Brush, Sanpete County: Outlier at E. edge of Wasatch Plateau with top sloping N. and breaking off in cliff, sec. 13, T. 2 S., R. 5 E., 9 mi. in air line W. of Ferron; 5-ft. cairn-----	°	'	"	°	'	"	Feet
	39	04	11.4	111	18	35.6	10,200
Culmination, Grand County: On summit of E. Tavaputs Plateau, 24 mi. NE. of Green River, 4 mi. E. of southernmost salient; 5-ft. cairn-----	39	11	29.8	109	46	43.6	-----
Ephraim, Juab County: On flat-topped summit of Gunnison Plateau, sec. 25, T. 16 S., R. 1 E., 9 mi. in air line WNW. of Ephraim; 5-ft. cairn-----	39	23	28.4	111	45	03.2	8,750
Fayette, Sanpete County: On low cliff, sec. 5, T. 19 S., R. 1 E., 2 mi. in air line SE. of Fayette; 5-ft. cairn-----	39	12	34.3	111	49	16.9	6,000
Gunnison North, Sanpete County: T. 19 S., R. 1 E., sec. 20, on N. end of Gunnison base line, 5,972 ft. S. of U. S. Engineer Monument in Gunnison; cut-stone monument 1 ft. square extending 18 in. above ground-----	39	08	31.1	111	49	12.9	-----
Gunnison South, Sanpete County: T. 20 S., R. 1 E., sec. 20, on S. end of Gunnison base line, 7 mi. S. of Engineer Astronomical sta. in Gunnison, on N. side of Willow Creek; cut-stone monument with top edges dressed similar to gable roof extending 6 in. above ground-----	39	03	11.0	111	49	12.9	-----
Indian Head, Utah County: On round summit of W. Tavaputs Plateau (highest point in vicinity), 4 mi. in air line NE. of Kyune, N. of Emma Park; 5-ft. cairn-----	39	51	47.3	110	53	22.6	9,850
John, Kane County: On salient of Vermilion Cliffs, E. of Kanab city limits; 4.5-ft. cairn-----	37	02	55.7	112	30	53.9	6,000
Jura, Sanpete County: On inconspicuous point among Jurassic Hills, 6 mi. in air line SSE. of Gunnison; cairn-----	39	04	52.5	111	45	57.3	6,000
Mansard, Kane County: On conspicuous white sandstone knob on Vermilion Cliff, 5.5 mi. in air line E. of Kanab, 3.5 mi. SW. of Johnson sta. overlooking Kanab-Johnson rd.; conical piece of eroded sandstone-----	37	02	55.5	112	25	19.3	6,000
Mollie, Kane County: Outlier of white cliff sandstone near W. fork of Paria Creek, about 7 mi. NW. of Paria settlement; acute butte-----	37	16	15.3	112	03	15.9	6,500

Station	Latitude	Longitude	Approximate elevation
Navajo Well, Kane County: On highest point of S. salient of Vermilion Cliffs, overlooking Navajo Well and having flat top an acre in extent; gently sloping NW., 6 mi. in air line ESE. of Johnson; 10-ft. cairn of stone and wood.	37° 03' 39.8"	112° 16' 42"	Feet 6,000
Pennell, Garfield County: On higher and westernmost of two points on Mount Pennell, a conspicuous peak of Henry Mountains, 11 mi. in air line S. of Mount Ellen; 7-ft. stone monument.	37° 57' 23.6"	110° 47' 24.2"	11,250
Pink Cliff, Kane County: On S. edge of Paunsaugunt Plateau, 11 mi. in air line N. of Clarkston, 10 mi. SE. of Alton; 8- by 15-ft. triangular crib of logs.	37° 25' 05.8"	112° 19' 18.3"	9,500
Red Plateau, Emery County: Near southernmost salient of timbered plateau with S. side of cliff between Price and San Rafael Rivers, 28 mi. WNW. of Green River; cairn.	39° 10' 16.7"	110° 37' 07.1"	
Street, Kane County: Pier from which was determined the latitudes and longitudes depending upon the Kanab base and in its meridian. No permanent mark was set to indicate pier's exact position. Stone witness post was set firmly in ground in tithing-office square exactly 76 ft. due E. of observing pier, marked "76 ft. E. of B. L."	37° 02' 59.1"	112° 31' 48.0"	
Tithing Yard, Kane County: In NW. corner of tithing-office yard enclosed by stone wall, in NW. corner of Kanab public square, low sandstone monument, square at top, marked "76 E. of B. L." This is not a triangulation sta. but marks Street sta., which was 76 ft. W. of it.	37° 02' 59.1"	112° 31' 47.2"	
Valley, Sanpete County: On E. slope of Valley Range near base, sec. 5, T. 20 S., R. 1 W., 7 mi. in air line WSW. of Gunnison; cairn.	39° 05' 41.2"	111° 56' 16.7"	

TINTIC MINING REGION, 1896

S. S. GANNETT, chief of party

The stations of this project that are here listed were located by the three-point method from Coast and Geodetic Survey stations Deseret, Mount Nebo, and Scipio. Station Mammoth Peak, now called Eureka, is not included because, although Gannett located it by the three-point method at about the same time that he located the other stations of the project, it has since been included in triangulation of a higher order of accuracy. C. F. Urquhart relocated this station in 1915 and changed its name to Eureka. Under that name it appears, with other stations of Urquhart's Northern Utah project, in the main body of the bulletin.

This triangulation was originally computed on the United States standard (old North American) datum,³⁸ and the results were published in the Eighteenth Annual Report.³⁹ Readjustment of those results to the North American datum of 1927 requires that the positions of the stations be consistent with the new position for station Eureka, as determined by the readjustment of Urquhart's triangulation of 1915 (Northern Utah project).

Station	Latitude	Longitude	Approximate elevation
Eureka Peak, Juab County: On highest part of steep, rocky summit of this name, about 1 mi. in air line S. of Eureka, under small cairn; copper bolt in solid rock-----	° ' " 39 56 25.64	° ' " 112 07 02.35	<i>Feet</i> 7,909
Robinson, Juab County: On highest part of ridge, 0.5 mi. in air line SE. of Oregon Short Line R. R. sta.; flagpole-----	39 55 13.11	112 07 13.66	6,826
Sioux Peak, Utah County: On highest part of summit, 0.9 mi. in air line NE. of Mammoth, 2 mi. by trail SE. of Eureka; small cairn-----	39 56 07.20	112 06 01.93	8,094
Sunrise Peak, Juab County: On highest part of round rocky summit, 3.5 mi. in air line SE. of Silver City; small cairn-----	39 52 02.19	112 05 21.53	7,693

³⁸ See footnote 3, p. 4.

³⁹ Wilson, H. M., Renshawe, J. H., Douglas, E. M., and Goode, R. U., Triangulation and spirit leveling: U. S. Geol. Survey 18th Ann. Rept., pt. 1, pp. 205-208, 1897.

BINGHAM SPECIAL MAP, 1899

R. U. GOODE, chief of party

The two stations of this project described in the following table were located by the three-point method from Coast and Geodetic Survey stations Deseret and Mount Nebo and Geological Survey station Spanish Fork Peak, which was established by H. L. Baldwin, Jr., in 1897-98 (Uinta Forest Reserve project). Another station of the project—Bingham—which Goode also located by the three-point method, has been omitted in the table because it has been included in triangulation of a higher order of accuracy. C. F. Urquhart relocated Bingham in 1915, and it appears in the main body of the bulletin as a station of Urquhart's Northern Utah project.

This triangulation was originally computed on the United States standard (old North American) datum,⁴⁰ and the results were published in the Twenty-first Annual Report.⁴¹ The readjustment of those results to the North American datum of 1927 depends on new positions, as determined by the Coast and Geodetic Survey, for stations Deseret, Mount Nebo, and Spanish Fork Peak.

Station	Latitude	Longitude	Approximate elevation
Freeman, Salt Lake County: On westernmost of three points locally known as Mahogany Mountain, on ridge from main crest between Freeman and Dry Canyons, about 2 mi. in air line NW. of town of Bingham Canyon; cairn-----	° ' "	° ' "	Feet
	40 33 27.54	112 10 02.43	-----
Markham, on Salt Lake-Tooele county line: On high point locally known as Clipper Peak, 2.3 mi. SW. of town of Bingham Canyon, N. of wagon rd. crossing main divide from Bingham Canyon by way of U. S. mine to Middle Fork; small tree guyed by wire-----	40 30 49.30	112 11 11.78	9,207

⁴⁰ See footnote 3, p. 4.

⁴¹ Wilson, H. M., Renshaw, J. H., Douglas, E. M., and Goode, R. U., Triangulation, primary traverse, and spirit leveling: U. S. Geol. Survey 21st Ann. Rept., pt. 1, p. 348, 1900.

PARK CITY MINES, 1901-2

E. M. DOUGLAS and PEARSON CHAPMAN, chiefs of party

Triangulation for the control of the Park City special quadrangle, in which the mines in the following list are situated, was extended from stations Wanship and Clayton Peak, established by H. L. Baldwin, Jr., in 1897-98 (Uinta Forest Reserve project).

This triangulation was originally computed on the United States standard (old North American) datum,⁴² and the results were published in Bulletin 216.⁴³ The readjustment to the North American datum of 1927 furnishes positions of the mines which are consistent with the new position of Clayton Peak determined by the readjustment of Baldwin's triangulation (Uinta Forest Reserve project).

Station		Latitude			Longitude		
Name of mine	Point located						
Ontario 2.....	Flagpole.....	40	37	22. 21	111	29	36. 25
Ontario 2.....	Hoisting rope.....	40	37	22. 18	111	29	36. 32
Silver King.....	Flagpole.....	40	37	51. 05	111	30	45. 63
Silver King.....	North shaft.....	40	37	51. 04	111	30	45. 61
Daly 2.....	Flagpole.....	40	37	14. 19	111	30	20. 35
Daly West.....	Flagpole.....	40	36	55. 20	111	30	41. 95
Daly West.....	Hoisting rope.....	40	36	55. 24	111	30	41. 97
Quincy.....	Hoisting rope.....	40	36	46. 41	111	30	32. 54
Anchor.....	Flagpole.....	40	36	46. 07	111	31	11. 49
Anchor.....	Hoisting rope.....	40	36	46. 00	111	31	11. 45

FRISCO QUADRANGLE, 1904

FRED McLAUGHLIN, chief of party

The stations in the following table were located by a net of triangulation of a low order of accuracy expanded from Coast and Geodetic Survey stations Tushar and Milford Needle.

This triangulation was originally computed on the United States standard (old North American) datum,⁴² but was never adjusted, so that the positions determined for the stations were of doubtful precision. For this reason the readjustment of these positions to the North American datum of 1927, which requires that they be made consistent with the new positions for the base stations determined by the Coast and Geodetic Survey, leaves them still doubtful.

⁴² See footnote 3, p. 4.

⁴³ Gannett, S. S., Results of primary triangulation and primary traverse, fiscal year 1902-3: U. S. Geol. Survey Bull. 216, p. 163, 1903.

The results of this project have not heretofore been published.

Station	Latitude	Longitude	Approximate elevation
Antelope, Beaver County: On dark-colored rocky peak, about 16 mi. in air line NE. of Milford; tablet cemented in rock-----	° ' " 38 34 07.1	° ' " 112 48 44.4	Feet -----
Hickory, Beaver County: On bare rocky knoll on N. end of timbered ridge, 6 mi. in air line W. of Milford; tablet cemented in rock embedded in ground-----	38 23 48.6	113 07 13.0	6,450
Porphyry, Beaver County: On highest part of hill, 3 mi. in air line SW. of Frisco; tablet cemented in bedrock-----	38 25 24.9	113 16 36.2	7,308
Solus, Beaver County: On Mineral Monument Hill, 4 ft. W. of monument 1, about 10 mi. in air line NE. of Frisco; tablet cemented in bedrock-----	38 32 28.1	113 07 05.4	-----

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