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FIRST-ORDER LEVELING IN ALASKA

By

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FIRST-ORDER LEVELING IN ALASKA

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ILLUSTRATIONS

GENERAL STATEMENT

This publication contains the descriptions and elevations of all bench marks in Alaska whose elevations have been determined by first-order leveling. The field work was done by the United States Coast and Geodetic Survey during the field seasons of 1922 and 1923. Approximately 890 miles of first-order leveling was run and 308 bench marks were established or tied into the lines.

The leveling in 1922 was done by F. W. Hough, assisted by W. O. Manchester, and followed the Alaska Railroad from Anchorage to Fairbanks and the Valdez Trail or Richardson Highway from Fairbanks to Fox Farm Road House.

The leveling of 1923 was done by Herman Odessey, assisted by W. O. Manchester, and followed the Richardson Highway from Fox Farm Road House to Valdez, with a spur line from Willow Creek, on the Richardson Highway, to Chitina, on the Copper River and Northwestern Railway. A line was also run from Seward to Anchorage following the Alaska Railroad.

The first-order leveling in Alaska was carried out under rather unusual and very trying conditions. Transportation was difficult and insect pests made life miserable for the personnel. Food supplies, materials for constructing bench marks, and all other forms of equipment were difficult to obtain in the field. Considerable credit is due to the chiefs of party for the high standard of accuracy maintained on this leveling in spite of unusually adverse conditions.

The field parties of this bureau were greatly aided in the execution of their field work by the cooperation of various organizations in Alaska, especially by the Alaska Railroad and the Alaska Road Commission. These organizations, as well as many smaller organizations

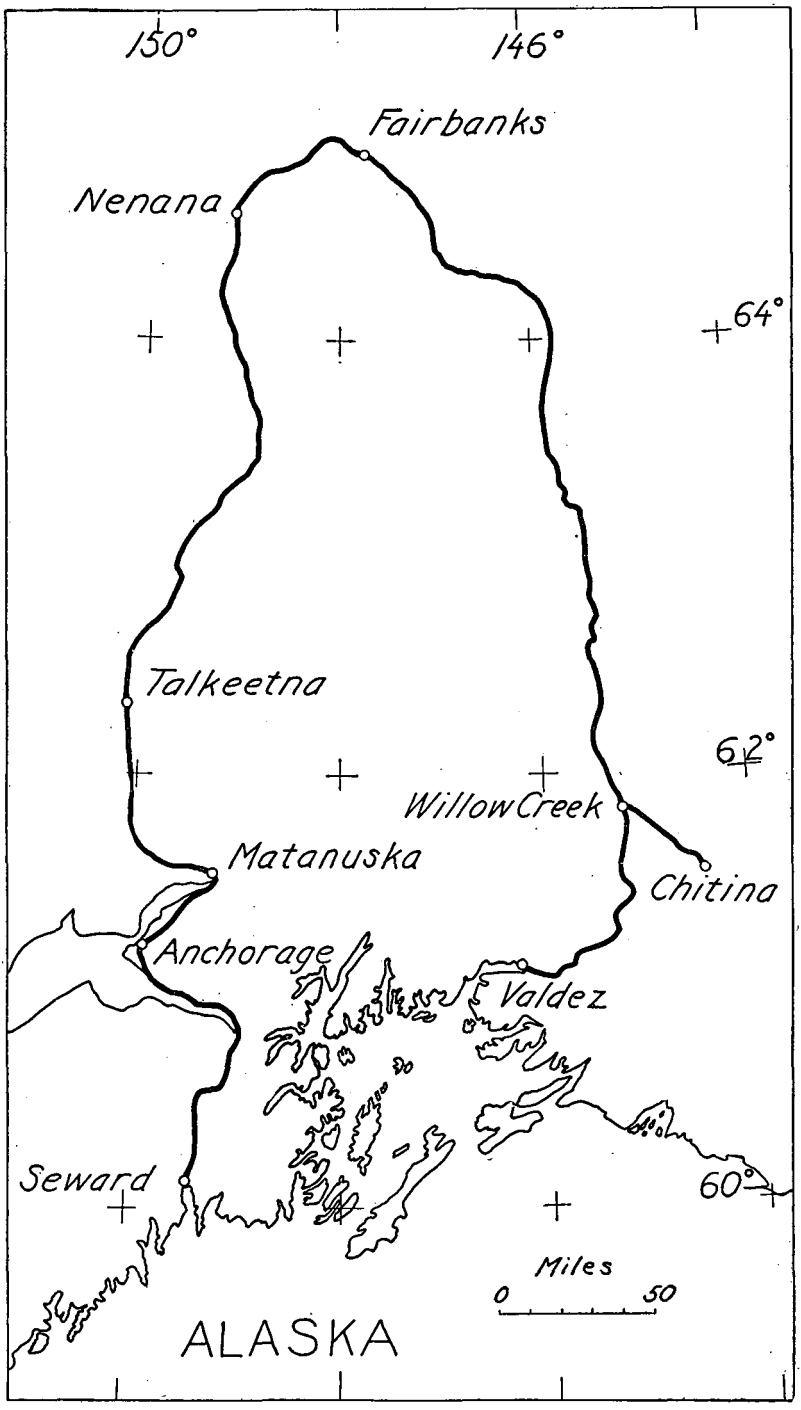

FIGURE 1.—Index map showing leveling in Alaska

and individuals, were of assistance in carrying on the field work by rendering timely assistance when difficulties arose and by counsel and advice based on their long experience under Alaskan conditions.

INSTRUMENTS AND FIELD METHODS

The instrumental equipment used on the Alaska leveling was of the type which has been used on all of the first-order leveling of the United States Coast and Geodetic Survey since about 1900. The instruments and rods are described in detail in Special Publication No. 129, Geodetic Level and Rod.[1]

The field work was all done in accordance with the specifications and instructions which are covered in detail in Special Publication No. 140, Manual of First-Order Leveling.[2]

COMPUTATIONS AND ADJUSTMENT

The office computation of the leveling was carried out in accordance with the instructions contained in Special Publication No. 140, Manual of First-Order Leveling.

After the office computation had been completed and all necessary corrections applied to the observations, the loop from Seward through Anchorage and Fairbanks to Valdez was adjusted to fit the elevations of the tidal bench marks at both Seward and Valdez. The details regarding the connections with the plane of mean sea level at both Seward and Valdez will be found on page 4. The closure which was distributed uniformly through the loop from Seward to Valdez in order to make the line fit the elevations of the tidal bench marks at each end was 5.6 millimeters (0.018 foot). This closure is extremely small and has little or no significance when the accuracy of the determination of the tidal datum planes at either end of the line is considered.

ORTHOMETRIC CORRECTION

Owing to the fact that the earth is an oblate spheroid, level surfaces at different elevations are not parallel but tend to converge slightly toward the poles of the earth. This necessitates the application of an orthometric correction to the observed differences of elevation in order that the elevations of the bench marks represent their exact height above the sea-level surface. The orthometric correction and the methods used in computing it are discussed in detail in Special Publication No. 140, Manual of First-Order Leveling.

The orthometric correction reaches its maximum on lines which trend north and south and run at high elevations while it is zero on an east and west line. The major portion of the Alaskan leveling extends in a general north-and-south direction and some of it was run at a considerable height above sea level.

The maximum effect of the orthometric correction on the height of any bench mark given in this publication is not in excess of 80 millimeters (0.262 foot). The maximum correction to the difference in elevation between two successive bench marks is 4.8 millimeters (0.016 foot). This maximum correction occurred at a place in the line where a distance of approximately 5 miles separated the two adjacent marks.

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[1] This may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 5 cents.

[2] This may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 30 cents.

The average value of the orthometric correction applied to the observed difference in elevation between two adjacent bench marks 2 or 3 miles apart was of the order of a millimeter or less. From this it will be seen that, when leveling of a lesser order of accuracy is checked against the elevations published for the first-order bench marks, the uncertainty arising from the introduction or neglect of the orthometric correction will be relatively very much smaller than the uncertainty in the observations themselves and may be neglected.

BENCH MARKS

Practically all of the bench marks established by the United States Coast and Geodetic Survey in the course of the Alaskan leveling were the standard bronze disks shown in Figure 2. These were set in existing structures, rock outcrops, or in concrete posts built especially for the purpose. Where concrete posts were built to hold the disks, care was taken to select the site for the mark on the best-drained and most gravelly bit of land in the locality. In order to prevent, as far as possible, their disturbance by the freezing action encountered in the severe Alaskan winters, they were built considerably heavier and set deeper in the ground than is the usual practice.

Disks were set in existing structures or in outcrops of rock only when they showed evidence of extending far enough below the surface of the ground to be quite free from the possibility of heaving as a result of freezing.

DATUM PLANES

In February, 1928, the division of tides and currents of the United States Coast and Geodetic Survey furnished the following data regarding the plane of mean sea level at Seward, Anchorage, and Valdez.

Determination of sea level

Port	Bench mark	Mean sea level below bench mark	Length of series of observations
		Feet	
Seward	1 a	9.36	2 years (continuous).
Anchorage	9	26.23	28 months (in five short series).
Valdez	H 11	11.48	3 years (continuous).

The loop of leveling from Seward through Anchorage and Fairbanks to Valdez was fitted to the above elevations of bench marks 1 a and H 11 and the elevations of the bench marks so derived have been distributed in answer to requests for information.

In October, 1929, the following data were furnished by the division of tides and currents.

Revised determination of sea level

Port	Bench mark	Mean sea level below bench mark	Length of series of observations
		Feet	
Seward	1 a	9.44	4 years (continuous)
Anchorage	9	26.23	28 months (same as above).
Valdez	H 11	11.65	4 years and 9 months (continuous).

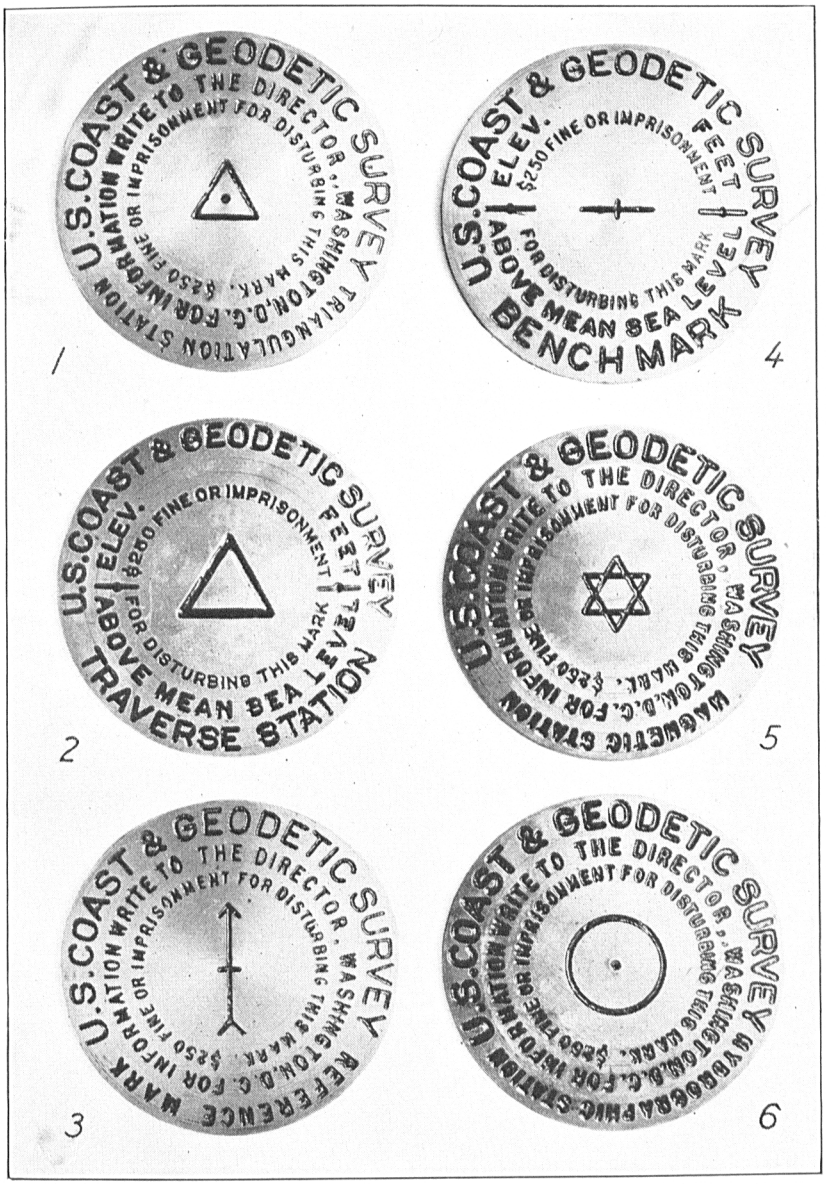

FIGURE 2.—STANDARD MARKS OF THE U. S. COAST AND GEODETIC SURVEY

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

The estimated possible variations from true mean sea level of these data are: Anchorage, ±½ foot; Seward, ±0.2 foot; and Valdez, ±⅓ foot.

It will be noted that the 1929 values for mean sea level differ from the 1928 values by amounts less than the estimated possible error in the determinations. Also it will be seen that the adjusted elevation of bench mark 9 at Anchorage is 0.443 foot higher than the elevation given by the division of tides and currents, but is still within the range of the estimated possible variation from the true plane of mean sea level.

Owing to severe weather conditions and the difficulty in keeping gages in continuous operation in so remote a locality, the tidal records at some of the Alaskan ports are somewhat fragmentary. It was decided therefore, that inasmuch as the circuit closure from mean sea level at Seward around the loop through Fairbanks to Valdez was much less than the possible error in the determination of sea level at either end of the line, it would be best simply to hold the elevations as first adjusted in 1928.

As a result the elevations given in this publication are the same as those already given out in manuscript form for the use of the Alaska Railroad, Alaska Road Commission, and various other engineering and commercial enterprises. The possible effect of more accurately determined datum planes at the three tidal stations may be that later slight changes will be made to accepted elevations for the marks if the best possible absolute elevations are needed. The elevations given in this publication are amply accurate for all practical purposes and the difference in elevation between successive bench marks will in no case be affected by any readily appreciable amount as a result of any future adjustment.

DESCRIPTIONS AND ELEVATIONS OF BENCH MARKS

In the following pages will be found the descriptions and elevations for all the bench marks established or tied in by this bureau. Following the designation of the mark, in the case of marks established by other organizations, will be found in parentheses the initials of the name of the organization which originally established the mark. The descriptions proceed from the general to the detailed description of the location of the mark and give the character of the mark itself. The elevations of the marks are given in both meters and feet, the value in feet being a conversion of the metric elevation using the factor, 1 meter equals 3.2808333 feet.

The exceptions to the above rule are found in the cases of bench marks 1 a and H 11, whose elevations were furnished in feet by the division of tides and currents and were converted into metric units for use in the adjustment.

Since the completion of this leveling a few of the marks are known to have been destroyed and, in such cases, appropriate notes are appended to the descriptions.

LINE 1, ANCHORAGE TO FAIRBANKS

This line follows the Alaska Railroad from Anchorage to Nenana and the narrow-gage line from Nenana to Fairbanks. The field work was done by F. W. Hough, assisted by W. O. Manchester,

during the summer of 1922. In writing the descriptions of the bench marks along this line the railroad was assumed to run north and south at all points regardless of its actual direction. As a result of this convention, north means toward Fairbanks, south means toward Anchorage, east means to the right when facing along the track toward Fairbanks, and west means to the left when facing along the track toward Fairbanks. The directions right and left, when used, are correct when facing along the track toward Fairbanks. The mileage along the Alaska Railroad is based on the value of 114.3 miles at the station at Anchorage.

Tidal 9.—At **Anchorage,** between warehouse No. 1 of the Alaska Engineering Commission and the small building south of the Alaska Engineering Commission office building, in the edge of a concrete manhole. A standard disk, stamped "9 1918," and set horizontally in the concrete. (8.130 meters or 26.673 feet.)

Tidal 10 (A. E. C.).—At **Anchorage,** 2 yards north of the railroad track and directly opposite warehouse No. 1 of the Alaska Engineering Commission. The top of a railroad spike set in the top of a concrete post which is set below the surface of the ground and is reached through a section of tile set vertically over it. (7.314 meters or 23.996 feet.)

Tidal 8.—About 1 mile north of **Anchorage,** on the east shore of Knik Arm, 850 yards north along the beach from the Alaska Engineering Commission dock, at the foot of a steep earth slope. A standard disk, stamped "8 1918," and set in the top of a concrete post which projects about 2 feet above the surface of the ground. (6.064 meters or 19.895 feet.)

Tidal 7.—About 1 mile north of **Anchorage,** on the east shore of Knik Arm, 985 yards north along the beach from the Alaska Engineering Commission dock, at the foot of a steep earth slope. A standard disk, stamped "7 1918," and set in the top of a concrete post which projects about 1 foot above the surface of the ground. (5.694 meters or 18.681 feet.)

A 1.—At **Anchorage,** at the new (1922) Elks' Hall, in the east face of the foundation, 18 inches from the northeast corner and 4 feet above the ground. A standard disk, stamped "A 1 1922," and set vertically. (30.744 meters or 100.866 feet.)

B 1.—At **Anchorage,** in the concrete building of the Bank of Alaska, in the north face, 15 inches from the northwest corner, and 4 feet above the sidewalk. A standard disk, stamped "B 1 1922," and set vertically. (33.733 meters or 110.672 feet.)

C 1.—At **Anchorage,** in the railroad yards, 70 yards north of the north end of the railroad bridge over Ship Creek, 15 yards west of the main track, 4 feet north of the night watchman's office, and across the track from the office of the Chugach National Forest. A standard disk, stamped "C 1 1922," and set in the top of a concrete post. (8.447 meters or 27.713 feet.)

D 1.—About 3.4 miles north along the Alaska Railroad from the station at **Anchorage,** in a gravel pit, 2 yards west of the east edge, and 5 yards east of the east rail. A standard disk, stamped "D 1 1922," and set in the top of a concrete post. (44.913 meters or 147.352 feet.)

NOTE.—The track may possibly be moved about 50 yards westward from its position in 1922.

E 1.—About 6.0 miles north along the Alaska Railroad from the station at **Anchorage,** in the northwest corner of the crossing of an old road, and 6 yards west of the west rail. A standard disk, stamped "E 1 1922," and set in the top of a concrete post. (72.774 meters or 238.759 feet.)

F 1.—About 9.6 miles north along the Alaska Railroad from the station at **Anchorage,** in a small gravel flat, at the place where the track makes a 10° curve to the right, and 7 yards west of the west rail. A standard disk, stamped "F 1 1922," and set in the top of a concrete post. (63.460 meters or 208.202 feet.)

G 1.—About 12.2 miles north along the Alaska Railroad from the station at Anchorage, at **Eagle River** siding, 100 yards north of the telephone booth, and 11 yards west of the main track. A standard disk, stamped "G 1 1922," and set in the top of a concrete post. (58.792 meters or 192.887 feet.)

H 1.—About 15.3 miles north along the Alaska Railroad from the station at Anchorage, 2.0 miles north of **Eagle River trestle** and at the south end of the second curve north of the trestle at the place where the track curves to the right, about 4 yards east of the east rail. A standard disk, stamped "H 1 1922," and set in the top of a concrete post. (56.627 meters or 185.784 feet.)

J 1.—About 17.9 miles south along the Alaska Railroad from Matanuska, 3.5 miles south of the station at **Birchwood,** at mileage 132.8, in the north end of a long gravel pit, and 4 yards east of the east rail. A standard disk, stamped "J 1 1922," and set in the top of a concrete post. (43.707 meters or 143.395 feet.)

K 1.—About 14.4 miles south along the Alaska Railroad from Matanuska, 110 yards south of the station at **Birchwood,** and 19 yards west of the main track. A standard disk, stamped "K 1 1922," and set in the top of a concrete post. (24.500 meters or 80.380 feet.)

L 1.—About 11.1 miles south along the Alaska Railroad from Matanuska, 3.3 miles north of **Birchwood,** about 15 telegraph poles south of milepost 140, approximately at the point of intersection of the tangents to the second curve south of Eklutna River trestle, and about 5 yards west of the west rail. A standard disk, stamped "L 1 1922," and set in the top of a concrete post. (10.000 meters or 32.808 feet.)

M 1.—About 8.7 miles south along the Alaska Railroad from Matanuska, 25 yards north of the station at **Eklutna** siding, directly opposite milepost 142, and 7 yards east of the east rail. A standard disk stamped "M 1 1922," and set in the top of a concrete post. (13.253 meters or 43.481 feet.)

N 1.—About 5.8 miles south along the Alaska Railroad from Matanuska, 2.9 miles north of the station at **Eklutna,** about 2½ telegraph poles south of milepost 145, at the north end of a curve where the track passes around a high rock cliff, 5 yards east of the east rail, and about 4 feet above the ground. A standard disk, stamped "N 1 1922," and set vertically in the face of the rock cliff. (8.810 meters or 28.904 feet.)

O 1.—About 2.5 miles south along the Alaska Railroad from **Matanuska,** about 75 yards south of the south end of Matanuska River trestle, 7 telegraph poles north of milepost 148, and 2 yards east of the east rail. A standard disk, stamped "O 1 1922," and set in the top of a concrete post. (10.462 meters or 34.324 feet.) This bench mark has been destroyed.

P 1.—At **Matanuska,** 51 yards north of the railroad station, about 8¾ telegraph poles south of milepost 151, and 18 yards east of the east rail. A standard disk, stamped "P 1 1922," and set in the top of a concrete post. (8.822 meters or 28.944 feet.)

Q 1.—About 3.2 miles north along the Alaska Railroad from **Matanuska,** about 3¾ telegraph poles south of milepost 154, about in the middle of a 12° curve to the right, and 12 yards west of the west rail. A standard disk, stamped "Q 1 1922," and set in the top of a concrete post. (30.439 meters or 99.865 feet.)

R 1.—About 2.9 miles south along the Alaska Railroad from **Wasilla,** 2½ telegraph poles south of milepost 157, about in the middle of a 10° curve to the right through a gravel cut, and 8 yards east of the east rail. A standard disk, stamped "R 1 1922," and set in the top of a concrete post. (74.383 meters or 244.038 feet.)

S 1.—At **Wasilla,** 70 yards north of the railroad station, 4 telegraph poles south of milepost 160, and 8 yards west of the west rail. A standard disk, stamped "S 1 1922," and set in the top of a concrete post. (101.545 meters or 333.152 feet.)

T 1.—About 3.1 miles north along the Alaska Railroad from **Wasilla,** about 3½ telegraph poles south of milepost 163, at the south end of a 3° curve to the right, and 28 yards west of the west rail. A standard disk, stamped "T 1 1922," and set in the top of a concrete post. (103.604 meters or 339.907 feet.)

U 1.—About 6.4 miles north along the Alaska Railroad from Wasilla, about 2¼ telegraph poles south of the south end of **Pittman** siding, one-fourth mile south of the water tank, about 10¼ telegraph poles north of milepost 166, and 10 yards west of the west rail. A standard disk, stamped "U 1 1922," and set in the top of a concrete post. (87.227 meters or 286.177 feet.)

V 1.—About 10.0 miles north along the Alaska Railroad from Wasilla, 3.3 miles north of **Pittman,** at the north end of a long gravel cut, about 6½ telegraph poles south of milepost 170, 1 telegraph pole south of an old abandoned boiler, and 10 yards west of the west rail. A standard disk, stamped "V 1 1922," and set in the top of a concrete post. (77.160 meters or 253.149 feet.)

W 1.—About 15.0 miles northward along the Alaska Railroad from Wasilla, 30 yards north of the south end of **Houston** siding, one-half mile north of center of the trestle over Little Susitna River, about 7½ telegraph poles south of milepost 175, and 11 yards east of the east rail. A standard disk, stamped "W 1 1922," and set in the top of a concrete post. (73.557 meters or 241.328 feet.)

X 1.—About 18.6 miles north along the Alaska Railroad from Wasilla, 2.9 miles south of **Nancy** siding, about 14¾ telegraph poles north of milepost 178, across

the track from a large gravel pit, and 10 yards west of the west rail. A standard disk, stamped "X 1 1922," and set in the top of a concrete post. (73.689 meters or 241.761 feet.)

Y 1.—About 22.5 miles north along the Alaska Railroad from Wasilla, 3.4 miles south of **Willow** siding, about 12½ telegraph poles north of milepost 182, in a gravel cut, and 10 yards west of the west rail. A standard disk, stamped "Y 1 1922," and set in the top of a concrete post. (76.502 meters or 250.990 feet.)

Z 1.—About 25.8 miles north along the Alaska Railroad from Wasilla, at **Willow** siding, about 23 telegraph poles north of milepost 185, in the north face of the concrete foundation of the water tank, and 18 inches above the ground. A standard disk, stamped "Z 1 1922," and set vertically in the concrete. (69.407 meters or 227.713 feet.)

A 2.—About 30.2 miles north along the Alaska Railroad from Wasilla, 4.3 miles north of **Willow** siding, about 30 yards north of milepost 190, and 34 yards east of the track, in a gravel pit. A standard disk, stamped "A 2 1922," and set in the top of a concrete post. (51.802 meters or 169.954 feet.)

B 2.—About 32.9 miles south along the Alaska Railroad from Talkeetna, at **Kashwitna** siding, about 9¼ telegraph poles south of milepost 194, and 10 yards west of the main track, in a gravel pit. A standard disk, stamped "B 2 1922," and set in the top of a concrete post. (70.557 meters or 231.486 feet.)

C 2.—About 28.7 miles south along the Alaska Railroad from Talkeetna, 4.1 miles north of **Kashwitna** siding, about 30 yards north of milepost 198, and about 75 yards west of the track, in a large gravel pit. A standard disk, stamped "C 2 1922," and set in the top of a concrete post. (63.403 meters or 208.015 feet.)

D 2.—About 24.5 miles south along the Alaska Railroad from Talkeetna, at **Caswell** siding, 8 telegraph poles north of milepost 202, 44 yards south of the section house, and 10 yards west of the main track. A standard disk, stamped "D 2 1922," and set in the top of a concrete post. (73.444 meters or 240.958 feet.)

E 2.—About 20.8 miles south along the Alaska Railroad from Talkeetna, 3.6 miles north of **Caswell** siding, about 3½ telegraph poles south of milepost 206, at a short curve, opposite the point of intersection of two long tangents, and 8 yards west of the track. A standard disk, stamped "E 2 1922," and set in the top of a concrete post. (78.995 meters or 259.169 feet.)

F 2.—About 17.4 miles south along the Alaska Railroad from Talkeetna, at **Montana** siding, in the south side of the concrete foundation of the water tank, and 2 feet above the ground. A standard disk, stamped "F 2 1922," and set vertically in the concrete. (84.563 meters or 277.437 feet.)

G 2.—About 14.2 miles south along the Alaska Railroad from Talkeetna, 3.2 miles north of **Montana** siding, about 19½ telegraph poles south of milepost 213, about 2¾ telegraph poles south of trestle No. 2126, at a short curve at the top of the steep grade north of Montana Creek, and 8 yards west of the track. A standard disk, stamped "G 2 1922," and set in the top of a concrete post. (85.345 meters or 280.003 feet.)

H 2.—About 12.4 miles south along the Alaska Railroad from Talkeetna, 1 mile south of **Sunshine** siding, 11 telegraph poles north of milepost 214, at the point where the track passes through a cut at the top of a grade, west of an old construction siding, 6 feet lower than the present (1922) location of the main track, and 10 yards west of the main track. A standard disk, stamped "H 2 1922," and set in the top of a granite bowlder. (105.686 meters or 346.738 feet.)

J 2.—About 8.4 miles south along the Alaska Railroad from Talkeetna, 3.0 miles north of **Sunshine** siding, about 14 telegraph poles north of milepost 218, directly opposite the south end of a 5-mile tangent, and 12 yards west of the track. A standard disk, stamped "J 2 1922," and set in the top of a concrete post. (87.141 meters or 285.895 feet.)

K 2.—About 5.4 miles south along the Alaska Railroad from Talkeetna, at the north end of **Fishlake** siding, about 13¾ telegraph poles north of milepost 221, about 18 yards south of trestle No. 2214, and 17 yards west of the track. A standard disk, stamped "K 2 1922," and set in the top of a concrete post. (92.267 meters or 302.713 feet.)

L 2.—About 2.6 miles south along the Alaska Railroad from **Talkeetna**, 0.5 mile north of the top of the grade over Talkeetna Hill, 4¾ telegraph poles north of milepost 224, at the south end of a gravel cut, 7 yards from the top of the bank of Susitna River, and 7 yards west of the track. A standard disk, stamped "L 2 1922," and set in the top of a concrete post. (108.144 meters or 354.802 feet.)

M 2.—At **Talkeetna**, 92 yards south of the railroad station, 53 yards north of trestle No. 2267, and 17 yards east of the main track. A standard disk, stamped

"M 2 1922," and set in the top of a concrete post. (105.540 meters or 346.259 feet.)

N 2.—About 3.3 miles north along the Alaska Railroad from **Talkeetna,** about 50 yards south of milepost 230 and trestle No. 2300, about in the middle of a 4-mile tangent, and 14 yards east of the track. A standard disk, stamped "N 2 1922," and set in the top of a concrete post. (114.449 meters or 375.488 feet.)

O 2.—About 7.1 miles north along the Alaska Railroad from Talkeetna, 2.4 miles south of **Chase** siding, about 7 telegraph poles south of milepost 234, 48 yards south of trestle No. 2339, at the north end of a ¾-mile tangent, and 8 yards east of the track. A standard disk, stamped "O 2 1922," and set in the top of a concrete post. (125.346 meters or 411.239 feet.)

P 2.—About 9.3 miles north along the Alaska Railroad from Talkeetna, at **Chase** siding, 30 yards north of milepost 236, 22 yards north of the south end of the switch, and 12 yards east of the main track. A standard disk, stamped "P 2 1922," and set in the top of a concrete post. (138.217 meters or 453.467 feet.)

Q 2.—About 12.7 miles north along the Alaska Railroad from Talkeetna, 3.2 miles north of **Chase** siding, about 15 telegraph poles north of milepost 239, 356 yards south of trestle No. 2396, about in the middle of a ¾-mile tangent, and 7 yards west of the track. A standard disk, stamped "Q 2 1922," and set in the top of a concrete post. (139.533 meters or 457.785 feet.)

R 2.—About 15.7 miles north along the Alaska Railroad from Talkeetna, at the south end of **Lane** siding, 17 telegraph poles north of milepost 242, and 12 yards east of the main track. A standard disk, stamped "R 2 1922," and set in the top of a concrete post. (147.404 meters or 483.608 feet.)

S 2.—About 19.0 miles north along the Alaska Railroad from Talkeetna, 2.6 miles south of the railroad station at **Curry,** about 12½ telegraph poles south of milepost 246, 136 yards north of trestle No. 2456, and 8 yards east of the track, in a gravel pit. A standard disk, stamped "S 2 1922," and set in the top of a concrete post. (157.301 meters or 516.078 feet.)

T 2.—About 20.1 miles north along the Alaska Railroad from Talkeetna, 1.5 miles south of the railroad station at **Curry,** at the north end of trestle No. 2468, 3 yards east of the track, and 4 feet higher than the track, in an outcrop of granite. A standard disk, stamped "T 2 1922," and set vertically. (160.763 meters or 527.437 feet.)

U 2.—About 23.2 miles north along the Alaska Railroad from Talkeetna, 1.6 miles north of the railroad station at **Curry,** near the south end of a 2-mile tangent, 241 yards north of trestle No. 2498, and 7 yards east of the track. A standard disk, stamped "U 2 1922," and set in the top of a concrete post. (165.616 meters or 543.358 feet.)

V 2.—About 27.5 miles north along the Alaska Railroad from Talkeetna, 2.8 miles south of **Sherman** siding, at the north end of trestle No. 2542, 6 yards east of the track, and 3 feet higher than the roadbed. A standard disk, stamped "V 2 1922," and set vertically in the face of a rock cliff. (178.979 meters or 587.200 feet.)

W 2.—About 31.4 miles north along the Alaska Railroad from Talkeetna, 1.1 miles north of **Sherman** siding, 100 yards north of the south end of the second curve north of Sherman, 81 yards south of trestle No. 2582, and 9 yards east of the track. A standard disk, stamped "W 2 1922," and set in the top of a concrete post. (197.608 meters or 648.319 feet.)

X 2.—About 34.4 miles north along the Alaska Railroad from Talkeetna, 2.4 miles south of **Gold Creek** siding, 194 yards north of milepost 261, at the south end of a long gravel cut, and 7 yards east of the track. A standard disk, stamped "X 2 1922," and set in the top of a concrete post. (210.850 meters or 691.764 feet.)

Y 2.—About 37.4 miles north along the Alaska Railroad from Talkeetna, 0.6 mile north of **Gold Creek** siding, at the steel bridge over Susitna River, in the top of the west end of the north abutment, and 14 feet west of the west rail. A standard disk, stamped "Y 2 1922," and set horizontally in the concrete. (218.658 meters or 717.380 feet.)

Z 2.—About 41.3 miles north along the Alaska Railroad from Talkeetna, 26 yards south of the south end of **Canyon** siding, 29 yards north of milepost 268, and 11 yards east of the track. A standard disk, stamped "Z 2 1922," and set in the top of a concrete post. (260.962 meters or 856.173 feet.)

A 3.—About 43.8 miles north along the Alaska Railroad from Talkeetna, 2.1 miles north of **Canyon** siding, 62 yards south of trestle No. 2706, and 11 yards west of the track. A standard disk, stamped "A 3 1922," and set horizontally in the top of a cone-shaped granite bowlder. (318.381 meters or 1,044.555 feet.)

B 3.—About 47.0 miles north along the Alaska Railroad from Talkeetna, 81 yards south of the south end of **Chulitna** siding, 150 yards north of the north end of a long gravel cut, and 15 yards east of the track. A standard disk, stamped "B 3 1922," and set in the top of a concrete post. (387.837 meters or 1,272.429 feet.)

C 3.—About 49.6 miles north along the Alaska Railroad from Talkeetna, 2.4 miles north of **Chulitna** siding, 260 yards south of the south end of a curved trestle which is at the foot of a long steep grade, and 12 yards west of the track, in a gravel pit. A standard disk, stamped "C 3 1922," and set in the top of a concrete post. (410.707 meters or 1,347.461 feet.)

D 3.—About 53.6 miles north along the Alaska Railroad from Talkeetna, 1.1 miles south of **Hurricane** siding, at the south end of a small cut on the top of a hill, 302 yards north of a trestle, and 10 yards west of the track. A standard disk, stamped "D 3 1922," and set in the top of a concrete post. (507.160 meters or 1,663.907 feet.)

E 3.—About 57.4 miles north along the Alaska Railroad from Talkeetna, at the steel bridge over **Hurricane Gulch,** 18 inches from the east end of the south abutment, and about 8 feet lower than the top of the rails. A standard disk, stamped "E 3 1922," and set horizontally in the top of the concrete abutment. (496.817 meters or 1,629.974 feet.)

F 3.—About 60.8 miles north along the Alaska Railroad from Talkeetna, 1.2 miles south of **Honolulu** siding, 473 yards south of the south end of the bridge over Honolulu Creek, and 10 yards west of the track, on the top of a 4-foot bank. A standard disk, stamped "F 3 1922," and set in the top of a concrete post. (455.775 meters or 1,495.322 feet.)

G 3.—About 63.3 miles north along the Alaska Railroad from Talkeetna, 1.3 miles north of **Honolulu** siding, 67 yards south of a small trestle, in a gravel flat across the track from a long 8-foot gravel bank, and 9 yards west of the track. A standard disk, stamped "G 3 1922," and set in the top of a concrete post. (456.478 meters or 1,497.628 feet.)

H 3.—About 67.7 miles north along the Alaska Railroad from Talkeetna, 2.7 miles south of **Colorado** siding, 92 yards south of a small trestle which is at the south end of a ½-mile tangent, on range with the west rail of the tangent, and 10 yards west of the track. A standard disk, stamped "H 3 1922," and set in the top of a concrete post. (548.281 meters or 1,798.819 feet.)

J 3.—About 70.5 miles north along the Alaska Railroad from Talkeetna, 55 yards south of the north end of **Colorado** siding, and 14 yards west of the main track. A standard disk, stamped "J 3 1922," and set in the top of a concrete post. (595.538 meters or 1,953.861 feet.)

K 3.—About 73.7 miles north along the Alaska Railroad from Talkeetna, 3.3 miles north of **Colorado** siding, 150 yards north of a small trestle which is at the south end of a cut about 85 yards in length, and 11 yards west of the track. A standard disk, stamped "K 3 1922," and set in the top of a concrete post. (628.831 meters or 2,063.090 feet.)

L 3.—About 75.7 miles north along the Alaska Railroad from Talkeetna, 1.9 miles south of **Broad Pass** siding, 78 yards south of a small trestle, 25 yards south of the north end of a cut about 140 yards long, and 12 yards west of the track, on the top of a 3-foot bank. A standard disk, stamped "L 3 1922," and set in the top of a concrete post. (627.758 meters or 2,059.569 feet.)

M 3.—About 80.9 miles north along the Alaska Railroad from Talkeetna, 3.3 miles north of **Broad Pass** siding, 22 yards south of the point of intersection of the tangents to the fifth curve north of Broad Pass siding, and 8 yards west of the track. A standard disk, stamped "M 3 1922," and set in the top of a concrete post. (699.696 meters or 2,295.586 feet.)

N 3.—About 85.2 miles north along the Alaska Railroad from Talkeetna, 0.6 mile south of **Summit** siding, at the first curve south of the siding, and 120 yards north of the north end of a 2-mile tangent on which a water tank was being constructed in 1922. A standard disk, stamped "N 3 1922," and set in the top of a concrete post located about 11 yards east of the track. (714.739 meters or 2,344.940 feet.)

O 3.—About 87.1 miles north along the Alaska Railroad from Talkeetna, 1.3 miles north of **Summit** siding, 42 yards north of the point of intersection of the tangents to the first curve north of the siding, and 13 yards east of the track. A standard disk, stamped "O 3 1922," and set in the top of a concrete post. (712.182 meters or 2,336.550 feet.)

P 3.—About 90.0 miles north along the Alaska Railroad from Talkeetna, 2.8 miles south of **Cantwell** siding, 545 yards north of a wooden-truss bridge, and 10

yards west of the track. A standard disk, stamped "P 3 1922," and set in the top of a concrete post. (684.696 meters or 2,246.373 feet.)

Q 3.—About 91.5 miles south along the Alaska Railroad from Nenana, 0.5 mile north of **Cantwell** siding, 475 yards north of the water tank, at the south end of a cut, and 8 yards east of the track. A standard disk, stamped "Q 3 1922," and set in the top of a concrete post. (667.412 meters or 2,189.668 feet.)

R 3.—About 88.2 miles south along the Alaska Railroad from Nenana, 3.4 miles south of **Windy** siding, 0.3 mile north of the north end of a long wooden bridge over a creek, 43 yards south of the north end of a 1° curve about a mile long, and 7 yards east of the track. A standard disk, stamped "R 3 1922," and set in the top of a concrete post. (644.831 meters or 2,115.583 feet.)

S 3.—About 85.5 miles south along the Alaska Railroad from Nenana, 0.7 mile south of **Windy** siding, on the first curve south of the siding, 52 yards north of a wooden box culvert, and 16 yards east of the track. A standard disk, stamped "S 3 1922," and set in the top of a concrete post. (632.777 meters or 2,076.036 feet.)

T 3.—About 82.1 miles south along the Alaska Railroad from Nenana, 2.7 miles north of **Windy** siding, 150 yards south of a trestle over a small stream, 110 yards north of the north end of a rock cut, and 8 feet east of and 3 feet higher than the track. A standard disk, stamped "T 3 1922," and set vertically in a rock ledge. (608.648 meters or 1 996.873 feet.)

U 3.—About 77.5 miles south along the Alaska Railroad from Nenana, 0.4 mile south of **Carlo** siding, at the south end of the first curve south of Carlo, 8 feet west of the track, and 4 feet above the ground. A standard disk, stamped "U 3 1922," and set vertically in a rock ledge. (596.302 meters or 1,956.367 feet.)

V 3.—About 73.5 miles south along the Alaska Railroad from Nenana, 3.5 miles south of **Yanert** siding, about in the middle of a ½-mile tangent, 38 yards north of a wooden culvert, and 25 yards west of the track. A standard disk, stamped "V 3 1922," and set in the top of a concrete post. (594.470 meters or 1,950.357 feet.)

W 3.—About 69.6 miles south along the Alaska Railroad from Nenana, 127 yards south of the north end of **Yanert** siding, 70 yards south of a wooden culvert, and 30 yards east of the track. A standard disk, stamped "W 3 1922," and set in the top of a granite bowlder. (594.536 meters or 1,950.574 feet.)

X 3.—About 66.5 miles south along the Alaska Railroad from Nenana, 2.9 miles south of **McKinley Park** siding, about in the middle of a ½-mile tangent, at the north end of a shallow cut, and 8 yards east of the track. A standard disk, stamped "X 3 1922," and set in the top of a concrete post. (556.676 meters or 1,826.361 feet.)

Y 3.—About 64.0 miles south along the Alaska Railroad from Nenana, 0.4 mile south of the station at **McKinley Park,** at the steel bridge over Riley Creek, in the top of the south abutment, 36 inches from the west end of the abutment, and about 8 feet lower than the track. A standard d sk, stamped "Y 3 1922," and set horizontally in the concrete abutment. (523.404 meters or 1,717.201 feet.)

Z 3.—About 61.2 miles south along the Alaska Railroad from Nenana, 2.4 miles north of **McKinley Park** siding, 21 yards north of the north end of the trestle over Sheep Creek, and 12 yards east o the track. A standard disk, stamped "Z 3 1922," and set horizontally in the top of a granite bowlder. (492.688 meters or 1,616.427 feet.)

A 4.—About 58.4 miles south along the Alaska Railroad from Nenana, at the south end of **Moody** siding, 0.5 mile south of a tunnel, and 15 yards east of the track. A standard disk, stamped "A 4 1922," and set in the top of a concrete post. (454.302 meters or 1,490.489 feet.)

B 4.—About 55.9 miles south along the Alaska Railroad from Nenana, 2.6 miles south of **Healy** siding, directly across the track from the Alaska Engineering Commission Hospital, and 15 yards east of the track. A standard disk, stamped "B 4 1922," and set in the top of a concrete post. (434.902 meters or 1,426.841 feet.)

C 4.—About 52.9 miles south along the Alaska Railroad from Nenana, 760 yards north of the station at **Healy**, and 19 yards east of the track. A standard disk, stamped "C 4 1922," and set in the top of a concrete post. (409.701 meters or 1,344.161 feet.)

D 4.—About 50.8 miles south along the Alaska Railroad from Nenana, 2.5 miles north of **Healy** siding, at the north end of a long gravel cut, about in the middle of a ¾-mile tangent, and 15 yards east of the track. A standard disk, stamped "D 4 1922," and set in the top of a concrete post. (385.940 meters or 1,266.205 feet.)

E 4.—About 48.2 miles south along the Alaska Railroad from Nenana, 110 yards south of the north end of **Lignite** siding, 25 yards in front of a log cabin, and 23 yards west of the track. A standard disk, stamped "E 4 1922." and set in the top of a concrete post. (356.907 meters or 1,170.952 feet.)

F 4.—About 45.1 miles south along the Alaska Railroad from Nenana, 3.1 miles north of **Lignite** siding, at the north end of a gravel cut, 220 yards south of trestle No. 41, and 11 yards east of the track. A standard disk, stamped "F 4 1922," and set in the top of a concrete post. (347.050 meters or 1,138.613 feet.)

G 4.—About 42.7 miles south along the Alaska Railroad from Nenana, 2.8 miles south of **Ferry** siding, 180 yards north of trestle No. 37, and 15 yards east of the track, on a gravel ridge. A standard disk, stamped "G 4 1922," and set in the top of a concrete post. (322.175 meters or 1,057.002 feet.)

H 4.—About 40.7 miles south along the Alaska Railroad from Nenana, 0.8 mile south of **Ferry** siding, in the top of the concrete pier of the bridge over Nenana River, 32 inches from the west end of the pier, 12 feet west of the west rail, and 8 feet lower than the track. A standard disk, stamped "H 4 1922,"and set horizontally. (308.530 meters or 1,012.235 feet.)

J 4.—About 37.1 miles south along the Alaska Railroad from Nenana, 204 yards north of the north end of **Moss** sid ng, 57 yards north of trestle No. 26, and 17 yards east of the track. A standard disk, stamped "J 4 1922," and set in the top of a concrete post. (288.444 meters or 946.337 feet.)

K 4.—About 33.1 miles south along the Alaska Railroad from Nenana, 2.8 miles south of **Browne** siding, 40 yards west of the point of intersection of the tangents to a short curve, 210 yards south of trestle No. 17, and 45 yards east of and about 6 feet higher than the track. A standard disk, stamped "K 4 1922," and set horizontally in the top of a granite bowlder. (270.066 meters or 886.042 feet.)

L 4.—About 31.5 miles south along the Alaska Railroad from Nenana, 1.2 miles south of **Browne** siding, on a long curve to the right, 40 yards south of trestle No. 15, and 15 yards east of the track. A standard disk, stamped "L 4 1922," and set in the top of a concrete post. (259.090 meters or 850.031 feet.)

M 4.—About 28.6 miles south along the Alaska Railroad from Nenana, 1.7 miles north of **Browne** siding, at the second point of land north of Browne, 14 yards west of the track, at about the same elevation as the track, and in the top of a huge rock formation at the edge of the river. A standard disk, stamped "M 4 1922," and set horizontally in solid rock. (240.926 meters or 790.438 feet.)

N 4.—About 26.7 miles south along the Alaska Railroad from Nenana, 2.4 miles south of **Kobe** siding, at the point of intersection of the tangents to a curve, 124 yards north of a culvert, 15 yards south of another culvert, and 8 yards west of the track. A standard disk, stamped "N 4 1922," and set in the top of a concrete post. (226.808 meters or 744.119 feet.)

O 4.—About 24.8 miles south along the Alaska Railroad from Nenana, 0.5 mile south of **Kobe** siding, at the point of intersection of the tangents to a curve at the south end of an 11-mile tangent, and 11 yards west of the track. A standard disk, stamped "O 4 1922," and set in the top of a concrete post. (215.605 meters or 707.364 feet.)

P 4.—About 22.5 miles south along the Alaska Railroad from Nenana, 1.8 miles north of **Kobe** siding, opposite milepost 389, at the south end of a shallow cut, and 11 yards west of the track, on a gravel ridge. A standard disk, stamped "P 4 1922," and set in the top of a concrete post. (200.636 meters or 658.253 feet.)

Q 4.—About 19.3 miles south along the Alaska Railroad from Nenana, 2.2 miles south of **Clear** siding, at the edge of the railroad right of way, and 16 yards west of the track, on a gravel ridge. A standard disk stamped "Q 4 1922," and set in the top of a concrete post. (177.865 meters or 583.545 feet.)

R 4.—About 17.3 miles south along the Alaska Railroad from Nenana, 225 yards north of the south end of **Clear** siding, and 31 yards west of the track, at the edge of a clearing. A standard disk, stamped "R 4 1922," and set in the top of a concrete post. (162.474 meters or 533.050 feet.)

S 4.—About 10.2 miles south along the Alaska Railroad from Nenana, 140 yards north of the south end of **Julius** siding, and 18 yards west of the track, at the top of a ridge. A standard disk, stamped "S 4 1922," and set in the top of a concrete post. (131.770 meters or 432.315 feet.)

T 4.—About 5.9 miles south along the Alaska Railroad from Nenana, 4.3 miles north of **Julius** siding, about in the middle of a cut which is about 75 yards long, and 12 yards east of and about 3 feet higher than the track. A standard disk, stamped "T 4 1922," and set in the top of a concrete post. (120.243 meters or 394.497 feet.)

U 4.—About 2.4 miles south along the Alaska Railroad from **Nenana,** at the entrance to a cemetery, and 17 yards east of the track. A standard disk, stamped "U 4 1922," and set in the top of a concrete post. (110.900 meters or 363.844 feet.)

V 4.—At **Nenana,** 25 yards in front of the new (1922) railroad station, and between the station and the Tanana River. A standard disk, stamped "V 4 1922," and set in the top of a concrete post. (107.280 meters or 351.968 feet.)

W 4.—At **Nenana,** at the new (1922) railroad station, 18 inches from the southwest corner, in the south face of the foundation and 5 inches below the top. A standard disk, stamped "W 4 1922," and set vertically. (107.484 meters or 352.637 feet.)

X 4.—At **Nenana,** at the steel railroad bridge over the Tanana River, and in the west face of the west pier of the most southerly pair of piers. A standard disk, stamped "X 4 1922," and set vertically. (108.369 meters or 355.541 feet.)

Y 4.—At **Nenana,** at the steel bridge over the Tanana River, in the west end of the concrete pier which supports the south end of the small deck truss. A standard disk, stamped "Y 4 1922," and set vertically. (108.851 meters or 357.122 feet.)

Z 4.—About 4.2 miles north along the narrow-gage track from Nenana at the north end of **North Nenana** siding, at the north end of a ½-mile tangent, and 10 yards east of the main track. A standard disk, stamped "Z 4 1922," and set in the top of a concrete post. (110.046 meters or 361.043 feet.)

A 5.—About 5.7 miles north along the narrow-gage track from Nenana, 1.5 miles north of **North Nenana** siding, 8 feet east of the track, and 4.5 feet above the ground, on a rocky point. A standard disk, stamped "A 5 1922," and set vertically in rock. (108.182 meters or 354.927 feet.)

B 5.—About 8.9 miles north along the narrow-gage track from Nenana, 225 yards north of the south end of **Mahon** siding, at mileage 420.4, and 16 yards west of the track. A standard disk, stamped "B 5 1922," and set in the top of a concrete post. (111.319 meters or 365.219 feet.)

C 5.—About 14.3 miles north along the narrow-gage track from Nenana, 320 yards north of the south end of **Berg** siding, at mileage 425.8, and 18 yards west of the track. A standard disk, stamped "C 5 1922," and set in the top of a concrete post. (109.232 meters or 358.372 feet.)

D 5.—About 20.3 miles north along the narrow-gage track from Nenana, 175 yards south of the north end of **Dunbar** siding, 90 yards south of the road house, at mileage 431.8, and 16 yards west of the main track. A standard disk, stamped "D 5 1922," and set in the top of a concrete post. (110.772 meters or 363.424 feet.)

E 5.—About 24.3 miles north along the narrow-gage track from Nenana, 230 yards north of the south end of **California** siding, 280 yards north of a small trestle, at mileage 435.8, and 11 yards east of the main track. A standard disk, stamped "E 5 1922," and set in the top of a concrete post. (117.838 meters or 386.607 feet.)

F 5.—About 28.3 miles north along the narrow-gage track from Nenana, 350 yards north of **Standard** siding, 102 yards north of the first trestle north of the siding, at mileage 439.8, and 16 yards east of the track. A standard disk, stamped "F 5 1922," and set in the top of a concrete post. (119.870 meters or 393.273 feet.)

G 5.—About 23.8 miles south along the narrow-gage track from Fairbanks, 1.6 miles north of **Muskeg** siding, at the top of a ridge south of a small lake, at mileage 446.5, and 12 yards west of the track. A standard disk, stamped "G 5 1922," and set in the top of a concrete post. (136.599 meters or 448.159 feet.)

H 5.—About 21.0 miles south along the narrow-gage track from Fairbanks, 320 yards south of the north end of **Cache** siding, 225 yards north of the north end of a deep cut, at mileage 449.3, and 18 yards west of the main track. A standard disk, stamped "H 5 1922," and set in the top of a concrete post. (138.611 meters or 454.760 feet.)

J 5.—About 16.5 miles south along the narrow-gage track from Fairbanks, at **Martin** siding, at the top of a ridge about in the middle of the siding, at mileage 453.8, and 17 yards east of the main track. A standard disk, stamped "J 5 1922," and set in the top of a concrete post. (152.132 meters or 499.120 feet.)

K 5.—About 9.4 miles south along the narrow-gage track from Fairbanks, at a wood spur 2.1 miles south of **Happy,** 150 yards south of the south end of a long trestle, 16 yards north of the spur switch, at mileage 460.9, and 14 yards east of the main track. A standard disk, stamped "K 5 1922," and set in the top of a concrete post. (172.950 meters or 567.420 feet.)

L 5.—About 7.4 miles south along the narrow-gage track from Fairbanks, 28 yards north of the south end of the **Happy** wye, at mileage 462.9, and 11 yards east of the main track. A standard disk, stamped "L 5 1922," and set in the top of a concrete post. (182.955 meters or 600.245 feet.)

M 5.—About 7.2 miles south along the narrow-gage track from Fairbanks, at the north end of the **Happy** wye, at mileage 463.1, and 14 yards west of the main track. A standard disk, stamped "M 5 1922," and set in the top of a concrete post. (182.439 meters or 598.552 feet.)

N 5.—About 4.8 miles south along the narrow-gage track from Fairbanks, at the south end of **Ester** siding, at mileage 465.5, 75 yards east of a new grade, 60 yards east of a small truss bridge on the highway, 15 yards west of the track, and 7 yards north of the Ester auto trail. A standard disk, stamped "N 5 1922," and set in the top of a concrete post. (146.982 meters or 482.223 feet.)

O 5.—About 1.3 miles south of the narrow-gage railroad station at **Fairbanks,** 12 yards east of the point of intersection of the tangents to the first curve of the new (1922) grade, 25 yards south of a trestle, at mileage 469, and 24 yards east of the narrow-gage track. A standard disk, stamped "O 5 1922," and set in the top of a concrete post. (133.487 meters or 437.949 feet.)

P 5.—At **Fairbanks,** in the west face of the south abutment of the steel highway bridge. A standard disk, stamped "P 5 1922," and set vertically about 3 feet below the top of the concrete abutment. (134.107 meters or 439.983 feet.)

Q 5.—At **Fairbanks,** one block south and one-half block west of the public-school building and in the center of the lawn in front of the Government detention hospital. A standard disk, stamped "Q 5 1922," and set in the top of a concrete post. (134.103 meters or 439.970 feet.)

R 5.—At **Fairbanks,** at the Government radio tower, in the northeast face of the northwest footing, and 1 foot below the top of the concrete. A standard disk, stamped "R 5 1922," and set vertically. (135.181 meters or 443.506 feet.)

LINE 2, FAIRBANKS TO VALDEZ

This line follows the Richardson Highway or the Valdez Trail from Fairbanks to Valdez. The field work as far south as bench mark K 6, at Fox Farm Road House, was done by F. W. Hough, assisted by W. O. Manchester, in the fall of 1922. For this portion of the line the trail or road is assumed to be running north and south at all points no matter what the actual direction of the road at the location of the marks. This means the directions are arbitrary, with north toward Fairbanks, south toward Valdez, and east and west to the right and left, respectively, when facing Fairbanks.

The field work from bench mark K 6 southward was done by Herman Odessey, assisted by W. O. Manchester, during the summer of 1923. In writing the descriptions of the bench marks along this portion of the line the arbitrary convention of assuming the road to be running north and south at all points was dropped and directions are as stated in the descriptions.

S 5.—About 3.8 miles south along the Valdez Trail from the Government radio tower at **Fairbanks,** at a curve to the west, 140 yards south of a culvert, 35 yards north of a culvert, and 15 yards east of the trail. A standard disk, stamped "S 5 1922," and set in the top of a concrete post. (136.785 meters or 448.769 feet.)

T 5.—About 6.7 miles south along the Valdez Trail from the Government radio tower at **Fairbanks,** 1.2 miles north of **Saint Louis' Farmhouse,** 15 yards south of a bridge over a small stream, and 7 yards west of the trail. A standard disk, stamped "T 5 1922," and set in the top of a concrete post. (140.844 meters or 462.086 feet.)

U 5.—About 9 miles south along the Valdez Trail from the Government radio tower at Fairbanks, at the south end of a straight stretch of sandy trail about one-half mile in length at the north end of which is a 25-foot wooden bridge, 85 yards north of a large gravel pit, and 20 yards east of the trail. A standard disk, stamped "U 5 1922," and set in the top of a concrete post. (144.429 meters or 473.847 feet.)

V 5.—About 12 miles south along the Valdez Trail from the Government radio tower at Fairbanks, on a curve to the west, 50 yards south of a large gravel pit, and 12 yards east of the trail. A standard disk, stamped "V 5 1922," and set in the top of a concrete post. (147.923 meters or 485.311 feet.)

W 5.—About 15 miles south along the Valdez Trail from the Government radio tower at Fairbanks, 0.7 mile north of **King Post Bridge,** 0.5 mile south of a culvert under a short high fill, and 10 yards west of the trail. A standard disk, stamped "W 5 1922," and set in the top of a concrete post. (151.847 meters or 498.185 feet.)

X 5.—About 17 miles south along the Valdez Trail from the Government radio tower at Fairbanks, 0.5 mile north of **Eighteen Mile Road House,** 85 yards north of the north end of a cleared field, and 11 yards east of the trail. A standard disk, stamped "X 5 1922," and set in the top of a concrete post. (155.446 meters or 509.992 feet.)

Y 5.—About 22 miles south along the Valdez Trail from the Government radio tower at Fairbanks, 0.3 mile south of **Twenty-one Mile Farmhouse,** 100 yards north of the second culvert south of the farmhouse, and 15 yards west of the trail. A standard disk, stamped "Y 5 1922," and set in the top of a concrete post. (162.601 meters or 533.467 feet.)

Z 5.—About 24 miles south along the Valdez Trail from the Government radio tower at Fairbanks, at the place where the trail running parallel to a slough curves to the west, at the only exposure of gravelly soil for one-half mile in either direction, and 7 yards east of the trail, at the edge of the timber. A standard disk, stamped "Z 5 1922," and set in the top of a concrete post. (167.097 meters or 548.217 feet.)

A 6.—About 28 miles south along the Valdez Trail from the Government radio tower at Fairbanks, 550 yards north of Piledriver Bridge over **Chena Slough,** 150 yards south of a double king-post bridge, and 13 yards east of the trail. A standard disk, stamped "A 6 1922," and set in the top of a concrete post. (172.926 meters or 567.341 feet.)

B 6.—About 32 miles south along the Valdez Trail from the Government radio tower at Fairbanks, 1.5 miles north of **Salcha** telegraph station, 225 yards south of the point where the slough bears away from the trail, and 10 yards east of the trail, in an exposure of gravel. A standard disk, stamped "B 6 1922," and set in the top of a concrete post. (179.944 meters or 590.366 feet.)

C 6.—About 34 miles south along the Valdez Trail from the Government radio tower at Fairbanks, 1.0 mile south of **Salcha** telegraph station, 0.9 mile north of the mouth of Little Salcha River, 6 feet east of the trail, and 4 feet above the ground. A standard disk, stamped "C 6 1922," and set vertically in the face of a rock cliff. (185.387 meters or 608.224 feet.)

D 6.—About 38 miles south along the Valdez Trail from the Government radio tower at Fairbanks, 2.5 miles north of **Munson's Road House,** at the place where a construction road leads down to a gravel pit located west of the trail, 125 yards north of the point where the road leads down to a lower bench, and 8 yards east of the trail. A standard disk, stamped "D 6 1922," and set in the top of a concrete post. (193.427 meters or 634.602 feet.)

E 6.—About 40 miles south along the Valdez Trail from the Government radio tower at Fairbanks, at **Munson's Road House,** midway between the house and the barn, 8 yards east of the trail, and 1 yard west of a fence. A standard disk, stamped "E 6 1922," and set in the top of a concrete post. (194.375 meters or 637.712 feet.)

F 6.—About 42 miles south along the Valdez Trail from the Government radio tower at Fairbanks, 1.2 miles north of the foot of **Five-Mile Mountain,** at the place where the telegraph line intersects the trail, in line with the telegraph poles, and 10 yards east of the trail. A standard disk, stamped "F 6 1922," and set in the top of a concrete post. (205.676 meters or 674.789 feet.)

G 6.—About 47 miles south along the Valdez Trail from the Government radio tower at Fairbanks, on the upper bench at the point where the trail leads down in a southerly direction into a gravel dugway, 7 yards east of the trail, and 15 yards east of the river. A standard disk, stamped "G 6 1922," and set in the top of a concrete post. (217.332 meters or 713.030 feet.)

H 6.—About 50 miles south along the Valdez Trail from the Government radio tower at Fairbanks, 0.6 mile north of **Fox Farm Road House,** on the upper bench at the point where the road leads down in a southerly direction to a lower level, 64 yards north of a small culvert and old milepost 320, and 7 yards west of the trail. A standard disk, stamped "H 6 1922," and set in the top of a concrete post. (224.177 meters or 735.487 feet.)

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J 6.—About 50 miles south along the Valdez Trail from the Government radio tower at Fairbanks, 0.3 mile north of **Fox Farm Road House,** 12 yards east of the river, 6 yards south of a small culvert, 4 yards east of the road, and 4 yards west of an old prospect hole, on the top of a bank about 5 feet higher than the road. A standard disk, stamped "J 6 1922," and set in the top of a concrete post. (222.104 meters or 728.686 feet.)

K 6.—About 50 miles south along the Valdez Trail from the Government radio tower at Fairbanks, at **Fox Farm Road House,** in front of the house, 11 yards east of the trail, 10 yards south of the northwest corner of the fence, in line with the telegraph poles, and 2 feet west of a fence. A standard disk, stamped "K 6 1922," and set in the top of a concrete post. (219.691 meters or 720.770 feet.)

Bench mark **K 6** is the last of the bench marks established in 1922. The leveling from this point to Valdez was completed in 1923. It should also be noted that in the descriptions of the bench marks established in 1923 the Valdez Trail is known as the Richardson Highway and that Fox Farm Road House is spoken of as Taylor's Road House. (See p. 14 regarding change in designating directions.)

L 6.—On the Richardson Highway, about 5½ miles southeast of **Taylor's Road House,** about 1 mile north of Birch Lake, about 40 yards southwest of a sign reading "Lake Road House 1 mile," and 25 feet south of the center of the road. A standard disk, stamped "L 6 1923," and set in the top of a concrete post. (237.417 meters or 778.926 feet.)

M 6.—On the Richardson Highway, about three-fourth mile south of the **Birch Lake Road House,** 12 yards from the southeast shore of Birch Lake, and 8 yards east of the center of the road, on a small knoll. A standard disk, stamped "M 6 1923," and set in the top of a concrete post. (246.847 meters or 809.864 feet.)

N 6.—On the Richardson Highway, about 4.4 miles north of **Richardson Road House,** at the top of a long hill, and about 8 yards northeast of the center of the road. A standard disk, stamped "N 6 1923," and set in the top of a concrete post. (357.471 meters or 1,172.803 feet.)

O 6.—On the Richardson Highway, about 3.5 miles north of **Richardson Road House,** about one-fourth mile north of the north end of a small swamp, near the southern end of a large bare hill, and about 25 feet west of the center of the road, on a small knoll. A standard disk, stamped "O 6 1923," and set in the top of a concrete post. (256.486 meters or 841.488 feet.)

P 6.—On the Richardson Highway, in front of the telegraph station at **Richardson,** and 10 yards east of the center of the road. A standard disk, stamped "P 6 1923," and set in the top of a concrete post. (266.577 meters or 874.595 feet.)

Q 6.—On the Richardson Highway, about 2½ miles south of **Richardson Road House,** about 2 miles south of the telegraph station, at the crest of a long hill, and about 10 yards west of the center of the road. A standard disk, stamped "Q 6 1923," and set in the top of a concrete post. (407.722 meters or 1,337.668 feet.)

R 6.—On the Richardson Highway, about 5.2 miles south of **Richardson Road House,** 15 yards northeast of a small wooden bridge over Tenderfoot Creek, about 25 yards northwest of a deserted cabin, and 7 yards north of the center of the highway. A standard disk, stamped "R 6 1923," and set in the top of a concrete post. (291.117 meters or 955.106 feet.)

S 6.—On the Richardson Highway, about 9.2 miles south of **Richardson Road House,** about 175 yards northwest of the wooden bridge over Shaw Creek, and 7 feet west of and about 4 feet higher than the center of the road. A standard disk, stamped "S 6 1923," and set vertically in the face of a rock cliff. (285.952 meters or 938.161 feet.)

T 6.—On the Richardson Highway, about 12.1 miles south of **Richardson Road House,** about 100 yards south of the end of a long straight stretch of road, and about 9 yards east of the center of the road. A standard disk, stamped "T 6 1923," and set in the top of a concrete post. (283.202 meters or 929.139 feet.)

U 6.—On the Richardson Highway, about 15.6 miles southeast of **Richardson Road House,** about 60 yards southeast of a wooden culvert, about 60 yards north of the north bank of Delta River, about 9 yards south of the center of the road, and 1 yard south of the row of telegraph poles. A standard disk, stamped "U 6 1923," and set in the top of a concrete post. (291.975 meters or 957.921 feet.)

V 6.—On the Richardson Highway, about 1.9 miles north of the telegraph station at **Grunder,** at the top of a small gravel ridge, 9 yards east of the center of the road, and about 10 yards west of the line of telegraph poles. A standard disk, stamped "V 6 1923," and set in the top of a concrete post. (304.466 meters or 998.902 feet.)

W 6.—On the Richardson Highway, about 45 feet northwest of the northwest corner of the telegraph station at **Grunder,** and about 3 feet south of the flagpole. A standard disk, stamped "W 6 1923," and set in the top of a concrete post. (303.175 meters or 994.667 feet.)

X 6.—On the Richardson Highway, about 0.8 mile south of **Grunder,** about 65 feet southwest of a small wooden culvert, 48 feet west of the line of telegraph poles, and 35 feet west of the center of the road. A standard disk, stamped "X 6 1923," and set in the top of a concrete post. (304.535 meters or 999.129 feet.)

Y 6.—On the Richardson Highway, about 5.2 miles south of the telegraph station at **Grunder,** 68 yards north of a wooden culvert, and 8 yards west of the center of the road. A standard disk, stamped "Y 6 1923," and set in the top of a concrete post. (337.690 meters or 1,107.905 feet.)

Z 6.—On the Richardson Highway, about 1.4 miles north of the bridge across **Jarvis Creek,** 150 feet southeast of an angle in the line of telegraph poles, and 25 feet east of the center of the road, at about the same elevation as the road. A standard disk, stamped "Z 6 1923," and set in the top of a concrete post. (353.220 meters or 1,158.856 feet.)

A 7.—On the Richardson Highway, one-fourth mile southeast of the wooden bridge across **Jarvis Creek,** about 200 feet south of the southern end of a small rise just south of the creek, and 25 feet west of the center of the road. A standard disk, stamped "A 7 1923," and set in the top of a concrete post. (365.923 meters or 1,200.532 feet.)

B 7.—On the Richardson Highway, about 2 miles south of the wooden bridge across **Jarvis Creek,** about three-fourth mile south of the first bend in the road to the south of the creek, about 25 feet east of the center of the road, and at about the same elevation as the road surface. A standard disk, stamped "B 7 1923," and set in the top of a concrete post. (386.599 meters or 1,268.367 feet.)

C 7.—On the Richardson Highway, about 4.2 miles south of the crossing of **Jarvis Creek,** near the top of a gradual ascent which begins about 3 miles south of Jarvis Creek, about 200 feet north of the north end of a straight stretch of road which is about 3½ miles in length, about 20 feet west of the center of the road, about 17 feet west of the line of telegraph poles, and about 1 foot higher than the surface of the road. A standard disk, stamped "C 7 1923," and set in the top of a concrete post. (420.355 meters or 1,379.115 feet.)

D 7.—On the Richardson Highway, about 6.3 miles south of the long wooden bridge over **Jarvis Creek,** about 3 yards west of the center of the road, and in line with the telegraph poles. A standard disk, stamped "D 7 1923," and set in the top of a concrete post. (456.447 meters or 1,497.527 feet.)

E 7.—On the Richardson Highway, about 2¼ miles south of **Beale's Cache,** 4 yards west of the center of the road, and in line with the telegraph poles. A standard disk, stamped "E 7 1923," and set in the top of a concrete post. (533.822 meters or 1,751.381 feet.)

F 7.—On the Richardson Highway, about 5.3 miles south of **Beale's Cache,** on the top of a small knoll, about 250 yards east of the nearest of a group of small lakes, and 40 feet east of the center of the road. A standard disk, stamped "F 7 1923," and set in the top of a concrete post. (641.075 meters or 2,103.260 feet.)

G 7.—On the Richardson Highway, about 9.4 miles north of the telegraph station at **Donnelly,** about 8.8 miles south of **Beale's Cache,** and about 9 yards east of the center of the road. A standard disk, stamped "G 7 1923," and set in the top of a concrete post. (833.688 meters or 2,735.191 feet.)

H 7.—On the Richardson Highway, about 7.3 miles north of the telegraph station at **Donnelly,** about 160 yards south of a culvert, about 64 yards north of another culvert, and 22 yards east of the road. A standard disk, stamped "H 7 1923," and set in a large bowlder. (856.702 meters or 2,810.696 feet.)

J 7.—On the Richardson Highway, about 4.9 miles north of the telegraph station at **Donnelly,** about 78 yards north of a wooden culvert, and 9 yards west of the center of the road. A standard disk, stamped "J 7 1923," and set in the top of a concrete post. (707.035 meters or 2,319.664 feet.)

K 7.—On the Richardson Highway, at the telegraph station at **Donnelly,** 20 yards east of the entrance to the telegraph station, 20 yards north of a tool house,

15 yards east of the center of the road, 9 yards east of the flagpole, and 9 yards north of the line of telegraph poles leading to the station. A standard disk, stamped "K 7 1923," and set in the top of a concrete post. (539.184 meters or 1,768.973 feet.)

L 7.—On the Richardson Highway, about 2.5 miles south of the telegraph station at **Donnelly,** 140 yards south of a large wooden culvert, about 75 yards east of the east bank of Delta River, and about 9 yards east of the center of the road. A standard disk, stamped "L 7 1923," and set in the top of a concrete post. (558.338 meters or 1,831.814 feet.)

M 7.—On the Richardson Highway, about 5.0 miles south of the telegraph station at **Donnelly,** and 13 yards west of the highway. A standard disk, stamped "M 7 1923," and set in the top of a concrete post. (589.032 meters or 1,932.516 feet.)

N 7.—On the Richardson Highway, about 7.9 miles south of the telegraph station at **Donnelly,** 85 yards south of a small wooden bridge, 20 yards north of a wooden culvert, 10 yards east of the road, at the foot of a hill, and at the beginning of a ½-mile stretch of straight road. A standard disk, stamped "N 7 1923," and set in the top of a concrete post. (618.037 meters or 2,027.676 feet.)

O 7.—On the Richardson Highway, 2 yards west of the northwest corner of the **Rapids Road House,** 22 yards east of the line of telegraph poles, and about 8 yards east of the center of the road. A standard disk, stamped "O 7 1923," and set in the top of a concrete post. (648.823 meters or 2,128.680 feet.)

P 7.—On the Richardson Highway, about 2.0 miles south of the **Rapids Road House,** about 3 yards west of the center of the road, and about 3 feet higher than the surface of the road. A standard disk, stamped "P 7 1923," and set horizontally in the top of a huge bowlder about 15 feet in diameter which projects about 8 feet above the ground. (705.192 meters or 2,313.617 feet.) Destroyed.

Q 7.—On the Richardson Highway, about 6.6 miles south of the **Rapids Road House,** 23 yards south of a wooden bridge over a glacial stream, 15 yards west of the line of telegraph poles, and 9 yards west of the center of the road. A standard disk, stamped "Q 7 1923," and set in the top of a concrete post. (718.567 meters or 2,357.499 feet.)

R 7.—On the Richardson Highway, about 3.3 miles north of the former site of **Miller's Road House,** 0.6 mile north of a long wooden bridge over a glacial stream, 20 yards west of the line of telegraph poles, and 10 yards west of the center of the road, opposite a gravel pit. A standard disk, stamped "R 7 1923," and set in the top of a concrete post. (744.518 meters or 2,442.639 feet.)

S 7.—On the Richardson Highway, about 1.7 miles north of the former site of **Miller's Road House,** about three-eighths of a mile south of the first large glacial stream north of Millers, about 2 yards west of the center of the road, and 1.5 feet above the ground. A standard disk, stamped "S 7 1923," and set vertically in the face of a rock ledge. (762.430 meters or 2,501.406 feet.)

T 7.—On the Richardson Highway, at the former site of **Miller's Road House,** 19 yards northeast of the northeast corner of a wooden cabin, 10 yards east of the center of the road, and about 4 yards east of the line of telegraph poles. A standard disk, stamped "T 7 1923," and set in the top of a concrete post. (758.292 meters or 2,487.830 feet.)

U 7.—On the Richardson Highway, about 2.7 miles south of the former site of **Miller's Road House,** about 4 yards north of the bank of Delta River, and about 5 feet north of and about 4 feet higher than the center of the road. A standard disk, stamped "U 7 1923," and set vertically in the face of a rock cliff. (764.079 meters or 2,506.816 feet.) Destroyed.

V 7.—On the Richardson Highway, about 6.3 miles south of the former site of **Miller's Road House,** about 25 yards north of the end of a change in the grade of the road, on the east side of and about 3.5 feet higher than the road. A standard disk, stamped "V 7 1923," and set vertically in the face of a rock ledge. (803.460 meters or 2,636.018 feet.)

W 7.—On the Richardson Highway, about 2¼ miles north of the telegraph station **McCallum,** about 150 yards southwest of the northern end of a small ridge which parallels the road, about 100 yards north of a bend in the road, about 28 yards west of the line of telegraph poles, and 8 yards west of the center of the road. A standard disk, stamped "W 7 1923," and set in the top of a concrete post. (843.462 meters or 2,767.258 feet.)

X 7.—On the Richardson Highway, about 15 yards south of the entrance to the telegraph station **McCallum,** 8 yards south of the center of the road, and 2 yards east of the flagpole. A standard disk, stamped "X 7 1923," and set in the top of a concrete post. (883.036 meters or 2,897.094 feet.)

Y 7.—On the Richardson Highway, about 2.8 miles south of the telegraph station **McCallum,** at the foot of a short steep climb at the southerly end of a long gradual ascent, about 70 yards southeast of the western end of a ridge which parallels the road, about 38 yards west of a wooden culvert, and 8 yards north of the center of the road. A standard disk, stamped "Y 7 1923," and set in the top of a concrete post. (937.561 meters or 3,075.981 feet.)

Z 7.—On the Richardson Highway, about 9.6 miles north of the telegraph station at **Paxson's,** about one-half mile south of a relief cabin, about 20 yards east of the shore of Summit Lake, about 10 yards south of the nearest of two wooden culverts, and about 9 yards west of the center of the road. A standard disk, stamped "Z 7 1923," and set in the top of a concrete post. (981.749 meters or 3,220.955 feet.)

A 8.—On the Richardson Highway, about 6.2 miles north of the telegraph station at **Paxson's,** at the south end of Summit Lake, about 70 yards north of a wooden culvert, about 25 yards east of the shore of the lake, about 17 yards east of the line of telegraph poles, and 10 yards east of the center of the road. A standard disk, stamped "A 8 1923," and set in the top of a concrete post. (981.919 meters or 3,221.513 feet.)

B 8.—On the Richardson Highway, about 2.7 miles north of the telegraph station at **Paxson's,** about 350 yards north of a small creek that crosses the road, about 200 yards south of the point where the telegraph line starts over a hill east of the road, 15 yards west of the center of the road, and 10 yards east of a creek which parallels the road. A standard disk, stamped "B 8 1923," and set in the top of a concrete post. (920.465 meters or 3,019.892 feet.)

C 8.—On the Richardson Highway, about 10 yards south of the telegraph station at **Paxson's,** 8 yards east of the center of the road, and 3 yards east of the flagpole. A standard disk, stamped "C 8 1923," and set in the top of a concrete post. (821.949 meters or 2,696.678 feet.)

D 8.—On the Richardson Highway, about 5.7 miles south of the telegraph station at **Paxson's,** about 65 yards south of a wooden culvert, about 40 yards east of the shore of Gulkana Lake, about 5 yards west of the center of the road, and about 4 yards east of the line of telegraph poles. A standard disk, stamped "D 8 1923," and set in the top of a concrete post. (786.071 meters or 2,578.968 feet.)

E 8.—On the Richardson Highway, about 6.2 miles north of **Meier's Road House,** at a break in the steep grade just south of a small creek, 20 yards north of a wooden culvert, 2 telegraph poles south of an angle in the line of telegraph poles, and 8 yards west of the center of the road. A standard disk, stamped "E 8 1923," and set in the top of a concrete post. (865.706 meters or 2,840.237 feet.)

F 8.—On the Richardson Highway, about 1.3 miles north of **Meier's Road House,** 300 yards north of a large outcrop of rock, 10 yards east of the center of the road, about 3½ yards south of a wooden culvert, and 3 feet higher than the surface of the road. A standard disk, stamped "F 8 1923," and set vertically in the face of a rock ledge. (853.612 meters or 2,800.559 feet.)

G 8.—On the Richardson Highway, at **Meier's Road House,** about 35 yards east of the road, 17 yards east of the northeast corner of the largest building east of the road, 5 feet east of the line of telegraph poles, and 2 feet above the ground. A standard disk, stamped "G 8 1923," and set vertically in the face of a rock ledge. (828.047 meters or 2,716.684 feet.)

H 8.—On the Richardson Highway, about 69.2 miles north of Copper Center, one-fourth mile northeast of a small lake, at the top of a long grade, 25 yards east of the line of telegraph poles, and 10 yards east of the center of the road. A standard disk, stamped "H 8 1923," and set in the top of a concrete post. (834.236 meters or 2,736.989 feet.)

J 8.—On the Richardson Highway, about 2.1 miles north of the creek at **Our Home,** on the north side of an old gravel pit, about 45 yards west of the road, and 3 feet above the ground. A standard disk, stamped "J 8 1923," and set horizontally in the surface of a rock ledge. (798.230 meters or 2,618.860 feet.)

K 8.—On the Richardson Highway, about 1.6 miles south of **Our Home,** 17 yards north of a wooden culvert, 9 yards west of the road, and 2 feet lower than the surface of the road. A standard disk, stamped "K 8 1923," and set horizontally in the top of a granite bowlder. (774.521 meters or 2,541.074 feet.)

L 8.—On the Richardson Highway, about 4.0 miles south of **Hogan's Hill,** about 175 yards north of a long wooden culvert, and 8 yards east of the center of the road. A standard disk, stamped "L 8 1923," and set in the top of a concrete post. (676.272 meters or 2,218.736 feet.)

M 8.—On the Richardson Highway, about 7.3 miles south of **Hogan,** about 50 yards south of a culvert near a bend in the road, and 14 yards east of and about 4 feet higher than the center of the road. A standard disk, stamped "M 8 1923," and set in the top of a concrete post. (673.752 meters or 2,210.468 feet.)

N 8.—On the Richardson Highway, about 1.9 miles north of **Sour Dough,** about 65 yards north of a wooden culvert, and about 10 yards west of and about 1 foot above the road. A standard disk, stamped "N 8 1923," and set in the top of a concrete post. (601.140 meters or 1,972.240 feet.)

O 8.—On the Richardson Highway, about 0.3 mile south of **Sour Dough,** near the summit of a hill where the telegraph line crosses over the highway, and 22 yards west of the highway, in a granite bowlder. A standard disk, stamped "O 8 1923," and set horizontally. (594.185 meters or 1,949.422 feet.)

P 8.—On the Richardson Highway, 2.9 miles south of **Sour Dough,** 40 yards north of a lake on the west side of the road, 30 yards south of a lake on the east side of the road, and 10 yards west of the road, on a small knoll. A standard disk, stamped "P 8 1923," and set in the top of a concrete post. (599.149 meters or 1,965.708 feet.)

Q 8.—On the Richardson Highway, about 7 miles south of **Sour Dough,** 100 yards north of a small wooden culvert, 75 yards north of the place where the telegraph line crosses the road, 30 yards east of the line of telegraph poles, 25 yards east of the highway, on a small knoll, and in a bowlder. A standard disk, stamped "Q 8 1923." (577.684 meters or 1,895.285 feet.)

R 8.—On the Richardson Highway, about 10¾ miles south of **Sour Dough,** 30 yards west of the line of telegraph poles, 25 yards south of a small wooden culvert, 6 yards east of the road, and in a large bowlder located in an old gravel pit. A standard disk, stamped "R 8 1923," and set in the side of the bowlder. (541.703 meters or 1,777.237 feet.)

S 8.—On the Richardson Highway, about 8 miles north of **Gulkana,** about midway between mileposts 137 and 136, about 9 yards east of the center of the road, and about 4 yards west of the line of telegraph poles. A standard disk, stamped "S 8 1923," and set in the top of a concrete post. (540.474 meters or 1,773.205 feet.)

T 8.—On the Richardson Highway, about 4.0 miles north of **Gulkana Road House,** 30 yards north of a small hollow, 15 yards south of a small wooden culvert, 10 yards east of the center of the highway, and 25 yards south of the line of telegraph poles. A standard disk, stamped "T 8 1923," and set in the top of a concrete post. (506.739 meters or 1,662.526 feet.)

U 8.—On the Richardson Highway, about 100 yards east of **Gulkana Road House,** 85 yards northeast of the bridge across Gulkana River, 14 yards west of the telegraph station, and 1 yard southwest of the flagpole. A standard disk, stamped "U 8 1923," and set in the top of a concrete post. (419.875 meters or 1,377.540 feet.)

V 8.—On the Richardson Highway, 2.5 miles south of **Gulkana,** 46 yards north of a wooden culvert, 10 yards east of the center of the road, and in line with the row of telegraph poles. A standard disk, stamped "V 8 1923," and set in the top of a concrete post. (486.108 meters or 1,594.839 feet.)

W 8.—On the Richardson Highway, about 5¼ miles south of **Gulkana,** about midway between mileposts 123 and 124, about 65 yards north of a wooden culvert, and 8 yards west of the center of the road. A standard disk, stamped "W 8 1923," and set in the top of a concrete post. (487.013 meters or 1,597.808 feet.)

X 8.—On the Richardson Highway, about 8 miles south of **Gulkana,** about midway between mileposts 120 and 121, in line with the row of telegraph poles, about 5 yards north of a telegraph pole, and 8 yards west of the center of the road. A standard disk, stamped "X 8 1923," and set in the top of a concrete post. (482.696 meters or 1,583.645 feet.)

Y 8.—On the Richardson Highway, about 1.9 miles south of **Dry Creek,** 55 yards south of a small wooden culvert, 6½ telegraph poles south of the south end of a long tangent, in line with the row of telegraph poles, and 6 yards west of the road. A standard disk, stamped "Y 8 1923," and set in the top of a concrete post. (466.036 meters or 1,528.986 feet.)

Z 8.—On the Richardson Highway, about 12.8 miles north of **Copper Center,** at the south end of a steep grade, about 2 miles north of the bridge over Tazlina River, 10 yards east of Miller's ranch house, and 7 yards west of the road. A standard disk, stamped "Z 8 1923," and set in the top of a concrete post. (363.643 meters or 1,193.052 feet.)

A 9.—On the Richardson Highway, about 10.2 miles north of **Copper Center,** on the west bank of the Tazlina River, about 40 yards west of a small group of

buildings, and about 10 yards east of the north approach to the bridge across the river. A standard disk, stamped "A 9 1923," and set in the top of a concrete post. (338.377 meters or 1,110.159 feet.) Destroyed.

B 9.—On the Richardson Highway, about 5.6 miles north of **Copper Center,** about 400 yards south of milepost 108, about 7 yards west of the center of the road, and about 5 feet east of the line of telegraph poles. A standard disk, stamped "B 9 1923," and set in the top of a concrete post. (393.599 meters or 1,291.333 feet.)

C 9.—At **Copper Center,** about 15 yards west of the Richardson Highway, 10 yards southwest of the Indian Schoolhouse, and about 2 yards east of the flagpole. A standard disk, stamped "C 9 1923," and set in the top of a concrete post. (314.224 meters or 1,030.917 feet.)

D 9.—At **Copper Center,** about 150 yards north of a bridge over Copper River, about 130 yards northeast of the telegraph station, and about 75 yards east of the machine shop of the Signal Corps. A standard disk, stamped "D 9 1923," and set in the top of a concrete post which also marks the location of the astronomic station at Copper Center. (312.886 meters or 1,026.527 feet.)

E 9.—On the Richardson Highway, about 1.6 miles south of **Copper Center,** at mileage 100.9, 50 yards northeast of the point where the descent over the clay bank begins, and about 11 yards east of the center of the road. A standard disk, stamped "E 9 1923," and set in the top of a concrete post. (356.960 meters or 1,171.126 feet.)

F 9.—On the Richardson Highway, about 5.5 miles south of **Copper Center,** about 45 yards south of a large wooden culvert, about 15 yards east of the center of the road, and about 8 yards east of the line of telegraph poles. A standard disk, stamped "F 9 1923," and set in the top of a concrete post. (420.454 meters or 1,379.439 feet.)

G 9.—On the Richardson Highway, about 7.8 miles south of **Copper Center,** about 45 yards north of milepost "Valdez 95," about 100 yards southeast of a small lake, and about 15 yards west of the road. A standard disk, stamped "G 9 1923," and set in the top of a concrete post. (443.077 meters or 1,453.662 feet.)

H 9.—On the Richardson Highway, about 175 yards north of the junction of the Chitina and Valdez roads at **Willow Creek,** about 8 yards east of the center of the road, and about 4 yards west of a small cultivated field. A standard disk, stamped "H 9 1923," and set in the top of a concrete post. (435.217 meters or 1,427.874 feet.)

J 9.—At **Willow Creek,** at the junction of the Richardson Highway and the road to Chitina, 9 yards east of the road leading to Valdez, and 15 yards east of the line of telegraph poles. A standard disk, stamped "J 9 1923," and set in the top of a concrete post. (428.188 meters or 1,404.813 feet.)

B 10.—On the Richardson Highway, about 0.6 mile south of **Willow Creek** and the junction of the Richardson Highway and the road to Chitina, 5 yards east of the center of the road, in line with the row of telegraph poles and on the top of a small knoll. A standard disk stamped "B 10 1923," and set in the top of a concrete post. (437.743 meters or 1,436.162 feet.)

C 10.—On the Richardson Highway, about 4.7 miles south of **Willow Creek** and the junction of the Richardson Highway and the road to Chitina, 15 yards south of a wooden culvert, and about 10 yards east of the center of the road. A standard disk, stamped "C 10 1923," and set in the top of a concrete post. (454.447 meters or 1,490.965 feet.)

D 10.—On the Richardson Highway, about 7 miles south of **Willow Creek** and the junction of the Richardson Highway and the road to Chitina, 0.3 mile north of the milepost "Valdez 85," 25 yards west of the center of the road, and due west of a wooden culvert. A standard disk, stamped "D 10 1923," and set horizontally in the upper surface of a small outcrop of rock. (602.078 meters or 1,975.318 feet.)

E 10.—On the Richardson Highway, about 1.7 miles north of the Tonzina River bridge, 40 yards north of a wooden culvert, and 8 yards east of the center of the road. A standard disk, stamped "E 10 1923," and set in the top of a concrete post. (575.353 meters or 1,887.637 feet.)

F 10.—On the Richardson Highway, about 8 yards north of the northwest corner of **Upper Tonzina Road House,** about 25 yards southwest of the bridge over Tonzina River, and 5 yards east of the center of the road. A standard disk, stamped "F 10 1923," and set in the top of a concrete post. (455.007 meters or 1,492.802 feet.)

G 10.—On the Richardson Highway, about 2.8 miles south of **Upper Tonzina Road House,** about one-fourth mile north of milepost "Valdez 78," about 6 yards

west of the center of the road, and about 2 yards west of the line of telegraph poles near the top of a small knoll. A standard disk, stamped "G 10 1923," and set in the top of a concrete post. (482.851 meters or 1,584.154 feet.)

H 10.—On the Richardson Highway, about 11.8 miles north of **Ernestine Road House,** about 0.2 mile south of milepost "Valdez 75," and about 20 yards east of and about 10 feet higher than the center of the road. A standard disk, stamped "H 10 1923," and set horizontally in the surface of a large granite bowlder about 8 feet in diameter which projects about 5 feet above the ground. (524.338 meters or 1,720.266 feet.)

J 10.—On the Richardson Highway, about 0.2 mile south of milepost "Valdez 71," about 150 yards south of a small wooden bridge, about 10 yards west of the center of the road, and about 5 yards west of the line of telegraph poles. A standard disk, stamped "J 10 1923," and set in the top of a concrete post. (549.989 meters or 1,804.422 feet.)

K 10.—On the Richardson Highway, about 4.5 miles north of **Ernestine Road House,** about midway between mileposts 67 and 68, and about 2 yards east of the center of the road. A standard disk, stamped "K 10 1923," and set horizontally in the surface of a large bowlder, the exposed portion of which is about 2 feet in diameter. (556.860 meters or 1,826.965 feet.)

L 10.—On the Richardson Highway, about 1.6 miles north of **Ernestine Road House,** about 21 yards south of a small wooden culvert, about 8 yards west of the center of the road, about 3 yards west of a rock outcrop, and in line with the telegraph poles. A standard disk stamped "L 10 1923," and set vertically in the face of a natural rock ledge. (564.014 meters or 1,850.436 feet.)

M 10.—On the Richardson Highway, about 3 miles south of **Ernestine Road House,** about 9 yards southwest of milepost 60, about 3 yards west of the center of the road, and about 6 yards west of the line of telegraph poles. A standard disk, stamped "M 10 1923," and set in the top of a concrete post. (487.214 meters or 1,598.468 feet.)

N 10.—On the Richardson Highway, about 75 yards west of the telegraph station at **Tiekel,** and about 4 yards west of and about 3½ feet higher than the road. A standard disk, stamped "N 10 1923," and set vertically in the face of a natural rock ledge. (440.592 meters or 1,445.509 feet.)

O 10.—On the Richardson Highway, about 2.2 miles north of **Tiekel Road House,** about 15 yards west of the line of telegraph poles, and about 2 yards west of and 2½ feet higher than the center of the road. A standard disk, stamped "O 10 1923," and set vertically in the face of a natural rock ledge. (404.042 meters or 1,325.594 feet.)

P 10.—On the Richardson Highway, 1.5 miles south of **Tiekel Road House,** about 6 yards north of a culvert, 6 yards west of the bank of the river, and 3 yards west of the center of the road. A standard disk, stamped "P 10 1923," and set vertically in the face of a rock cliff. (361.154 meters or 1,184.886 feet.)

Q 10.—On the Richardson Highway, about 5.2 miles south of **Tiekel Road House,** 6 yards south of a bridge across the Kanata River, and 6 yards east of the center of the road. A standard disk, stamped "Q 10 1923," and set horizontally in a ledge of rock. (346.762 meters or 1,137.668 feet.)

R 10.—On the Richardson Highway, about 2 miles north of **Beaver Dam,** about 4 yards west of the shore of Kanata River, about 4 yards north of a telegraph pole, and about 2 yards west of the center of the road. A standard disk, stamped "R 10 1923," and set vertically in the face of a natural rock ledge, about 2½ feet higher than the road. (373.550 meters or 1,225.555 feet.)

S 10.—On the Richardson Highway, about 0.7 mile south of the telegraph station at **Beaver Dam,** about 4 yards west of a glacial stream and about 3 yards west of and about 4 feet higher than the center of the road. A standard disk, stamped "S 10 1923," and set vertically in the face of a natural rock ledge. (397.964 meters or 1,305.654 feet.) Destroyed.

T 10.—On the Richardson Highway, about 38.1 miles north of Valdez, about 50 yards south of a small wooden bridge, about 10 yards west of a narrow river gorge, about 6 yards west of the line of telegraph poles, and 3 yards west of the center of the road. A standard disk, stamped "T 10 1923," and set vertically in the face of a large outcrop of rock. (473.992 meters or 1,555.089 feet.)

U 10.—On the Richardson Highway, about 35.9 miles north of Valdez, about 2 miles south of a bridge across the Kanata River, and 8 feet east of the center of the road. A standard disk, stamped "U 10 1923," and set vertically near the south end of a rock ledge. (497.520 meters or 1,632.280 feet.)

V 10.—On the Richardson Highway, about 140 yards south of **Ptarmigan Drop,** about 25 yards west of milepost "Valdez 33," and about 11 yards west of

and about 3 feet higher than the center of the road. A standard disk, stamped "V 10 1923," and set vertically in the face of and about 15 yards southwest of the northern side of the natural rock ledge which is the second ledge south of Ptarmigan Drop. (527.455 meters or 1,730.492 feet.)

W 10.—On the Richardson Highway, about 30.9 miles north of Valdez, about 0.2 mile south of a bridge across Saina River, and 8 yards east of the center of the road. A standard disk, stamped "W 10 1923," and set horizontally in the top of a large rock ledge. (616.825 meters or 2,023.700 feet.)

X 10.—On the Richardson Highway, about 8.7 miles north of **Wortman,** about 125 yards south of the outlet at the north end of a large lake, and about 2 yards west of and 3 feet higher than the center of the road. A standard disk, stamped "X 10 1923," and set vertically in the face of a rock ledge which is about 8 feet high at this point. (718.946 meters or 2,358.742 feet.)

Y 10.—On the Richardson Highway, about 7.3 miles north of **Wortman,** at the top of **Thompson's Pass,** and about 11 yards east of and about 7 feet higher than the road. A standard disk, stamped "Y 10 1923," and set vertically in the west face of a rock ledge. (832.116 meters or 2,730.034 feet.)

Z 10.—On the Richardson Highway, about 2.9 miles north of **Wortman,** about 12 yards south of the center of the road, about 8 feet higher than the road, and near the center of a ledge of rock. A standard disk, stamped "Z 10 1923," and set horizontally. (359.839 meters or 1,180.572 feet.)

A 11.—On the Richardson Highway, about three-eighths mile north of the telegraph station at **Wortman,** at the south end of the suspension bridge, in a concrete foundation. A standard disk, stamped "A 11 1923." (189.696 meters or 622.361 feet.)

B 11.—On the Richardson Highway, 16 miles north of **Valdez,** at the northern entrance to Keystone Canyon, about 80 yards south of milepost "Valdez 16," and about 10 feet west of and about 3 feet higher than the center of the road. A standard disk, stamped "B 11 1923," and set vertically in the east face of a rock cliff. (211.052 meters or 692.426 feet.)

C 11.—On the Richardson Highway, about 13 miles north of **Valdez,** about 70 yards east of milepost "Valdez 13," and about 3 yards north of and about 3 feet higher than the center of the road. A standard disk, stamped "C 11 1923," and set vertically in the face of a rock cliff. (93.713 meters or 307.457 feet.) Destroyed.

D 11.—On the Richardson Highway, about 9.9 miles north of **Valdez,** about 130 yards south of milepost "Valdez 10," 125 yards north of a bridge over a small creek, and 4 yards west of and about 18 inches higher than the center of the road. A standard disk, stamped "D 11 1923," and set vertically in the face of a rock ledge. (76.648 meters or 251.469 feet.)

E 11.—On the Richardson Highway, about 5.2 miles north of **Valdez,** about 3 yards west of the center of the road, about 5 yards west of the line of telegraph poles, and about 4 feet higher than the surface of the road. A standard disk, stamped "E 11 1923," and set vertically in the face of a natural rock ledge. (21.621 meters or 70.935 feet.)

F 11.—At **Valdez,** at the corner of Broadway and Eighth Street, about 9 yards west of the center of Broadway, about 7 yards south of the center of Eighth Street, at the end of the Richardson Highway, and 20 yards east of the grand stand at the ball park. A standard disk, stamped "F 11 1923," and set in the top of a concrete post. (10.324 meters or 33.871 feet.)

G 11.—At **Valdez,** in the southeast corner of the backyard of the courthouse, about 40 yards southwest of the courthouse, and about 3 yards from the center of the alley. A standard disk, stamped "G 11 1923," and set in the top of a concrete post. (3.606 meters or 11.831 feet.)

Gauge.—At **Valdez,** at the seaward end of the dock belonging to the Valdez Dock Co., and near the top of a new (1923) creosoted pile. The center of the middle one of five brass screws driven into the pile. (4.091 meters or 13.422 feet.)

H 11.—At **Valdez,** at the southwest corner of the telegraph station, about 6 yards north of the center of Alaska Avenue, and about 12 yards east of the center of McKinley Avenue. A standard disk, stamped "H 11 1923," and set in the top of a concrete post. (3.499 meters or 11.480 feet.)

LINE 3, WILLOW CREEK TO CHITINA

This line was run during the summer of 1923 by Herman Odessey, assisted by W. O. Manchester, and extends from the Richardson Highway at Willow Creek along the road to Chitina. The line is a spur and the elevations are based on bench mark J 9 of the line from Fairbanks to Valdez.

J 9.—See page 21.

K 9.—About one-half mile east of **Willow Creek** and the junction of the Willow Creek-Chitina road with the Richardson Highway, about 75 yards east of a wooden culvert, about 30 yards east of a cultivated field, about 9 yards north of the Willow Creek-Chitina road, and 25 yards west of a wooden culvert. A standard disk, stamped "K 9 1923," and set in the top of a concrete post. (424.355 meters or 1,392.238 feet.)

L 9.—On the Willow Creek-Chitina road, about 0.2 mile east of milepost "Chitina 36," at the intersection of the tangents to a curve, and about 18 yards north of the center of the road, on a small knoll. A standard disk, stamped "L 9 1923," and set in the top of a concrete post. (417.321 meters or 1,369.161 feet.)

M 9.—On the Willow Creek-Chitina road, about 0.2 mile east of milepost "Chitina 34," about 80 yards east of a small wooden culvert, and about 8 yards north of the center of the road. A standard disk, stamped "M 9 1923," and set in the top of a large bowlder. (417.345 meters or 1,369.239 feet.)

N 9.—On the Willow Creek-Chitina road, about 7.9 miles east of **Willow Creek,** 36 yards east of milepost "Chitina 31 miles," and 9 yards west of the road, in the top of a large rock about 10 feet long, 6 feet wide and 18 inches high. A standard disk, stamped "N 9 1923," and set horizontally. (438.583 meters or 1,438.918 feet.)

O 9.—On the Willow Creek-Chitina road, about 175 yards southeast of milepost "Chitina 27 miles," 15 yards southeast of the southeast corner of **Kenny Lake Road House,** about 200 feet northeast of the shore of Kenny Lake, and about 10 yards from the center of the road. A standard disk, stamped "O 9 1923," and set in the top of a concrete post. (386.979 meters or 1,269.614 feet.)

P 9.—On the Willow Creek-Chitina road, about 4 miles east of **Kenny Lake Road House,** at the top of a small knoll which marks the beginning of a long gradual descent to Lower Tonzina Road House, and 8 yards north of the center of the road. A standard disk, stamped "P 9 1923," and set in the top of a concrete post. (403.898 meters or 1,325.122 feet.)

Q 9.—On the Willow Creek-Chitina road, about 4 miles northwest of **Lower Tonzina Road House,** about 150 yards south of a short sharp curve in the road, at the north end of a long straight stretch of road, about 10 yards north of and on the opposite side of the road from milepost "Chitina 19 miles," and 10 yards west of the road. A standard disk, stamped "Q 9 1923," and set in the top of a concrete post. (358.050 meters or 1,174.702 feet.)

R 9.—On the Willow Creek-Chitina road, about one-fourth mile north of **Lower Tonzina Road House,** on the inside of a curve in the road, at the foot of a hill and 6 yards east of the center of the road. A standard disk, stamped "R 9 1923," and set in the top of a large granite bowlder. (194.459 meters or 637.988 feet.)

S 9.—On the Willow Creek-Chitina road, about 1.7 miles southeast of **Lower Tonzina Road House,** about 0.3 mile northwest of milepost "Chitina 13 miles" and 2 yards west of the road. A standard disk, stamped "S 9 1923," and set in the vertical face of a rock cliff. (222.217 meters or 729.057 feet.) Destroyed.

T 9.—On the Willow Creek-Chitina road, about 3.4 miles east of **Lower Tonzina Road House,** 30 yards south of the center of a 100-foot trestle over a mountain stream, and about 4 feet higher than the road, in a natural rock ledge. A standard disk, stamped "T 9 1923," and set horizontally. (322.806 meters or 1,059.073 feet.)

U 9.—On the Willow Creek-Chitina road, about 6.6 miles southeast of **Lower Tonzina Road House,** about three-eighths mile east of **Bull's Fox Farm,** about midway between mile posts 8 and 9, and about 6 yards north of and about 4 feet higher than the center of the road. A standard disk, stamped "U 9 1923," and set horizontally in the top of a natural rock ledge. (378.025 meters or 1,240.237 feet.)

V 9.—On the Willow Creek-Chitina road, about 6.6 miles northwest of **Chitina,** about 15 yards south of a wooden culvert, about 3 yards north of a second wooden culvert, and 3 yards west of the center of the road. A standard disk, stamped

"V 9 1923," and set horizontally in a natural ledge of rock. (298.916 meters or 980.694 feet.)

W 9.—On the Willow Creek-Chitina road, about 4.8 miles northwest of **Chitina,** 30 yards north of a wooden bridge over a small stream, at the foot of a long steep hill, and about 3 yards west of and about 3 feet higher than the center of the road. A standard disk, stamped "W 9 1923," and set vertically in the face of a natural rock ledge. (202.315 meters or 663.762 feet.)

X 9.—On the Willow Creek-Chitina road, about 3.0 miles northwest of **Chitina,** about 100 yards south of milepost "Chitina 3 miles," about 45 yards east of a small wooden bridge, and about 4 feet north of and about 3 feet higher than the center of the road. A standard disk, stamped "X 9 1923," and set vertically in the face of a rock cliff. (222.119 meters or 728.735 feet.)

Y 9.—At **Chitina,** in front of the office of the United States marshal, 160 yards north of the Chitina Cash Store, at the corner of Harding Street and Coolidge Avenue, 1 yard northeast of the northeast corner of the building, 10 yards from the center of the highway, and 20 yards southwest of a small bridge. A standard disk, stamped "Y 9 1923," and set in the top of a concrete post. (177.185 meters or 581.314 feet.)

Z 9.—At **Chitina,** about 20 yards west of the west end of the Copper River & Northwestern Railway station, 4 feet east of the railroad warehouse, about 18 yards north of the center of the track, and about 7 yards south of a spur track. A standard disk, stamped "Z 9 1923," and set in the top of a concrete post. (174.764 meters or 573.372 feet.)

A 10.—At **Chitina,** about 250 yards east of the Copper River & Northwestern Railway station, at the west end of a rock cut at the entrance to a tunnel, and 7 feet north of and about 3½ feet higher than the track. A standard disk, stamped "A 10 1923," and set vertically in the face of the rock wall of the cut. (175.190 meters or 574.769 feet.)

LINE 4, SEWARD TO ANCHORAGE

This line follows the Alaska Railroad from Seward to Anchorage. The field work was done by Herman Odessey, assisted by W. O. Manchester, during the latter part of the season of 1923.

Tidal 6.—At **Seward,** on the shore west of the wharf, at the foot of a mountain which rises abruptly from the water, about 80 yards south of the point where the beach on the north side of the bay strikes the mountain on the west, and about 37 yards from a small log house at the south end of a wooden trestle, in a large rock situated at the high-water line. A copper bolt, stamped with the letters "U. S. B. M.," and set in a drill hole in the rock. (3.158 meters or 10.361 feet.)

Tidal 7.—At **Seward,** on the west shore of Resurrection Bay, about 300 yards west of the dock, and surrounded by and likely to be covered by loose rock from the steep mountain side above the mark. The center of the top of a granite post 8 inches square, the northeast face of which has the letters "S 726 Cor. 3 WG." This mark is about 9 yards north of Tidal 6. (1.965 meters or 6.447 feet.)

Tidal 2.—At **Seward,** on the west shore of Resurrection Bay, about 300 yards west of the dock, about 60 yards south of the corner of the bay, about 8 yards north of Tidal 7, and 4½ feet above the ground. A copper bolt, leaded horizontally in the face of the rock cliff and surrounded by the letters "U. S. B. M." which are cut in the rock. (3.678 meters or 12.067 feet.)

Tidal 1 a.—At **Seward,** on the west shore of Resurrection Bay, about 300 yards west of the dock, 75 yards north of a log house on the beach, and 40 yards south of the north end of a wooden trestle, in the top of a large split rock located at the high-water line. The top of a copper bolt, stamped "U. S. B. M," and cemented vertically into a drill hole in the rock. (2.853 meters or 9.360 feet.)

J 11.—At **Seward,** at the Arcade Building, at the southwest entrance, and in the bottom step. A standard disk, stamped "J 11 1923," and set horizontally. (7.433 meters or 24.386 feet.)

Tidal 8.—At **Seward,** at the Fourth Avenue entrance to the Bank of Seward, at the north end of the fourth step, flush with the top of the step, and about 2½ feet higher than the sidewalk. A standard disk, stamped "8 1912." (18.524 meters or 60.774 feet.)

K 11.—At **Seward,** at the corner of Fifth and Adams Streets, 5 yards north of the southeast corner of the United States Commissioner's Building, in the east face of and at the top of the concrete foundation. A standard disk, stamped "K 11 1923," and set vertically. (16.857 meters or 55.305 feet.)

Tidal 9.—At **Seward,** at the plant of the Standard Oil Co., about 20 yards east of the east side of the warehouse, about 22 yards south of the center of the main track of the Alaska Railroad, and about 1½ feet southwest of a large oil tank. The top of a granite post, about 8 inches square, set with its top about a foot lower than the bottom of the tank. (3.000 meters or 9.842 feet.)

L 11.—At **Seward,** 17 yards north of the northwest corner of the railroad station, and 22 yards west of the main-line track of the Alaska Railroad A standard disk, stamped "L 11 1923," and set in the top of a concrete post. (4.820 meters or 15.814 feet.)

U 11.—About 3.5 miles north along the Alaska Railroad from **Seward,** on a long tangent, 40 yards north of a road crossing, 120 yards south of wooden trestle No. 3.7, and 7 yards west of the center of the track. A standard disk, stamped "U 11 1923," and set in the top of a concrete post. (9.724 meters or 31.903 feet.)

V 11.—About 7.3 miles north along the Alaska Railroad from **Seward,** 485 yards north of the point of the north switch at **Woodrow,** 0.3 mile north of milepost 7, 3 yards east of and about at the same elevation as the track. A standard disk, stamped "V 11 1923," and set horizontally in a rock ledge. (61.931 meters or 203.185 feet.)

W 11.—About 10.0 miles north along the Alaska Railroad from **Seward,** about 35 yards south of milepost 10, 3 yards east of the east rail, and 3 feet higher than the track. A standard disk, stamped "W 11 1923," and set horizontally in a natural rock ledge. (154.729 meters or 507.640 feet.)

X 11.—About 13.5 miles north along the Alaska Railroad from **Seward,** about 75 yards north of the north end of a trestle in the middle of a high fill, about 2.5 yards west of the west rail, and 3 feet higher than the track. A standard disk, stamped "X 11 1923," and set vertically in the face of a natural rock ledge. (180.921 meters or 593.572 feet.)

Y 11.—About 18.4 miles north along the Alaska Railroad from Seward, about 30 yards south of the flag stop **Primrose,** about 2 yards east of the east rail, and 1 foot higher than the track. A standard disk, stamped "Y 11 1923," and set horizontally in a rock ledge. (138.018 meters or 452.814 feet.)

Z 11.—About 20.7 miles north along the Alaska Railroad from Seward, 0.3 mile south of milepost 21, 10 yards east of the east shore of **Kenai Lake,** 125 yards south of culvert No. 20.8, about 2 yards east of the east rail, and about one-half foot higher than the track. A standard disk, stamped "Z 11 1923," and set vertically in the face of a natural rock ledge. (138.634 meters or 454.835 feet.)

A 12.—About 24 miles north along the Alaska Railroad from Seward, about 0.7 mile north of **Roosevelt** station, about 70 yards south of milepost 24, 13 yards west of the center of the track, and 2½ feet higher than the roadbed. A standard disk, stamped "A 12 1923," and set in the top of a large bowlder. (142.643 meters or 467.988 feet.)

B 12.—About 27.1 miles north along the Alaska Railroad from Seward, 100 yards north of milepost 27, and 7 feet west of and about 2 feet higher than the track. A standard disk, stamped "B 12 1923," and set vertically in a rock ledge. (146.442 meters or 480.452 feet.)

C 12.—About 29.8 miles north along the Alaska Railroad from Seward, 0.4 mile north of the **Moose Pass** station, 470 yards north of the north end of bridge No. 29.5, 40 yards south of the north end of a cut, and 4 yards east of the center of and about 1 foot higher than the track. A standard disk, stamped "C 12 1923," and set vertically in a rock ledge. (149.104 meters or 489.185 feet.)

D 12.—About 32.9 miles north along the Alaska Railroad from Seward, about 200 yards south of milepost 33, about 90 yards south of the south end of a trestle, about 2 yards east of the east rail, and 2 feet higher than the track. A standard disk, stamped "D 12 1923," and set horizontally in a rock ledge. (148.201 meters or 486.223 feet.)

E 12.—About 34.1 miles north along the Alaska Railroad from Seward, 200 yards northeast of milepost 34, about 200 yards north of the south end of a 4-mile tangent, 2 yards west of the west rail, and about 4 feet higher than the track. A standard disk, stamped "E 12 1923," and set vertically in the face of a natural rock ledge. (147.859 meters or 485.101 feet.)

F 12.—About 36.7 miles north along the Alaska Railroad from Seward, 0.3 mile south of milepost 37, 155 yards south of culvert No. 36.8, and 11 yards north of the center of the track. A standard disk, stamped "F 12 1923," and set in the top of a concrete post. (155.698 meters or 510.819 feet.)

G 12.—About 40 miles north along the Alaska Railroad from Seward, in the west face of the concrete foundation of the water tank at **Hunter,** about 165 yards north of the section house, 75 yards north of milepost 40, 5 feet east of the east

rail, and about one-half foot higher than the track. A standard disk, stamped "G 12 1923," and set vertically. (184.646 meters or 605.793 feet.)

H 12.—About 43 miles north along the Alaska Railroad from Seward, at milepost 43, 35 yards south of the signpost marking the limits of sections 5 and 6, about 5 feet west of the west rail, and 4½ feet higher than the track. A standard disk, stamped "H 12 1923," and set vertically in the face of a rock cliff. (267.554 meters or 877.800 feet.)

J 12.—About 45 miles north along the Alaska Railroad from Seward, 11 yards north of the north end of the switch at **Grandview,** and 8 feet west of the center of and about 1 foot higher than the track. A standard disk, stamped "J 12 1923," and set vertically in a rock ledge. (323.009 meters or 1,059.739 feet.)

K 12.—About 47.8 miles north along the Alaska Railroad from Seward, in the south abutment of the southern Placer River bridge and 5 feet east of the center of and 4 feet lower than the track. A standard disk, stamped "K 12 1923," and set horizontally. (237.458 meters or 779.060 feet.)

L 12.—About 50.7 miles north along the Alaska Railroad from Seward, about 0.3 mile south of **Tunnel** station, at an overhead crossing, 9 feet south of the north end of the abutment, and 8 feet west of the center of and 1½ feet higher than the track. A standard disk, stamped "L 12 1923," and set horizontally in the top of the concrete abutment. (154.535 meters or 507.004 feet.)

M 12.—About 52½ miles north along the Alaska Railroad from Seward, midway between tunnels 52.4 and 52.5, in the southeast parapet of the concrete abutment of a small wooden bridge, 5 feet east of the east rail, and 1 foot lower than the track. A standard disk, stamped "M 12 1923," and set horizontally. (98.700 meters or 323.818 feet.)

N 12.—About 56.4 miles north along the Alaska Railroad from Seward, about 25 yards north of the north end of trestle No. 56.4, 3 yards east of the east rail, and at about the same elevation as the track, in the face of a rock ledge. A standard disk, stamped "N 12 1923," and set vertically. (22.882 meters or 75.072 feet.)

O 12.—About 55.2 miles south along the Alaska Railroad from Anchorage, at mileage 59.1, 20 yards south of the point of the south switch at **Spencer,** 3 yards north of the section house, and 11 yards west of the center of the track. A standard disk, stamped "O 12 1923," and set in the top of a concrete post. (16.432 meters or 53.911 feet.)

P 12.—About 50.4 miles south along the Alaska Railroad from Anchorage, 255 yards north of the south end of the switch at **Portage,** about 100 yards south of milepost 64, in line with the row of telegraph poles, and 14 yards west of the center of the track. A standard disk, stamped "P 12 1923," and set in the top of a concrete post. (7.513 meters or 24.649 feet.)

Q 12.—About 47.8 miles south along the Alaska Railroad from Anchorage, at mileage 66.5, 50 yards north of a rocky point which extends about 40 yards out into the tide flats, and about 13 yards east of the center of the track. A standard disk, stamped "Q 12 1923," and set horizontally in a rock ledge. (9.215 meters or 30.233 feet.)

R 12.—About 45.0 miles south along the Alaska Railroad from Anchorage, at the north end of the second rock cut north of milepost 69, 3 yards east of the east rail, and 1 foot above the level of the track, in the face of a rock cliff. A standard disk, stamped "R 12 1923," and set vertically. (11.557 meters or 37.917 feet.)

S 12.—About 41.8 miles south along the Alaska Railroad from Anchorage, at mileage 72.5, at the north end of a cut on a curve, and 3 yards east of the center of and about 3.5 feet higher than the track, in the face of a rock cliff. A standard disk, stamped "S 12 1923," and set vertically. (15.862 meters or 52.041 feet.)

T 12.—About 37.8 miles south along the Alaska Railroad from Anchorage, about 1.7 miles north of **Girdwood,** 60 yards north of snowshed No. 76.5, 3 yards east of the east rail, and 1 foot higher than the track, in the face of a rock ledge. A standard disk, stamped "T 12 1923," and set vertically. (10.087 meters or 33.094 feet.)

U 12.—About 34.0 miles south along the Alaska Railroad from Anchorage, 0.3 mile south of milepost 80, near the north end of a short tangent, 4 yards east of the track, and 1 foot higher than the track, in the face of a rock ledge. A standard disk, stamped "U 12 1923," and set vertically. (9.783 meters or 32.096 feet.)

V 12.—About 33.5 miles south along the Alaska Railroad from Anchorage, at mileage 80.8, at the south end of a cut on a curve, 200 yards south of a water tank, 3 yards east of the center of the track, and about 1.5 feet higher than the

track, in the face of the rock cliff. A standard disk, stamped "V 12 1923," and set vertically. (9.958 meters or 32.671 feet.)

W 12.—About 30.0 miles south along the Alaska Railroad from Anchorage, about 80 yards south of bridge No. 84.3, 11 feet east of the center of and 1 foot higher than the track, in the face of a rock ledge. A standard disk, stamped "W 12 1923," and set vertically. (8.769 meters or 28.770 feet.)

T 11.—About 27.3 miles south along the Alaska Railroad from Anchorage, 10 yards south of milepost 87, 5 yards east of the center of and 2½ feet higher than the track, in the face of a small rock ledge. A standard disk, stamped "T 11 1923," and set vertically. (9.930 meters or 32.579 feet.)

S 11.—About 23.3 miles south along the Alaska Railroad from Anchorage, opposite milepost 91, at the south end of a curve in a cut, 18 yards east of the center of and 1½ feet higher than the track, in a natural rock ledge. A standard disk, stamped "S 11 1923," and set horizontally. (15.201 meters or 49.872 feet.)

R 11.—About 20.3 miles south along the Alaska Railroad from Anchorage, opposite milepost 94, near the north end of a short tangent, 3½ yards east of the center of and about 3½ feet higher than the track, in the face of a rock ledge. A standard disk, stamped "R 11 1923," and set vertically. (18.427 meters or 60.456 feet.)

Q 11.—About 17.4 miles south along the Alaska Railroad from Anchorage, 165 yards south of milepost 97, at the north end of a small rock cut, 4 yards east of the center of and about 2 feet higher than the track, in a ledge of rock. A standard disk, stamped "Q 11 1923," and set horizontally. (13.328 meters or 43.727 feet.)

P 11.—About 14.3 miles south along the Alaska Railroad from Anchorage, about 200 yards south of milepost 100, near the south end of a rock cut, 3 yards east of the center of and 4 feet higher than the track, in the face of a rock ledge. A standard disk, stamped "P 11 1923," and set vertically. (11.924 meters or 39.121 feet.)

O 11.—About 11.1 miles south along the Alaska Railroad from Anchorage, at mileage 103.2, about 80 yards north of a bridge over a small river, 7 yards east of the center of the track, and 8 yards west of a steep bank through which the grade is cut. A standard disk, stamped "O 11 1923," and set in the top of a concrete post. (14.025 meters or 46.014 feet.)

N 11.—About 7.7 miles south along the Alaska Railroad from **Anchorage,** at mileage 106.6, at the north end of a fill and the south end of a cut on a long tangent, and 10 yards east of the center of the track, in the top of a large bowlder. A standard disk, stamped "N 11 1923," and set horizontally. (42.945 meters or 140.895 feet.)

M 11.—About 4.4 miles south along the Alaska Railroad from **Anchorage,** about 0.4 mile north of the **Campbell** siding, near the north end of a tangent, at the south end of a cut on a curve, and 6 yards west of the center of the track. A standard disk, stamped "M 11 1923," and set in the top of a concrete post. (30.587 meters or 100.351 feet.)

For bench marks at Anchorage, see page 6.

INDEX TO BENCH-MARK LOCATIONS

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- ☐ 109. Astronomic Work.
- ☐ 109–A. Base Lines.
- ☐ 109–B. Coast Pilots.
- ☐ 109–C. Currents.
- ☐ 109–D. Geodesy, or Measurement of the Earth.
- ☐ 109–E. Gravity.
- ☐ 109–F. Hydrography.
- ☐ 109–G. Leveling.
- ☐ 109–H. Nautical Charts.
- ☐ 109–I. Oceanography.
- ☐ 109–J. Traverse.
- ☐ 109–K. Seismology.
- ☐ 109–L. Terrestrial Magnetism.
- ☐ 109–M. Tides.
- ☐ 109–N. Topography.
- ☐ 109–O. Triangulation.
- ☐ 109–P. Cartography.
- ☐ 109–R. Airway Maps.

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