

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

GEORGE OTIS SMITH, DIRECTOR

BULLETIN 559

RESULTS OF SPIRIT LEVELING
IN MICHIGAN

1911 AND 1913

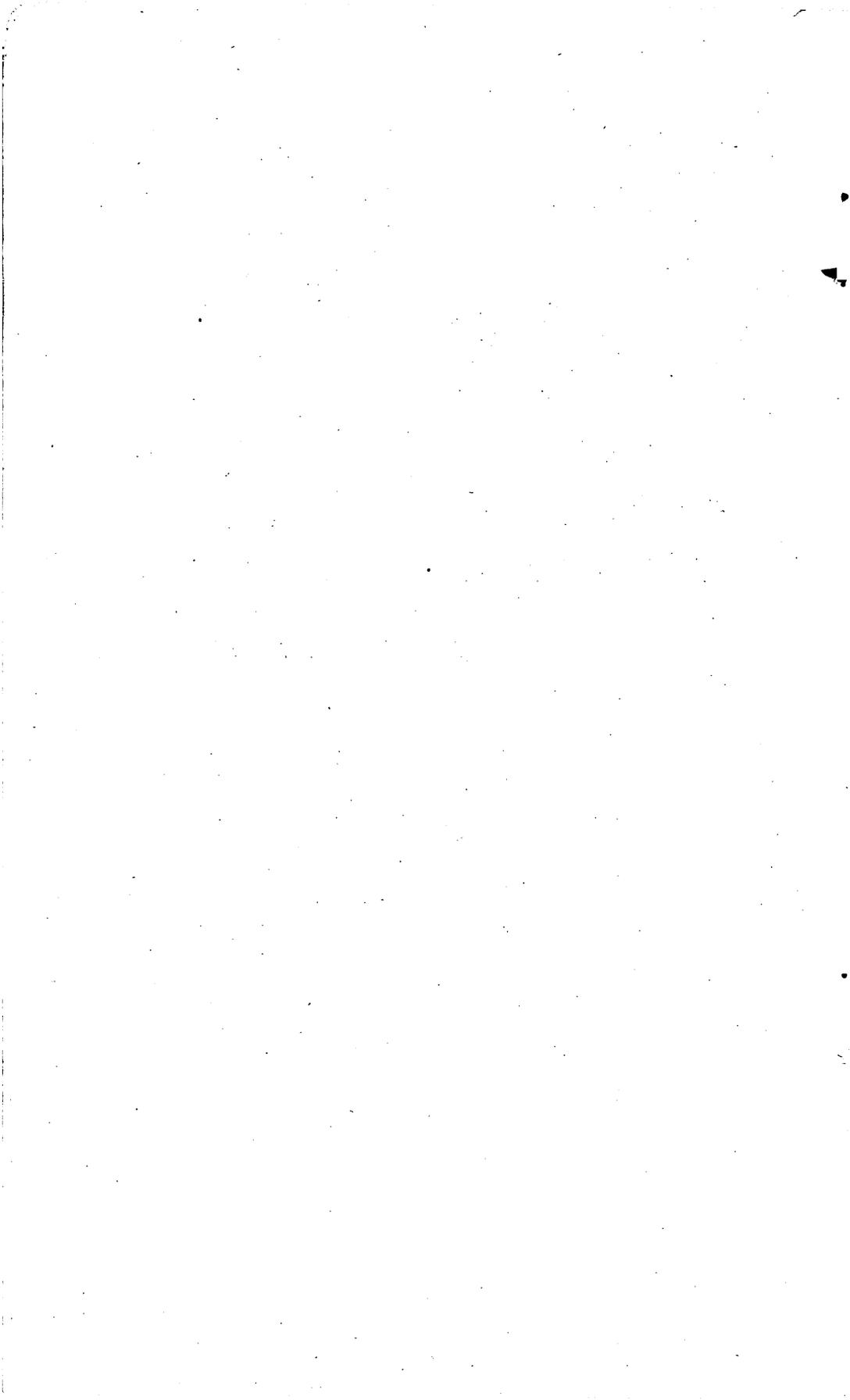
R. B. MARSHALL, CHIEF GEOGRAPHER

Work done in cooperation with the State of Michigan, through the Michigan Geological
and Biological Survey, R. O. Allen, Director



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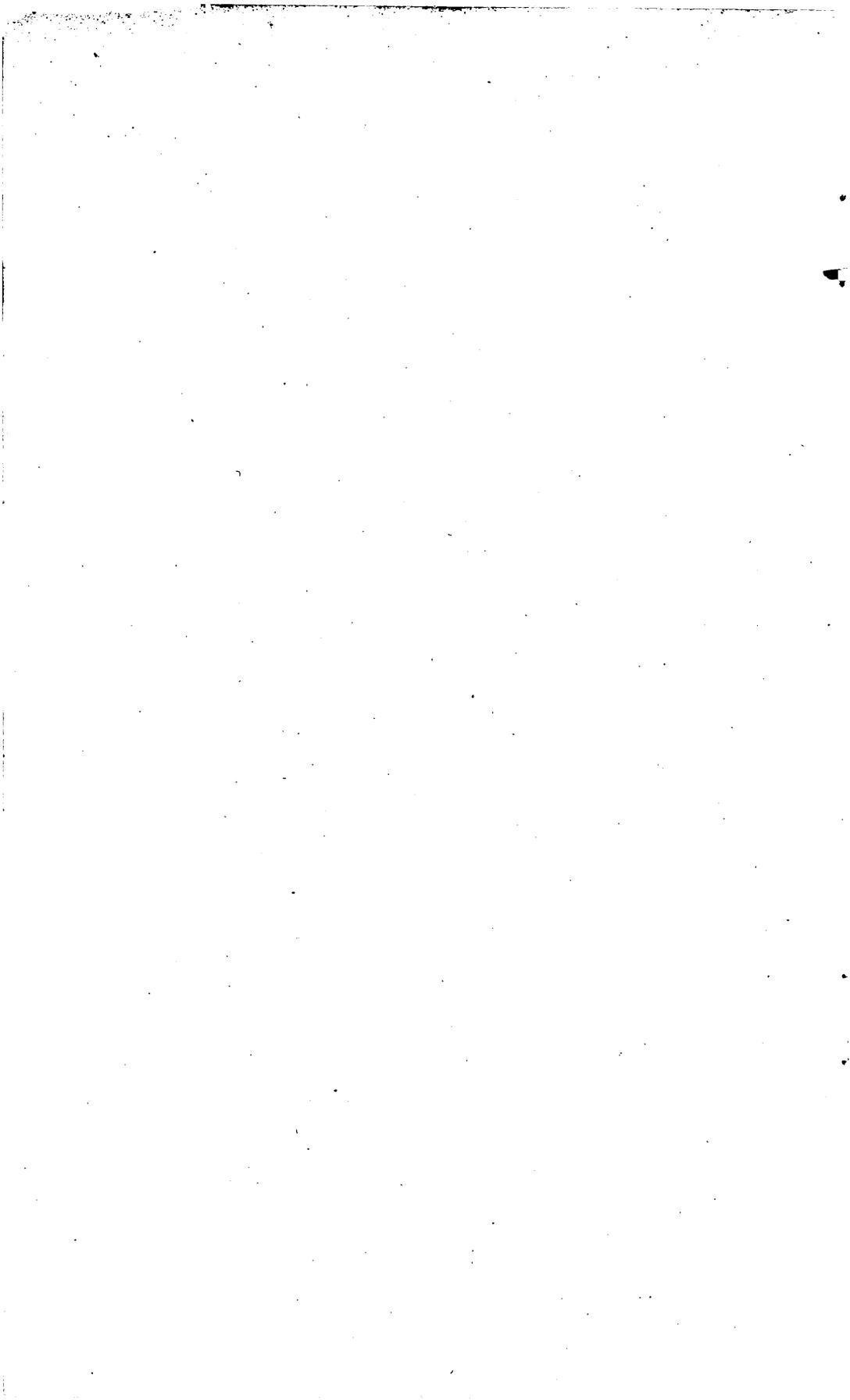


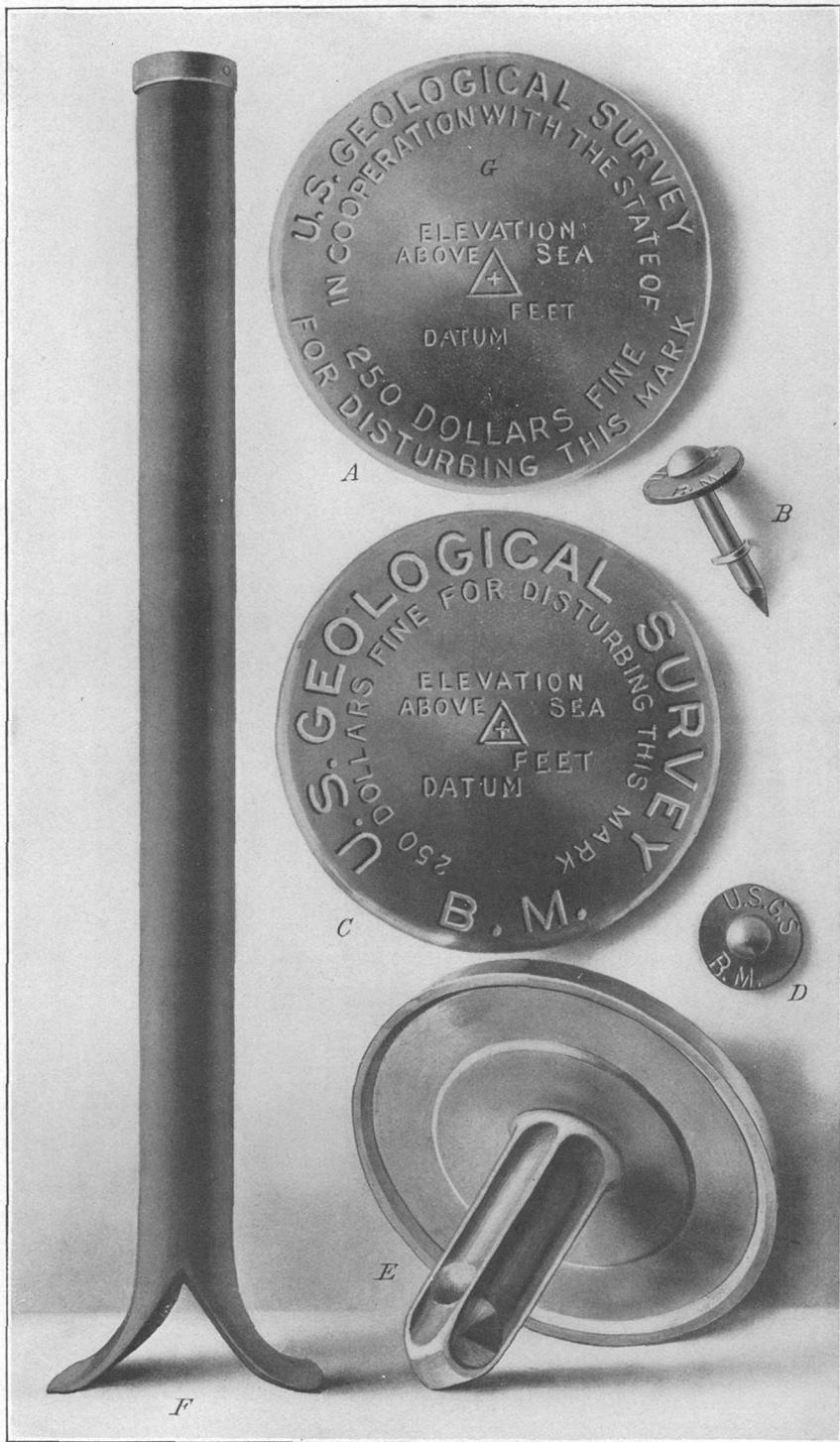
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GEOLOGICAL SURVEY BENCH MARKS.

- A*, Tablet used in cooperating States. The State name is inserted at *G*.
B and *D*, Copper temporary bench mark, consisting of a nail and copper washer.
A, *C*, and *E*, Tablets for stone or concrete structures.
F, Iron post used where there is no rock.

RESULTS OF SPIRIT LEVELING IN MICHIGAN IN 1911 AND 1913.

R. B. MARSHALL, Chief Geographer.

INTRODUCTION.

Cooperation.—The State of Michigan contributed financially to all the work of 1911 and 1913 in this State.

Previous publication.—The following results of spirit leveling are supplemental to and in accord with the elevations contained in Bulletin 461 and are in agreement with the 1907 adjustment of precise leveling. Elevations were not changed by the 1912 adjustment. No spirit leveling was done in the State by the United States Geological Survey during 1912.

Personnel.—The field work of 1911 and 1913 was done under the supervision of W. H. Herron, geographer, under the general direction of R. B. Marshall, chief geographer. Credit is given to the respective levelmen in the introductions to the several lists. The office work of computation, adjustment, and preparation of lists was done mainly by S. S. Gannett, geographer, under the general direction of E. M. Douglas, geographer.

Classification.—The elevations are classified as precise or primary, according to the methods employed in their determination. For precise lines instruments and rods of the highest grade are used, each line is run in both forward and backward directions, and every precaution is taken to guard against error. The allowable divergence between the forward and the backward lines in feet is represented by the formula $0.017\sqrt{D}$, in which D is the distance in miles between bench marks. For primary lines standard Y levels are used; lines are run in circuits or are closed on precise lines, with an allowable closing error in feet represented by the formula $0.05\sqrt{D}$, in which D is the length of the circuit in miles, sufficient care being given the work to maintain this standard. For levels of both classes careful office adjustments are made, the small outstanding errors being distributed over the lines.

Bench marks.—The standard bench marks are of two forms. The first form is a circular bronze or aluminum tablet (*C* and *E*, Pl. I),

3½ inches in diameter and one-fourth inch thick, having a 3-inch stem, which is cemented in a drill hole in solid rock, in the wall of some public building, in a bridge abutment, or in other substantial masonry structure. The second form (*F*, Pl. I), employed where masonry or rock is not accessible, consists of a hollow wrought-iron post 3½ inches in outer diameter and 4 feet in length. It is split at the bottom and expanded to 10 inches in order to give a firm bearing on the earth, and is set about 3 feet in the ground. A bronze or aluminum-bronze cap is riveted upon the top of the post. A third style of bench mark with abbreviated lettering (*B* and *D*, Pl. I) is used for unimportant points. This consists of a special copper nail 1½ inches in length driven through a copper washer seven-eighths of an inch in diameter. The tablets as well as the caps on the iron posts are appropriately lettered, and cooperation by States is indicated by the addition of the State name (*G*, Pl. I).

The numbers stamped on the bench marks described in the following pages represent the elevations to the nearest foot as determined by the levelman. These numbers are stamped with $\frac{3}{16}$ -inch steel dies on the tablets or post caps, to the left of the word "feet." The office adjustment of the notes and the reduction to mean sea-level datum may so change some of the figures that the original markings are 1 or 2 feet in error. It is assumed that engineers and others who have occasion to use the bench-mark elevations will apply to the Director of the United States Geological Survey, at Washington, D. C., for the adjusted values and will use the markings as identification numbers only.

Datum.—All United States Geological Survey elevations are referred to mean sea level, which is the level that the sea would assume if the influence of winds and tides were eliminated. This level is not the elevation determined from the mean of the highest and the lowest tides, nor is it the half sum of the mean of all the high tides and of the mean of all the low tides, which is called half-tide level. *Mean sea level is the average height of the water, all stages of the tide being considered.* It is determined from observations made by means of tidal gages placed at stations where local conditions, such as long, narrow bays, rivers, and like features, will not affect the height of the water. To obtain even approximately correct results these observations must extend over at least one lunar month, and if great accuracy is desired they must extend over several years. At ocean stations half-tide level and mean sea level usually differ but little. It is assumed that there is no difference between the mean sea levels determined from observations made in the Atlantic Ocean, the Gulf of Mexico, and the Pacific Ocean, respectively.

The connection with tidal stations for bench marks in certain areas that lie at some distance from the seacoast is still uncertain, and this

fact is indicated by the addition of a letter or a word to the right of the word "Datum" on tablets or posts. For such areas corrections of published results will be made from time to time as the precise-level lines of the United States Geological Survey or other Government organizations are extended.

Topographic maps.—Maps of the following quadrangles wholly or partly in Michigan have been published by the United States Geological Survey up to November 1, 1914. They may be obtained, unless otherwise noted, for 10 cents each, or \$3 for 50, on application to the Director of the Survey, at Washington, D. C.

Alvordton (Ohio-Mich.).	Milford.
Ann Arbor. ¹	Ned Lake.
Calumet.	Passage Island.
Crystal Falls.	Perch Lake.
Detroit.	Pontiac.
Dexter. ¹	Rochester.
Fowlerville.	Romulus.
Grand Rapids.	Sagola.
Grossepoint.	Saline. ¹
Howell.	South Lyon. ¹
Iron River (Mich.-Wis.).	Toledo (Ohio-Mich.).
Lansing.	Wauseon (Ohio-Mich.).
Marquette.	Wayne.
Marquette special (50 cents).	Witbeck.
Maumee Bay (Ohio-Mich.).	Wyandotte.
Menominee special.	Ypsilanti. ¹

PRECISE LEVELING.

Greenland, Houghton, Paynesville, Rubicon, Sidnaw, and Winona quadrangles.

HOUGHTON AND ONTONAGON COUNTIES.

The following elevations were determined by precise leveling in 1911 by E. L. McNair and are based upon bench mark No. 1 of the Corps of Engineers, U. S. Army, at Houghton. The orthometric corrections have been made.

GREENLAND QUADRANGLE.

[Latitude 46° 45'–47°; longitude 89°–89° 15'.]

From point 2 miles east of Lake Mine west along Copper Range R. R. to Peppard.

Lake Mine, 2 miles east of, at east end of bridge over east branch of Firestone River, on north side of track, 15 inches from northeast corner of concrete abutment; aluminum tablet stamped "967".....	Feet. 967.550
Lake Mine, 1 mile east of, 240 feet west of sign "One mile to station"; spike in telegraph pole, painted "U. S. B. M. 1004.1".....	1,004.44
Lake Mine, in front of station; top of rail.....	1,006.5
Lake Mine, 620 feet west of station, 20 feet west of road crossing, south side of track; spike in telegraph pole, painted "U. S. B. M. 1006.0".....	1,006.32

¹ Dexter, Saline, South Lyon, and Ypsilanti maps show Ann Arbor quadrangle on a larger scale.

Lake Mine, 670 feet north of railroad track, about 100 feet northwest of residence of manager of Lake mine, in large outcrop of solid rock 200 feet west of road or street nearly north-south; aluminum tablet stamped "Prim. Trav. Sta. No. 11, 1037, 1911"	Feet. 1,037.435
Peppard, crossing of Copper Range and Mineral Range railroads	1,053.1
Peppard, 290 feet south of railroad crossing, west side of track; spike in telegraph pole, painted "U. S. B. M. 1050"	1,050.77

HOUGHTON QUADRANGLE.

[Latitude 47°-47° 15'; longitude 88° 30'-88° 45'.]

From Houghton southwest along Copper Range R. R. to point 1 mile north of Toivola.

Houghton, 120 feet west of Duluth, South Shore & Atlantic Ry. station, on west line of Huron Street, 275 feet north of Sheldon Street, in stone foundation of brick store building of L. Hennes & Co., 0.5 foot from corner and about 0.5 foot above sidewalk; head of 60d spike driven in wall (U. S. E. B. M. 1)	608.747
Houghton, 120 feet west of Duluth, South Shore & Atlantic Ry. station, on west line of Huron Street, 275 feet north of Sheldon Street, in north face of foundation wall of brick store building of L. Hennes & Co., about 4 feet above ground; aluminum tablet stamped "612"	611.591
Houghton, in front of Duluth, South Shore & Atlantic Ry. station; top of rail	608.2
Hancock, brick office building of Detroit & Lake Superior Smelting Works, southwest corner of; small horizontal surface cut on beveled edge of sandstone water table about midway of the bevel (U. S. E. B. M. 1) Engineers' elevation 609.829	609.865
Houghton, in front of Copper Range R. R. station; top of rail	607.4
Houghton, 0.9 mile west of Copper Range R. R. station, 30 feet east of road crossing, at milepost 18, on south side of track; spike in telegraph pole, painted "U. S. B. M. 637.1"	637.06
Milepost 19, about 600 feet west of; spike in telegraph pole, painted "U. S. B. M. 743.7"	743.71
Houghton, 2.9 miles west of, at milepost 20, 25 feet north of track; iron post stamped "823"	822.840
Milepost 21, about 1,260 feet north of; spike in telegraph pole, painted (incorrectly) "U. S. B. M. 884.5"	894.46
Atlantic, 600 feet north of station, on east side of track; spike in telegraph pole, painted "U. S. B. M. 991.7"	991.68
Atlantic, in front of station; top of rail	996.1
Atlantic, 0.5 mile south of station, on south side of track; spike in telegraph pole, painted "U. S. B. M. 1032.0"	1,032.03
Mill Mine Junction, intersection of Copper Range R. R. tracks; top of rail	1,127.7
Mill Mine Junction, 35 feet north of main track, 45 feet west of Painesdale and Red Ridge track; iron post stamped "1128"	1,127.596
Mill Mine Junction, southwest corner of station platform; copper nail	1,128.65
Mill Mine Junction, 1 mile south of, on east side of track; spike in telephone pole, painted "U. S. B. M. 1217.6"	1,217.56
Messner, switch stand at north end of siding; top of rail	1,259.2
Milepost 26, 950 feet north of, east side of track; spike in telegraph pole, painted "U. S. B. M. 1266.6"	1,266.54
Milepost 27, 90 feet south of; spike in telegraph pole, painted "U. S. B. M. 1280.6"	1,280.65

Milepost 28, 95 feet south of; spike in telegraph pole, painted "U. S. B. M. 1281.6"	Feet. 1, 281. 58
Ricedale, 1.3 miles north of, 25 feet west of track; iron post stamped "1278"	1, 278. 259
Ricedale, 0.3 mile north of; spike in telegraph pole, painted "U. S. B. M. 1290.8"	1, 290. 78
Toivola, 2 miles north of, 2,320 feet north of milepost 31; spike in telegraph pole, painted "U. S. B. M. 1286.8"	1, 286. 82
Toivola, 1 mile north of, 930 feet north of signboard "1 mile to station"; spike in telegraph pole, painted "U. S. B. M. 1278.5"	1, 278. 53

PAYNESVILLE QUADRANGLE.

[Latitude 46° 30'-46° 45'; longitude 89°-89° 15'.]

From McKeever Junction southeast along Chicago, Milwaukee & St. Paul Ry. to Wasas siding.

McKeever Junction, near south end of Y, 135 feet east of track, in line with public road running west, on top of bank, 55 feet west of quarter corner between secs. 9 and 10, T. 50 N., R. 38 W.; iron post stamped "1057"	1, 057. 739
McKeever Junction, 1.2 miles south of; spike in telegraph pole, painted "U. S. B. M. 1100.2"	1, 100. 49
Milepost 303, near; spike in telegraph pole, painted "U. S. B. M. 1124.9"	1, 125. 27
Wasas siding; 460 feet south of north end of; spike in telegraph pole, painted "U. S. B. M. 1158.1"	1, 158. 42

RUBICON QUADRANGLE.

[Latitude 46° 30'-46° 45'; longitude 88° 45'-89°.]

From milepost 301 on Chicago, Milwaukee & St. Paul Ry. southeast along railroad to milepost 283.

Milepost 301, 550 feet north of; spike in telegraph pole, painted "U. S. B. M. 1123.7"	1, 124. 07
Rubicon, 920 feet north of station, 12 feet east of track, 85 feet south of road crossing; iron post stamped "1092"	1, 092. 754
Rubicon, in front of Hubbell's Mill station; top of rail	1, 104. 7
Milepost 299; spike in post, painted "U. S. B. M. 1149.1"	1, 149. 42
Plato, 500 feet south of township line, 600 feet south of water tank, 40 feet west of track; iron post stamped "Prim. Trav. Sta. No. 13, 1165, 1911"	1, 165. 416
Milepost 297, 1,260 feet east of; spike in telegraph pole, painted "U. S. B. M. 1165.4"	1, 165. 69
Milepost 296, 1,200 feet south of; spike in telegraph pole, painted "U. S. B. M. 1182.9"	1, 183. 23
Milepost 295, 2,480 feet south of; spike in telegraph pole, painted "U. S. B. M. 1226.0"	1, 226. 39
Milepost 294; spike in post, painted "U. S. B. M. 1250.7"	1, 251. 07
Milepost 293, opposite, 22 feet north of track, on outside of curve; iron post stamped "Prim. Trav. Sta. No. 14, 1301, 1911"	1, 301. 279
Milepost 292; spike in post, painted "U. S. B. M. 1348.7"	1, 349. 03
Milepost 292, 2,800 feet east of; spike in telegraph pole, painted "U.S.B.M. 1369.0"	1, 369. 33
Milepost 291; spike in post, painted "U. S. B. M. 1398.0"	1, 398. 38
Frost Junction, at north end of siding, 510 feet south of switch stand, 26 feet west of track; iron post stamped "Prim. Trav. Sta. No. 15, 1397, 1911"	1, 397. 553
Frost Junction, at south end of siding; top of rail	1, 407. 4
Milepost 289, 950 feet south of; spike in telegraph pole, painted "U. S. B. M. 1387.2"	1, 387. 52

Milepost 288, 800 feet south of; spike in telegraph pole, painted "U. S. B. M. 1351.5"	Feet. 1, 351. 89
Milepost 287; spike in post, painted "U. S. B. M. 1346.9"	1, 347. 28
Milepost 286; spike in post, painted "U. S. B. M. 1386.4"	1, 386. 75
Milepost 285, 15 feet north of; spike in telegraph pole, painted "U. S. B. M. 1361.0"	1, 361. 37
Milepost 284, about 200 feet north of; spike in telegraph pole, painted "U. S. B. M. 1319.9"	1, 320. 20
Milepost 283, 7 feet from post, 20 feet north of track; iron post stamped "Prim. Trav. Sta. No. 16, 1333, 1911"	1, 333. 147
Milepost 283, 2,700 feet south of; spike in telegraph pole, painted (incorrectly) "U. S. B. M. 1327.3"	1, 328. 68

SIDNAW QUADRANGLE.

[Latitude 46° 30'-46° 45'; longitude 88° 30'-83° 45']

From milepost 282 southeast along Chicago, Milwaukee & St. Paul Ry. to Sidnaw.

Milepost 282, 40 feet west of; spike in telegraph pole, painted (incorrectly) "U. S. B. M. 1315.8"	1, 317. 12
Milepost 281, 160 feet west of; spike in telegraph pole, painted (incorrectly) "U. S. B. M. 1323.9"	1, 325. 20
Sidnaw, 1.25 miles west of station, 50 feet east of milepost 280, 40 feet south of track; iron post stamped (incorrectly) "1368"	1, 369. 820
Milepost 279, 1,200 feet west of post, at road crossing; top of rail.	1, 365. 00
Sidnaw, 200 feet west of station, at crossing of Duluth, South Shore & Atlantic Ry.; top of rail.	1, 376. 41
Sidnaw, opposite east end of station, north side of railroad, 40 feet east of Northern Hotel, near entrance to Roycroft farm; iron post stamped "Prim. Trav. Sta. No. 17, 1381, 1911" (incorrectly stamped 1381)	1, 382. 827

WINONA QUADRANGLE.

[Latitude 46° 45'-47°; longitude 88° 45'-89°.]

From Toivola southwest along Copper Range R. R. to milepost 53.

Toivola, 112 feet north of office window in station, 19 feet east of center of track, 40 feet south of section house, near fence around house; iron post stamped "Prim. Trav. Sta. No. 7, 1276, 1911"	1, 275. 831
Toivola, in front of station; top of rail.	1, 276. 1
Toivola, 1 mile south of, 30 feet north of sign "1 mile to station;" spike in telegraph pole, painted "U. S. B. M. 1298.4"	1, 298. 44
Stunington siding, in front of signboard; top of rail.	1, 305. 9
Stunington siding, south end of; spike in telegraph pole, painted "U. S. B. M. 1303.2"	1, 303. 26
Milepost 36, 720 feet north of; spike in telegraph pole, painted "U. S. B. M. 1282.5"	1, 282. 47
Milepost 37, 30 feet south of; spike in telegraph pole, painted "U. S. B. M. 1279.3"	1, 279. 26
Milepost 38, 70 feet south of; spike in telegraph pole, painted "U. S. B. M. 1268.2"	1, 268. 23
Elm River siding, 430 feet south of section house, 46 feet west of center of track, on top of bank about 8 feet above track; iron post stamped "Prim. Trav. Sta. No. 8, 1270, 1911"	1, 269. 850
Elm River, 1 mile south of, 240 feet south of sign "One mile to station;" spike in telegraph pole, painted "U. S. B. M. 1224.7"	1, 224. 75
Milepost 40, 1,970 feet south of; spike in telegraph pole, painted "1220.9"	1, 220. 94

Twin Lakes, 300 feet north of station; spike in telegraph pole, painted "U. S. B. M. 1203.5"	Feet. 1,203.55
Twin Lakes, in front of station; top of rail.....	1,209.1
Faleston, in front of station; top of rail.....	1,205.6
Faleston, 1,090 feet south of station, at bridge over Misery River, 6 feet east of center of track, on top of concrete abutment; aluminum tablet stamped "1200"	1,199.844
Winona, 1 mile east of, 240 feet west of sign "One mile to station;" spike in telegraph pole, painted "U. S. B. M. 1240.9"	1,240.89
Winona, in front of station; top of rail.....	1,244.9
Winona, 750 feet west of station, 31 feet north of track, on bank about 3 feet above track; iron post stamped "Prim. Trav. Sta. No. 9, 1247, 1911"	1,247.084
Milepost 46, 60 feet east of; spike in telegraph pole, painted "1,210.6 U. S. B. M."	1,210.95
Milepost 47, 1,150 feet south of; spike in telegraph pole, painted (incorrectly) "1204.3 U. S. B. M."	1,205.66
Seager siding, 75 feet south of section house, 31 feet east of track, about same level as track; iron post stamped "Prim. Trav. Sta. No. 10, 1220, 1911." (Incorrectly stamped "1220")	1,221.112
Seager, 0.8 mile south of, 760 feet east of sign "One mile to station;" spike in telegraph pole, painted (incorrectly) "U. S. B. M. 1177.4"	1,178.71
Milepost 50, 0.25 mile south of; spike in telegraph pole, painted "U. S. B. M. 1127.8"	1,128.12
Milepost 51, 160 feet south of; spike in telegraph pole, painted "U. S. B. M. 1081.2"	1,081.57
Senecal flag station, at road crossing; top of rail.....	1,063.2
Indiana flag station, 20 feet east of milepost 52; spike in telegraph pole, painted "U. S. B. M. 1031.8"	1,032.14
Milepost 53, 100 feet east of; spike in telegraph pole, painted "U. S. B. M. 982.4"	982.75

PRIMARY LEVELING.

Adrian, Alfordton, Edon, Hudson, Pioneer, Swanton, and Wauseon quadrangles.

HILLSDALE AND LENAWEЕ COUNTIES.

The elevations in the following list were determined by primary leveling and accord with those in Bulletin 461 for Michigan and in Bulletins 411 and 476 for Ohio.

The leveling was done in 1911 in Alfordton quadrangle by Philip Flitman and C. W. Howell; in Edon and Pioneer quadrangles by C. R. French; in Hudson quadrangle by Flitman; in Swanton quadrangle by F. Mabrey; and in Adrian and Wauseon quadrangles by C. E. Mills.

Additional leveling in most of these quadrangles will be found in Ohio lists.

ADRIAN QUADRANGLE.

[Latitude 41° 45'-42"; longitude 84°-34° 15'.]

From Ridgeville west along highways to point 3 miles northwest of Morenci.

Ridgeville, northeast corner of crossroads, northwest corner of concrete step at entrance to district school No. 5; chiseled square.....	Feet. 736.42
Ridgeville, 0.8 mile west of, southwest corner of crossroads; spike in base of fence post, marked "736.9"	737.07

Lyons, 1 mile east by 4 miles north of, southwest corner of crossroads; iron post stamped "748".....	Feet. 748. 507
Lyons, 4 miles north of, northwest corner of crossroads; spike in base of telephone pole, marked "761.4".....	761. 58
Weston, 1 mile south of, northeast corner of crossroads; spike in base of fence post, marked "779.2".....	779. 32
Weston, 1 mile south by 1 mile west of, northwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 33, 779, Mich., 1911".....	779. 283
Weston, 1 mile south by 2 miles west of, at Lake Shore & Michigan Southern Ry. crossing, southeast corner of crossroads; spike in base of fence post, marked "788.8".....	788. 95
Weston, 1 mile south by 3 miles west of, northwest corner of crossroads; painted square on concrete base of fence post, marked "793.4".....	793. 52
Morenci, 2.25 miles north by 2.5 miles east of, southeast corner of crossroads; iron post stamped "788".....	787. 943
Morenci, 2.25 miles north by 1.25 miles east of, southeast corner of T road south; spike in base of telephone pole, marked "783.6".....	783. 71
Morenci, 2.25 miles north by 0.8 mile east of, northwest corner of T road north; spike in base of fence post, marked "781.8".....	781. 84
Morenci, 2.25 miles north of, northeast corner of crossroads at schoolhouse (district 2, Seneca); iron post stamped "792".....	791. 992
Morenci, 2.25 miles north by 0.5 mile west of, on west bank of Bean Creek, on south side of road at bend; spike in base of telephone pole, marked "783.9".....	783. 96

ALVORDTON QUADRANGLE.

[Latitude 41° 30'-41° 45'; longitude 84° 15'-84° 30'.]

From point 4 miles southeast of Ransom east and north along public road to point 1 mile north by 2 miles west of Waldron.

Ransom, 2 miles east by 2.5 miles south of, at northeast corner of T road; spike in fence post, marked "903.9".....	903. 88
Ransom, 3 miles east by 2.5 miles south of, at southwest corner of crossroads; spike in telephone pole, marked "893.9".....	893. 88
Waldron, 2 miles west by 1 mile north of, at northwest wing of bridge at crossroads over Maumee drain; spike in bulkhead, marked "889.7".....	889. 73

From point 3 miles west of Morenci to point 5 miles northwest of Morenci.

Morenci, 3 miles west of, at southeast corner of crossroads; copper nail in culvert, painted "T. B. M. 786.0".....	786. 19
Morenci, 3 miles west by 0.6 mile north of, at northeast corner of crossroads; iron post stamped "806".....	806. 524
Morenci, 3 miles west by 1.6 miles north of, at southwest corner of crossroads; spike in base of telephone pole, marked "T. B. M. 812.9".....	813. 05

EDON QUADRANGLE.

[Latitude 41° 30'-41° 45'; longitude 84° 45'-85°.]

From point 1 mile southwest of Camden to point 4 miles southwest of Camden.

Camden, 1 mile south of, southwest corner of crossroads, 10 feet west of fence corner; iron post stamped "1019".....	1, 020. 138
Camden, 1 mile south by 2 miles west of, at southwest corner of crossroads; spike in base of fence post, marked "1080.321".....	1, 081. 30
Camden, 2 miles south by 2 miles west of, at southwest corner of T road west, 70 feet east to small black-oak tree; iron post stamped "1002".....	1, 003. 124

Camden, 3 miles south by 2 miles west of, at northeast corner of crossroads, 150 feet west by 20 feet north to South Camden Church; top of rock, marked "1086.985"..... 1, 087. 96

HUDSON QUADRANGLE.

[Latitude 41° 45'-42"; longitude 84° 15'-84° 30'.]

From point 1 mile north by 2 miles west of Waldron north and east to point 2 miles north by 1.5 miles west of Morenci.

Waldron, 2 miles west by 2 miles north of, at southwest corner of crossroads; iron post stamped "896"..... 895. 821
 Waldron, 2 miles north by 1 mile west of, at southwest corner of crossroads; spike in fence post, marked "895.9"..... 895. 88
 Waldron, 2 miles north of, at northeast corner of crossroads; spike in fence post, marked "896.3"..... 896. 28
 Waldron, 2 miles north by 1 mile east of, at southwest corner of crossroads; iron post stamped "896"..... 896. 044
 Waldron, 2 miles north by 2 miles east of, at southeast corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 31, 889, 1911"..... 889. 264
 Waldron, 1.5 miles north by 3 miles east of, at west end of T road; spike in fence post, marked "858.2"..... 858. 27
 Munson, 2.5 miles north of, at southwest corner of crossroads; iron post stamped "846"..... 845. 878
 Munson, 2.5 miles north by 2 miles east of, southeast corner of crossroads; spike in fence post, marked "829.6"..... 829. 68
 Munson, 2.5 miles north by 3 miles east of, at northeast corner of crossroads; iron post stamped "818"..... 818. 548
 Morenci, 2.25 miles north by 1.5 miles west of, southeast corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 32, 798, Mich., 1911"..... 797. 735

PIONEER QUADRANGLE.

[Latitude 41° 30'-41° 45'; longitude 84° 30'-84° 45'.]

From point 4 miles southeast of Camden to point 1 mile south of Camden.

Camden, 3 miles south by 2 miles east of, in southwest corner of crossroads, at edge of road; stone marked "1027.5"..... 1, 028. 52
 Camden, 2 miles south by 2 miles east of, at northeast corner of T road south, 10 feet west to east side of T road, 70 feet east to 15-inch hickory tree; iron post stamped "993"..... 994. 511
 Camden, 2 miles south by 2.5 miles east of, at T road north, bridge over Joe River, north truss, east end; top of nut on connecting pin, marked "954.1"..... 955. 14
 Joe River, surface of water, August 4, 1911..... 944
 Camden, 1 mile south by 2.5 miles east of, in northwest corner of crossroads, in edge of road; rock marked "1012.338"..... 1, 013. 338

From point 2 miles northeast of Pioneer north along highways 3 miles, thence west to point 3 miles southeast of Camden.

Pioneer, 1 mile north by 2 miles east of, at northwest corner of T road south, on wing of concrete abutment of bridge; chiseled square painted "T. B. M. 875.0"..... 875. 08
 Ransom, 1 mile east by 4.5 miles south of, at northwest corner of crossroads; iron post stamped "887"..... 886. 595
 Ransom, 1 mile east by 3.5 miles south of, at northeast corner of crossroads; copper nail in top of post, painted "T. B. M. 901.4"..... 901. 46

Ransom, 2 miles east by 3.5 miles south of, at northeast corner of crossroads; spike in fence post, marked "890.1".....	Feet. 890.14
Ransom, 1 mile east by 2.5 miles south of, at head of T road west; iron post stamped "916".....	915.946
Ransom, 2.5 miles south of, at northeast corner of crossroads, on Amboy-Ransom township line; spike in base of telephone pole, marked "924.7".....	924.76
Ransom, 2.5 miles south by 1 mile west of, at southeast corner of crossroads, Amboy-Ransom township line; spike in base of post, marked "944.7".....	944.72
Ransom, 2.5 miles south by 2 miles west of, at northeast corner of T road north, Amboy-Ransom township line; iron post stamped "967".....	966.950
Ransom, 3 miles west by 2 miles south of, at T road south, on large stone at center of T; chiseled square painted "T. B. M. 1018.1".....	1,018.10
Frontier, 0.5 mile west by 3 miles south of, southeast corner of crossroads, Amboy-Woodbridge township line; spike in fence post marked "970.7".....	970.66
Frontier, 1.5 miles west by 3 miles south of, at southwest corner of crossroads, Amboy-Woodbridge township line; iron post stamped "982".....	981.998
Frontier, 2.5 miles west by 3 miles south of, at head of T road east; spike in base of telephone pole, painted "T. B. M. 1014.0".....	1,014.00
Frontier, 2.5 miles west by 2.5 miles south of, at head of T road west; chiseled square on stone, painted "T. B. M. 1007.4".....	1,007.44
Frontier, 3.5 miles west by 2.5 miles south of, at northeast corner of T road east; chiseled square on large granite bowlder, painted "T. B. M. 1008.4".....	1,008.44
Frontier, 3.5 miles west by 3 miles south of, at northwest corner of T road west; nail in base of post, painted "T. B. M. 1008.0".....	1,007.97
Camden, 1 mile south by 3.5 miles east of, at southeast corner of T road south; iron post stamped "991".....	990.837

SWANTON QUADRANGLE.

[Latitude 41° 30'-41° 45'; longitude 83° 45'-84°.]

From point 7.1 miles east of Mulberry west along highways through Mulberry to Ridgeville.

Mulberry, 7.1 miles east of, 0.5 mile north of Ohio-Michigan State line, southeast corner of crossroads; spike in base of corner post, marked "692.6".....	693.65
Mulberry, 6.6 miles east of, southeast corner of T road east, spike in base of corner post, marked "698.8".....	699.90
Mulberry, 6.1 miles east of, southwest corner of crossroads; spike in base of corner post; marked "698.0".....	699.10
Mulberry, 5.1 miles east of, 1 mile north of Southlands station, northwest corner of crossroads; iron post stamped "699".....	700.350
Mulberry, 4.1 miles east of, northeast corner of crossroads; spike in base of telephone pole, painted "703.3".....	704.29
Mulberry, 3.1 miles east of, northeast corner of crossroads; spike in base of fence post, painted "707.9".....	708.25
Mulberry, 2.1 miles east of, northwest corner of crossroads; iron post stamped "710".....	710.660
Mulberry, 1.1 miles east of, northeast corner of crossroads; spike in base of telephone pole, marked "713.2".....	713.51
Mulberry, northeast corner of crossroads; spike in base of telephone pole, marked "717.6".....	717.89
Mulberry, 1 mile west of, northeast corner of crossroads; iron post stamped "720".....	720.579

Mulberry, 2 miles west of, northeast corner of crossroads; spike in base of fence post, painted "722.0"	Feet. 722.30
Mulberry, 3 miles west of, northeast corner of crossroads; spike in base of telephone pole, painted "724.8"	725.10
Mulberry, 3.5 miles west of, northeast corner of T road north; spike in base of fence post, painted "723.6"	723.86
Mulberry, 4 miles west of, southeast corner of crossroads; iron post stamped "724"	725.398
Mulberry, 5 miles west of, southeast corner of crossroads; spike in base of fence post, painted "724.6"	724.82
Mulberry, 6.2 miles west of, in southwest point of five points in road; spike in fence post, marked "732.5"	732.76

WAUSEON QUADRANGLE.

[Latitude 41° 30'-41° 45'; longitude 84°-84° 15'.]

From point 3 miles east by 1 mile north of Lyons north to Ridgeville.

Lyons, 3 miles east by 2 miles north of, at crossroads, at northwest corner of wooden culvert over stream; copper nail	740.89
Lyons, 3 miles east by 3 miles north of, southeast corner of crossroads; iron post stamped "737"	736.994

Grand Rapids, Holland, Ionia, Jenison, Lowell, and Muir quadrangles.

BARRY, EATON, KENT, AND OTTAWA COUNTIES.

The elevations in the following list were determined by primary leveling based upon bench marks of the U. S. Corps of Engineers at Macatawa and Grand Rapids, and accord with the 1907 adjustment. The adopted mean elevation of Lake Michigan for the period 1860 to 1875 is 581.63 feet above mean sea level.

The leveling was done in 1911 by L. D. Townsend; additional leveling near Moline in Grand Rapids quadrangle was done in 1913 by E. C. Bibbee.

GRAND RAPIDS QUADRANGLE.

[Latitude 42° 45'-43°; longitude 85° 30'-85° 45'.]

From United States Army Engineers bench mark No. 9 along Market Street to Livingston Hotel (run twice).

Grand Rapids, southwest of city, on south bank of Grand River west of Plaster Creek, 50 feet southwest of elm tree, about 0.5 foot under ground; top of cap on iron pipe 1½ inches in diameter (U. S. C. E. B. M. 9)	Feet. 596.360
Grand Rapids, southeast corner of Wealthy Avenue and Market Street, on curbing	604.65
Grand Rapids, Pere Marquette R. R. crossing at Wealthy Avenue, 50 feet west of Nye Street; top of farthest rail east	615.00
Grand Rapids, at southeast corner of Wealthy Avenue and South Division Street, on north side of lamp-post; top of nut to bolt fastening lamp-post to walk	648.10
Grand Rapids, at monument square in front of Livingston Hotel, east of monument, granite stone surrounded by walk; copper bolt projecting 2 inches (city b. m. 1)	645.599

From Grand Rapids east along highway to Ada, thence along highway south to Cascade, thence west and south to St. Mary's Church, thence west to Troosts farm (west of Fisher station), thence north and east to Grand Rapids.

Grand Rapids, Park Square, in top of stone marking astronomical station of Lake Survey of 1874; aluminum tablet stamped "655".....	654. 531
Grand Rapids, at northwest corner of East Fulton and Lafayette Streets, on curbing; chiseled square	687. 53
Grand Rapids, at northwest corner of East Fulton, North Union and Lake Avenue intersection, on curbing at edge of walk; chiseled square.....	720. 48
Grand Rapids, northwest corner of East Fulton Street and Lowell Avenue, on curbing at edge of walk; chiseled square.....	743. 18
Grand Rapids, 2.5 miles east of, on East Fulton Street, 100 feet west of Lakeside Drive, on north side of road; iron post stamped "750"	749. 919
Grand Rapids, 4 miles east of, at Y road (road west), on south side of tree standing north of road in fence line; copper nail in root, marked "790" ..	790. 01
Grand Rapids, 5.8 miles east of, at northeast corner of T road north, at northwest corner of Grand Rapids district No. 2 schoolhouse; iron post stamped "804".....	803. 723
Grand Rapids, 6.1 miles east of, at southeast corner of bridge over Grand Trunk Ry., at T road south; copper nail on beam holding floor, marked "789" ..	788. 87
Grand Rapids, 6.1 miles east by 0.8 mile south of, at T road east, on south end of culvert across east road; chiseled square on stone, marked "768"....	767. 92
Grand Rapids, 6.5 miles east of, via Cascade road, at southeast corner of crossroads, in root of third tree from corner of yard of G. Gillette; copper nail marked "766".....	765. 66
Grand Rapids, 7 miles east of, at Van Houten Corners, at northeast corner of crossroads; iron post stamped "755".....	755. 266
Van Houten Corners, 0.5 mile north of, at northwest corner of crossroads, near wagon track; copper nail in stump, marked "789".....	788. 64
Ada, 2.5 miles west of, at T road north, in triangle formed by wagon roads; copper nail in stump, marked "778".....	778. 31
Ada, 1.5 miles west of, at T road south, at southeast corner of road; copper nail in root on north side of tree, marked "724".....	723. 55
Ada, 1.5 miles south by 0.5 mile west of, at T road west, on east side of road; copper nail in root of maple tree, being second tree south from walk in dooryard of A. Antonides, marked "675".....	675. 03
Cascade, at intersection of roads from Ada and Grand Rapids, at southwest corner of crossroads, at general store of S. Watterson, on stone at bottom at northeast corner of concrete steps; chiseled square marked "665".....	664. 51
Cascade, 1 mile west of, in front of H. De Good's house, north side of second tree from gate to east; copper nail in root of maple tree marked "773"	773. 25
T. 6 N., R. 10 W., northeast corner of sec. 18, northeast corner of crossroads, diagonally opposite Cascade schoolhouse (district 8); iron post stamped "760".....	759. 680
T. 6 N., R. 10 W., northwest corner of sec. 19, at southwest corner of T road west, on top of rock near corner post in fence; chiseled square marked "782".....	782. 28
Cascade, 1.7 miles west by 2.5 miles south of, at T road east, center of line between secs. 29 and 30, T. 6 N., R. 10 W., on stone on outside of corner fence post; chiseled square marked "804".....	804. 46
T. 6 N., R. 10 W., southeast corner of sec. 30, at southwest corner of crossroads, on northwest corner of concrete steps of St. Mary's Catholic Church, on top of bottom step; chiseled square marked "804".....	804. 185

	Feet.
St. Marys Church, 1 mile west of, at northwest corner of crossroads; copper nail in root on east side of elm tree marked "786".....	786. 32
T. 6 N., R. 11 W., southeast corner of sec. 26, at northwest corner of crossroads, near fence corner; iron post stamped "722".....	722. 333
T. 6 N., R. 11 W., line between secs. 27 and 34, at southwest corner of T road south, near telephone pole; chiseled square on stone marked "752".....	752. 05
Fisher station, 4 miles east of, at northwest corner of T road north, 150 feet from intersection of roads, at southeast corner of church sheds (brick church on same corner); chiseled square on large white bowlder marked "792".....	792. 11
Fisher station, 2.5 miles east of, at Bylsma Corners, at southwest corner of crossroads, 20 feet west of corner of fence, on road side; iron post stamped "Prim. Trav. Sta. No. 17, 741".....	741. 245
Fisher station, 0.2 mile north by 0.5 mile west of, at northeast corner, at junction of T road east with South Division Street (Grand Rapids) extended, on top of second fence post east from corner; copper nail marked "675".....	675. 37
Fisher station, at Grand Rapids & Indiana Ry. crossing, north side of wagon road, 15 feet from west rail of main track, 150 feet south of station, in top of second post of five standing in an east-west line along north side of wagon road; copper nail marked "668".....	668. 70
Fisher station, 0.5 mile west of, at northeast corner of T road east, near fence corner; iron post stamped "Prim. Trav. Sta. No. 18, 672".....	672. 082
T. 6 N., R. 12 W., northwest corner of sec. 34, at southeast corner of crossroads, on top of concrete corner post in fence; chiseled square marked "729".....	728. 62
Wentworth, 2 miles south by 0.5 mile east of, Troost's farm, at southeast corner of crossroads, in fence line, in root on north side of middle one of three oak trees; spike marked "719".....	719. 10
Wentworth, 1 mile south by 0.5 mile east of, T. 6 N., R. 12 W., northeast corner of sec. 28, at southwest corner of T road west, in unused road in curve turning south; chiseled square on stone on ground marked "693".....	693. 13
T. 6 N., R. 12 W., northwest corner of sec. 22, at southeast corner of crossroads, in front of schoolhouse (district 2, Wyoming) (New Hall); copper nail in root of pine tree marked "642".....	641. 71
Wentworth, Lake Shore & Michigan Southern Ry. crossing; top of rail marked "640".....	640. 3
Wentworth, 0.2 mile northwest of, at T road east, on west side of northwest-southeast road; iron post stamped "631".....	631. 265
Ivanrest, on Grand Rapids, Holland & Chicago Electric Ry., top of north rail; marked "616".....	615. 74
Ivanrest, 0.5 mile north of, at north corner of T road northeast, 50 feet south of and parallel to Pere Marquette R. R. (another parallel road lies north of track); copper nail in root of oak tree marked "612".....	612. 37
Grand Rapids, 4 miles southwest of, in center of road, crossing of Lake Shore & Michigan Southern Ry.; top of east rail marked "608".....	608. 33
Grand River, under Lake Shore & Michigan Southern Ry. bridge; surface of water June 7, 1911.....	588
Grand Rapids, 3 miles west of, at plaster quarries, west of private road leading to American Cement Co., on bridge across creek; chiseled square on south concrete abutment marked "614".....	614. 22

Grand Rapids, 4 miles west of, at southeast corner of school yard (district 2, Walker), on north side of road, 100 feet east of T road south; iron post stamped "646 Prim. Trav. Sta. No. 10"	Feet. 646. 033
Kinney's Corners, at northeast corner of crossroads, at west side of mail-box post; chiseled square on stone marked "738"	738. 18
Grand Rapids, 4 miles west of, at northwest corner of crossroads, at edge of road, 3 feet northeast of telephone pole; chiseled square on stone marked "754"	753. 96
Grand Rapids, 2.5 miles west of via West Bridge Street, at northeast corner of "Smith's greenhouse" corners, opposite district 7 schoolhouse, on northwest corner between footpath and road; iron post stamped "758"	758. 204
Grand Rapids, Bridge Street station, crossing of Grand Rapids & Indiana Ry. and West Bridge Street, on same corner as station, in center line of sidewalk; top of farthest rail west marked "608"	608. 38
From Reeds Lake south to point 4 miles east of Fisher station.	
Reeds Lake; surface of water June 10, 1911	732
Reeds Lake, southwest corner of, at T road south from Lake Avenue Consumers' Ice houses to head of road north, 20 feet north of walnut tree and 25 feet south of hickory tree, southwest corner of road; copper nail in root of elm tree, marked "756"	755. 40
Grand Rapids, 3 miles east of along Hall Street extended, at southwest corner of T road west; copper nail in gnarled root of maple tree, marked "758"	757. 90
Grand Rapids, 3 miles east of along Burton Avenue from South Division Street, in corner of crossroads (Halls Corners); chiseled square on top step of concrete porch to schoolhouse standing at northeast corner of road, marked "769"	768. 84
Reeds Lake, 2.5 miles south of lake, at northeast corner of crossroads, southwest corner of sec. 10, T. 6 N., R. 11 W.; chiseled square on southwest corner of schoolhouse steps, marked "735"	735. 13
Reeds Lake, 3.2 miles south of lake, in concrete abutment to bridge over Plaster Creek, on top of vertical reinforcement I iron (the one nearest bridge), marked "679"	679. 26
Reeds Lake, 4.8 miles south of lake, at northeast corner at T road north, 7 feet west of two mail boxes, home of James W. Bowen, on south side of road; chiseled square on stone, marked "777"	776. 47
Fisher station, 4 miles east by 1 mile north of, at southeast corner of T road south; copper nail in top of corner fence post, marked "777"	776. 80
From Grand Rapids south on Division Street to Fisher station.	
Grand Rapids, southwest corner of South Division and Hall streets, on curbstone; chiseled cross marked "657"	656. 56
Grand Rapids, at southwest corner of South Division Street and Burton Avenue, at edge of walk; chiseled square on curbing, marked "688"	687. 53
Grand Rapids, 1 mile south of Burton Avenue on South Division Street, 300 feet south of Michigan Central R. R. crossing, at southwest corner of crossroads, on outside of fence, near two telephone poles; iron post stamped "656"	655. 825
Goodwin's Corners, northeast corner of crossroads, on grounds of school (district 6, Paris and Wyoming), on top of stump of telephone pole projecting 2½ feet above ground; copper nail marked "680"	679. 78
Smith's Corners on South Division Street, at northeast corner of crossroads; copper nail in root on west side of third maple tree from south, marked "682"	681. 76

From Troosts farm (west of Fisher station) south along highway to Herps, thence east to Caledonia, thence north to St. Mary's Church.

	Feet.
Byron Center, 3.5 miles north of, on east side of road at T road west, north-west corner of school yard, under maple tree; iron post stamped "730" ..	730.377
Byron Center, 1.5 miles north of, at northeast corner of crossroads, near corner post in fence; chiseled square on highest point of bowlder, marked "698"	697.85
Byron Center, 1 mile north of, at northeast corner of crossroads; copper nail in top of corner fence post, marked "716"	715.99
Byron Center, at town hall, at southeast corner of road, 500 feet east of Lake Shore & Michigan Southern Ry. station, at northwest corner of top of concrete step at front of building; aluminum tablet stamped "757" ..	757.081
Byron Center, 1 mile south of, 100 feet west of crossroads, at Lake Shore & Michigan Southern Ry., on south side of wagon road on north long tie in cattle guard; copper nail in top of east end, marked "718"	718.52
Herps, road crossing at railway station; top of rail	692
Herps, 0.2 mile east of, northeast corner of crossroads, 3 feet northwest of telephone pole; iron post stamped "700"	700.170
T. 5 N., R. 12 W., southwest corner of sec. 36, 1 mile south by 1 mile west of Corinth, at center of crossroads, on top of stone marking section corner; chiseled square marked "783"	782.90
T. 5 N., R. 12 W., southeast corner of sec. 36, at center of crossroads, on county line, on top of stone marking section corner; chiseled cross marked "782"	782.13
Corinth, at northeast corner of crossroads, between corner post of fence and telephone pole, southwest corner of sec. 30, T. 5 N., R. 11 W.; iron post stamped "806"	805.921
T. 5 N., R. 11 W., southeast corner of sec. 30, center of T road south; chiseled square on top of stone marking section corner, marked "850.5" ..	850.54
Corinth, 2 miles east of, 300 feet south of southeast corner of crossroads, on top steps of schoolhouse, 2 feet north of door; chiseled square marked "865.5"	865.54
Corinth, 2.5 miles east by 1 mile south of, northwest corner of crossroads, on county line, near fence; iron post stamped "Prim. Trav. Sta. No. 19, 860"	860.094
T. 5 N., R. 11 W., southeast corner of sec. 34, at northwest corner of T road north, on top of corner post in fence; copper nail marked "881.2"	881.26
T. 4 N., R. 11 W., northeast corner of sec. 2, southwest corner of crossroads, on stone under the farther east of two mail boxes; chiseled square marked "833.2"	833.20
T. 5 N., R. 11 W., southeast corner of sec. 36, northwest corner of crossroads, near corner fence post; iron post stamped "Prim. Trav. Sta. No. 20, 797"	797.470
Caledonia, 1.5 miles south of, at northeast corner of crossroads, in root on west side of wild cherry tree; copper nail marked "800.9"	800.94
Caledonia, 0.5 mile south of, at T road east, in center of road; chiseled square on large stone, marked "813.8"	813.90
Caledonia, at southwest corner of school yard, under maple tree, near walk at head of T road south; iron post stamped "844"	844.037
Caledonia, 0.8 mile north by 0.2 mile west of, at Michigan Central R. R. crossing, 200 feet north of T road west, on top of bolt head to bond plate on north side of north rail, on first nut west of plank crossing, marked "802.4"	802.52

T. 5 N., R. 10 W., southeast corner of sec. 18, at northwest corner of crossroads, 200 feet north of crossing, 6 feet southeast of corner fence post in cemetery, opposite a schoolhouse on northeast corner, and church on southwest corner, and near Mennonites Church, 4 feet west of telephone pole; iron post stamped "807".....	Feet. 806.750
T. 5 N., R. 10 W., southwest corner of sec. 8, northeast corner of crossroads; copper nail in top of corner fence post, marked "832.4".....	832.51
T. 5 N., R. 10 W., northwest corner of sec. 8, southeast corner of crossroads, on concrete side to porch of schoolhouse (district 5, Caledonia), at north end of west railing; chiseled square marked "800".....	799.80
T. 5 N., R. 10 W., northeast corner of sec. 6, southwest corner of crossroads, near north-south fence, 10 feet south of corner fence post; iron post stamped "780".....	779.654
From point 2.5 miles east of Fisher station south along highway to point 2 miles east of Corinth.	
T. 6 N., R. 11 W., southwest corner of sec. 33, northeast corner of crossroads, on west side of large maple tree used as corner fence post; copper nail in root marked "763.9".....	763.95
T. 5 N., R. 11 W., southeast corner of sec. 5, on south end of concrete culvert on west side, 150 feet north of crossroads; chiseled square marked "737.4".....	737.39
T. 5 N., R. 11 W., southwest corner of sec. 9, at northeast corner of crossroads near east-west fence; iron post stamped "788".....	788.288
T. 5 N., R. 11 W., northwest corner of sec. 21, at southwest corner of brick schoolhouse (district 3), southeast corner of crossroads; point on water table marked "814.2".....	814.17
T. 5 N., R. 11 W., southwest corner of sec. 21, at northeast corner of road, opposite brick church on southeast corner, just outside corner post of cemetery; chiseled square on large boulder marked "891.8".....	891.73
Near Herps.	
North Dorr, 1 mile east of, at northwest corner of T road north, 20 feet west of center of north road; chiseled square on top of large boulder marked "755.5".....	755.56
From Caledonia southeast along wagon road 2.2 miles.	
Caledonia, 2.2 miles southeast of, at southeast corner of railway crossing with east-west road, at southwest end of tie, the only one sticking out of cinder bed, 5.5 feet north of corner post in right of way fence; copper nail marked "814.5".....	814.55
From Herps to point near Moline.	
Herps, 1.2 miles east of, southeast corner of crossroads, on county line, in top of end of brace pole at corner fence post; copper nail marked "741".....	740.73
Corinth, 1 mile south by 1 mile west of, southwest corner of sec. 36, T. 5 N., R. 12 W., center of crossroads, on top of stone marking section corner; chiseled square.....	782.90
Moline, 2 miles north of, on line between Kent and Allegan counties, on west abutment south side of bridge, 30 feet east of Grand Rapids & Indiana Ry.; chiseled square painted "764.7".....	764.83

HOLLAND QUADRANGLE.

[Latitude 42° 45' -43°; longitude 86° -86° 15'.]

From Macatawa (Ottawa Beach) east along highway to sec. 31, T. 5 N., R. 14 W.

Macatawa, on light keeper's residence, on top of horizontal shoulder in second stone 2.18 feet from northwest corner, 0.38 foot below bottom of baseboard, in top course in north foundation wall; notch (U. S. Corps of Engineers' b. m.).....	Feet. 590.064
Three-foot mark on gage (U. S. Corps of Engineers' elevation, 584.630)	584.63
Macatawa, at U. S. life-saving station, on concrete inclined entrance to boathouse, about 6 inches from southwest corner of south wing of station, at extreme east edge of entrance, 7 feet south of double doors; aluminum tablet stamped "588 1911".....	588.036
Macatawa, 1.9 miles east of U. S. life-saving station, on south shore of Black Lake, on south side of road, at southeast corner of T road south; chiseled square on large limestone block marked "592.6".....	592.61
Macatawa, 4 miles east of U. S. life-saving station, at T road running south from Lake road, on south side of Black Lake; copper nail in large poplar stump north of road marked "604.2".....	604.26
Holland, on Sixteenth Street, 11 feet north of southeast corner of Holland Shoe Co.'s factory; in east foundation wall, in seventh stone from corner in top tier; aluminum tablet stamped "607".....	607.378
T. 5 N., R. 15 W., northeast corner of sec. 34, southwest corner of crossroads, in top of platform to hold milk cans, at northeast corner; copper nail marked "665.6".....	665.63
T. 5 N., R. 15 W., southwest corner of sec. 26, at northeast corner of crossroads, near telephone pole; iron post stamped "660".....	660.240
T. 5 N., R. 15 W., northeast corner of sec. 35, west of T road south, on top of southeast abutment, 2 feet from east end of bridge (road jogs here, running 500 feet north to avoid creek); chiseled square marked "595.0".	595.02
T. 5 N., R. 15 W., northeast corner of sec. 36, southwest corner of crossroads, near outside wagon track; chiseled square on stone in ground marked "606.4".....	606.48
T. 5 N., R. 14 W., northeast corner of sec. 31, south of road at T road running northeast a short distance, then north, west of creek, at east end of gravel pit; iron post stamped "631".....	630.924

IONIA QUADRANGLE.

[Latitude 42° 45' -43°; longitude 85° -85° 15'.]

From Carlton east along highway to Sunfield.

T. 4 N., R. 8 W., northwest corner of sec. 12, at southeast corner of crossroads, 8 feet east by 3 feet north of corner fence post, opposite schoolhouse (Carlton 1885, district 7) on southwest corner; chiseled square on top of bowlder marked "861.7".....	861.78
T. 4 N., R. 8 W., southeast corner of sec. 1, 3 feet south of corner post in fence, northwest corner of crossroads; iron post stamped "Prim. Trav. Sta. No. 23, 851, Mich., 1911".....	851.479
T. 4 N., R. 7 W., southwest corner of sec. 5, at northeast corner of crossroads, opposite church on northwest corner and schoolhouse on southwest corner; at end of culvert crossing east-west road; chiseled square on top of stone marked "821.1".....	821.24
T. 4 N., R. 7 W., corner of secs. 5, 4, 8, and 9, at T road south, on top of stone set in center of junction marking section corner; chiseled square marked "838.3".....	838.39

T. 4 N., R. 7 W., southwest corner of sec. 3, at northeast corner of crossroads, southeast corner of school yard (North Jordan school), 3 feet south by 3 feet east of southwest corner of wood house; iron post stamped "863".....	Feet. 863. 325
T. 4 N., R. 7 W., southwest corner of sec. 2, at northeast corner of crossroads, 3 feet from corner post; on top of large boulder inside fence; chiseled square marked "878.8".....	378. 98
Woodbury, 0.5 mile south by 1 mile west of, at northeast corner of crossroads, 5 feet east by 3 feet south of concrete corner post in fence (mail box on this post and evergreen hedge ends here), near J. J. Echart's home, opposite schoolhouse on northwest corner; iron post stamped "Prim. Trav. Sta. No. 24, 1911, 885".....	884. 662
T. 4 N., R. 7 W., southeast corner of sec. 1, northwest corner of crossroads, 20 feet north of corner fence post, 4 feet from fence; chiseled cross in square on top of large boulder marked "877.6".....	877. 72
Woodbury, 1.5 miles east by 0.5 mile south of, at northeast corner of crossroads, east-west road crosses road running northwest-southeast, at southeast corner of school yard, 5 feet south of corner fence post; iron post stamped "841".....	841. 574
Woodbury, 2.5 miles east by 0.5 mile south of, at northwest corner of crossroads, at edge of wire fence, 4 feet from corner fence post; chiseled square on stone marked "846.7".....	846. 82
T. 4 N., R. 6 W., northeast corner of sec. 9, southwest corner of crossroads, on root on north side of butternut tree; with copper nail in it, marked "853.2".....	853. 33

JENISON QUADRANGLE.

[Latitude 42° 45'-43°; longitude 85° 45'-86°.]

From sec. 31, T. 5 N., R. 14 W., east along highway to North Dorr.

T. 5 N., R. 14 W., northwest corner of sec. 33, at southeast corner of T road south; copper nail in root on northwest side of sycamore tree, marked "612.5".....	612. 59
Drenthe, at northeast corner of school yard, on south side of road, 200 feet east of crossroads, 3 feet south by 2 feet west of north end of board fence between school and church; iron post stamped "665".....	664. 604
Drenthe, 2 miles east of, at northeast corner of crossroads, on north end of 8-inch steel culvert running across east-west road; chiseled cross battered in threads, marked "712.6".....	712. 69
T. 5 N., R. 14 W., southeast corner of sec. 30, at northwest corner of crossroads, 6 feet north of corner fence post; iron post stamped "677".....	676. 956
Drenthe, 4 miles east of, at southeast corner of crossroads, on extreme south end of southwest corner of L-shaped concrete abutment to sluiceway across east-west road; chiseled square marked "679.6".....	679. 73
Gitchel crossroads, general store of Speck Van Der Kolk at northwest corner, 1 foot west of southeast corner of concrete steps; chiseled square marked "705.7".....	705. 80
T. 5 N., R. 13 W., southwest corner of sec. 26, at northeast corner of crossroads and 5 feet north of corner fence post; iron post stamped "704".....	703. 892
Diamond schoolhouse, southeast of, just north of center of road at crossroads; chiseled square on blue stone set in road, marked "744.1".....	744. 15
North Dorr, 2 miles west of, on Ottawa-Allagan county line, on section corner stone in center of crossroads; chiseled cross in square, marked "U.S. 768.3".....	768. 41

North Dorr, 1 mile west of, at northwest corner of crossroads, 3 feet west of telephone pole; iron post stamped "786".....	Feet. 786. 520
North Dorr, at southwest corner of crossroads, 6 feet east of corner post in fence about Catholic Church yard; chiseled square on highest point of large bowlder, marked "766.6".....	766. 69

LOWELL QUADRANGLE.

[Latitude 42° 45'-43"; longitude 85° 15'-85° 30'.]

From Ada north across Grand River (a small circuit).

Ada, at back of schoolhouse, on top of concrete steps leading to second story; aluminum tablet stamped "684".....	683. 776
Ada, at southeast corner of crossroads, 100 feet east of bridge of Grand Trunk Ry. over road running east-west (Masonic Temple on northeast corner); chiseled square on outer edge of sidewalk, marked "640".....	639. 48
Ada, 0.8 mile east of, at southwest corner of crossroads, on east bank of Grand River, on top of first post in railing east of bridge; copper nail marked "638".....	637. 66
Ada, east of; surface of water in Grand River June 14, 1911.....	613
Ada, 0.8 mile east by 1.7 miles north of, at southeast corner of crossroads, 20 feet north of Honey Creek bridge; highest point on large stone, marked "715".....	715. 41
T. 7 N., R. 10 W., southwest corner of sec. 14, south of T road west; chiseled square on stone in bank, marked "832".....	831. 89
T. 7 N., R. 10 W., northeast corner of sec. 21, at southeast corner of T road west, on top of corner post in fence; copper nail marked "726.8".....	726. 68
Ada, 2.5 miles northwest of, at northeast corner of junction of road from north with road on northeast side of Grand River; chiseled square on stone under walnut tree, marked "637".....	636. 97
Ada, 0.8 mile east by 1.25 miles northwest of, on river road on northeast side of Grand River, east corner of junction of T road northeast, on large bowlder 100 feet east of crossing; chiseled square marked "641".....	641. 27

From point near Parmelee east along highway to Carlton.

Caledonia, 3 miles southeast of, northeast of crossing of Michigan Central R. R. with road running north-south; top of center one of three iron stakes holding plank to prevent earth from sliding into ditch, marked "794.6".....	794. 72
Parmelee, road crossing on Michigan Central R. R.; top of rail, marked "771.8".....	771. 9
Parmelee, 0.4 mile west of, at southeast corner of crossroads, near corner post in fence, opposite schoolhouse on northeast corner and United Brethren Church on northwest corner; iron post stamped "789".....	788. 683
Parmelee, 0.8 mile east of, 0.2 mile east of Thornapple River, on north side of T road west, 100 feet west of north-south road, at farm house of J. L. Boughton "Riverside Farm;" chiseled cross on top of stone hitching post, marked "724.7".....	724. 81
Parmelee, 1.7 miles east of, at southwest corner of crossroads, on northeast corner of top of concrete step to schoolhouse facing east; chiseled square, marked "783.3".....	783. 37
T. 4 N., R. 9 W., southwest corner of sec. 6, at northeast corner of crossroads, about 4 feet south by 6 feet east of corner post; iron post stamped "773".....	773. 236

T. 4 N., R. 9 W., southwest corner of sec. 5, at northeast corner of crossroads where road south jogs to east, at edge of wagon track; chiseled square on top of large boulder, marked "866.3".....	Feet. 866.44
T. 4 N., R. 9 W., southwest corner of sec. 4, at head of T road west, at east edge of road, big maple tree stands in triangle of roads; chiseled square on northwest end of large stone, marked "947.8".....	947.93
T. 4 N., R. 9 W., quarter corner on east side of sec. 5, on west side of T road east, 40 feet north of intersection, 5 feet northwest of 8-inch oak tree; iron post stamped "859".....	858.718
T. 4 N., R. 9 W., at center of sec. 3, southeast corner of crossroads, at north end of porch and close to west wall; chiseled square on top concrete step of Irving schoolhouse (district 7), marked "822.2".....	822.30
Freeport, 1.5 miles west by 0.5 mile south of, at head of T road west, east side of road and a little north of junction; copper nail in root on west side of 30-inch maple tree, marked "811.1".....	811.23
Freeport, 1.5 miles west by 1 mile south of, at southeast corner of crossroads (road west very poor); copper nail in top of corner fence post, marked "816.2".....	816.36
Freeport, 0.8 mile west by 1 mile south of, southwest corner of crossroads, 10 feet northeast of fence corner, 3 feet south of mail box post (the more eastern of two); iron post stamped "Prim. Trav. Sta. No. 22, 829".....	829.236
T. 4 N., Rs. 8 and 9 W., 1 mile south of Freeport, at crossroads (east-west road jogs 100 feet to north), the Pere Marquette R. R. property line ends here; chiseled square on stone in west wagon track, marked "818.7".....	818.84
Freeport, 1 mile east by 1 mile south of, at crossroads, in triangular grass plot, on north side of tree (road to east jogs 50 feet to south here); copper nail in notch cut in root of 36-inch maple tree, marked "801.1".....	801.24
T. 4 N., R. 8 W., southwest corner of sec. 5, at northeast corner of crossroads; copper nail in top of corner fence post, marked "813.1".....	813.24
T. 4 N., R. 8 W., northeast corner of sec. 9, at southwest corner of crossroads, on school grounds of Carlton schoolhouse (district 10), 75 feet west of crossing, in line with telephone poles and about halfway between the first two to west; iron post stamped "820".....	819.784

MUIR QUADRANGLE.

[Latitude 42° 45'-43°; longitude 84° 45'-85°.]

From Sunfield east along highway to Grand Ledge.

T. 4 N., R. 6 W., northeast corner of sec. 10, at southwest corner of crossroads, 3 feet north by 3.5 feet west of corner fence post, 4 feet west of sidewalk; iron post stamped "Prim. Trav. Sta. No. 25, 858, 1911".....	858.066
T. 4 N., R. 6 W., southeast corner of sec. 2, southeast corner of concrete porch to schoolhouse standing at northwest corner of crossroads and facing south; chiseled square marked "866.1".....	866.21
Sunfield, 0.5 mile south by 1.8 miles east of, at southwest corner of crossroads, west end of concrete end of bridge across north-south road; chiseled square on highest point marked "827.3".....	827.48
T. 4 N., R. 5 W., southwest corner of sec. 5, northeast corner of crossroad, 4 feet south of east-west fence and 10 feet east of corner fence post; iron post stamped "848 1911".....	848.128
T. 4 N., R. 5 W., southwest corner of sec. 4, at northeast corner of T road north, on stone sunk in ground 3 feet north of north track of east-west road, 20 feet south of 8-inch elm tree; chiseled square marked "865.5".....	865.65

Mulliken, 0.5 mile south of, at southeast corner of crossroads, northwest corner of school yard (Roxana, district 2), 2 feet northeast of 6-inch poplar tree, 15 feet east of concrete sidewalk; iron post stamped "Prim. Trav. Sta. No. 26, 870, 1911".....	Feet. 870.551
T. 4 N., R. 5 W., southeast corner of sec. 3, northwest corner of crossroads, in edge of road, at west end of culvert across north-south road, in row of stones across road; chiseled square on highest point of large stone, marked "871.2".....	871.41
T. 4 N., R. 5 W., southwest corner of sec. 1, at northeast corner of crossroads, on highest point of large boulder lying farthest south of four along outside of road as it curves to north; chiseled square marked "872.4".....	872.53
T. 4 N., R. 4 W., southwest corner of sec. 6, northeast corner of crossroads, 20 feet north of creek and 3 feet west of rail fence; iron post stamped "854 1911".....	854.459
T. 4 N., R. 4 W., northeast corner of sec. 7, at southwest corner of crossroads, in northeast corner of Free Methodist Church yard, 4 feet east of telephone pole; iron post stamped "Prim. Trav. Sta. No. 2, 875, 1909".....	875.286
T. 4 N., R. 4 W., 60 feet east of northwest corner of sec. 9, south side of road in end of unused culvert (creek turns east here along road); chiseled square on large stone, marked "879.4".....	879.60
T. 4 N., R. 4 W., northwest corner of sec. 10, southeast corner of crossroads; chiseled square on highest point of large flat boulder, marked "867.8".....	867.96
Grand Ledge, at west city limits, on Jefferson Avenue running east-west, at southeast corner of crossroads, 4 feet northwest of telephone and power line poles which stand side by side in edge of road; chiseled cross on highest point of large stone, marked "850.4".....	850.56
Grand Ledge, at north corner of Jackson and East Scott streets, on top of fire plug, on the one to south of two nuts holding top on, marked "848.6".....	848.75
Centerville, Coldwater, Kalamazoo, Reading, Schoolcraft, Sturgis, and Wayland quadrangles.	

ALLEGAN, BRANCH, HILLSDALE, KALAMAZOO, AND ST. JOSEPH COUNTIES.

The elevations in the following list were determined by primary leveling, extended from bench marks established in 1911 on Grand Rapids and Edon quadrangles, and accord with Bulletin 461.

The leveling was done in 1913 in Kalamazoo, Schoolcraft, and Wayland quadrangles by E. C. Bibbee; in Coldwater, Reading, and Sturgis quadrangles by R. G. Clinite; and in Centerville quadrangle by Bibbee and Clinite.

CENTERVILLE QUADRANGLE.

[Latitude 41° 45'-42°; longitude 85° 30'-85° 45'.]

From point near Moore Park south along Lake Shore & Michigan Southern Ry. to Three Rivers, thence east along highway to Centerville, thence south along highways to Klinger, thence east 1 mile.

Moore Park, 2 miles south of, about 0.4 mile west of southeast corner of sec. 31, T. 5 S., R. 11 W., in base of telegraph pole; rail spike, marked "827.8".....	Feet. 828.00
Three Rivers, 2 miles north of, near northeast corner of NW. ¼ sec. 7, T. 6 S., R. 11 W., at southeast corner of crossroads, in root of 2-foot maple tree; rail spike.....	821.34

	Feet.
Three Rivers, in north side of Lafayette Park on Main Street, opposite schoolhouse; iron post stamped "820".....	820.592
Three Rivers, Lake Shore & Michigan Southern Ry. station, 400 feet south of, on west side of south abutment of iron bridge over St. Joseph River; chiseled square, marked "798.3".....	798.53
St. Joseph River, below dam at railroad bridge; surface of water Sept. 29, 1913.....	785.7
Three Rivers, crossing of Lake Shore & Michigan Southern and Michigan Central railroads; top of rail.....	801.0
Three Rivers, on east side of south abutment of wagon bridge over St. Joseph River; chiseled square, marked "801.7".....	802.01
St. Joseph River, above dam; surface of water.....	793.7
Three Rivers, 2 miles east of, 150 feet west of C. Rammelic residence, south end of tile 5 feet north of south road line; highest point marked "812.4".....	812.64
Three Rivers, 3.2 miles east of, on south side of road, 700 feet west of D. O. Young residence, in root of oak tree; nail head.....	825.30
Centerville station, 2 miles west by 0.5 mile north of, near southeast corner of sec. 15, T. 6 S., R. 11 W.; iron post stamped "825".....	825.684
Centerville station, 2 miles west of, 120 feet south of railroad, at southeast corner of T road east, on large granite boulder; highest point marked "826.1".....	826.37
Centerville station, 0.99 mile west of, on line between secs. 23 and 24, on north side of public road, on concrete base for post; chiseled square marked "833.5".....	833.80
Centerville station, 120 feet east of, 27 feet south of railroad, on east side of public road, 4 feet south of railroad-crossing sign, in top of 10 by 10 inch post level with ground; rail spike.....	822.54
Prairie River; surface of water October 1, 1913.....	800
Centerville, 4 feet east of north entrance to county courthouse; iron post stamped "826".....	826.353
Centerville, 0.84 mile south of, at northeast corner of sec. 36, T. 6 S., R. 11 W., on large granite boulder, 4 feet north of south fence line; chiseled square marked "854.4".....	854.62
Vevee Lakes; surface of water October 1, 1913.....	855
Centerville, 1.88 miles south of, at southwest corner of sec. 31, T. 6 S., R. 10 W., on east side of road opposite T road west, on large granite rock; chiseled square marked "868.0".....	868.25
Centerville, 1.88 miles south by 0.5 mile west of, 25 feet south of northwest corner of NE. $\frac{1}{4}$ sec. 1, T. 7 S., R. 11 W., in base of telephone pole; 60-penny spike marked "853.7".....	853.94
Centerville, 2.88 miles south by 0.5 mile west of, at southwest corner of SE. $\frac{1}{4}$ sec. 1, T. 7 S., R. 11 W., in corner fence post; rail spike marked "884.6".....	884.85
Centerville, 3.88 miles south by 0.5 mile west of, near northeast corner of NW. $\frac{1}{4}$ sec. 13, T. 7 S., R. 11 W., on large granite boulder, 3 feet west of south end of culvert; chiseled square marked "892.3".....	892.54
Centerville, 4.88 miles south of, 30 feet south by 23 feet west of northeast corner of NW. $\frac{1}{4}$ sec. 24, T. 5 S., R. 11 W.; iron post stamped "838".....	838.228
Centerville, 5.84 miles south of, near northwest corner of NE. $\frac{1}{4}$ sec. 26, T. 7 S., R. 11 W., 25 feet south of southeast corner of crossroads, 2 feet east of east line of road, in top of 2-foot stump; 60-penny spike.....	834.47
Centerville, 6.84 miles south of, 60 feet north of southwest corner of SE. $\frac{1}{4}$ sec. 26, T. 7 S., R. 11 W., in base of telephone pole; rail spike.....	858.34

	Feet.
Centerville, 8 miles south of, 100 feet north of Charles Miller's cottage on Klinger Lake, on west side of south abutment of iron bridge over inlet to Klinger Lake; chiseled square marked "809.4".....	809. 70
Klinger Lake; surface of water October 4, 1913.....	807. 0
Klinger station, 0.67 mile north of, about 0.25 mile south of northwest corner of sec. 6, T. 8 S., R. 10 W., on south side of east abutment of concrete culvert opposite T road west; chiseled square.....	847. 30
Klinger station, 600 feet northeast of, in southwest angle of crossroads, 2 feet south of corner post, about 0.1 mile south of northeast corner of sec. 12, T. 8 S., R. 11 W.; iron post stamped "858 Mich.".....	858. 564
Klinger station, 1.1 miles east of, in northwest angle at crossing of Lake Shore & Michigan Southern Ry. and highway, in base of crossing post; rail spike.....	874. 05

**From Centerville along highways north and west to Fisher Lake, thence south to point
4 miles east of Three Rivers.**

Centerville station, 120 feet east of, 27 feet south of railroad, on east side of public road, 4 feet south of railroad-crossing sign, in top of 10 by 10 inch post level with ground; rail spike.....	822. 54
T. 6 S., R. 10 W., near quarter corner on north side of sec. 19, 1 mile north by 0.5 mile east of Centerville, in southeast angle of crossroads, at fence corner, in charred osage stump; copper nail.....	834. 20
T. 6 S., R. 10 W., quarter corner on west side of sec. 17, 1.5 miles north by 1 mile east of Centerville, in northeast angle of road forks, in southwest corner of yard of Wilcox School, in root of 30-inch oak tree; copper nail..	836. 54
T. 6 S., R. 10 W., at southeast corner of sec. 6, in northwest angle of T road west, 10 feet north of corner post; iron post stamped "870 Mich.".....	870. 656
Bridge over St. Joseph River, east side of north span, on concrete girder; painted square.....	832. 23
St. Joseph River, under bridge; surface of water December 11, 1913.....	825. 7
T. 6 S., R. 10 W., sec. 6, at center of, in northeast angle of T road north, 5 feet west of corner of rail fence, in root of twin-oak tree; copper nail.....	838. 93
T. 5 S., R. 10 W., sec. 31, quarter corner on south side of, in northeast angle of T road east, 10 feet north of corner post, in top of peg; copper nail....	837. 45
T. 5 S., R. 10 W., sec. 30, quarter corner on south side of, in northeast angle of crossroads, top of concrete base of corner post; raised part of letter "D".	846. 46
T. 5 S., R. 11 W., sec. 36, quarter corner on north side of, in southeast angle of T road south, 30 feet east of corner post, in root of 16-inch maple tree; copper nail.....	832. 56
T. 5 S., R. 11 W., sec. 25, at southwest corner of, 27 feet north by 30 feet east of center of crossroads, in school yard; iron post stamped "832 Mich.".....	832. 433
T. 5 S., R. 11 W., sec. 2, at southeast corner of, 35 feet north by 16 feet west of center of crossroads, in root of 20-inch oak tree; copper nail.....	827. 02
T. 6 S., R. 11 W., sec. 3, 0.25 mile north of quarter corner on east side of, 45 feet south by 25 feet west of center of T road east, in root of 16-inch white-oak tree; copper nail.....	832. 42
T. 6 S., R. 11 W., sec. 10, about 0.25 mile north by 0.25 mile east of center of, on east side at north end of steel highway bridge over St. Joseph River, at north end of steel girder; head of rivet.....	808. 99
St. Joseph River, under above-named bridge; surface of water.....	795. 5
T. 6 S., R. 11 W., sec. 10, at southeast corner of, 27 feet north by 30 feet west of center of T road east, in root of 18-inch maple tree; copper nail.....	828. 18

Centerville station, 2 miles west by 0.5 mile north of, near southeast corner of sec. 15, T. 6 S., R. 11 W., in northwest angle of crossroads, 5 feet west of corner post; iron post stamped "825 Mich."	Feet. 825. 684
From Three Rivers west along highways 1.5 miles, thence north 2.5 miles, thence west to sec. 31, T. 5 S., R. 12 W., thence south and southeast over devious route to Constantine, thence northeast and east to point 3 miles south of Centerville.	
Three Rivers, in north side of Lafayette Park, on Main Street opposite schoolhouse; iron post stamped "820 Mich."	820. 592
Three Rivers, 1.5 miles west by 0.4 mile north of, northwest corner of T. 6 S., R. 12 W., sec. 13, opposite T road north, 16 feet east of corner post, in base of telephone anchor post; rail spike	838. 24
T. 6 S., R. 12 W., sec. 1, at southwest corner of, 25 feet east of center of T road west, in stump of scrub oak; copper nail	831.00
T. 6 S., R. 12 W., sec. 2, quarter corner on east side of, in southwest angle of crossroads, in root of 14-inch lone elm tree; copper nail	829. 43
T. 5 S., R. 12 W., sec. 36, quarter corner on west side of, in northeast angle of crossroads, 7 feet north of corner post; iron post stamped "835 Mich." ..	834. 922
T. 5 S., R. 12 W., sec. 34, quarter corner on east side of, 35 feet east by 27 feet north of center of T road north, in root of 30-inch oak tree; copper nail	871. 80
T. 5 S., R. 12 W., sec. 33, quarter corner on east side of, in northwest angle of T road north, at southeast corner of yard of Mount Zim school, in root of 10-inch maple tree; copper nail	930. 26
T. 5 S., R. 12 W., sec. 33, quarter corner on west side of, in northeast angle of crossroads, 20 feet east of corner post, 2.5 feet west of 20-inch oak tree, in top of stump; copper nail	978. 27
T. 5 S., R. 12 W., sec. 31, quarter corner on east side of, 12 feet south by 30 feet west of center of T road east, in root of 5-inch oak tree; copper nail ..	922. 57
T. 5 S., R. 12 W., sec. 32, at northwest corner of, in southeast angle of crossroads, 10 feet east of corner post; iron post stamped "926 Mich." ..	926. 111
Tps. 5 and 6 S., R. 12 W., corner of secs. 31, 32, and 5, 6; painted circle on corner stone	912. 90
T. 6 S., R. 12 W., sec. 5, quarter corner on west side of, 40 feet south by 16 feet east of center of crossroads, in top of charred oak stump; copper nail ..	929. 17
T. 6 S., R. 12 W., sec. 8, northwest corner of, in southeast angle of crossroads, 60 feet west of southwest corner of schoolhouse, in top of oak stump; copper nail	985. 49
T. 6 S., R. 12 W., sec. 8, near southwest corner of, 27 feet south by 60 feet west of center of T road east, 600 feet north of north shore of Clear Lake, in root of 10-inch white-oak tree; copper nail	897. 88
T. 6 S., R. 12 W., about 0.2 mile south of quarter corner on east side of sec. 18, in northwest angle of road forks, 15 feet west by 25 feet north of center of road intersection; iron post stamped "883 Mich."	883. 248
T. 6 S., R. 12 W., sec. 20, 0.4 mile north of center of, 800 feet west of south end of Clear Lake, 100 feet northwest of silo in farmyard, on south side of turn in road, in root of 14-inch hickory tree; copper nail	906. 87
T. 6 S., R. 12 W., sec. 16, 0.25 mile west by 0.25 mile south of center of, in northwest angle of crossroads, 4 feet south of corner post, on top of boulder; painted circle	946. 74
T. 6 S., R. 12 W., sec. 21, at center of, in center of intersection of T road south, in root of 38-inch oak tree; rail spike	913. 31
T. 6 S., R. 12 W., sec. 28, at center of, in northwest angle of road forks, in northeast corner of school yard, 3 feet north of corner post, 0.5 mile north of Fabius; iron post stamped "913 Mich."	913. 133

	Feet.
Fabius, in front of station; top of rail.....	901. 1
Fabius, 0.25 mile east of, in southwest angle of T road south, 5 feet east of corner post, in root of 20-inch elm tree; copper nail.....	904. 23
T. 6 S., R. 12 W., sec. 33, 450 feet north of southeast corner of, in southwest angle of T road south, 60 feet south by 10 feet west of center of road intersection, in top of stump; copper nail.....	888. 68
T. 7 S., R. 12 W., sec. 10, 190 feet south by 22 feet east of northwest corner of, in southeast angle of T road east, in top of 18-inch white-oak stump; copper nail.....	896. 95
T. 7 S., R. 12 W., sec. 9, 300 feet north of quarter corner on east side of, in northwest angle of road forks, 400 feet northwest of brick school-house, 3 feet north of corner post; iron post stamped "885 Mich.".....	885. 649
T. 7 S., R. 12 W., sec. 10, quarter corner on south side of, in northeast angle of road forks, south end of row of maple trees, in root of 13-inch maple tree; copper nail.....	818. 69
T. 7 S., R. 12 W., 0.2 mile south of quarter corner on east side of sec. 15, in northwest angle of crossroads, 2 feet north of corner post, in base of telephone pole; rail spike.....	801. 11
Constantine, southwest corner of intersection of upper Mottville road and North Washington Street, 2 feet south of corner post; iron post stamped "781 Mich.".....	781. 838
Constantine, south side of power house, below dam on St. Joseph River, at foot of race; surface of water, Nov. 26, 1913.....	770. 6
Lake Shore & Michigan Southern Ry. bench mark, in base of semaphore post; track spike (railroad elevation, 224.65).....	797. 56
T. 7 S., R. 11 W., sec. 18, southwest corner of, 1.4 miles northeast of Constantine, in northeast angle of road forks, 3 feet east of corner post, in top of small stump; copper nail.....	803. 58
T. 7 S., R. 11 W., sec. 18, 0.25 mile west of quarter corner on north side of, in southeast angle of T road east, 40 feet south of corner post, in root of 20-inch sycamore tree; copper nail.....	802. 22
T. 7 S., R. 11 W., 0.25 mile west of quarter corner between secs. 6 and 7, 30 feet west of center of T road east, in root of 6-inch elm tree; copper nail..	800. 73
T. 7 S., R. 11 W., sec. 5, in southwest corner of, at northeast corner of crossroads, in school yard, 4 feet north of telephone pole; iron post stamped "807 Mich.".....	806. 905
T. 7 S., R. 11 W., sec. 9, at northwest corner of, in southeast angle of crossroads, 5 feet north of corner post, in root of 16-inch oak tree; copper nail..	811. 78
T. 7 S., R. 11 W., sec. 9, in northeast corner of, at southwest corner of crossroads, 20 feet south by 50 feet west of section corner, in root of 18-inch oak tree; copper nail.....	815. 71
T. 7 S., R. 11 W., sec. 3, in southeast corner of, in northwest angle of crossroads, 20 feet north by 35 feet west of section corner, 6 feet west of corner post; iron post stamped "825 Mich.".....	825. 011
T. 7 S., R. 11 W., sec. 2, in southeast corner of, in northwest angle of T road north, at fence corner, in base of 24-inch oak tree; copper nail.....	900. 84
Centerville, 2.88 miles south by 0.5 mile west of, in northeast angle of crossroads, quarter corner on south side of sec. 1, T. 7 S., R. 11 W., in corner fence post; rail spike.....	884. 85

From Klinger station west along Lake Shore & Michigan Southern Ry. and highway to Mottville, thence northeast to Constantine.

Klinger station, 600 feet northeast of, in south west angle of crossroads, 2 feet south of corner post, about 0.1 mile south of northeast corner of sec. 12, T. 8 S., R. 11 W.; iron post stamped "858 Mich.".....	Feet. 858. 564
Klinger station, 1 mile west of, 180 feet southeast of Oakwood Crossing depot, 40 feet south of center of track of Lake Shore & Michigan Southern Ry., in root of chestnut tree; copper nail.....	853. 52
Klinger station, 2 miles west of, on north side of Lake Shore & Michigan Southern Ry. right of way, 920 feet east of milestone C 124, 13 feet east of north-south fence line, in top of pine stump; copper nail.....	837. 55
T. 8 S., R. 11 W., about 0.25 mile west of quarter corner on south side of sec. 3, in northwest angle of crossroads, in southwest corner of school yard, 3 feet north of corner post; iron post stamped "822 Mich.".....	822. 267
T. 8 S., R. 11 W., sec. 4, about 0.25 mile south of quarter corner on west side of, in southeast angle of crossroads, 12 feet east of corner post, in root of 12-inch maple tree; copper nail.....	826. 04
T. 8 S., R. 11 W., about 0.15 mile south of quarter corner on west side of sec. 5, in northeast angle of T road north, 18 feet south of corner post, on east end of 8-inch tile drain; painted square.....	816. 05
White Pigeon, in southeast corner of public-school yard, 2 feet north of corner post; iron post stamped "819 Mich.".....	819. 220
White Pigeon, 1 mile west of, in southeast angle of crossroads, 6 feet north of corner post, in base of telephone pole; rail spike.....	817. 37
White Pigeon, 2 miles west of, on northwest angle of crossroads, 60 feet west of corner post, 4 feet south of fence, opposite school, in root of 16-inch maple tree; rail spike.....	812. 84
T. 8 S., R. 12 W., sec. 3, just north of the southwest corner of, 3 miles west of White Pigeon, on the "Chicago Turnpike," in northeast angle of crossroads, 12 feet east of corner post; iron post stamped "808 Mich.".....	808. 109
White Pigeon, 4 miles west of, in southeast angle of crossroads, in northwest corner of farmyard, in root of 20-inch maple tree; copper nail.....	791. 67
Mottville, 0.5 mile east of, in southeast angle of crossroads, 40 feet east of corner post, in base of telephone pole; rail spike.....	788. 48
Mottville, east edge of village, in northwest angle of crossroads, in southeast corner of school yard; iron post stamped "783 Mich.".....	783. 566
Mottville, at covered bridge over St. Joseph River; surface of water Nov. 24, 1913 (12.9 feet below bridge floor).....	757. 3
Mottville, 0.8 mile northwest of, 27 feet east of center of road forks, in root of 30-inch beech tree; copper nail.....	795. 35
Mottville, 1.4 miles (by road) north of, just south of center of sec. 31, T. 7 S., R. 12 W., 60 feet west by 10 feet south of center of T road north, 4 feet west of drain, in top of 8-inch elm stump; copper nail.....	788. 97
Mottville Reservoir; surface of water Nov. 25, 1913.....	785. 7
Mottville, 2.7 miles (by road) northeast of, just north of center of sec. 32, T. 7 S., R. 12 W., in southeast angle of private T road south, 1 foot south of corner post, in base of telephone pole; spike.....	794. 70
T. 7 S., R. 12 W., sec. 33, 0.25 mile west of quarter corner on north side of, 3.5 miles northeast of Mottville, on south side of Mottville-Constantine road, 120 feet west of center of T road north, 10 feet east of northeast corner of J. Massing's farmyard, in top of 30-inch elm stump; copper nail.....	792. 40

T. 7 S., R. 12 W., sec. 28, 0.4 mile east of center of, opposite center of T road west, 30 feet east of center of road intersection, in root of 16-inch elm tree; copper nail.....	793. 63
Constantine, 0.6 mile west of, on south side of road, opposite dim private road north, 180 feet northeast of red barn, 16 feet east of north-south fence line, in base of telephone pole; rail spike.....	788. 95

From Mottville south to Indiana-Michigan State line.

Mottville, east edge of village, in northwest angle of crossroads, in southeast corner of school yard; iron post stamped "783 Mich.".....	783. 566
Mottville, 1.1 miles south of, 36 feet east by 90 feet north of center of T road east, in field, in root on east side of 30-inch maple tree; copper nail.....	785. 94
Mottville, 2.3 miles south of, in southwest angle of crossroads, 12 feet south of corner post, in root of lone oak tree; copper nail.....	789. 09
Mottville, 2.8 miles south by 0.6 mile east of, on north side of State line, 20 feet north by 14 feet west of center of T road south, in top of oak peg; copper nail.....	794. 02

From Indiana-Michigan State line north to Klinger station.

T. 8 S., R. 11 W., sec. 13, near southwest corner of, on west side of stone bridge over channel between Pickerel and Aldridge lakes; painted circle.....	819. 24
Pickerel and Aldridge lakes, at bridge over channel bed; surface of water Dec. 19, 1913.....	816. 2
T. 8 S., R. 11 W., sec. 13, 0.25 mile west of quarter corner on north side of, in southeast angle of T road south, 50 feet east of fence corner, in root of 13-inch elm tree; copper nail.....	854. 76
T. 8 S., R. 10 W., sec. 7, at southwest corner of, in northeast angle of crossroads, 0.8 mile south of Klinger station, at fence corner, 10 feet north of telephone pole, in top of osage stump; copper nail.....	865. 87
Klinger station, 600 feet northeast of, in southwest angle of crossroads, 2 feet south of corner post, about 0.1 mile south of northeast corner of sec. 12, T. 8 S., R. 11 W.; iron post stamped "858 Mich.".....	858. 564

COLDWATER QUADRANGLE.

[Latitude 41° 45'-42°; longitude 85°-85° 15'.] °

From point 5 miles east of Fawn River east along highways to point near Kinderhook.

T. 8 S., R. 8 W., sec. 9, about 0.25 mile north by 0.25 mile east of center of, in northwest angle of T road west, 120 feet north of brick schoolhouse, in root of 20-inch maple tree; copper nail.....	915. 32
T. 8 S., R. 8 W., sec. 10, at center of, in southwest angle of T road south, 38 feet southwest of center of road intersection, in root of 18-inch maple tree; copper nail.....	933. 08
T. 8 S., R. 8 W., quarter corner between secs. 10 and 11, in northeast angle of crossroads, 7 feet north of corner post; iron post stamped "933 Mich.".....	932. 884
T. 8 S., R. 8 W., sec. 12, near southwest corner of, 16 feet northeast of center of road forks, in base of telephone pole; rail spike.....	949. 30
T. 8 S., R. 7 W., sec. 7, at southwest corner of, in northeast angle of T road east, 50 feet east of corner post, in root of 36-inch oak tree; copper nail..	967. 13
T. 8 S., R. 7 W., sec. 7, at southeast corner of, in northwest angle of crossroads, 6 feet west of corner post; iron post stamped "993 Mich.".....	993. 365
T. 8 S., R. 7 W., sec. 8, in southeast corner of, 200 feet west of center of crossroads, in southwest corner of yard of West Gilead School, in root of 20-inch maple tree; copper nail.....	997. 12

T. 8 S., R. 7 W., sec. 9, in southeast corner of, in northwest angle of crossroads, 12 feet south of corner post, on headstone of draw; bottom of chiseled square.....	Feet. 962.12
T. 8 S., R. 7 W., sec. 15, at northeast corner of, in southwest angle of crossroads, in northeast corner of Ira Taylor's yard, in root of 18-inch hickory tree; copper nail.....	961.88
East Gilead, in northeast angle of crossroads, 70 feet north of Carroll's store; iron post stamped "981 Mich.".....	980.955
East Gilead, 1 mile east of, 50 feet southeast of center of crossroads, in root of 12-inch maple tree; copper nail.....	978.92
T. 8 S., R. 6 W., quarter corner between secs. 7 and 18, at center of T road south, on highest point of section stone; painted circle.....	987.84
T. 8 S., R. 6 W., sec. 17, near the northwest corner of, in southeast angle of T road south, at fence corner, in root of 15-inch maple tree; copper nail..	1,005.86
T. 8 S., R. 6 W., about 0.4 mile south of quarter corner between secs. 8 and 9, opposite center of T road south, 40 feet north of center of road intersection, in top of 6-inch hickory stump; copper nail.....	1,024.67
Kinderhook, 1 mile south of, on west shore of Silver Lake, in northwest angle of T road west, 12 feet north of corner post; iron post stamped "999 Mich.".....	999.592
Silver Lake; surface of water October 31, 1913.....	991.9

KALAMAZOO QUADRANGLE.

[Latitude 42° 15'–42° 30'; longitude 85° 30'–85° 45']

From point near Martin south along Grand Rapids & Indiana Ry. to Kalamazoo. thence south along Lake Shore & Michigan Southern Ry. 2 miles.

Martin, 2.4 miles south of, 3.4 miles north of Plainwell, 330 feet west of rail-railroad, at northeast corner of crossroads; iron post stamped "787 Mich.".....	786.680
Plainwell, 2.57 miles north of, at southwest corner of T road east at railroad crossing, corner of property with railroad right of way; vertical T rail; highest point painted "732.3".....	732.47
Plainwell, 1.96 miles north of, on west side of south abutment of iron-girder bridge over Willow Creek; chiseled square marked "727.2".....	727.34
Plainwell, 0.75 mile north of, 40 feet east of railroad, 30 feet south of public road, in base of telegraph pole; rail spike marked "727.1.".....	727.28
Plainwell, 185 feet south of, 100 feet northwest of crossing of Grand Rapids & Indiana and Lake Shore & Michigan Southern railroads and electric railroad; iron post stamped "738 Mich.".....	737.914
Plainwell, 0.81 mile south of, 25 feet east of railroad, 30 feet south of public road at railroad crossing, in base of telegraph pole; rail spike marked "731.8".....	731.92
Plainwell, 1.21 miles south of, on east side of south abutment of bridge over Kalamazoo River; chiseled square marked "734.8".....	734.93
Kalamazoo River; surface of water, 9.40 a. m., September 10.....	724
Plainwell, 2.51 miles south of, 50 feet east of railroad, 25 feet north of public road, 0.5 mile north of water tank; iron post stamped "737 Mich.".....	737.245
Cooper, 2.22 miles north of, 45 feet east of railroad, 100 feet south of public road, 0.16 mile south of water tank, in base of telephone pole; rail spike painted "739.6".....	739.72
Cooper, 1.19 miles north of, 70 feet east of railroad, 25 feet south of private crossing, in base of telegraph pole; rail spike painted "747.3".....	747.46
Cooper, 120 feet southeast of, 60 feet north of public road, 60 feet east of railroad, on railroad right of way; iron post stamped "764 Mich.".....	763.727
Cooper, 1 mile south of, at private railroad crossing, east end of 2-foot steel drain under railroad; highest point on small flange; painted "772.7"....	772.91

Cooper, 2.14 miles south of, on inside of large curve, 0.2 mile north of mile-post marked "R. 189, M. 271," 20 feet west of railroad, on large granite boulder; chiseled square marked "770.0".....	Feet. 770. 18
Cooper, 2.52 miles south of, 2.81 miles north of Grand Rapids & Indiana Ry. station at Kalamazoo, in west side of north abutment of concrete bridge; tablet stamped "766 Mich.".....	766. 511
Kalamazoo, 2.23 miles north of, 50 feet west of railroad, 15 feet north of second-class road, in base of telegraph pole; rail spike.....	755. 32
Kalamazoo, 0.99 mile north of, 30 feet north of milepost marked "R. 187, M. 273," on south side of east end of concrete arch culvert; chiseled square.....	765. 31
Kalamazoo, 0.21 mile north of, 25 feet northeast of Grand Rapids & Indiana and Michigan Central railroad crossing, on southwest corner of concrete signal stand, on head of bolt that fastens signal stand to concrete base; highest point painted "772.5".....	772. 91
Kalamazoo, Michigan Central R. R. station; top of rail.....	778. 7
Kalamazoo, Grand Rapids & Indiana Ry. station; top of rail.....	769. 9
Kalamazoo, in north end of door sill at east entrance to courthouse; tablet stamped "793 Mich.".....	793. 352
Kalamazoo, 0.32 mile south of Grand Rapids & Indiana Ry. station, 30 feet south of Lake Shore & Michigan Southern Ry. crossing, opposite signal tower, on concrete base of support for signal arm; chiseled square painted "761.0".....	761. 38
Kalamazoo, 1.41 miles south of Grand Rapids & Indiana Ry. station, 1.1 miles south of Grand Rapids & Indiana Ry. crossing on Lake Shore & Michigan Southern Ry., 40 feet west of R. Somers grocery, 25 feet east of railroad, on north side of concrete sidewalk, 1 foot from telegraph pole; chiseled square painted "775.0".....	775. 37
Kalamazoo, 2 miles south of crossing of Grand Rapids & Indiana and Lake Shore & Michigan Southern railroads, 75 feet northeast of water tank, on southwest corner of concrete foundation to water tank; chiseled square painted "806.0".....	806. 38

READING QUADRANGLE.

[Latitude 41° 45'-42°; longitude 84° 45'-85°.]

From point near Kinderhook along highways east and south to Camden.

Kinderhook, 1 mile south by 1 mile east of, on north side of road, 100 feet east of north-south fence line, in root of small hickory stump; copper nail.....	1, 017. 72
T. 8 S., R. 6 W., about 0.15 mile north of quarter corner between secs. 13 and 14, 55 feet southeast of junction of T road south, at corner of rail fence; iron post stamped "1021 Mich.".....	1, 020. 866
T. 8 S., R. 5 W., sec 18, at center of, 3 miles north of Fremont, Ind., at center of crossroads, on section stone; chiseled circle.....	1, 048. 11
T. 8 S., R. 5 W., sec. 17, quarter corner on east side of, in northwest angle of crossroads, 12 feet west of corner post; iron post stamped "1061 Mich.".....	1, 061. 583
T. 8 S., R. 5 W., sec. 16, quarter corner on east side of, in northwest angle of crossroads, in root of lone 4-foot oak tree; copper nail.....	1, 071. 21
T. 8 S., R. 5 W., sec. 14, quarter corner on west side of, in northeast angle of Troad north, 30 feet east of corner, in root of 12-foot elm tree; copper nail.....	1, 089. 46
T. 8 S., R. 5 W., sec. 14, quarter corner on east side of, in southwest angle of crossroads, in northeast corner of school yard; iron post stamped "1085 Mich.".....	1, 085. 017

T. 8 S., R. 5 W., sec. 13, quarter corner on east side of, at jog in road, 30 feet west of Branch-Hillsdale county line, 3 feet east of telephone pole, in top of stump, in copper washer; spike.....	Feet. 1,073.74
Montgomery, opposite public school, 80 feet northeast of center of crossroads, in root of 14-inch oak tree; copper nail.....	1,046.95
T. 8 S., R. 4 W., sec. 17, quarter corner on east side of, in northwest angle of T road west, 5 feet west of corner post, 2.7 feet east of 6-inch white-oak tree, in limestone rock, 6 inches below surface of ground; bronze tablet stamped "1039 Mich.".....	1,039.087
T. 8 S., R. 4 W., sec. 16, quarter corner on south side of, 8 feet north of center of turn in road, 20 feet southwest of fence corner, highest point on rock; painted circle.....	1,066.92
Camden, at north edge of village, 150 feet south of road forks, creek crossing on main north-south street, west end of stone abutment, top course; bottom of chiseled square.....	986.30

SCHOOLCRAFT QUADRANGLE.

[Latitude 42°-42° 15'; longitude 85° 30'-85° 45'.]

From point near Kalamazoo south along Lake Shore & Michigan Southern Ry. to point 1 mile south of Moore Park.

Portage, 3.2 miles north of, 3 feet north of public road, 25 feet west of railroad, about 300 feet southwest of a park; iron post stamped "822".....	822.568
Portage, 2.15 miles north of, vertical T rail at south end of rack for extra rails, 60 feet south of railroad crossing, 100 feet south of post marked "Sec. 11 and 12," highest point painted "851.3".....	851.52
Portage, 1.15 miles north of, at south end of rack for rails, at mile sign marked "W P 31, G R 64"; top of vertical T rail painted "847.0".....	847.19
Portage, at the southeast corner of crossroads, 100 feet northeast of station, 300 feet west of post office; iron post stamped "866".....	866.608
Portage, 1.09 miles south of, 100 feet east of public road, 450 feet south of J. S. Chubb's residence, in base of telegraph pole; rail spike painted "874.7".....	874.87
Portage, 2.13 miles south of, 2 feet west of railroad property line, in public road, in root of hickory tree 20 inches in diameter; rail spike painted "884.9".....	885.12
Portage, 3.22 miles south of, on east side of public road, opposite Frank Van Hoesen's residence, 200 feet north of railroad crossing; iron post stamped "882".....	882.473
Schoolcraft, 1.95 miles north of, at railroad crossing, 25 feet west of railroad, on north side of public road, in top of 1-foot oak stump; rail spike painted "867.0".....	867.21
Schoolcraft, 0.96 mile north of, on east side of railroad, in base of telegraph pole; rail spike painted "879.5".....	879.70
Schoolcraft, 80 feet north of Lake Shore & Michigan Southern Ry. station, 2 feet east of west property line, 2 feet north of public road, on railroad right of way; iron post stamped "879".....	879.386
Lake Shore & Michigan Southern and Grand Trunk railroad crossing.....	876.9
Schoolcraft, 1 mile south of, on east side of concrete foundation to signal for railroad crossing; chiseled square marked "874.3".....	874.54
Schoolcraft, 1.66 miles south of, 25 feet east of railroad, 35 feet south of public road, in base of telegraph pole; rail spike painted "867.4".....	867.58
Schoolcraft, 2.64 miles south of, on east side of railroad, 100 feet north of public road, in base of telegraph pole; rail spike painted "858.4".....	858.61

Flowerfield station, 400 feet south of, on east side of public road, opposite T road west; iron post stamped "855"	Feet. 854.812
Flowerfield station, 1 mile south of, near center of sec. 7, T. 5 S., R. 11 W., in base of railroad-crossing sign, 20 feet west of railroad, 12 feet north of public road; rail spike painted "848.0"	848.23
Flowerfield station, 1.5 miles south of, 0.4 mile west of northeast corner of sec. 18, T. 5 S., R. 11 W., 25 feet east of railroad, 40 feet south of public road, in base of telegraph pole; rail spike painted "851.8"	851.98
Moore Park, 0.92 mile north of, 0.4 mile west of northeast corner of sec. 19, T. 5 S., R. 11 W., 100 feet south of public road, 25 feet east of railroad, in base of telegraph pole; rail spike painted "845.2"	845.43
Moore Park station, 500 feet south of Lake Shore & Michigan Southern Ry. station, about 300 feet west of southeast corner of SW. $\frac{1}{4}$ sec. 19, T. 5 S., R. 11 W., on north side of public road, 2 feet west of railroad right of way; iron post stamped "833"	832.758
Moore Park, 1 mile south of, about 0.4 mile west of southeast corner of sec. 30, T. 5 S., R. 11 W., 40 feet south of public road, 25 feet west of railroad, in base of telegraph pole; rail spike painted "829.7"	829.91

STURGIS QUADRANGLE.

[Latitude 41° 45'-42"; longitude 85° 15'-85° 30'.]

From point near Klinger east along Lake Shore & Michigan Southern Ry. to Sturgis, thence south and east along highways to point 5 miles east of Fawn River.

Klinger station, 2.1 miles east of, in southwest angle of Lake Shore & Michigan Southern Ry. and highway crossing, in base of crossing post; rail spike	883.18
Klinger station, 3.13 miles east of, in southeast angle of Lake Shore & Michigan Southern Ry. and highway crossing, 52 feet south of center of track, 2 feet west of fence; iron post stamped "893 Mich."	893.080
Klinger station, 4.15 miles east of, in southwest angle of Lake Shore & Michigan Southern Ry. and highway crossing, 35 feet south of center of track, in root of 20-inch maple stump; rail spike	905.19
Sturgis, 0.35 mile west of, in southeast angle of Lake Shore & Michigan Southern Ry. and highway crossing, 15 feet southeast of crossing board, in base of telephone pole; rail spike	913.05
Sturgis, 450 feet west of Lake Shore & Michigan Southern Ry. station, 11 feet north of lone maple tree in station park; iron post stamped "921 Mich."	920.828
Sturgis, in front of station; top of rail	922.3
Sturgis, at east corporate limits, in northwest corner of East Chicago St. and Lake View Ave., in root of 18-inch maple tree; spike	930.27
Sturgis, 1.3 miles south by 0.5 mile east of, T. 8 S., Rs. 9 and 10 W., corner of secs. 7 and 18, and 12 and 13, respectively, on highest point on section stone; painted square	898.44
T. 8 S., R. 9 W., sec. 18, at northeast corner of, in southwest angle, 90 feet west of center of cross roads, 65 feet northwest of Nabor schoolhouse, in root of 16-inch maple tree; rail spike	905.40
T. 8 S., R. 9 W., sec. 16, at quarter corner on north side of, in southeast angle of T road south, 8 feet west of corner post, highest point on large granite boulder; painted square	907.52
Fawn River, at west edge of village, on north side of east-west street, at Fawn River Union Church, east end of concrete steps, on first step; bottom of chiseled square	890.10

	Feet.
T. 8 S., R. 9 W., sec. 10, at center of, 0.6 mile northeast of Fawn River, at center of road forks, 250 feet south of red brick barn, in center of triangular grass plot; iron post stamped "905 Mich"	905. 609
T. 8 S., R. 9 W., sec. 11, at center of, opposite T road north, 36 feet south of center of road intersection, in root on north side of buckeye tree; copper nail	911. 06
T. 8 S., R. 9 W., sec. 12, at center of opposite T road west, 48 feet east of center of road intersection, in root on west side of 26-inch oak tree; rail spike	923. 10
T. 8 S., Rs. 8 and 9 W., corner of secs. 7 and 18 and 12 and 13, respectively, St. Joseph-Branch county line, center of T road north, in foot of 24-inch oak tree; copper nail	922. 65
T. 8 S., R. 8 W., sec. 18, at northeast corner of, in southwest angle of T road south, 15 feet south of corner post; iron post stamped "917 Mich"	917. 689
T. 8 S., R. 8 W., sec. 8, 0.25 mile north of center of, opposite T road east, in southeast corner of H. N. Good's farmyard, in base of telephone pole; rail spike	914. 33

WAYLAND QUADRANGLE.

[Latitude 42° 30'-42° 45'; longitude 85° 30'-85° 45'.]

From point near Moline south along Grand Rapids & Indiana Ry. to point 1.8 miles south of Martin.

Moline, 0.9 mile north of, at first railroad crossing, 40 feet east of railroad, 27 feet north of public road, in base of telegraph pole; rail spike painted "778.3"	778. 39
Moline, in northwest corner of public school yard; iron post stamped "805 Mich"	805. 474
Moline, in front of station; top of rail	806. 8
Moline, 0.71 mile south of, at first railroad crossing, 20 feet west of railroad, 20 feet east of public road, 30 feet south of crossing, in base of telephone pole; rail spike painted "786.0"	786. 12
Moline, 1.5 miles south of, 3.3 miles north of Wayland, on east side of railroad, about 1,000 feet northeast of large barn, in base of telegraph pole; rail spike	766. 54
Moline, 2.24 miles south of, 2.56 miles north of Wayland, 45 feet west of railroad, 20 feet north of public road, about 0.5 mile north of milepost marked "M. 245"; iron post stamped "756 Mich"	756. 592
Wayland, 1.51 miles north of, on Grand Rapids & Indiana Ry., 10 feet west of electric railroad, on north side of public road, in center of west end of concrete culvert under electric railroad; chiseled square marked "739.6"	739. 75
Wayland, 1 mile north of, 20 feet north of milepost marked "R. 214 M. 246," first drift bolthead at southeast corner of trestle; highest point marked "743.0"	743. 65
Wayland, about 200 feet southwest of station, on north side of public road, 5 feet west of railroad right of way; iron post stamped "746 Mich"	746. 074
Wayland, 0.77 mile south of, 30 feet east of public road, in base of telephone pole; rail spike marked "740.3"	740. 43
Wayland, 1.52 miles south of, 40 feet west of railroad, 20 feet north of public road at railroad crossing, in base of telephone pole; rail spike marked "744.1"	744. 23
Bradley, 0.5 mile north of, at first railroad crossing, 40 feet east of railroad, 20 feet south of public road, in base of telephone pole; rail spike marked "762.5"	762. 62

Bradley, 100 feet south of, on south side of public road, 45 feet east of railroad; iron post stamped "784 Mich".....	Feet. 784.406
Bradley, 0.74 mile south of, at first railroad crossing, in root of elm tree, 60 feet east of railroad on right of way, 25 feet north of public road; copper nail marked "805.7".....	805.84
Bradley, south of, on Grand Rapids & Indiana Ry., at electric overhead crossing; top of rail.....	844.8
Bradley, 1.64 miles south of, 1.2 miles north of Shelbyville, on top of southwest concrete pier at overhead road crossing; chiseled square.....	851.12
Shelbyville, 0.79 mile north of, at first railroad crossing, 50 feet east of railroad, 20 feet north of public road, in root of maple tree; rail spike marked "839.1".....	839.24
Shelbyville, 150 feet east of station, on south side of public road, 100 feet east of railroad, 13 feet north of concrete sidewalk, 150 feet west of post office; iron post stamped "831 Mich".....	831.265
Shelbyville, 0.92 mile south of, at first railroad crossing, 60 feet west of railroad, 17 feet north of public road, in base of telephone pole; rail spike marked "807.2".....	807.32
Shelbyville, 1.94 miles south of, at second railroad crossing, on east side of railroad, at corner of railroad property line and south line of public road, on T rail used as corner post; highest point marked "822.2".....	822.30
Martin, 0.82 mile north of, 50 feet west of railroad, on south side of public road, in base of telephone pole; rail spike marked "822.1".....	822.24
Martin, 150 feet east of, 7 feet south of property line of public road, on railroad right of way; iron post stamped "832 Mich".....	832.499
Monteith station, 0.16 mile north of, 30 feet east of railroad, on north road line and east property line of railroad, on vertical T rail; highest point marked "822.3".....	822.50
Grand Rapids & Indiana and Michigan Central railroad crossing.....	822.0
Martin, 1.83 miles south of, 50 feet west of railroad, 15 feet south of public road, on large granite boulder; chiseled square marked "813.1".....	813.22

Chesaning, Corunna, Fowlerville, Saginaw, and St. Charles quadrangles.

LIVINGSTON, SAGINAW, AND SHIAWASSEE COUNTIES

The elevations in the following list were determined by primary leveling and accord with Bulletin 461 and with elevations determined by the Corps of Engineers, U. S. Army, at Saginaw.

The leveling was done in 1913 by E. C. Bibbee.

CHESANING QUADRANGLE.

[Latitude 43°-43° 15'; longitude 84°-84° 15'.]

From sec. 23, T. 7 N., R. 3 E. north along highways to sec. 29, T. 10 N., R. 4 E

T. 7 N., R. 3 E., 40 feet north by 30 feet east of southwest corner of sec. 12, 5 miles east by 1 mile north of Owosso; iron post stamped "750".....	Feet. 749.789
NOTE.—Moved 4 feet east of this position and elevation not changed.	
T. 7 N., R. 3 E., near southeast corner of sec. 2, 100 feet northwest of crossroads, on southeast corner of first step at entrance to district school No. 5; chiseled square.....	763.91
T. 8 N., R. 3 E., near southeast corner of sec. 35, 10 feet east of northwest corner of crossroads, on large granite boulder; highest point.....	754.83
T. 8 N., R. 3 E., 125 feet northeast of southwest corner of sec. 25, on southwest corner of porch at entrance to Hart schoolhouse; chiseled square....	749.06

	Feet.
T. 8 N., R. 3 E., 0.25 mile west of southeast corner of sec. 26, at northeast corner of T road north; iron post stamped "747".....	746. 517
T. 8 N., R. 3 E., 400 feet west of southeast corner of sec. 23, on south side of east abutment of bridge over creek; chiseled square.....	736. 32
T. 8 N., R. 3 E., 30 feet north of southeast corner of sec. 14, on top of west end of stone-arch culvert; chiseled square.....	734. 39
T. 8 N., R. 3 E., near southwest corner of sec. 12, at northeast corner of crossroads; iron post stamped "730".....	729. 945
T. 8 N., R. 3 E., 480 feet south of northeast corner of sec. 11, on center of west end of stone-arch culvert; chiseled square.....	726. 74
T. 9 N., R. 3 E., rock marking southwest corner of sec. 36, on Shiawassee-Saginaw county line, in center of road north; highest point.....	703. 36
T. 9 N., R. 3 E., near northeast corner of sec. 35, at southwest corner of crossroads; iron post stamped "689".....	688. 744
T. 9 N., R. 3 E., near northwest corner of sec. 25, on south side of west abutment of bridge over ditch, 12 feet southeast of center of crossroads; chiseled square.....	672. 35
T. 9 N., R. 3 E., near northwest corner of sec. 24, 20 feet southwest of center of crossroads, on south side of west abutment of bridge over ditch; chiseled square.....	659. 39
T. 9 N., R. 3 E., near northeast corner of sec. 14, at southwest corner of crossroads, opposite district school No. 9, 2.5 miles due east of Chesaning; iron post stamped "634".....	633. 464
T. 9 N., R. 3 E., near southwest corner of sec. 1, 10 feet northeast of corner of crossroads, on granite boulder; chiseled square.....	619. 21
T. 9 N., R. 4 E., 100 feet east of southwest corner of sec. 6, 20 feet north of center of road; in root of 2-foot white-oak tree; copper nail.....	621. 15
T. 9 N., R. 4 E., near southwest corner of sec. 5, at northeast corner of crossroads, opposite district school No. 5; iron post stamped "620".....	620. 229
T. 9 N., R. 4 E., 300 feet west of northeast corner of sec. 6, opposite T road north, on south side of road, 15 feet north of south fence line, in root of white-oak tree; copper nail.....	611. 74
T. 10 N., R. 4 E., 30 feet southwest of northeast corner of sec. 31, at southwest corner of crossroads, on west end of top of flange of 4-foot steel drain; highest point.....	600. 50
T. 10 N., R. 4 E., near northwest corner of sec. 29, at southwest corner of crossroads, south end of flange on 4-foot steel drain; highest point.....	595. 58

CORUNNA QUADRANGLE.

[Latitude 42° 45'-43"; longitude 84°-84° 15'.]

From sec. 18, T. 4 N., R. 4 E., along highways north to sec. 23, T. 7 N., R. 3 E.

T. 4 N., R. 4 E., near quarter corner on west side of sec. 7, on east side of south abutment of iron bridge over Conway and Cohocta ditch; chiseled square.....	876. 44
T. 4 N., R. 4 E., 20 feet east of quarter corner on west side of sec. 6, 150 feet north of E. H. Young's house, opposite T road west, in root of oak tree; copper nail.....	886. 26
T. 4 N., R. 3 E., 12 feet southwest of northwest corner of sec. 1, on Livingston-Shiawassee county line, in top of 2-foot white-oak stump; copper nail.....	877. 73
T. 5 N., R. 3 E., 50 feet north of southwest corner of sec. 35, on west side of road at T road north, 50 feet north of Livingston-Shiawassee county line; iron post stamped "895".....	894. 629

	Feet.
T. 5 N., R. 3 E., near southwest corner of sec. 26, at northeast corner of small bridge, on rock; chiseled square.....	861. 16
T. 5 N., R. 3 E., near quarter corner on south side of sec. 26; opposite T road north, in root of 5-foot elm tree; copper nail.....	881. 12
T. 5 N., R. 3 E., at quarter corner on north side of sec. 26, on concrete base to corner fence post; chiseled square.....	884. 18
T. 5 N., R. 3 E., near quarter corner on south side of sec. 14, on east side of road, 200 feet north of W. L. Scribner's residence; iron post stamped "876"	875. 654
T. 5 N., R. 3 E., 260 feet east of quarter corner on north side of sec. 14, in root of 2-foot black-oak tree; copper nail.....	867. 28
T. 5 N., R. 3 E., at northwest corner of sec. 12, on concrete base of corner fence post; chiseled square.....	856. 40
T. 5 N., R. 3 E., near quarter corner on west side of sec. 1, 1 mile south of Bancroft, on west side of north abutment of iron bridge over ditch; chiseled square.....	844. 61
Bancroft, 400 feet east of schoolhouse, at northeast corner of crossroads, near center of sec. 36, T. 6 N., R. 3 E.; iron post stamped "844".....	844. 432
T. 6 N., R. 3 E., 0.25 mile west of quarter corner on east side of sec. 26, at southwest corner of crossroads, in center of east end of water trough; chiseled square.....	839. 42
T. 6 N., R. 3 E., 0.25 mile west by 0.1 mile south of northeast corner of sec. 23, 300 feet north of N. P. Harder's residence, on fence line on west side of road, opposite T road east, on large boulder; chiseled square.....	837. 45
T. 6 N., R. 3 E., near center of sec. 14, 25 feet south of public road, in root of 2-foot white-oak tree; copper nail.....	833. 60
T. 6 N., R. 3 E., in center of sec. 11, at southwest corner of crossroads; iron post stamped "818".....	818. 378
T. 6 N., R. 3 E., in SE. $\frac{1}{4}$ sec. 2, 460 feet north of Shiawassee River, on east side of south abutment of iron bridge; chiseled square.....	771. 56
T. 6 N., R. 3 E., 0.25 mile west of center of sec. 2, in center of concrete header at south end of 2-foot steel drain under road; chiseled square.....	779. 30
T. 7 N., R. 3 E., 25 feet northeast of southeast corner of sec. 35, in root of 2 $\frac{1}{2}$ -foot tree, in center of road; copper nail.....	795. 69
Larned, at crossing of Grand Trunk Ry.; top of rail.....	787. 7
Larned, at crossing of Ann Arbor R. R. and S. S. Lines; top of rail.....	786. 5
T. 7 N., R. 3 E., near southwest corner of sec. 25, 2.5 miles southeast of Corunna, at northeast corner of crossroads; iron post stamped "756".....	756. 256
T. 7 N., R. 3 E., 0.5 mile north of southeast corner of sec. 26, 20 feet south of southeast corner of bridge over Shiawassee River, on retaining wall; chiseled square.....	748. 86
Shiawassee River; surface of water July 28, 1913.....	737
T. 7 N., R. 3 E., 0.25 mile south of northeast corner of sec. 23, 300 feet south of Kincade's elevator, at northwest corner of crossroads, on large sandstone rock; chiseled square.....	762. 31
T. 7 N., R. 3 E., near northeast corner of sec. 23, in northeast corner of porch at entrance to schoolhouse; nail head painted white.....	767. 00

FOWLerville QUADRANGLE.

[Latitude 42° 30'–42° 45'; longitude 84°–84° 15'.]

From sec. 14, T. 4 N., R. 3 E., east along highway to sec. 18, T. 4 N., R. 4 E.

T. 4 N., R. 3 E., center of line between secs. 13 and 14, directly in front of J. B. Fuller's house, in small grass plot at junction with T road; iron post stamped "Prim. Trav. Sta. No. 1, 907".....	Feet. 906.815
T. 4 N., R. 4 E., 30 feet north of quarter corner on west side of sec. 18, on large rock; chiseled square.....	909.95

SAGINAW QUADRANGLE.

[Latitude 43° 15'–43° 30'; longitude 83° 45'–84.].

From sec. 20, T. 10 N., R. 4 E., north to Saginaw.

T. 10 N., R. 4 E., near quarter corner on east side of sec. 21, 25 feet southwest of center of crossroads, at southwest corner of bridge over ditch, on top of T rail for abutment; highest point.....	593.64
T. 10 N., R. 4 E., near quarter corner on east side of sec. 22, 30 feet west by 30 feet south of center of T road west; iron post stamped "600".....	599.450
T. 10 N., R. 4 E., near southwest corner of sec. 14, in center of west end of concrete box culvert, 20 feet east of northwest corner of crossroads; chiseled square.....	598.03
T. 10 N., R. 4 E., 1,000 feet north of southeast corner of sec. 11, on west side of road, in root of water-maple tree; copper nail.....	601.50
T. 10 N., R. 4 E., near southeast corner of sec. 2, at northwest corner of crossroads; iron post stamped "595".....	594.785
T. 10 N., R. 4 E., 2,000 feet south of northeast corner of sec. 2, on west side of north abutment of iron bridge over ditch; chiseled square.....	595.19
T. 11 N., R. 4 E., near center of sec. 35, in southwest corner of crossroads, in root of 14-inch maple tree; copper nail.....	596.47
Flint River; surface of water August 4, 1913.....	586.6
T. 11 N., R. 4 E., 30 feet west by 35 feet south of northeast corner of sec. 26, at southwest corner of crossroads; iron post stamped "596".....	595.809
T. 11 N., R. 4 E., 20 feet west by 20 feet south of northeast corner of sec. 23, on west end of steel drain under pike; highest point.....	591.31
Cass River; surface of water August 5, 1913.....	501.1
T. 11 N., R. 4 E., at northeast corner of bridge over Cass River, in top of 12 by 20-inch stringer on top of piling; copper nail.....	588.50
T. 11 N., R. 4 E., 0.7 mile south of South Saginaw (in Forest Lawn Cemetery), on west side of north abutment of bridge over ditch; chiseled square.....	585.98
T. 12 N., R. 4 E., 0.25 mile north of southwest corner of sec. 36, in forks of East Street and Washington Avenue in South Saginaw; iron post stamped "600".....	599.314
South Saginaw, Washington Avenue and Hess Street; intersection.....	593.3
South Saginaw, on east side of sec. 35, T. 12 N., R. 4 E., at corner of Center Street and Washington Avenue, in front of Moeller's drug store, on curb, 3 feet east of fire plug and 3 feet west of pump; chiseled square.....	598.60
South Saginaw, intersection of Washington Avenue and Webber Street.....	594.7
Saginaw, southwest corner of Washington Avenue and Bristol Street, 1 foot east of hitching post, 200 feet southwest to City Hall, on curb; chiseled square.....	601.39
Saginaw, in cement walk at head of stairs on south side of east approach of the Genesee Street bridge; circular copper plate (U. S. C. E. B. M.).....	598.889

From Saginaw along streets to West Saginaw.

West Saginaw, at northwest corner of Salt and Center streets, on top of catch basin at east end of curb; paint spot.....	Feet. 599.90
West Saginaw, northwest corner of Michigan Avenue and Wheeler Street, near A. T. Farrell Manufacturing Co.'s plant, on top of catch basin; paint spot.....	599.34

ST. CHARLES QUADRANGLE.

[Latitude 43° 15'–43° 30'; longitude 84°–84° 15'.]

From sec. 29, T. 10 N., R. 4 E., northeast along highway to sec. 20, T. 10 N., R. 4 E.

T. 10 N., R. 4 E., near center of sec. 19, at southwest corner of McDonald's Corners, 1 mile south of Alicia post office; iron post stamped "595".....	594.644
T. 10 N., R. 4 E., 0.25 mile west of center of sec. 20, 60 feet north of public road, in root of 20-inch white-oak tree; copper nail.....	597.32

From West Saginaw north along highway to southeast corner of sec. 32, T. 13 N., R. 4 E., thence west 5.5 miles, thence south to point near Swan Creek post office, thence east to West Saginaw.

T. 12 N., R. 4 E., 0.25 mile west of center of sec. 33, 12 feet northeast of southwest corner of T road south, at Vogt Corners, in root of 3-foot elm tree; copper nail.....	595.78
T. 12 N., R. 4 E., near quarter corner on east side of sec. 29, at northwest corner of crossroads, southeast corner of Otto school yard; iron post stamped "604".....	604.030
T. 12 N., R. 4 E., near quarter corner on west side of sec. 21, at southeast corner of crossroads, in root of poplar tree; copper nail.....	620.58
T. 12 N., R. 4 E., 25 feet north by 30 feet east of southwest corner of sec. 16, in root of pine stump; copper nail.....	627.08
T. 12 N., R. 4 E., near southeast corner of sec. 8, at west abutment of concrete box culvert, on west side of north end of wing wall; chiseled square.	626.28
T. 12 N., R. 4 E., 20 feet west by 20 feet south of northeast corner of sec. 8, on west end of concrete box culvert; chiseled square.....	627.32
T. 13 N., R. 4 E., 25 feet north by 25 feet west of southeast corner of sec. 32; iron post stamped "627".....	626.262
T. 13 N., R. 4 E., 165 feet west of southeast corner of sec. 31, in northeast corner of foundation for scales, 70 feet west of Lawndale station, head of drift-bolt; highest point.....	636.71
T. 13 N., R. 4 E., 30 feet north by 30 feet east of southwest corner of sec. 31, in base of sugar-maple tree; 40-penny spike.....	627.64
T. 12 N., R. 3 E., 30 feet west by 30 feet south of northeast corner of sec. 2, at southwest corner of crossroads; iron post stamped "627".....	627.218
T. 13 N., R. 3 E., 25 feet north by 25 feet east of southwest corner of sec. 35, about 200 feet east of Tittabawassee River, in root of maple tree; copper nail.....	614.89
T. 12 N., R. 3 E., 100 feet west by 20 feet south of northwest corner of sec. 3, in top of 3-foot elm stump; copper nail.....	621.46
T. 13 N., R. 3 E., 0.5 mile east of southwest corner of sec. 33, in yard opposite T road south, in root of poplar tree; copper nail.....	620.84
T. 12 N., R. 3 E., 60 feet west by 20 feet north of quarter corner on south side of sec. 4, at northeast corner of bridge, on T rail used to support wing wall; highest point.....	603.33
T. 12 N., R. 3 E., 0.25 mile north of Frost, northwest wing wall to iron bridge over Swan Creek; chiseled square.....	598.02
T. 12 N., R. 3 E., 80 feet north of quarter corner on south side of sec. 9, at Frost, on southeast corner of scales opposite general store; top of bolt-head.....	607.07

T. 12 N., R. 3 E., 300 feet south of quarter corner on south side of sec. 16, at northwest corner of bridge over McClellan Run; sixth rivet head from bottom of truss, highest point.....	Feet. 599.70
T. 12 N., R. 3 E., at center of sec. 21; iron post stamped "599".....	598.627
T. 12 N., R. 3 E., 20 feet south by 30 feet west of center of sec. 28, on State pike, in root of pine stump; bolthead.....	608.08
T. 12 N., R. 3 E., near center of sec. 33, 20 feet south of Pere Marquette R. R., in base of telephone pole; rail spike.....	608.31
T. 11 N., R. 3 E., 25 feet north by 20 feet west of southeast corner of sec. 4; iron post stamped "Prim. Trav. Sta. No. 16, 594".....	593.317
T. 11 N., R. 3 E., 500 feet west of northeast corner of sec. 10, on south side of road; on Michigan Central R. R. right of way, opposite Swan Creek post office; iron post stamped "595".....	594.350
T. 11 N., R. 3 E., 25 feet east by 20 feet south of northwest corner of sec. 12, in base of telephone pole; rail spike.....	594.18
T. 11 N., R. 3 E., 50 feet north by 50 feet west of southeast corner of sec. 1, in cultivated field, in root of ash tree; copper nail.....	594.75
T. 11 N., R. 4 E., 15 feet west by 12 feet south of northeast corner of sec. 7, on southeast corner of concrete box culvert; chiseled square.....	592.82
T. 11 N., R. 4 E., 25 feet west by 20 feet south of quarter corner on north side of sec. 8, 50 feet west of railroad switch to mine; iron post stamped "592".....	591.783
T. 11 N., R. 4 E., 0.25 mile south of northeast corner of sec. 5, 25 feet west by 20 feet south of center of T road south, in base of telephone pole; rail spike.....	592.12
From sec. 33, T. 13 N., R. 3 E., along highway west 5.5 miles, thence south and east to Swan Creek post office.	
T. 13 N., R. 3 E., 25 feet north by 25 feet west of southeast corner of sec. 32, at northwest corner of crossroads; iron post stamped "617".....	616.823
T. 12 N., R. 3 E., near northeast corner of sec. 6, on south end of doorsill at entrance to district No. 2 schoolhouse; chiseled square.....	622.14
T. 13 N., R. 2 E., 25 feet north by 30 feet west of southeast corner of sec. 36, at northwest corner of crossroads; iron post stamped "625".....	624.367
T. 13 N., R. 2 E., 200 feet east of southwest corner of sec. 36, on north side of west abutment of iron bridge over south branch of Swan Creek; chiseled square.....	619.20
T. 13 N., R. 2 E., near southwest corner of sec. 35, at northeast corner of crossroads, in corner fence post, 5 feet above ground; rail spike.....	630.50
T. 12 N., R. 2 E., 40 feet south by 30 feet east of northwest corner of sec. 3, on east side of road, opposite the John C. Nafe district No. 7 schoolhouse; iron post stamped "637".....	637.019
T. 12 N., R. 2 E., 25 feet west by 30 feet north of southeast corner of sec. 4, in root of elm tree; rail spike.....	638.30
T. 12 N., R. 2 E., 200 feet north by 16 feet west of southeast corner of sec. 9, on wing wall at southwest corner of iron bridge over creek; chiseled square.....	636.37
T. 12 N., R. 2 E., 140 feet south by 30 feet east of quarter corner west side of sec. 15, in southwest corner of Lunney school yard; iron post stamped "643".....	643.118
T. 12 N., R. 2 E., 20 feet north by 20 feet west of quarter corner east side of sec. 21, at northwest corner of crossroads, on west end of tile drain; highest point.....	643.93

T. 12 N., R. 2 E., 20 feet north by 20 feet west of quarter corner on east side of sec. 28, 400 feet east of Hemlock post office, in base of telephone pole; rail spike.....	Feet. 649. 25
T. 12 N., R. 2 E., 320 feet south of northeast corner of sec. 33, on west side of north abutment of concrete bridge; chiseled square.....	646. 02
T. 11 N., R. 2 E., 20 feet west by 35 feet south of northeast corner of sec. 4; iron post stamped "641".....	640. 481
T. 11 N., R. 2 E., 150 feet southwest of northeast corner of sec. 9, on northwest corner of porch at entrance to Cleveland schoolhouse; chiseled square.....	640. 19
T. 11 N., R. 2 E., 25 feet north by 12 feet east of southwest corner of sec. 2, in root of pine stump; rail spike.....	629. 26
T. 11 N., R. 2 E., 700 feet east of southwest corner of sec. 1, 4 feet northeast of northeast corner of small bridge; on T rail support to wing wall; highest point.....	621. 46
T. 11 N., R. 2 E., 25 feet south by 25 feet west of northeast corner of sec. 12, at southwest corner of crossroads; iron post stamped "609".....	608. 682
T. 11 N., R. 3 E., 20 feet west by 30 feet south of northeast corner of sec. 7, in root of pine stump; copper nail.....	606. 20
T. 11 N., R. 3 E., 100 feet east by 20 feet north of southwest corner of sec. 4, in root of pine stump; 20-penny spike.....	606. 23
From Swan Creek south along Michigan Central R. R. to Fergus, thence east to point near Allecia.	
T. 11 N., R. 3 E., 0.25 mile north of southeast corner of sec. 9, 50 feet north of railroad, 25 feet west of public road, in corner fence post on railroad right of way; rail spike.....	589. 36
T. 11 N., R. 3 E., NW. $\frac{1}{4}$ sec. 16, on west side of public road, 60 feet south of railroad, in root of maple tree; rail spike.....	596. 71
T. 11 N., R. 3 E., 30 feet west by 55 feet north of southeast corner of sec. 17, 40 feet south of Garfield station, 1 foot east of railroad right of way; iron post stamped "600".....	599. 580
T. 11 N., R. 3 E., 0.4 mile west of southeast corner of sec. 20, 10 feet west of railroad right of way, in brace of telephone pole; rail spike.....	599. 74
T. 11 N., R. 3 E., 0.1 mile east of center of sec. 29, 40 feet east of railroad, 100 feet south of public road, in base of telephone pole; rail spike.....	600. 24
T. 11 N., R. 3 E., near center of sec. 32, 40 feet east of railroad, on north side of public road, in base of telephone pole; rail spike.....	601. 28
T. 10 N., R. 3 E., N. $\frac{1}{2}$ sec. 5, 300 feet north of St. Charles Electric Light and Power Co.'s house, on east side of north abutment of bridge over Bad River; chiseled square.....	594. 74
T. 10 N., R. 3 E., sec. 5, in northeast corner of St. Charles school yard; iron post stamped "596".....	595. 837
T. 10 N., R. 3 E., SE. $\frac{1}{4}$ sec. 8, 1 mile south of St. Charles, in cultivated field, 50 feet south of public road, 70 feet west of railroad at crossing, in root of oak tree; rail spike.....	596. 49
T. 10 N., R. 3 E., E. $\frac{1}{2}$ sec. 16, 400 feet north of milepost marked "B C 31 J 84," on west side of railroad, in west side of switch stand at switch leading to No. 3 mine; highest point of rail spike.....	606. 36
T. 10 N., R. 3 E., near quarter corner on east side of sec. 20, opposite Fergus post office, on north side of public road, 50 feet east of railroad; iron post stamped "602".....	601. 706
T. 10 N., R. 3 E., 1,200 feet east of quarter corner on west side of sec. 22, on north side of west abutment of iron bridge over Shiawassee River; chiseled square.....	603. 63

T. 10 N., R. 3 E., 15 feet north by 15 feet west of quarter corner on east side of sec. 22, on west end of concrete arch culvert; chiseled square.....	Feet. 594. 44
T. 10 N., R. 3 E., 20 feet south by 10 feet east of quarter corner on west side of sec. 24, on northeast corner of small bridge; top of bolthead.....	594. 75
T. 10 N., R. 4 E., near quarter corner on west side of sec. 19, in base of telephone pole, about 6 inches above ground; 60-penny spike.....	596. 19
From sec. 9, T. 11 N., R. 2 E., south and east along highways to Fergus.	
T. 11 N., R. 2 E., 20 feet west by 50 feet south of northeast corner of sec. 16, in root of elm tree, 2 feet east of trunk; copper nail.....	631. 83
T. 11 N., R. 2 E., 27 feet west by 30 feet south of center of sec. 16, at southwest corner of T road west; iron post stamped "629".....	628. 244
T. 11 N., R. 2 E., 15 feet west by 20 feet south of northeast corner of sec. 21, on west end of concrete arch culvert; chiseled square.....	627. 58
T. 11 N., R. 2 E., 30 feet north by 30 feet east of southwest corner of sec. 22, at south entrance to E. S. Winchel's store, on west end of second step from bottom; chiseled square.....	628. 72
T. 11 N., R. 2 E., 50 feet north by 10 feet west of southeast corner of sec. 28, on center of west end of concrete arch culvert; chiseled square.....	621. 83
T. 11 N., R. 2 E., 25 feet south of southwest corner of sec. 34, opposite T road north; iron post stamped "617".....	617. 114
T. 10 N., R. 2 E., 70 feet west by 70 feet south of northeast corner of sec. 9, on top of east side of well curb, in Frank Ewing's yard; paint spot.....	618. 79
T. 10 N., R. 2 E., 15 feet north by 15 feet west of southeast corner of sec. 9, on north end of concrete culvert; chiseled square.....	615. 32
T. 10 N., R. 2 E., 0.2 mile north of southwest corner of sec. 15, in southwest corner of Brant school yard; iron post stamped "612".....	612. 101
T. 10 N., R. 2 E., 200 feet west of northeast corner of sec. 22, 1 foot east of southeast corner of bridge over Old Canal, on steel wing wall; paint spot.....	602. 09
T. 10 N., R. 2 E., 100 feet northwest of southeast corner of sec. 14, at entrance to Ring schoolhouse, on southeast corner of concrete porch; chiseled square.....	606. 79
T. 10 N., R. 2 E., in center of T road south, at northeast corner of SE. $\frac{1}{4}$ sec. 14; on rock marking corner; highest point.....	609. 68
T. 10 N., R. 3 E., 30 feet south by 25 feet east of quarter corner on west side of sec. 18; iron post stamped "605".....	604. 836
T. 10 N., R. 3 E., in east part of sec. 18, 50 feet south of T road, on east side of road, in root of 15-inch oak tree; copper nail.....	600. 67
T. 10 N., R. 3 E., 0.3 mile west of northeast corner of sec. 19, at northeast corner of small bridge, on granite rock in wing wall; chiseled point on highest part.....	600. 07
T. 10 N., R. 3 E., 20 feet south by 20 feet west of quarter corner on north side of sec. 20, on west end of concrete arch culvert; chiseled square....	601. 08

Houghton quadrangle.

HOUGHTON COUNTY.

The elevations in the following list were determined by primary levels and accord with elevations for Houghton given in Bulletin 461. The leveling was done in 1911 by Howard Clark.

HOUGHTON QUADRANGLE.

[Latitude 47°-47° 15'; longitude 88° 30'-88° 45'.]

From Houghton south along highways to Chassell, thence west to Painesdale.

Houghton, in lawn in front of main building of School of Mines, 18 feet east of walk leading directly east from main building, 54 feet from walk from building; iron post stamped "695".....	Feet. 694. 523
Houghton, 1.1 miles southeast of, at Isle Royale copper mine, sec. 5, T. 54 N., R. 33 W., on west side of highway at T road; spike in base of telephone pole.....	664. 64
T. 54 N., R. 33 W., southeast corner of sec. 5, 2.1 miles southeast of Houghton, at Pilgrim station, on east side of highway; spike in base of telephone pole.....	617. 97
T. 54 N., R. 33 W., northeast corner of sec. 17, at T road, 3.4 miles southeast of Houghton; iron post stamped "621".....	620. 527
Chassell, 1 mile north of, at T road, northeast corner of sec. 32, T. 54 N., R. 33 W., on east side of highway; spike in base of telephone pole....	620. 01
Chassell, in middle of village, at street crossing, southeast corner of sec. 32, T. 54 N., R. 33 W.; iron post stamped "625".....	624. 878
Chassell, 1.2 miles west of, at road crossing, northwest corner of sec. 6, T. 53 N., R. 33 W.; spike in base of fence post.....	863. 49
T. 53 N., R. 34 W., northwest corner of sec. 12, 2.2 miles west by 1 mile south of Chassell; spike in root of stump.....	966. 39
T. 53 N., R. 34 W., sec. 11, 3 miles west by 1.8 miles south of Chassell, in rock near Adolph Poisson's residence; aluminum tablet stamped "Prim. Trav. Sta. No. 2, 988".....	988. 178
T. 53 N., R. 34 W., sec. 3, 4 miles east of Painesdale, at Issac Beltry's residence; spike in root of stump holding flagpole.....	873. 94
T. 54 N., R. 34 W., west side of sec. 34, at T road, 2.5 miles east of Painesdale; copper nail in root of stump.....	914. 35
Painesdale, Copper Range R. R. station, 10 feet east of northeast corner of; copper nail in platform.....	1, 203. 92

From Houghton north along highways to lighthouse at ship canal entry.

Houghton, in stone foundation wall of brick building of L. Hennes & Co., north face of wall, about 3 feet from northeast corner, 5 feet above ground; aluminum tablet stamped "612".....	611. 568
T. 55 N., R. 34 W., sec. 34, 2.1 miles northwest of Houghton, at road forks, on north side of highway, 200 feet north of overhead crossing; spike in base of fence post.....	641. 12
T. 55 N., R. 34 W., sec. 28, 2.8 miles northwest of Houghton, at Michigan Smelts, at road forks; spike in base of telephone pole.....	619. 08
T. 55 N., R. 34 W., northeast corner of sec. 20, at T road, 5.1 miles northwest of Houghton; iron post stamped "714".....	713. 986
T. 55 N., R. 34 W., sec. 8, 6.6 miles northwest of Houghton, at Oskar, in front of residence; spike in base of telephone pole.....	616. 88
T. 55 N., R. 34 W., sec. 4, at lane leading to farm, 8.1 miles northwest of Houghton, in field on east side of highway; spike in base of telephone pole.....	675. 74
T. 56 N., R. 34 W., sec. 28, 10.6 miles northwest of Houghton, at ship canal entry, on lawn in front of lighthouse, at base of flagpole; iron post stamped "624".....	624. 060

From point 4.8 miles east of Redridge west along highway to Redridge, thence south along Copper Range R. R. to Painesdale.

	Feet.
T. 55 N., R. 34 W., sec. 18, 4.8 miles east of Redridge, at lane leading to Dr. Stinback's residence, on north side of highway, in root of large stump; copper nail.....	720. 33
T. 55 N., R. 35 W., southeast corner of sec. 13, at road crossing, 3.8 miles east of Redridge, in base of fence post; copper nail.....	734. 13
T. 55 N., R. 35 W., south side of sec. 14, 2.3 miles east of Redridge, in corner of field on north side of highway; iron post stamped "832".....	831. 940
Redridge, on railroad trestle over spillway of reservoir, in southwest corner of west concrete abutment; aluminum tablet stamped "Prim. Trav. Sta. No. 6, 692".....	692. 364
Salmon Trout, 0.7 mile west of, 1,600 feet west of bridge; spike in base of whistle post.....	761. 34
Salmon Trout, south side of railroad, 1,600 feet east of bridge, at base of telephone pole; iron post stamped "781".....	780. 805
Salmon Trout, 1 mile east of switch, on south side of railroad opposite milepost; spike in base of telephone pole.....	847. 82
Obenhoff, 0.7 mile west of, on south side of railroad; spike in base of whistle post.....	963. 42
Obenhoff, 100 feet east of east end of switch, on south side of railroad near telephone pole; iron post stamped "998".....	997. 898
Obenhoff, 1 mile east of station, on south side of railroad opposite milepost; spike in base of telephone pole.....	1, 049. 95
Mill Mine Junction, 1 mile northwest of, 100 feet south of milepost, on west side of railroad; spike in base of telephone pole.....	1, 127. 19
Mill Mine Junction, in southwest corner of platform at station, 4 feet north-east from railroad crossing, 1 foot above level of track; copper nail....	1, 128. 43
South Range railroad station, in southwest corner of platform; copper nail..	1, 139. 77
South Range, 20 feet southwest of southwest corner of South Range Bank building, in yard; iron post stamped "1141".....	1, 140. 790
South Range, 1 mile south of, on east side of railroad; spike in base of milepost.....	1, 138. 83
Trimountain, on east side of railroad, 40 feet east of northeast corner of station; spike in base of telephone pole.....	1, 154. 33

APPENDIX A.

ELEVATIONS ADJUSTED BY THE COAST AND GEODETIC SURVEY FROM PRECISE LEVELING.

Algonac, Alpena, Bay City, Bay Mills, Benton Harbor, Burnt Island, Chief, Copper Harbor, Croswell, Detour, Detroit, Escanaba, Fennville, Gardendale, Good Hart, Grindstone City, Groscap, Grossepoint, Harbor Beach, Harvey, High Island, Holland, Marine City, Marquette, Marquette, Monroe, Montague, Mount Clemens, Munising, Muskegon, Pickford, Port Huron, Raber, Rock, Saginaw, St. Ignace, Sault Ste. Marie, South Fox Island, South Haven, South Manitou, Whiskey, and Wyandotte quadrangles.

ALGER, ALLEGAN, ALPENA, BAY, BERRIEN, CHIPPEWA, DELTA, HURON, KEWEE-NAW, LEELANAU, MACKINAC, MACOMB, MANISTEE, MARQUETTE, MONROE, MUSKEGON, OTTAWA, PRESQUE ISLE, ST. CLAIR, SANILAC, AND WAYNE COUNTIES.

The following descriptions and elevations are taken from reports of the Coast and Geodetic Survey and of the Corps of Engineers, United States Army, and are republished by permission of the chiefs of those bureaus. The bench marks were established from precise levels by the Coast and Geodetic Survey, by the United States Lake Survey, by the Corps of Engineers, and by the Board on Deep Waterways. Most of them were included in the 1903 adjustment by the Coast and Geodetic Survey and were not changed by the 1907 or the 1912 adjustment. The elevations are likely to be changed but slightly by any future adjustment.

ALGONAC QUADRANGLE.

[Latitude 42° 30'-42° 45'; longitude 82° 30'-82° 45'.]

From point near New Baltimore to Marine City.

New Baltimore, in southwest end of, northwest side of Main Street, in front face of foundation of house owned by heirs of Edward Rose, 7 inches west of cellar window and 5 inches below water table; brass bolt marked "U. S. P. B. M." (U. S. Deep Wy. P. B. M. 34).....	Feet. 590.255
New Baltimore, 2,300 feet below Washington Street, southwest side of road, in fence line, just south of Ed. Rose's house, on base of willow tree 18-inches in diameter; 20-penny spike with washer (U. S. Deep Wy. T. B. M. 93).....	584.534
New Baltimore, southwest corner of Main and Washington streets, on corner building owned by William Baker, north side, in window base of west window, 9 inches east of west end of stone and 4 inches from its front edge; brass bolt marked "U. S. P. B. M." (U. S. Deep Wy. P. B. M. 33).....	588.611
New Baltimore, 1,900 feet above Washington Street, on east side of Main Street, northwest corner of Henry C. Schnoor's residence, in water table, 6 inches east of its west end; brass bolt marked "U. S. P. B. M." (U. S. Deep Wy. P. B. M. 32).....	600.078

	Feet.
New Baltimore, in north limits of, 345 feet south of crossing of Detroit & River St. Clair Ry., just east of east road fence, on base of 20-inch maple tree; 20-penny spike with washer (U. S. Deep Wy. T. B. M. 92).....	592. 118
Anchorville, 1.2 miles west of, 0.2 mile west of Mr. Wendler's farmhouse, 85 feet west of small bridge over gully, south side of Detroit & River St. Clair Ry., on base of lone 16-inch elm tree; 20-penny spike with washer (U. S. Deep Wy. T. B. M. 91).....	586. 237
Anchorville, 1.2 miles east of north side of road, just north of fence in front of Thomas Beauvais's house, in base of 3-foot lone cottonwood tree; 20-penny spike with washer (U. S. Deep Wy. T. B. M. 89).....	585. 279
Fair Haven, 1 mile west of, 0.5 mile east of Swan Creek, southwest corner of Mrs. C. Rose's house, south face, in foundation, fourth course above ground, second course below water table; brass bolt marked "U. S. P. B. M." (U. S. Deep Wy. P. B. M. 31).....	583. 805
Fair Haven, at Henry C. Schnoor's stove mill, in south face of brick chimney, near boiler-room door, in tenth brick east from west face and in twenty-second course of brick above ground; brass bolt (U. S. Deep Wy. P. B. M. 30).....	583. 496
Algonac, 1.2 miles west of River Street, 170 feet west of fork of back road to Marine City, south side of road, 3 feet south of fence; 20-penny spike in root of large lone oak tree (U. S. Deep Wy. T. B. M. 75).....	586. 147
Algonac, in foundation of public school building, at northeast corner of east wing, in north face of corner stone; brass bolt marked "U. S. P. B. M." (U. S. Deep Wy. P. B. M. 29).....	584. 900
Algonac, in foundation of town hall, on its east face, sixth brick south from northeast corner and in eighth course of brick above stone foundation; brass bolt (U. S. Deep Wy. P. B. M. 28).....	585. 150
Algonac, northwest corner of River and Smith streets, on foundation of Mr. Moore's house, south side, second stone west from southeast corner, 2.6 feet from corner (U. S. Deep Wy. Gage B. M. R.).....	585. 162
Algonac, northeast corner of Smith and River streets, in front of J. A. Smith's house, on east roof of 3-foot elm tree; spike with washer (U. S. Deep Wy. T. B. M. 73).....	582. 180
Roberts Landing, 1.2 miles below, on east edge of road, 230 feet below dock to Grummonds Grove; spike with washer in base of 2-foot hickory tree (U. S. Deep Wy. T. B. M. 71).....	581. 235
Roberts Landing, 0.5 mile below, 40 feet south of lane running west between road and O'Leary's barn; spike with washer in base of lone 2-foot hickory tree (U. S. Deep Wy. T. B. M. 70).....	582. 579
Roberts Landing, 0.5 mile north of, on river front, on house owned by D. B. Shier and A. S. Freeman, on north face in corner brick at northwest corner of kitchen, in sixteenth course above ground; brass bolt (U. S. Deep Wy. P. B. M. 27).....	585. 202

From Algonac to lower lighthouse at St. Clair Flats Canal.

Herson Island, on east side of, in front of Porter J. White's cottage; nail in center of 2-inch square cut in root on east side of large basswood tree (U. S. Lake Survey P. B. M. Herson Island).....	581. 416
St. Clair Flats Canal, at upper end of, on north side of Upper Lighthouse, in northeast corner of second step of stone stairway; brass bolt marked "U. S. ● B. M." (U. S. Lake Survey P. B. M. Upper Light).....	581. 576
St. Clair Flats Canal, at lower end of, on east side of Lower Lighthouse, in center of stone over middle cellar window; brass bolt marked "U. S. ● B. M." (U. S. Lake Survey P. B. M. Lower Light).....	581. 212

From point 2.5 miles above Algonac to head of St. Clair Flats Canal.

Roberts Landing, 0.8 mile below, 2.5 miles above Algonac, on property of John O'Leary, 14 meters back from water's edge of St. Clair River, 190 meters south of east end of lane running across north end of O'Leary's farm, 64 meters southeast of 30-inch maple tree, 139 meters northeast of 36-inch elm tree, 109 meters northeast of fence junction on east side of road, 109 meters north of junction of fence and water's edge, 310 meters above residence of James Harrow, and 479 meters below Elms Club; square on boulder (U. S. Lake Survey B. M. O'Leary).....	Feet. 578. 660
Algonac, 1.2 miles north of Pleasant Street, on line of fence which is north line of property of John Trix, 6 meters southeast of 14-inch white-willow tree, 11 meters northeast of 15-inch one, 200 meters north of Baily's Creek, 1,100 meters north of T. B. M. 17; nail in center of square cut in top cap of sheet piling and directly over a pile (U. S. Lake Survey T. B. M. 18).	578. 259
Algonac, north end of, 0.5 mile north of center of town, 380 meters north of waterworks, opposite most northerly one of two steamboat slips, 120 meters south of angle in road and 190 meters south of Coxs Creek, at east edge of sidewalk, in line of fence between properties of Peter Pocket and George Stromley; nail in 36-inch cottonwood stump on west side of Water Street (U. S. Lake Survey T. B. M. 17).....	583. 102
Algonac, 3 meters east of Water Street, 275 meters southwest of junction of Liberty and Water streets, 25 meters west of water's edge of North Channel, on line of south side of Pearl Beach Road, 194 meters northeast of bridge over canal, 22.5 meters from street corner on north side of road and 21 meters from street corner on south side of road, 23.5 meters east of P. B. M. Water Street; nail in west root of 36-inch elm tree (U. S. Lake Survey T. B. M. 16).....	583. 224
Algonac, at junction of Water Street and Pearl Beach Road, 3.5 meters west of west side of Water Street, 0.4 meter north of fence on south side of road, 23.5 meters west of T. B. M. 16, 194 meters northeast of bridge over canal, 275 meters southwest of junction of Liberty and Water streets, 635 meters southwest of junction of Pleasant and Water streets; copper bolt in cement block, surmounted by 2-inch iron pipe (U. S. Lake Survey P. B. M. Water Street), elevation of bolt.....	579. 918
Top of pipe.....	584. 038
Algonac, 1 mile southwest of junction of Pleasant and Water streets, 2 meters from water's edge of North Channel, at most southerly point of Point aux Chenes; wire nail in top of 3-inch willow stump (U. S. Lake Survey B. M. River Crossing Hub 4).....	577. 280
Algonac, 1.2 miles southwest of, 20 meters east of north end of north-south road across head of Herson Island (road passes 200 meters west of Grand Point Hotel); nail in west root of 15-inch maple tree (U. S. Lake Survey T. B. M. 15).....	579. 082
Algonac, 1.2 miles southwest of, 1.8 meters north of fence line, on south side of road running along south bank of North Channel, 1.5 meters west of fence line on west side of north-south road across Herson Island passing 200 meters west of Grand Point Hotel; copper bolt in cement block surmounted by iron pipe (U. S. Lake Survey P. B. M. North Channel), bolt..	576. 349
Top of pipe.....	580. 491

Algonac, 3 miles southwest of, 8.5 meters from east corner of porch on front of store owned by William La Croix, 12.5 meters from south corner of white house northeast of store, directly back of Sans Souci dock, 11 meters back from center of road along right bank of St. Clair River, on east side of Herson Island; nail in top of 24-inch maple stump (U. S. Lake Survey T. B. M. 13).....	Feet. 380. 288
Algonac, 3 miles southwest of, on property of William La Croix, directly back and in line of northeast side of William La Croix's store, 0.85 meter south of east corner of ice house, 0.7 meter from southeast side, directly back of San Souci dock, on east side of Herson Island; copper bolt in cement block, surmounted by iron pipe (U. S. Lake Survey P. B. M. San Souci), bolt.....	575. 926
Top of pipe.....	580. 051
Algonac, 3.5 miles southwest of, on east side of Herson Island, 142 meters southwest of Maple Leaf dock, 35 meters southwest of a canal, in one of a row of trees on northwest side of road, fourth tree southwest of canal; nail in north root of 15-inch maple tree (U. S. Lake Survey T. B. M. 12)....	578. 756
Algonac, 4 miles southwest of, 70 meters southwest of St. Mark's Catholic Church, 44 meters north of Herson Island Lower Light (No. 7), 900 meters southwest of Maple Leaf dock, 1,900 meters northeast of Muir's, on east side of Herson Island; nail in stump of small double poplar tree (U. S. Lake Survey T. B. M. 11).....	578. 208
Joe Bedores, 1.5 miles east of, 0.3 meter from trunk of tree, in first tree in front row of trees along right bank of St. Clair River, 2.5 meters from water's edge, directly in front of south corner of the Muir House, 2.5 meters southwest of walk between the Muir House and the dock in front of same, on east side of Herson Island; nail in west root of 10-inch maple tree (U. S. Lake Survey T. B. M. 9).....	578. 241
Joe Bedores, 1.5 miles east of, opposite head of Bassett Channel and the Canada Club; on line of second row of trees back from water's edge, right bank of St. Clair River, 1 meter north of third tree south of south corner of Muir House, 14 meters southwest of south corner of Muir House, 9 meters back from water's edge, half way between Muir House and first cottage southwest, on east side of Herson Island; copper bolt in cement block surmounted by iron pipe (U. S. Lake Survey P. B. M. Muir), copper bolt.....	575. 938
Top of pipe.....	580. 073
Joe Bedores, 0.8 mile east of, 10.5 meters in front of "Idle-Hours" cottage, 50 meters west of Southeast Bend Middle Light (No. 5), on east side of Herson Island, 0.8 mile west of head of Bassett Channel; spike in plank over the center of most northerly pile in sheet piling (U. S. Lake Survey T. B. M. 8).....	577. 950
Joe Bedores, 1.8 miles west of, 10 meters in front of small white cottage with log cabin in rear and belonging to A. Weber, 53 meters northeast of p. b. m. Weber, 200 meters northeast of Maybury Highway, 980 meters northeast of Star Island House; wire nail in top of 8-inch stump (U. S. Lake Survey T. B. M. 5).....	577. 730
Joe Bedores, 1.2 miles west of, on property of J. F. Weber, 6 meters northeast of sheet piling along right bank of St. Clair River, 38 meters northeast of canal, 28 meters southeast of canal, 37 meters southwest of canal, 53 meters southwest of t. b. m. 5, 85 meters northeast of J. F. Weber's cottage, 150 meters northeast of Maybury Highway, 925 meters northeast of Star Island House, 750 meters southwest of Riverside Hotel; copper	

bolt in cement block surmounted by iron pipe (U. S. Lake Survey P. B. M. Weber), copper bolt.....	Feet. 575. 526
Top of pipe.....	579. 642
Joe Bedores, 1.8 miles west of, 0.5 meter from trunk of tree, 1.6 miles northeast of head of St. Clair Flats Canal, northeast one of second row of trees back from water's edge, right bank of St. Clair River, southeast one of northeast row on Star Island House grounds; nail in northwest root of 30-inch willow tree (U. S. Lake Survey T. B. M. 4).....	578. 442
St. Clair Flats Canal, 500 meters above head of, one meter from heart of tree, 44 meters northeast of east corner of Old Club, 14 meters from east corner of Old Club dock, 36 meters from south corner of dock on northeast side of canal, 56 meters south of P. B. M. Old Club; nail in northwest root of 18-inch cottonwood tree which stands at east corner of grounds of Old Club (U. S. Lake Survey T. B. M. 2).....	578. 120
St. Clair Flats Canal, 500 meters above head of, in corner formed by southeast side of building and southwest side of porch of same, 3.7 meters from south corner of building, 0.7 meter from junction of building and porch, 1.5 meters from south corner of porch, this building was originally a bowling alley but is now used as a regular quarters in connection with the main clubhouse, 20 meters north of south corner of dock on north side of canal which passes between this building and the main clubhouse; copper bolt in cement block, surmounted by iron pipe (U. S. Lake Survey P. B. M. Old Club), copper bolt.....	576. 633
Top of pipe.....	580. 765

ALPENA QUADRANGLE.

[Latitude 45°-45° 15'; longitude 83° 15'-83° 30'.]

On Thunder Bay Island.

Thunder Bay Island, Lake Huron; top of stone door sill of Thunder Bay Island Lighthouse (U. S. Lake Survey B. M. Lighthouse).....	587. 37
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At Alpena.

Alpena, at northwest corner of McRae dock below Second Street draw-bridge; top of capping timber (U. S. Lake Survey B. M. McRae dock)..	586.263
Alpena, at corner of Fletcher and Dock streets; top of water table of Beck Building (U. S. Lake Survey B. M. Beck Building).....	592. 115

BAY CITY QUADRANGLE.

[Latitude 43° 30'-43° 45'; longitude 83° 45'-84°.]

In Saginaw Bay.

Saginaw Bay, at mouth of Saginaw River, Lake Huron; top of crib of Saginaw River Front Range Light (U. S. Lake Survey B. M. Range Light).....	589. 255
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Along Saginaw River.

The following bench marks along the Saginaw River were established by primary leveling of the U. S. Corps of Engineers; a single line of levels verified by subsequent lines of wye leveling.

Bay City, 23d Street, north side of east approach marked "A" (15th post from east end), in top of 10 by 12 inch cross timber; top of ½-inch drift bolt (U. S. Corps of Engineers B. M.).....	591. 901
Bay City, Cass Avenue, in concrete curb on north side of road, 7.5 feet east of storm sewer grating at extreme west end of pavement, about 14 feet east of railroad track; cross cut (U. S. Corps of Engineers B. M.).....	586. 985

Bay City, Interurban, in top of extreme west stone abutment of bridge, about under the axis of the track; cross cut (U. S. Corps of Engineers B. M.)	Feet. 585.832
Melbourne, in top of pile about 3 feet above ground on straight part of shore west of gage; nail (U. S. Corps of Engineers B. M.)	585.738
Loveland's, in trunk of 5-inch slanting willow tree about 50 feet south of mouth of slip opposite Loveland's pump house, from which shanty marked "Pleasant View" bears N. 20° 62.2 feet to corner; circle of five nails (U. S. Corps of Engineers B. M.)	582.130
New York Works, in shoulder cut in pile standing about 2 feet above ground at intersection of shore line and upper end of New York Works landing dock; top of railroad spike driven flush (U. S. Corps of Engineers B. M.) ..	581.608
Zilwaukee, in top of concrete foundation at southwest corner of high tension transmission tower on left bank of river; cross cut (U. S. Corps of Engineers B. M.)	590.054
Bay City, corner of 4th and Water streets, on most westerly basement window of Alert Pipe and Supply Co.'s store (U. S. Corps of Engineers B. M.)	588.68

BAY MILLS QUADRANGLE.

[Latitude 46° 15'-46° 30'; longitude 84° 30'-84° 45']

From point near Brimley to Iroquois Point.

Duluth, South Shore & Atlantic Ry., 21.5 feet north of 9-mile post, 31 feet west of center of track, under 6-inch square cedar post, in summit of stone buried to depth of 4 feet; copper bolt (U. S. Lake Survey P. B. M. 3).	670.351
Brimley, on Duluth, South Shore & Atlantic Ry., 200 feet east of station, 34.5 feet north of center of track, 192 feet west of west end of Waiska River railroad bridge, due north of frog for branch railroad across Waiska Bay, under red sandstone marked "U. S. B. M. No. 4," in top of stone monument; copper bolt (U. S. Lake Survey P. B. M. 4).....	648.038
Bay Mills, 8 inches from west and 7 inches from north side of pedestal (marked "U. S.") on southeast foundation for the steel water-tank tower which stands on south side of Hall and Munson's factory power house; brass bolt (U. S. Lake Survey P. B. M. Bay Mills).....	609.577
Bay Mills, 2.5 miles above, at top of point of sand terrace in upper end of mission and on west side of broad ravine running back from St. Marys River, 4 meters back from crest of high bank on river, 16 meters northeast of spruce tree blazed with a 4-inch triangle, 42 meters east of log house owned by Duel Cameron, 142 meters above small bridge over small creek crossing road in bottom of ravine, 1 mile above store at lower end of mission, under an 8 by 10 by 15 inch sandstone, in top of sandstone 14 by 10 by 6 inches, buried 3 feet under ground; brass bolt (U. S. Lake Survey P. B. M. Mission) (Surface stone is marked "U. S. P. B. M.") ..	636.686
Iroquois Point, in ground at east side of lighthouse yard, 2 feet west of north-south fence, 37.5 feet east of northeast corner of lighthouse building, on line with north side of building, in top of stone monument marked "U. S."; brass bolt (U. S. Lake Survey P. B. M. Δ).....	618.424
Iroquois Point, 4 meters east of walk from lighthouse to engine house, 29 meters south of east entrance of engine house, 60 meters south of shore of St. Marys River, 30 meters north of high bank, in top of bowlder; iron bolt (U. S. Lake Survey P. B. M. Iroquois).....	608.057

Iroquois Point, in southeast corner of lighthouse yard, 1 foot from south fence and 2 feet from east fence, 11.5 meters east and 18 meters south of extreme southeast corner of lighthouse building, under stone marked "U. S. P. B. M.," in top of stone 8 by 8 by 20 inches buried 2.5 feet in ground; brass bolt (U. S. Lake Survey P. B. M. Iroquois 1).....	Feet. 615.094
Iroquois Point, on north side of Iroquois Lighthouse, in top of course of masonry of foundation of lighthouse, in center of large stone; brass bolt (U. S. Lake Survey P. B. M. Iroquois Lighthouse) marked "U. S. P. B. M.".....	622.033
Iroquois Point, square notch cut in top of foundation of lighthouse on north side and 5 feet west of p. b. m. Iroquois Lighthouse; marked \square B. M. (U. S. Lake Survey P. B. M.).....	622.705

CHIEF QUADRANGLE.

[Latitude 44° 15'-44° 30'; longitude 86°-86° 15'.]

At Onekama.

Onekama, on east shore of Lake Michigan, at entrance to Portage Lake, old bank building; top of square cut on southeast corner of first stone in sill west of doorway, marked "U. S. B. M." (U. S. Lake Survey B. M. Onekama).....	589.71
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BENTON HARBOR QUADRANGLE.

[Latitude 42° 15'-42° 30'; longitude 86° 15'-86° 30'.]

At St. Joseph.

St. Joseph, in grounds of life saving station, at right angle 38.85 feet from north pier station 13 plus 46 and 52.70 feet from southwest corner of boathouse of life-saving station, 4 inches below surface of ground and covered with a 4 by 4 by $\frac{1}{2}$ -inch iron washer; top of cap of vertical iron pipe (U. S. Lake Survey B. M.).....	585.240
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BURNT ISLAND QUADRANGLE.

[Latitude 46°-46° 15'; longitude 83° 45'-84°.]

From point 2.2 miles west of Detour to Gatesville.

Detour, 2.2 miles west of, in bank on south side of county road, 25 meters east of crest of large hill, 11 meters east of very large limestone boulder lying on north side of road; small square cut on top of limestone boulder, marked "U. \square S." (U. S. Lake Survey T. B. M. 190).....	657.203
Detour, 4.5 miles west of, 364 meters east of point where wagon road leaves water's edge of Caribou Lake, 2.5 meters north of center of wagon road, 50 meters south of Caribou Lake, under 6-inch cedar post marked "U. S. B. M." on opposite sides, in top of cut stone buried in sand; iron bolt (U. S. Lake Survey P. B. M. Caribou).....	639.441
Schlesser post office, 1 mile west by 1 mile north of, at Rusks Corners, 1 mile north of Camerons Corners, in center of road leading west, near west fence line of north-south road, 57.5 meters northeast of northeast corner of school-house, 190 meters east of creek crossing road, 17.5 meters northwest of fence corner, 15.5 meters southwest of another fence corner, under 6 by 8 by 14 inch stone, in top of cut stone marked "U. S. P. B. M."; iron bolt (U. S. Lake Survey P. B. M. Schlesser).....	702.923

COPPER HARBOR QUADRANGLE.

[Latitude 47° 15'–47° 30'; longitude 87° 45'–88°.]

Bench marks of U. S. Lake Survey.

Copper Harbor, on north side of Keweenaw Peninsula, on south side of Lake Superior; square cut on northwest corner of doorsill of lighthouse tower (U. S. Lake Survey B. M. Copper Harbor).....	Feet. 627. 56
Keweenaw Point, south side, at entrance to Mendota Ship Canal, at northeast corner of main part of light keeper's dwelling at Mendota Lighthouse; cross cut in square on water table, U. S. B. M. is cut in cement walk adjacent (U. S. Lake Survey B. M. Mendota Lighthouse).....	607. 44

CROSWELL QUADRANGLE.

[Latitude 43° 15'–43° 30'; longitude 82° 30'–82° 45'.]

At Lexington.

Lexington, northeast corner of Main and Lake streets; center of period between the letters M. and E. in the center of corner stone of M. E. Church, 3 feet above ground and 9 inches north of southwest corner; corner stone is marked "First M. E. Church 1851–1890" (U. S. Lake Survey P. B. M. 1).....	623. 496
Lexington, at northeast corner of Main and Boynton streets, on top of water table on west side of two-story brick building owned by John L. Fead, 25 inches north of southwest corner of building and 3 inches back from front of water table; summit of small square (U. S. Lake Survey P. B. M. Lexington 2).....	619. 631
Lexington, in north end of stone sill of north door of City Hall, 3 inches south of north end of sill and 19.5 inches back of front edge, 10 feet south of northwest corner of building (building is a three-story brick and fronts on Main Street between Huron Avenue and Simons Street; ground floor used for hose house, second floor for council room, and third floor for Masonic Hall); brass bolt (U. S. Lake Survey P. B. M. Lexington 3)....	622. 663
Lexington, in front yard of Mrs. Martha Henry's property, 22 meters north of north end of Dallas Street and north side of Simons Street (foot of street is at dock), 40 meters back from high bank of lake and about 125 meters south of Lexington Woolen Mills, in top of large granite boulder; brass bolt (U. S. Lake Survey P. B. M. Lexington 4).....	612. 843

DETOUR QUADRANGLE.

[Latitude 45° 45'–46°; longitude 83° 45'–84°.]

From Detour along St. Marys River 2.2 miles west.

Detour, on gravel beach on east shore of bay and on west side of Detour Point, 65 meters north of boathouse belonging to Detour Lighthouse, 74 meters northeast of outer end of pier at boathouse, 3 meters east of water's edge, 7 meters west of edge of brush, 300 meters from Detour Lighthouse, in top of limestone boulder 6 inches from north edge, marked "U. S."; brass bolt (U. S. Lake Survey P. B. M. Boathouse).....	582. 177
Detour, 11 meters northwest of northwest corner of light keeper's dwelling, in top of large limestone boulder; brass bolt (U. S. Lake Survey P. B. M. Detour 5).....	590. 461
Detour, 5 meters north by 1.5 meters east of northwest corner of tower of Detour Lighthouse, in summit of very large limestone boulder, marked "U. S.+P. B. M."; brass bolt (U. S. Lake Survey P. B. M. Detour 4)....	594. 976

Detour, intersection of cross cut on top of iron plate about 6 inches north-west of northwest corner post of Detour Lighthouse (U. S. Lake Survey P. B. M. Detour 3).....	Feet. 591. 259
Detour Point, at northeast corner of residence at Detour Lighthouse, 1 meter north and 3 meters west of northeast corner of house, 3 meters from north-west corner of tower; small square cut on top of embedded limestone boulder (U. S. Lake Survey T. B. M. 196).....	590. 717
Detour, near center of foot of St. Marys Street, 35 meters from water's edge of St. Marys River, 7 meters south by 1.5 meters east of corner of sidewalk, 1 block north of Anthony's dock, 70 meters east and 8 meters south of southwest corner of Hotel Detour, owned by J. F. Goetz, in top of granite boulder; brass bolt (U. S. Lake Survey P. B. M. Goetz).....	602. 368
Detour, 85 meters east by 20 meters south of Huron House, 55 meters south of Bennett's store and post office, 17 meters from water's edge of St. Marys River, 24 meters northeast of northeast corner of J. T. Bennett's yard near Anthony's coal dock, in top of granite boulder flush with ground; iron bolt (U. S. Lake Survey P. B. M. Detour 2).....	586. 531
Detour, at junction of Superior and Huron streets, 2 meters west of east line of Superior Street, at a point where Superior Street angles to west, 8 meters northwest of large granite boulder, 17.5 meters east of fence corner which is southeast corner of block, southeast corner of Mr. Richard Terrett's yard, 26.5 meters southeast of northeast corner of Mr. Terrett's house, 22 meters northeast of log house, 80 meters northwest of water's edge of St. Marys River, 1 block south of P. B. M. Detour 1, in top of limestone boulder; brass bolt, marked "U. S. P. B. M." (U. S. Lake Survey P. B. M. Terrett).....	599. 697
Detour, at intersection of Superior and Drummond streets, 4 meters north by 3 meters east of fence corner at southeast corner of street intersection, under cedar post having letters "U. S. B. M." cut on opposite side of post, in top of cut stone; iron bolt (U. S. Lake Survey P. B. M. Detour 1)....	611. 875

On Pipe Island.

Pipe Island, in lower part of St. Marys River, 50 feet from water's edge, 20 feet west of walk from small wharf to light keeper's house, under a cedar tree; on top of boulder on surface of ground (U. S. Lake Survey B. M. Pipe Island).....	585. 27
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DETROIT QUADRANGLE.

[Latitude 42° 15'–42° 30'; longitude 83°–83° 15'.]

At Detroit.

Detroit, at foot of Woodward Avenue, on east side of street, in most easterly doorway of building just north of U. S. customhouse at ferry landing; cross cut in stone sill 1 inch from east end and 2 inches from its face (U. S. Lake Survey B. M. A, Detroit).....	580. 828
Detroit, at Fort Wayne, in northeast corner of U. S. military reservation, on south side of brick warehouse of U. S. Lake Survey, east of door, in brick; brass bolt (U. S. Lake Survey B. M. Warehouse).....	584. 317
Detroit, at Fort Wayne, in northeast corner of U. S. military reservation, on southeast corner of brick warehouse of U. S. Lake Survey; top of shelf cut on corner of water table (U. S. Lake Survey B. M. Corner).....	581. 227
Detroit River Lighthouse, at mouth of Detroit River in Lake Erie; top of coping of masonry at southwest angle of building (U. S. Lake Survey B. M. Lighthouse).....	584. 79

From Tecumseh salt works to Detroit waterworks.

Tecumseh salt works, north edge of evaporating shed, 42 feet west of northeast corner, in pile supporting shed (pile is only partly under building); top of 20-penny spike (U. S. Deep Wy. gage B. M. C).....	Feet. 577. 819
Tecumseh salt works, northwest from b. m. C, 50 feet east of northeast end of boiler room, in yard; top of pentagonal head of hydrant (U. S. Deep Wy. gage B. M. E).....	579. 423
Delray, northeast corner of River and Louis streets, on west side of first entrance east from Louis Street, on pedestal stone of west pillar of doorway; southwest corner marked by two lines cut at right angles to each other and forming a square with edges of stone (U. S. Deep Wy. P. B. M. 7)	593. 319
Detroit, northwest corner of Fort Wayne reservation grounds, south side of River Street, on first base stone of iron fence east of high stone gatepost, on north edge of stone; highest point inside of square (U. S. Deep Wy. T. B. M. 22).....	587. 404
Detroit, at Fort Wayne, in southwest quarter of military reservation, on river front of building No. 60, officers' quarters, in center of water-table course, 20 inches east from vertical center line of front of building and 3 feet 5 inches above ground; brass bolt marked "U. S. P. B. M." (U. S. Deep Wy. P. B. M. 8).....	601. 508
Detroit, northwest corner of River Street and Junction Avenue, 10 feet west of hydrant, at side of fire-alarm box 815, on curb; highest point in square cut in stone (U. S. Deep Wy. T. B. M. 23).....	585. 910
Detroit, northeast corner of Stanton and River streets, 28 feet east of east side of brick building, in prolongation of property line, at telegraph pole, on curb; highest point in square cut in stone (U. S. Deep Wy. T. B. M. 25).	590. 890
Detroit, at foot of Eighteenth Street (not cut through), on extreme southeast corner of foundation of roundhouse of Pere Marquette and Detroit & Lima Northern railroads (U. S. Deep Wy. gage B. M. F).....	581. 168
Detroit, near northeast corner of Seventh Street, at Nos. 316-320, River Street, on building of Avery Preserving Co., on window base 17:5 inches east of east face of brick pillar at entrance; highest point of square cut in stone (U. S. Deep Wy. T. B. M. 26).....	582. 487
Detroit, on southeast corner of Wayne and Woodbridge streets, at Nos. 81-89 Woodbridge Street, on north end of stone doorstep, 3 inches from west face of east pillar; highest point in square (U. S. Deep Wy. T. B. M. 27).....	581. 921
Detroit, on south side of Atwater Street east, one block and a half east of Woodward Avenue, on office building of city electric lighting plant, on west end of door stone of front entrance, 5 inches east of west face and 4 inches north of south face; brass bolt marked "U. S. □ P. B. M." (U. S. Deep Wy. P. B. M. 9).....	583. 011
Detroit, on Atwater Street, between St. Aubin and Dequindre streets on southeast corner of Detroit Dry Dock Co.'s boiler shop; highest point in square cut in capstone of foundation (U. S. Deep Wy. T. B. M. 28).....	581. 718
Detroit, on northwest corner of Mount Elliott Avenue and Wight Street, 90 feet west of Mount Elliott Avenue, 2.5 feet east of prolongation of east face of lighthouse station, 12 feet east of inlet, on curbstone; highest point in square (U. S. Deep Wy. T. B. M. 29).....	587. 899
Detroit, on foundation of lighthouse station, at foot of Mount Elliott Avenue, 8.2 feet below outer edge of water table, on west door jamb of south door; cross cut in stone (U. S. Lake Survey B. M. Detroit).....	584. 815

Detroit, at northeast corner of Wight Street and Mount Elliott Avenue, north end of doorstep of west entrance to Ireland & Mathews Manufacturing Co., 5 inches from north end of step, 3.75 inches from edge of stone; brass bolt marked "U. S. P. B. M." (U. S. Deep Wy. P. B. M. 10).	Feet. 592. 807
Detroit, near northwest corner of Boulevard and Jefferson Avenue, at No. 1389 Jefferson Avenue, 115 feet west of Boulevard, southwest corner of building, on top stone of foundation; highest point in square (U. S. Deep Wy. T. B. M. 30)	599. 070
Detroit, northwest corner of Jefferson and Crane avenues, on the curving part of curbstone, 10 inches south from Crane Avenue tangent and 4 feet above telegraph pole; highest point in square (U. S. Deep Wy. T. B. M. 31)	594. 060

ESCANABA QUADRANGLE.

[Latitude 45° 30'-45° 45'; longitude 87°-87° 15'.]

At Escanaba.

Escanaba, northwest corner of Ludington Street and Dauseman Avenue, southeast corner of building of S. Adler; top of water table (U. S. Lake Survey B. M. 1, 1874)	593. 608
Escanaba, in masonry foundation on west side of Escanaba Lighthouse, near northwest corner; copper bolt (U. S. Lake Survey B. M. 3, 1876)	587. 118
Escanaba, in fourth layer of cut stone below red water table of county building, on north side of building, 14 inches from northwest corner; brass bolt (U. S. Lake Survey B. M. Courthouse)	593. 758
Escanaba, on east side and 3 inches from southeast corner of Chicago & North Western Ry. station, in water table; brass bolt (U. S. Lake Survey B. M. Depot)	618. 352
Escanaba, in masonry wing wall of overhead railroad crossing approach to Chicago & North Western Ry. on dock No. 1, 3 inches from face of abutment, and 18 inches above ground; copper bolt (U. S. Lake Survey gage B. M. Escanaba)	593. 39

FENVILLE QUADRANGLE.

[Latitude 42° 30'-42° 45'; longitude 86°-86° 15'.]

At Saugatuck.

Saugatuck, southeast corner of southeast corner stone in foundation under lighthouse; ring chiseled around point and each face of stone marked "B.M." with chisel	601. 345
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GARDENDALE QUADRANGLE.

[Latitude 43°-43° 15'; longitude 82° 15'-82° 30'.]

From point near Port Huron to Lexington.

Port Huron, 2.2 miles above Black River, at foot of Lake Huron, at Fort Gratiot lighthouse, in south foundation wall of brick dwelling of lighthouse, in upper course of masonry, 2.1 feet from southeast corner and 0.6 foot below water table; copper bolt (U. S. Lake Survey B. M. Fort Gratiot Lighthouse)	590. 342
Fort Gratiot, on top of foundation of oil house (round building) at Fort Gratiot lighthouse; on south side about 3 inches north of edge of cement foundation and 7 inches from south wall of building; summit of small square cut (U. S. Lake Survey T. B. M. 62)	586. 915

Fort Gratiot, 1.2 miles north of, in northwest root of 2-foot Lombardy poplar tree, which is center one of three, all of about the same size and standing in a northeast-southwest line, 30 meters south of southeast corner of Huronia Beach Hotel, 30 meters east of car track; 30-penny wire nail (U. S. Lake Survey T. B. M. 63).....	Feet. 589. 820
Lakeport, 2 miles south of, 3 meters west of center of wagon road, 5 meters east of north-south fence on west side of road from Port Huron to Lakeport, 35 meters north of point in road directly west of Mr. Sterling's barn, which stands about 100 meters east of road; wire nail in east root of 10-inch elm tree (U. S. Lake Survey T. B. M. 69).....	594. 110
Lakeport, 0.2 mile south of, 10 meters east of north-south fence on west side of road, 15 meters west of top of bank of Lake Huron, in west root of 2½-foot white-pine tree which is north one of two large white-pine trees standing in wagon road; wire nail (U. S. Lake Survey T. B. M. 71).....	597. 715
Lakeport, in southeast corner of lot 2, block 2, in southeast corner of hotel yard owned by John Thoday, 20 inches north of fence on north side of Milwaukee Street, 14 inches west of fence on west side of Second Street, in 14 by 14 by 8 inch granite stone under 6 by 6 inch granite stone extending 4 inches above ground; brass bolt (U. S. Lake Survey P. B. M. Lakeport).....	595. 449
Lakeport, 2 miles north of, 4 meters east of center of State road, in 12-inch willow tree which forks about 7 feet above ground and is blazed with small triangle facing road (there is a grove of young timber on west side of road), in west root; wire nail (U. S. Lake Survey T. B. M. 74).....	616. 923
Lakeport, 5 miles north of, east of north-south fence on west side of State road, 150 meters north of creek which crosses the road 5 miles from Lakeport, in front of John Tolle's house, in northeast root of 10-inch elm tree; wire nail (U. S. Lake Survey T. B. M. 79).....	626. 958
Lexington, 3.8 miles south of, 3 meters west of north-south fence on west side of State road, 475 meters south of Mill Creek, in Willard Wurden's front yard, in west root of 3-foot willow tree; wire nail (U. S. Lake Survey T. B. M. 85).....	633. 222

In the vicinity of Huronia Beach.

Huronia Beach, on Lake Huron near foot of lake, 1.5 miles north of Fort Gratiot Lighthouse, 66 feet north of north end of steel footbridge crossing canal connecting Lake Huron with Black River, 75 feet north of north bank of canal, in front of first cottage north of canal (No. 38) on line with breakwater, just west of cement sidewalk, in main north root of 30-inch oak tree; top of 6-inch boat spike (U. S. Lake Survey B. M. Oak).....	593. 235
Huronia Beach, on Lake Huron near foot of lake, 1.5 miles north of Fort Gratiot Lighthouse, near north bank of canal connecting Lake Huron and Black River, on inshore part of breakwater which is at right angles with the offshore part, 100 feet from shore line north of breakwater, 50 feet from shore line south of breakwater; 10-inch ship spike in top of center one of row of five piles (U. S. Lake Survey B. M. Breakwater)...	585. 294
Huronia Beach, on Lake Huron near foot of lake, 1.5 miles north of Fort Gratiot Lighthouse, on south bank of canal connecting Lake Huron and Black River, on southeast foundation pier of steel footbridge across head of canal; top of northeast bolt in bedplate (U. S. Lake Survey gage B. M. Huronia Beach).....	583. 910
Fort Gratiot Lighthouse, 640 feet north of, at foot of Lake Huron, on pile breakwater on north property line of U. S. lighthouse reservation, in top of capping timber, over third pile from shore end of cap; top of 60-penny spike (U. S. Lake Survey B. M. Spiles).....	587. 302

GOOD HART QUADRANGLE.

[Latitude 45° 30'–45° 45'; longitude 85°–85° 15'.]

At Ile Aux Galets Lighthouse.

Ile Aux Galets, in north end of Lake Michigan on stone steps leading up to lighthouse tower door, outside northwest corner of third step from ground (no mark given) (U. S. Lake Survey B. M. Lighthouse)..... Feet.
589. 72

GRINDSTONE CITY QUADRANGLE.

[Latitude 44°–44° 15'; longitude 82° 45'–83°.]

At Port Austin.

Port Austin, in rock 13 feet southwest of gage, B. M. cut in rock near it; 6-inch bolt (U. S. Lake Survey B. M. 1873)..... 590. 97

GROSCAP QUADRANGLE.

[Latitude 45° 45'–46°; longitude 84° 45'–85°.]

On St. Helena Island.

St. Helena Island, in north end of Lake Michigan, on north side of light keeper's dwelling; near northeast corner of limestone sill of east basement window; square cut on top (U. S. Lake Survey B. M. Lighthouse)..... 588. 48

GROSSE POINTE QUADRANGLE.

[Latitude 42° 15'–42° 30'; longitude 82° 45'–83°.]

From Detroit waterworks to station L'Anse Creuse.

Detroit waterworks, on stone foundation of east gatepost of east gate of east driveway entrance from Jefferson Avenue to grounds, 3 inches from pillar; highest point in square cut on stone (U. S. Deep Wy. T. B. M. 32)..... 583. 398

Detroit, at waterworks, on standpipe tower on side facing river, on southwest end of doorstone of entrance to tower, 5 inches northeast from vertical face and 4 inches from edge of stone; brass bolt marked "U. S. P. B. M." (U. S. Deep Wy. P. B. M. 11)..... 587. 561

Windmill Point lighthouse station, on center and top of concrete coping of sea wall, 27.5 inches from its west end, south from keeper's house; highest point of square cut in cement (U. S. Deep Wy. T. B. M. 38)..... 579. 625

Windmill Point, on southwest corner of lighthouse keeper's house, 2 feet 5 inches east from sloping corner, in third course of masonry below water table and 3.5 feet above ground; brass bolt marked "U. S. P. B. M." (U. S. Deep Wy. P. B. M. 12)..... 584. 218

Windmill Point, in north by east face of foundation of lighthouse tower, in fifth course of masonry below cut stone water table; horizontal groove cut in stone slab 2½ by 1½ inches on face, set in flush with masonry (U. S. Lake Survey Old B. M.)..... 582. 760

Grosse Pointe, 95 feet northeast of red brick schoolhouse on east side of electric track, 15 feet northeast of "Shafer's 7-mile post," at surface of ground, in brace for telegraph pole; spike (U. S. Deep Wy. T. B. M. 37)..... 583. 376

Grosse Pointe (Cottage Grove post office), on southwest corner of Charles Seitz's house, 7.5 feet west of corner, 4.5 inches below west end of stone window sill, 2 feet 2.5 inches above stonework of foundation, in second course of brickwork below window sill; brass bolt (U. S. Deep Wy. P. B. M. 13)..... 592. 079

Grosse Pointe, 0.6 mile northeast from house of Country Club, on top of knob on northeast corner (which is highest point) of harbor line stone monument, marked "Harbor Line Reference Point b," at intersection of street fence line and property line (U. S. Lake Survey T. B. M. 96).....	Feet. 589. 455
Grosse Pointe Farms, 0.8 mile from Country Club house on Lake Shore wagon road, in sandstone water table of Catholic Church, 1.2 meters above ground, 0.7 meter west of corner; brass bolt (U. S. Lake Survey P. B. M. 35).....	604. 936
Grosse Pointe Farms, 0.8 mile northeast of Country Club house on Lake Shore wagon road, in foundation at southeast corner of Catholic Academy of the Sacred Heart, on face of building 0.5 meter north of southeast corner and 0.2 meter above ground; brass bolt (U. S. Lake Survey P. B. M. 36).....	606. 104
Milk River Point on Lake Shore Road, 1.5 miles south of, 33 meters S. 40° W. of southwest corner of Lake Side House, in front of residence of Victor Vernier; top of knob on top and near northwest side of large boulder (U. S. Lake Survey P. B. M. 37).....	584. 681
Lake St. Clair harbor line, on southeast corner of stone monument of, top of knob, marked "Harbor Line Reference Point C," on prolongation of south line of east-west road and on east side of north-south road at Milk River Point (U. S. Lake Survey P. B. M. 38).....	581. 091
Milk River Point, 2.2 miles north of, 30 meters southeast of residence of Thomas Labodie, 3 meters south of property-line cross fence to west, on west side of Lake Shore road; spike in root of 18-inch maple tree (U. S. Lake Survey T. B. M. 106).....	579. 234

At Windmill Point Lighthouse.

Windmill Point Lighthouse, at head of Detroit River, on center of top of coping of concrete sea wall, 42 feet north of board walk to dock, nearly in line of a 10-inch maple tree and south side of lighthouse tower; highest point in square cut (U. S. Lake Survey B. M. Wall).....	579. 529
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HARBOR BEACH QUADRANGLE.

[Latitude 43° 45'-44°; longitude 82° 30'-82° 45'.]

At Sand Beach.

Sand Beach, 0.8 mile from custodian's office, at edge of bluff and nearly in line with north side of west pier, on granite boulder; square in relief, marked "U. S. B. M." (U. S. Lake Survey B. M.).....	587. 814
Sand Beach, at west end of U. S. boathouse in front of U. S. Engineers' office, in rock; iron rod (U. S. Lake Survey B. M. A).....	583. 560
Sand Beach, just south of U. S. boathouse and near east end, in rock; top of mill shaft (U. S. Lake Survey B. M. B).....	583. 174
Sand Beach, 0.2 mile from U. S. Engineers' office, 250 feet from outer end of dock, in rock under dock; top of bar (U. S. Lake Survey B. M. E).....	583. 207
Sand Beach, on water table at southwest corner of J. Jenks & Co.'s brick store; marked (B. M. Jenks of Lake Survey).....	610. 559
Sand Beach, 550 feet south of U. S. Engineers' office; square cut on boulder (U. S. Lake Survey B. M. "Boulder in Harbor").....	582. 677

HARVEY QUADRANGLE.

[Latitude 46° 15'-46° 30'; longitude 87° 15'-87° 30'.]

At Sands.

Sands, 74 meters east by 53 meters south of switch at north end of siding, in natural rock; copper bolt (U. S. Lake Survey B. M. 5, 1876).....	1, 202. 697
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HIGH ISLAND QUADRANGLE.

[Latitude 45° 30'–45° 45'; longitude 85° 30'–85° 45'.]

On Beaver Island.

Beaver Island, on northern end of, in north end of Lake Michigan, at Beaver Harbor lighthouse, on second stone step of short flight leading to door of light keeper's dwelling; top of square cut on west end (U. S. Lake Survey B. M. Lighthouse).....	Feet. 588.10
Beaver Island, northern end of, in north end of Lake Michigan, at Beaver Harbor, in front of and across the road from Capt. Bonner's Hotel; nail in root of large oak tree (U. S. Lake Survey Gage B. M. Beaver Harbor)...	586.97

HOLLAND QUADRANGLE.

[Latitude 42° 45'–43°; longitude 86°–86° 15'.]

At Holland.

Holland, in yard of life-saving station, 2.2 feet north of south fence, 4.1 feet east of 8-inch poplar tree, 4 feet west of 11-inch poplar tree, 56.15 feet southwest of southeast corner of life-saving station, 2 inches below surface of ground and covered with two cast-iron washers; top of cap of vertical iron pipe.....	586.17
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MARINE CITY QUADRANGLE.

[Latitude 42° 30'–42° 45'; longitude 82° 15'–82° 30'.]

From Marine City to East China.

Marine City, 2.5 miles below Bell River bridge, 40 feet east of east road fence in William Cottrell's orchard, on base of southwest tree; spike and washer (U. S. Deep Wy. T. B. M. 67).....	582.809
Marine City, southeast corner of Water and Union streets, in Marine City Stave Co.'s store, near northwest corner, on stone base under window, 8 inches south of north end and 2.5 inches from front edge; brass bolt marked "U.S.P.B.M." (U. S. Deep Wy. P. B. M. 26).....	586.456
Marine City, on Backus Block, on north side of doorsill of bank of G. W. & F. T. Moore; marked by a cross (U. S. Deep Wy. Gage B. M. P).....	586.464
Marine City, southeast corner of Washington and Water streets, in northwest corner of stone foundation of building occupied by the Globe office, 2 feet below sill of building and 6 inches above ground; marked by a square (U. S. Deep Wy. Gage B. M. O).....	583.138
Marine City, northwest corner of Main and Broad streets, on city hall, near its southeast corner, at window entrance to corridor, 2 feet 5 inches above ground and 5 inches south of north jamb; brass bolt marked "U.S.P.B.M." (U. S. Deep Wy. P. B. M. 25).....	588.158
Marine City, in west face of city waterworks building, 5 inches north of southwest corner and 2.5 feet above ground; brass bolt (U. S. Deep Wy. P. B. M. 24).....	589.848
Marine City, at upper end of, on west side of Main Street, in front of Peter Francis's house, in base of 2-foot maple tree; spike with washer (U. S. Deep Wy. T. B. M. 62).....	584.291
Marine City, 1.2 miles above Broad Street, on east edge of road at top of river bank, opposite Charles Holland's house, in base of 1-foot poplar tree; spike with washer (U. S. Deep Wy. T. B. M. 61).....	583.515
Recor's Dock, on north side of road, 278 feet west of corner of fence where road turns abruptly toward the west, on base of maple tree 10 inches in diameter; spike with washer (U. S. Deep Wy. T. B. M. 59).....	583.132

MARINETTE QUADRANGLE.

[Latitude 45°-45° 15'; longitude 87° 30'-87° 45'.]

At Menominee.

Menominee, at north end of Menekaunee bridge, in water table of Carpenter, Cook Co. wholesale grocery and office building, on north side of building, 46 inches east of northwest corner; copper bolt (U. S. Lake Survey B. M. CCC).....	Feet. 589. 325
Menominee, in masonry on downstream end of north pier of Menekaunee bridge, 23 inches north of south side of pier, 11.5 inches east of east side of bedplate; copper bolt (U. S. Lake Survey B. M. Bridge).....	590. 044

MARQUETTE QUADRANGLE.

[Latitude 46° 30'-46° 45'; longitude 87° 15'-87° 30'.]

At Marquette.

Marquette, in third course of masonry above water table on north side of Duluth, South Shore & Atlantic Ry. general freight and ticket office, 1 foot from northeast corner; copper bolt (U. S. Lake Survey B. M. 6, 1876).....	628. 414
Marquette, on south side of new pump house of city waterworks, 10 inches from southwest corner, on water table (U. S. Lake Survey B. M. 11, 1896).....	620. 678

MONROE QUADRANGLE.

[Latitude 41° 45'-42°; longitude 83° 15'-83° 30'.]

From Monroe to Vienna station.

Monroe, on west end of south pier of Michigan Central R. R. bridge over Raisin River, on west face of pier, 6 inches north of its south edge and 4 feet above ground; brass bolt (U. S. Lake Survey P. B. M. C) (reported destroyed).....	581. 065
Monroe, on south side of First Street, 345 feet west of Kentucky Avenue, on northwest corner of city fire-engine house, on northeast corner of pedestal stone just under brickwork; bottom surface of square cut (U. S. Lake Survey P. B. M. D).....	590. 770
La Salle station, 1.5 miles below, on line of Lake Shore & Michigan Southern R. R., 115 meters below Lagerness road crossing, 3.38 meters east of east rail of track, on south side of open stone culvert, on top stone 3.5 feet above ground; square cut (U. S. Lake Survey P. B. M. E).....	582. 322
Vienna station, on Michigan Central and Lake Shore & Michigan Southern railroads, 325 feet west of track, on north side of road to Erie (on section line east-west of section 16), about 20 rods west of center of section, on southwest corner of Mrs. William McLain's house, in east end of water table stone of south side of building, about 2.5 feet above ground; brass bolt (U. S. Lake Survey P. B. M. F).....	588. 828

From Monroe to Monroe Lighthouse.

Monroe, 12 inches south of bedplate of west truss, in top of and at southwest end of south pier of Michigan Central R. R. bridge over Raisin River; brass bolt marked "U.S.B.●M." (U. S. Lake Survey new P. B. M. M. C. R. R. bridge).....	584. 225
Monroe Piers, in stone monument near end of pier to lighthouse and about 5 meters north of Raisin River; iron bolt (U. S. Lake Survey P. B. M. Monroe Piers).....	578. 654

Monroe Piers, at mouth of Raisin River, in cement foundation at southwest corner of lighthouse; brass bolt marked "U.S. ● B.M." (U. S. Lake Survey P. B. M. Lighthouse).....	Feet. 579. 886
Two-foot mark above gage zero.....	574. 682

MONTAGUE QUADRANGLE.

[Latitude 43° 15'-43° 30'; longitude 86° 15'-86° 30'.]

At White Lake.

White Lake, on line with north face of lighthouse, 10.6 feet east of northeast corner of lighthouse, 9.2 feet south of hard-maple tree, 11.28 feet north of hard-maple tree, 3 inches below surface of sod and covered with a 4 by ½ inch washer of iron; top of cap of vertical iron pipe.....	598. 630
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MOUNT CLEMENS QUADRANGLE.

[Latitude 42° 30'-42° 45'; longitude 82° 45'-83°.

From L'Anse Creuse to point near New Baltimore.

L'Anse Creuse station on the Detroit, Lake Shore & Mount Clemens R. R., on north buttress of tower of Catholic Church, 0.2 meter from corner, 0.3 meter above ground, in foundation stone; brass bolt (U. S. Lake Survey P. B. M. 39).....	581. 029
McSweeney's clubhouse, 3.8 miles southeast of, 20 meters east of Lake Shore road, 125 meters north of Erin schoolhouse (district 1), which is at motor-line station, Erin School; spike in root of 30-inch elm tree standing alone (U. S. Lake Survey T. B. M. 108).....	578. 353
Merten, motor-line station, 0.2 mile southwest of Maple Grove clubhouse, 30 meters south of vacant house, on west side of Lake Shore road; top of spike in root of 18-inch maple tree (U. S. Lake Survey T. B. M. 111).....	580. 808
McSweeney's clubhouse, 0.8 mile southwest of, 175 meters north of right-angled turn in road, 60 meters south of residence of Daniel Pornnyville, on west side of Lake Shore road; spike in root of 40-inch poplar tree (U. S. Lake Survey T. B. M. 112).....	580. 813
McSweeney's clubhouse, 200 meters west of, in hole drilled in sandstone of foundation at northwest corner of power house of Detroit, Lake Shore & Mount Clemens R. R., 5 centimeters above ground, 32 centimeters south of northwest corner, marked on stone "40 U. S."; brass bolt (U. S. Lake Survey P. B. M. 40).....	580. 228
McSweeney's clubhouse, 0.6 mile north of, 50 meters northeast of residence of William Kroll, 5 meters east of east road fence line, in pasture at turn in road; spike in root of 30-inch elm tree (U. S. Lake Survey T. B. M. 113).....	581. 729
Mount Clemens, 1 mile east of, on south bank of Clinton River, on west side of brick residence of J. Reimold, 0.9 meter above surface of ground, 0.7 meter north of bay window, in sandstone water table; brass bolt (U. S. Lake Survey P. B. M. 41).....	591. 180
J. Reimold's residence on Clinton River, 1 mile north of, on west side of Sugar Bush road, in west fence line, in root of 12-inch maple tree; top of spike (U. S. Lake Survey T. B. M. 117).....	583. 592
David Furnant, opposite residence of, 70 meters south of an angle in road to west, 2.2 miles north of town line, on east side of Sugar Bush road, in root of 24-inch cherry tree; spike (U. S. Lake Survey T. B. M. 124).....	587. 324
New Baltimore, 3.2 miles west of, 60 meters south of angle in road, opposite residence of Mitchel Pelkey, on east fence line of Sugar Bush road, in root of 15-inch elm tree; spike (U. S. Lake Survey T. B. M. 126).....	587. 938

New Baltimore, 2.5 miles west of, on top of south end of west abutment of 4-meter bridge over west branch of Salt River; top of knob on concrete (U. S. Lake Survey T. B. M. 127)..... Feet. 579. 581

MUNISING QUADRANGLE.

[Latitude 46° 15'-46° 30'; longitude 86° 30'-86° 45'.]

At Munising.

Munising, on south shore of Lake Superior; top of nut on tie rod extending through lower right-hand corner of east end of red brick boiler house which bears northwest about 100 meters from shore end of old Burtis dock (U. S. Lake Survey U. S. B. M. Munising)..... 609. 85

MUSKEGON QUADRANGLE.

[Latitude 43°-43° 15'; longitude 86°-86° 15'.]

Grand Haven, at corner of Washington and Water streets; on northwest corner of northwest corner stone of water table projecting from under brickwork above 1.75 inches on Water Street side and 1.5 inches on Washington Street side, the top being 8.5 inches above cement sidewalk... 595. 940

Muskegon, on middle of outside edge of sill of most easterly cellar window on north side of lighthouse and dwelling; scratched square 1 inch on each side..... 589. 407

PICKFORD QUADRANGLE.

[Latitude 46°-46° 15'; longitude 84° 15'-84° 30'.]

From southeast corner of sec. 1, T. 43 N., R. 1 E., to Barbeau.

T. 43 N., R. 1 E., southeast corner of sec. 1, on east fence line of county road, 26 meters north of junction of roads at section corner, 38 meters south of southwest corner of Fairview schoolhouse, under cedar post with letters "U. S. B. M." on opposite sides, in top of dressed stone; half-inch bolt (U. S. Lake Survey P. B. M. Fairview)..... 687. 247

Sterlingville, 1 mile east by 0.2 mile south of, 40 meters east of east fence line of north-south road, 400 meters south of road intersection, 400 meters north of Robert Campbell's house, which stands on a high bluff 2 miles south of Big Munuscong River, in top of very large bowlder marked "U. S." embedded in field belonging to Robert Campbell; brass bolt (U. S. Lake Survey P. B. M. Campbell)..... 627. 811

Kelden, 4 meters east of east fence line of north-south road, 91 meters north of north end of large barn on east side of road, 440 meters south of center of wagon bridge over Little Munuscong River, 950 meters north of Big Munuscong River, 420 meters south of post office, under post with "U. S. B. M." cut on sides, in top of cut stone; iron bolt (U. S. Lake Survey P. B. M. Munuscong)..... 601. 506

At Hessel.

Hessel, on north shore of Straits of Mackinac, 15 feet south of first house from lake on north-south road, 30 meters south of northwest corner of street intersection, 36 meters north of triangulation station Hessel; top of knob on top of granite bowlder (U. S. Lake Survey B. M. Hessel).... 581. 79

PORT HURON QUADRANGLE.

[Latitude 42° 45'–43°; longitude 82° 15'–82° 30'.]

From East China to point near Port Huron.

East China, 0.5 mile above Ricors dock on river front, in foundation on south side of Rankin's house, between kitchen and cellar door, 26 inches east of east kitchen door jamb, 7.75 inches below weatherboard and 18 inches above ground; brass bolt marked "U. S. P. B. M." (U. S. Deep Wy. P. B. M. 23).....	Feet. 590. 842
East China, opposite schoolhouse, on river bank, in base of large lone oak tree; spike with washer (U. S. Deep Wy. T. B. M. 57).....	593. 137
St. Clair, in south end of, on west side of Front Street opposite Oakland Hotel, just south of row of cottages, in base of 3-foot oak tree; spike with washer (U. S. Deep Wy. T. B. M. 54).....	608. 334
St. Clair, in lower part of town, on river front at John Schlinkert's coal yard, in brick wall of old storehouse, 7.25 inches north of southeast corner, 4.1 feet above ground, in twenty-first course of brick below woodwork of gable; brass bolt (U. S. Deep Wy. P. B. M. 22).....	599. 677
St. Clair, on south side of Adam Street, on north side of Barron Building, which is used as post office, on stone sill of east window in basement, 1 foot west of east edge of sill; marked by a square (U. S. Deep Wy. Gage B. M. N).....	583. 828
St. Clair, at foot of Adam Street, southwest corner of Schwabins Brothers' saloon, on corner of water table; marked by square (U. S. Deep Wy. Gage B. M. M).....	588. 758
St. Clair, at city waterworks, 5 feet 7.5 inches south of south end of door-stone at main entrance, in water table; brass bolt marked "U. S. P. B. M." (U. S. Deep Wy. P. B. M. 21).....	588. 808
St. Clair, on top of north sill, on west side of Front Street, in foundation of Mark Hopkins's residence, in east face, in second stone south of the northeast corner, top course of masonry; brass bolt marked "U. S. P. B. M." (U. S. Deep Wy. P. B. M. 20).....	627. 299
St. Clair, on top of hill above center of town, on west side of Front Street just east of sidewalk, on second maple tree, 2 feet in diameter, north of Mark Hopkins's north fence; spike and washer (U. S. Deep Wy. T. B. M. 53).....	623. 293
St. Clair, 1.2 miles above, on east side of River Street near river bank, opposite Hotel Summerville, in base of 3-foot lone elm tree; spike and washer (U. S. Deep Wy. T. B. M. 52).....	610. 259
St. Clair, 3 miles above, just above oak grove, on east side of river road where it turns from river below little bridge, on south bank of gully in base of 2-foot oak tree; spike and washer (U. S. Deep Wy. T. B. M. 49).....	606. 220
Marysville, 1 mile below, on west side of river road, 3 feet west of road fence, at Mr. Carlton's house, on seventh locust tree from upper end of row; spike with washer (U. S. Deep Wy. T. B. M. 47).....	593. 852
Marysville, on lower one of three tall chimneys, shingle mill chimney, on top of the northwest corner of stone foundation, 1 foot below surface of ground; highest point in square (U. S. Deep Wy. Gage B. M. L.).....	582. 760
Marysville, diagonally opposite Marysville Hotel, in foundation of N. B. Mill's store, in second brick northeast from corner and in seventh course above stone foundation; brass bolt (U. S. Deep Wy. P. B. M. 19).....	590. 012

Marysville, at upper mill (Sanburn sawmill), on chimney bearing stone marked 1871 in west end, south face, in corner brick, seventeenth course above foundation; brass bolt (U. S. Deep Wy. P. B. M. 18).....	Feet. 587. 164
Marysville, 0.8 mile above, 195 feet north of small bridge over gully, 130 feet above square frame house, in base of large oak tree having stones piled around it; spike with washer (U. S. Deep Wy. T. B. M. 46).....	593. 222
Black River, 2.8 miles below the Hamilton place, on west side of river road, 250 feet below house; highest point of hydrant (U. S. Deep Wy. Gage B. M. J)	596. 387
Port Huron, 2 miles below Black River, at Alverson and Dunford's dry dock, in south face of boiler house of pumping station, in top course of stone foundation, 10 inches west from west face of coal door and 6 inches below top of stone; brass bolt marked "U. S. P. B. M." (U. S. Deep Wy. P. B. M. 17).....	596. 726
Port Huron, 1.4 miles below Black River, 1,840 feet below viaduct over Pere Marquette R. R., west side of Military Street, in front of No. 2409, 12 feet north of horse block, on curb; highest point inside of square (U. S. Deep Wy. T. B. M. 41).....	603. 536
Port Huron, 0.8 mile below Black River, west side of Military Street, in front of No. 1915, south side of carriage walk to street, on curb; highest point inside of square (U. S. Deep Wy. T. B. M. 40).....	605. 702
Port Huron, at foot of Clyde Street, 100 feet from river, on brick powder house; top of lower hinge bolt (U. S. Deep Wy. Gage B. M. I).....	585. 361
Port Huron, 290 feet south of Black River, west side of Military Street, on Opera House block, center post of front entrance, on extreme southeast corner of iron plate; surface inside of 1-inch square (U. S. Deep Wy. P. B. M. 16).....	595. 265
Port Huron, on courthouse, on stone doorstep of northeast basement door, 4.5 inches south of south jamb and 3.25 inches from front edge; brass bolt marked "U. S. P. B. M." (U. S. Deep Wy. P. B. M. 15).....	599. 421
Port Huron, at city waterworks, south end of coal shed, 66 feet south of south face of main building; on coping stone of south retaining wall, 6 inches from its south face and 6 inches from its east end, at which point south wall of coal shed rises vertically 3 feet to upper coping; brass bolt marked "U. S. P. B. M." (U. S. Deep Wy. P. B. M. 14).....	600. 143

At Port Huron.

Port Huron, 0.3 mile below Fort Gratiot Lighthouse, 1,300 feet north of old customhouse at Fort Gratiot, at south end of east fence of Block I car shops, at north end of horizontal timber firmly attached to top of retaining wall; top of square headed iron bolt (U. S. Lake Survey Gage B. M. Section Gorge).....	584. 560
Port Huron, on top of foundation wall on east side of U. S. Customhouse (formerly Grand Trunk Ry. passenger station) (building is about 300 feet south of State Street and 150 feet from bank of St. Clair River), 3.54 feet from southeast corner; top of highest point in rectangle on top of stone (U. S. Lake Survey B. M. Customs).....	589. 767
Port Huron, on bank of St. Clair River, in Pine Grove Park, on south side of lower floor of main building of Port Huron pumping station; top of southeast corner of cut stone sill of window (U. S. Lake Survey B. M. WW)	589. 776
Port Huron, 450 feet north of mouth of Black River, on south wall of old dry dock, 40 feet from river face of burned dock, at north end of dock of Jenks Lumber Co., on east end of east top stone of short stone wall; highest point inside of square cut on stone, marked "U.S.B.M." (U. S. Lake Survey Gage B. M. MBR).....	583. 357

Port Huron, 2 miles below mouth of Black River, at dry dock of Reid Wrecking Co., in south face of boiler house, 1.5 feet above surface of ground, 1.5 feet from east end of wall, 29.1 feet east of P. B. M. 17; brass bolt, marked "U.S.B.M." (U. S. Lake Survey B. M. 17A).....	Feet. 589. 706
Port Huron, 2.5 miles below mouth of Black River, 25 feet north of Grant Place, 35 feet north of discharge section dry dock, on fence line on west side of river road; spike in root of 10-inch hickory tree (U. S. Lake Survey B. M. Hickory).....	594. 472
Port Huron, 2.5 miles below mouth of Black River, 2,000 feet below Dry Dock of Reid Wrecking Co., at foot of Grant Place, on east side of river road, at edge of bank, on line of discharge section dry dock; top of half-inch gas pipe embedded in concrete monument (U. S. Lake Survey B. M. Δ North West).....	592. 576

RABER QUADRANGLE.

[Latitude 46°-46° 15'; longitude 84°-84° 15'.]

From Gatesville to southeast corner sec. 1, T. 43 N., R. 1 E.

Gatesville, in small ditch west of wagon road running north from Gatesville post office, 5 meters east of north-south fence on west side of road, 133 meters north of intersection of roads at Gatesville, 1,435 meters south of P. B. M. Gatesville; small square cut on highest point of embedded limestone boulder (U. S. Lake Survey T. B. M. 173).....	738. 371
Raber, on south line of main street, 65 meters west of water's edge of St. Marys River, 76 meters east of intersection of narrow-gage railroad and the main street, 75 meters from entrance of a new church, 37 meters from southwest corner of Mud Lake Lumber Co.'s general store, under cedar post with letters "U.S.B.M." cut on opposite sides, in top of cut stone; iron bolt (U. S. Lake Survey P. B. M. Raber).....	582. 443
Gatesville, 1 mile north of, north side of county road, 7 feet west of large hemlock stump at corner of road, under 6-inch cedar post marked "U. S. B. M." on opposite sides, in top of cut stone; iron bolt (U. S. Lake Survey P. B. M. Gatesville).....	717. 495
T. 43 N., R. 2 E., southeast corner of sec. 27, 13 meters northwest of section, corner stake, 3 meters south of east-west fence which is south line of Frank Huber's property, 150 meters east of point in road opposite Huber's house, 125 meters north of creek crossing road in bottom of large ravine 1 mile north of county road, under cedar post with letters "U.S.B.M." cut on opposite sides, in top of cut stone marked "U.S."; iron bolt (U. S. Lake Survey P. B. M. Hudson).....	680. 232
P. B. M. Hudson, 12.5 meters west of, 5.5 meters south of fence on north side of east-west road, 21 meters west and 4 meters north of section corner stake, 140 meters east of point on road opposite Frank Huber's house, 125 meters north of creek which crosses road at bottom of large ravine; summit of small square on highest point of embedded granite boulder marked "U. \square S." (U. S. Lake Survey T. B. M. 164).....	683. 488
T. 43 N., R. 2 E., northeast corner of sec. 21, on east side of road at turn by the bluff, 12.5 meters south of section corner, under cedar post with letters "U.S.B.M." cut on opposite sides, in top of cut stone; iron bolt (U. S. Lake Survey P. B. M. Tripp).....	680. 806

ROCK QUADRANGLE.

[Latitude 46°-46° 15'; longitude 87°-87° 15'.]

At Maple Ridge.

Maple Ridge, on east side of Chicago & North Western Ry., 36 meters north of switch of siding leading to charcoal kilns, in natural rock; copper bolt (U. S. Lake Survey B. M. 4, 1876)	Feet. 959. 219
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SAGINAW QUADRANGLE.

[Latitude 43° 15'-43° 30'; longitude 83° 45'-84°.]

Along the Saginaw River.

The following bench marks were established by primary leveling of the U. S. Corps of Engineers; a single line of levels verified by subsequent lines of wye leveling.

Carrolton, at extreme west end of the 6th Street bridge, in north end of cross stringer; top of drift bolt (U. S. C. E. B. M.).....	Feet. 591. 828
Saginaw, in cement walk, at head of stairs on south side of east approach of the Genesee Street bridge, circular copper plate (U. S. C. E. B. M.)..	598. 889
Saginaw, at northeast corner of Rust and Fordney streets, in tee on top of 8-inch iron pipe protruding about 3 feet out of ground; top of square nut (U. S. C. E. B. M.).....	594. 622
Saginaw River; all gages along this river are set so that zero of each is at 579.0 feet above mean tide at New York. There is a gage located on each bridge or approach, also one at the Northern Chemical Works slip, one on Bairds boathouse at Zilwaukee, and one at the WaterWorks intake.	

ST. IGNACE QUADRANGLE.

[Latitude 45° 45'-46°; longitude 84° 30'-84° 45'.]

At Mackinaw City.

Mackinaw City, in rough stone face of first course of masonry on north side of Old Point Mackinaw lighthouse, 1.5 feet above ground and 2 feet west of center of slot window facing water, the letter B is cut above the east end of shelf; cut (U. S. Lake Survey B. M. 1).....	590. 917
Mackinaw City, top of edge of stone forming sill of door in light keeper's house that is nearest the light-house tower, the bench mark is at easterly side of door, on level part of stone, next to bevel of sill and at middle of 8-foot stone, the west half of which forms the doorsill (U. S. Lake Survey B. M. 2).....	593. 155
Mackinaw City, just north of railroad crossing on Huron Avenue, 13.3 feet north of north rail of most northerly track of Michigan Central R. R., 6.9 feet south of south rail of Grand Rapids & Indiana Ry., 6.4 feet east of lamp-post between above-named tracks, 2.6 feet west of west edge of plank sidewalk on west side of Huron Avenue, in top of block of concrete marked "U. S. 19 O 01 B. M."; brass tube (U. S. Lake Survey B. M. 3).	586. 944
Mackinaw City, 44.8 feet north of B. M. 3, 184.1 feet west of northwest corner of pump house, measurement made in line with north face of pump house, which is on east side of Huron Avenue, on west side of Huron Avenue near west street line; top of railroad rail set vertically in ground and projecting 1 foot out of ground (U. S. Lake Survey B. M. R.).....	589. 940

Mackinaw City, 64.7 feet east of b. m. R, 85.4 feet northeast of b. m. 3, 119.4 feet west of northwest corner of pump house, on east side of Huron Avenue, measured in line with north face of pump house, in concrete block marked "U. S. 19 0 01 B. M."; brass tube (U. S. Lake Survey B. M. 4)..... Feet. 584. 139

SAULT STE. MARIE QUADRANGLE.

[Latitude 46° 15' -46° 30'; longitude 84° 15' -84° 30'.]

From Barbeau to point near Brimley.

Barbeau, 1 meter north of south fence of east-west road, 59 meters west of 8-inch lone oak tree standing in road, 31 meters east of point in road opposite east line of small schoolhouse standing north of road, on top of hill and in front of Alexander Scales's house, 330 meters east of post office, which stands at southeast corner of junction of roads, under cedar post with "U.S.B.M." marks on sides, in top of dressed stone; iron bolt (U. S. Lake Survey P. B. M. Barbeau)..... 660. 881

Charlotte River, near mouth of, on north side of road which runs east-west just south of Charlotte River, 3 meters north of center of road and in line with west side of Mr. Dyer's house on north side of road, 9 meters west of west line of James Greg's house on south side of road, 55 meters west of Greg schoolhouse, 500 meters west of center of Hay Lake road; summit of small square cut on top of large sandstone boulder (U. S. Lake Survey T. B. M. 133)..... 621. 931

Charlotte River, near mouth of, at Hay Lake road crossing, 3 feet east of Hay Lake road, 140 feet south of Charlotte River; referenced as follows: 4 by 4 inch stone marked "U. S." on top is S. 64° W. and 59 feet distant; B. M. 3½ is N. 50' W. and 126 feet distant; northeast corner of house on east side of road is S. 01° 10' E.; under cedar post with letters U.S.B.M. on sides, in top of cut stone; iron bolt (U. S. Lake Survey P. B. M. Charlotte)..... 602. 190

Charlotte River, near mouth of, 5 meters south of bank of Charlotte River and just below wagon bridge over same; spike in east root of double elm tree (U. S. Lake Survey P. B. M. 3½)..... 600. 951

NOTE.—The wood has rotted around spike but it appeared to be solid when connected with in August, 1901.

Charlotte River, near mouth of, 5 meters south of bank of river, just below wagon bridge over river on Hay Lake road, on opposite side of tree from b. m. 3½; wire nail in west root of 3-foot double elm tree (U. S. Lake Survey T. B. M. 132)..... 600. 344

Charlotte River, 3 miles north of, at junction of Hay Lake and Rosedale roads, 2 feet east by 1 foot south of fence corner which is southwest corner of property of Mrs. John Hinds (the property on south of Rosedale road and east of Hay Lake road belongs to Van Lenven and is 10.5 miles south of Soo locks, 0.8 mile west of St. Marys River, and 3 miles due north of Charlotte River), under small boulder, in sandstone boulder buried with its flat top 2.5 feet below surface of ground; brass bolt (U. S. Lake Survey P. B. M. Hinds)..... 592. 194

"Soo" locks on Hay Lake road, 7 miles below, on right bank of St. Marys River, in south end of an ash grove belonging to Mrs. Newcomb, 10 meters from top of bank, 5 meters south of south fence line of lane leading from house to river, 3 meters south of line of north side of large barn, under pine post, in top of boulder; iron bolt (U. S. Lake Survey P. B. M. Newcomb)..... 584. 789

	Feet.
Riverside Cemetery, 4.5 miles below the "Soo" locks, in center of sixth masonry course above ground at south end of gateway to cemetery, stone is marked "U.S.P.B.M."; brass bolt (U. S. Lake Survey P. B. M. Riverside).....	590. 120
Riverside Cemetery, 1,143 meters below entrance to, 8 meters inside of fence, on river side of Hay Lake Road and in line with east fence of road running south from this point; wire nail in south root of 2½-foot elm tree (U. S. Lake Survey T. B. M. 123).....	589. 562
Sault Ste. Marie, 4 miles below, 8 meters north of center of Hay Lake Road, 597 meters below junction of road leading to Chippewa County poorhouse; wire nail in southwest root of 10-inch spruce tree (U. S. Lake Survey T. B. M. 121)	590. 529
Sault Ste. Marie, 2.5 miles below "Soo" locks at, on upper island, 10 meters back of Government light on right shore of main channel of St. Marys River; square iron bolt in top of sandstone boulder (U. S. Lake Survey P. B. M. Little)	586. 265
Sault Ste. Marie, 2.5 miles below "Soo" locks at, 8 meters east of center of wagon road along St. Marys River, 17 meters south of path leading toward the river and to rustic bridge crossing slough to small island, 51 meters west of west bank of slough, 165 meters above boathouse of Country Club, 267 meters below triangulation East Base (Soo base line), in top of boulder; square iron fox bolt (U. S. Lake Survey P. B. M. 14).....	586. 304
Sault Ste. Marie, northeast corner of Chippewa County courthouse, 2.5 feet above ground and 6 inches west of northeast corner of building, in north side of red sandstone; brass bolt (U. S. Lake Survey P. B. M. Soo)	619. 772
Sault Ste. Marie, at northeast corner of Chippewa County courthouse, 6 inches above ground, 5 inches west of northeast corner of building, 2.15 feet directly below p. b. m. "Soo;" summit of small square on top of first stone above ground (U. S. Lake Survey T. B. M. 117).....	617. 626
Sault Ste. Marie, on north side of Weitzel lock, 10 inches south of north edge of masonry and directly in line of lower gate at upper end of Weitzel Lock, 150 meters west of Government building; summit of square cut on top of masonry (U. S. Lake Survey P. B. M. A).....	606. 068
Sault Ste. Marie, at foot and on north side of Poe lock, 5 inches south of south side of steps leading down on north side of Poe lock and directly in line with front edge of second step from bottom; summit of square on top of masonry (U. S. Lake Survey P. B. M. B).....	588. 627
Sault Ste. Marie, on south side of Sault Ste. Marie Canal at movable dam, on southwest corner of masonry, 6 inches from south side and 8 inches from west side, 115 meters east of railroad and 900 meters west of west end of Weitzel lock; summit of small square cut on top of masonry (U. S. Lake Survey T. B. M. 90).....	607. 057
Sault Ste. Marie, in line of center of Meridian Street (Meridian Street bounds Fort Brady on the west), 4 feet east and 12 feet north of southeast corner of stone abutment of plate girder bridge carrying Soo Line over wagon road, 2 feet below the surface of ground, in hole walled up and covered with large stones; summit of square head of an iron bolt leaded in top of stone monument marking intersection of the principal meridian and south line of Sault Ste. Marie grant (U. S. Lake Survey P. B. M. Meridian)...	607. 833

Sault Ste. Marie, 2.5 miles above, 5 meters north of Minneapolis, St. Paul & Sault Ste. Marie Ry., 21 meters south of Duluth, South Shore & Atlantic Ry., 1,800 meters west of prominent point of bluff near North Western Leather Co.'s buildings on north side of railroads, 250 meters east of prominent point of bluff on south side of tracks, at which point the two railroads separate, in top of very large boulder marked "U. S."; summit of small square (U. S. Lake Survey T. B. M. 94).....	Feet. 640. 117
Sault Ste. Marie, in small ditch in small cut of Soo Line, 1.95 meters south of south rail of track, 35 meters west of road crossing, 63 meters east of point of curve of track, 185 meters east of smoke stack of North Western Leather Co.'s tannery, in top of large sandstone boulder marked "U. S."; brass bolt (U. S. Lake Survey P. B. M. Neaseville).....	641. 715
Brush Point, St. Marys River, in Solomon's clearing, 3 feet below surface of ground, 3.5 meters west of 15-inch white-pine tree, on which is blazed a 9-inch triangle, 16 meters south of top of river bank on line of an old fence running back from river, 925 meters by shore line below Brush Point, under 15 by 6 by 6 inch stone marked "U. S."; in top of sandstone 15 by 12 by 6 inches; brass bolt (U. S. Lake Survey P. B. M. Solomon).....	608. 339
Brush Point, 5 meters back of staff gage and 35 meters west of northwest corner of large boathouse on south shore of St. Marys River; five wire spikes in top of very large hub on top of low bank (U. S. Lake Survey P. B. M. Brush).....	603. 719
Duluth, South Shore & Atlantic Ry., 200 meters north of 3-mile post, 12 feet west of center line of track, in summit of large boulder, marked on east face "U.S.B.M."; copper bolt (U. S. Lake Survey P. B. M. 1).....	642. 092
Duluth, South Shore & Atlantic Ry., 29 feet north of 6-mile post, in summit of boulder buried to depth of 4 feet, 41 feet west of center of track, a red sandstone is set directly over underground mark; copper bolt (U. S. Lake Survey P. B. M. 2).....	641. 357

At Sault Ste. Marie.

Sault Ste. Marie, near center of downstream end of second pier from U. S. shore of the International Bridge across St. Marys River; flat surface 2 inches square on top of fifth course of masonry from top of pier, 6 feet below top of battered surface of pier and 1 foot north of center line, marked "U.S.B.M." (U. S. Lake Survey B. M. Pier 2).....	609. 333
Sault Ste. Marie, at end of east railing of Bingham Avenue Bridge across canal of Michigan Lake Superior Power Co., on north side of canal; top of northwest bolt in footplate of post (U. S. Lake Survey B. M. Bingham Avenue Bridge).....	613. 940

SOUTH FOX ISLAND QUADRANGLE.

[Latitude 45° 15' -45° 30'; longitude 85° 45' -86°.]

On South Fox Island.

South Fox Island, on south end of, in north end of Lake Michigan, at southeast corner of square lighthouse tower; top of water table (U. S. Lake Survey B. M. Lighthouse).....	612. 10
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SOUTH MANITOU QUADRANGLE.

[Latitude 45° -45° 15'; longitude 86° -86° 15'.]

On South Manitou Island.

South Manitou Island, on east side of, in north end of Lake Michigan, between two stones in beveled water table forming the top of foundation of South Manitou lighthouse, just at right of door leading into tower; highest point on head of brass screw (U. S. Lake Survey B. M. Lighthouse).....	598. 07
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WHISKEY ISLAND QUADRANGLE.

[Latitude 45° 45'–46°; longitude 85° 30'–85° 45'.]

On Squaw Island.

Squaw Island, in north end of Lake Michigan; top of level sill of north base- ment window of light keeper's dwelling, not marked (U. S. Lake Survey B. M. Lighthouse).....	Feet. 590. 68
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SOUTH HAVEN QUADRANGLE.

[Latitude 42° 15'–42° 30'; longitude 86° 15'–86° 30'.]

At South Haven.

South Haven, under southwest corner of Liberty Hall, at northeast corner of Michigan Avenue and Maple Street, tenth course above course under W. & S. cellar window frames; top of brick foundation.....	623. 091
South Haven, near northeast corner of water works pump house, on north end of stone window sill.....	591. 096

WYANDOTTE QUADRANGLE.

[Latitude 42°–42° 15'; longitude 83°–83° 15'.]

From Gibraltar to Monroe.

South Rockwood, 17 feet west of center of Michigan Central R. R. track, 198 feet south of station, on southeast stone pillar of water tank on north- east corner of stone; bottom of square cut (U. S. Lake Survey P. B. M. A). ..	587. 335
Newport, on line of Michigan Central R. R. track, 360 feet above station, in south abutment of bridge over Swan Creek, in end of north face, 3 feet above ground; brass bolt (U. S. Lake Survey P. B. M. B).....	580. 399

From Trenton to Amherstburg, Canada.

Trenton, southeast corner of Washington Avenue and St. Joseph Street, in northwest corner of Commercial Hotel, in west face, in first course below water table, second stone from corner; copper bolt (U. S. Lake Survey P. B. M. Trenton, 1877).....	603. 495
Trenton, 1 mile below, on northwest corner of east pier inside of truss of Michigan Central R. R. bridge across Detroit River to Grosse Isle, Mich., and Stony Island, Mich., marked "U.S. □ B.M."; square cut (U. S. Lake Survey P. B. M. Bridge).....	584. 556
Grosse Isle, on coping stone on north end of west course of west pier of Mich- igan Central Railroad bridge connecting Grosse Isle with Stony Island, marked "U.S. □ B.M."; square cut (U. S. Lake Survey P. B. M. Grosse Isle).....	584. 561
Stony Island, about 75 meters north of Michigan Central R. R. track and 15 meters from water's edge, in stone monument, about 3 feet above ground; iron bolt (U. S. Lake Survey P. B. M. Monument).....	577. 524

From Gibraltar to Tecumseh salt works.

Gibraltar, in foundation wall of lighthouse tower (now abandoned and used as a dwelling), at its southeast corner, east face, in fourth course of masonry below cut sandstone water table; copper bolt (U. S. Lake Survey B. M Gibraltar).....	582. 528
Gibraltar, on same lighthouse as above (now used as a dwelling), on south- east corner of stone sill of door in southeast angle of building; right angle cut on stone (U. S. Lake Survey P. B. M. No. 2).....	585. 045

Gibraltar, in southern part of town, on lake front, in rear of Edward Hall's wharf and boat house, 75 feet southwest of his house, in east face of stone milk house 8 inches south from northeast corner, 4 feet 4 inches above ground; brass bolt (U. S. Deep Wy. P. B. M. 1)	Feet. 587. 610
Trenton, 2 miles below, on west side of road south at north side of Riverside stock farm, 7 feet east of west fence, on lower and well-embedded boulder; highest point in square (U. S. Deep Wy. T. B. M. 4).....	576. 608
Trenton, southeast corner of Washington Avenue and St. Joseph Street, in west face of Commercial Hotel, second stone from northwest corner, in first course below water table; copper bolt (U. S. Lake Survey B. M. "Trenton").....	603. 496
Trenton, northwest corner of St. Joseph Street and Washington Avenue, in stone base of store building belonging to Joseph Anderson, 5 feet 4 inches north of north side of door, 4.75 inches south of north pillar, 4 inches back from face; brass bolt marked "U. S. P. B. M." (U. S. Deep Wy. P. B. M. 2)	601. 705
Sibley's stone quarry (crushing plant), 2,525 feet above, on north side of Mud Street, 354 feet west of center of south road, in foundation of F. B. Sibley's residence, in first course below baseboard and 1.5 feet above ground, 18.9 feet south of northeast corner; brass bolt marked "U. S. P. B. M." (U. S. Deep Wy. P. B. M. 3).....	593. 460
Wyandotte, lower part of, northwest corner of Forest Street and Biddle Avenue, at east line of west sidewalk on top rim (immovable) of hydrant, on the letter "n" of the word "open" (U. S. Deep Wy. T. B. M. 11).....	583. 779
Wyandotte, in southern part of, on river bank, 6 feet south of line fence between the Morton Salt Co. and Detroit Dry Dock Co., 40 feet west of face of dock, on top of hard-wood post 5 by 6 inches cross section, 6 inches above ground; top of 20-penny spike (U. S. Deep Wy. gage B. M. A.).....	578. 086
Wyandotte, on river front, 42 feet south of line fence between Morton Salt Co. and Detroit Dry Dock Co., in snubbing post; large cut spike (U. S. Deep Wy. gage B. M. B).....	579. 246
Wyandotte, on northwest corner of Biddle Avenue and Elm Street, south side of main entrance to corner store, southeast corner of pedestal stone of pillar; square on corner of stone (U. S. Deep Wy. T. B. M. 12).....	586. 208
Wyandotte, on west side of Biddle Avenue, 171 feet south of south side of Oak Street, in south pedestal stone of south pillar of brick store used as meat market, owned by J. P. Debo, 8.5 inches east of face of building and 4.5 inches north of north face of pillar; brass bolt marked "U. S. P. B. M." (U. S. Deep Wy. P. B. M. 4).....	585. 737
Wyandotte, 2,700 feet west of Biddle Avenue, on south side of Oak Street, in Union School building, north side of foundation, in third course of masonry below water table, inclosed by fire escape wire screw; copper bolt marked "U. S. P. B. M." (U. S. Lake Survey P. B. M. Wyandotte) ..	586. 383
Ecorse, on east side of river road, at foot of Labodie Street, on W. B. Smith's residence, in east face of foundation, 10.5 inches from southeast corner, in seventh course of brick below baseboard; brass bolt (U. S. Deep Wy. P. B. M. 5).....	584. 779
Ecorse, opposite head of Fighting Island, at Tecumseh salt works, 136 feet east of northeast corner of boiler room, on river front at end of railroad track, 11 feet west of bumper, 4.5 feet north of north rail on top of 10-inch pile, 14 inches above ground; top of 20-penny wire spike circumscribed by 2-inch square cut in wood (U. S. Deep Wy. P. B. M. 6) ..	578. 673

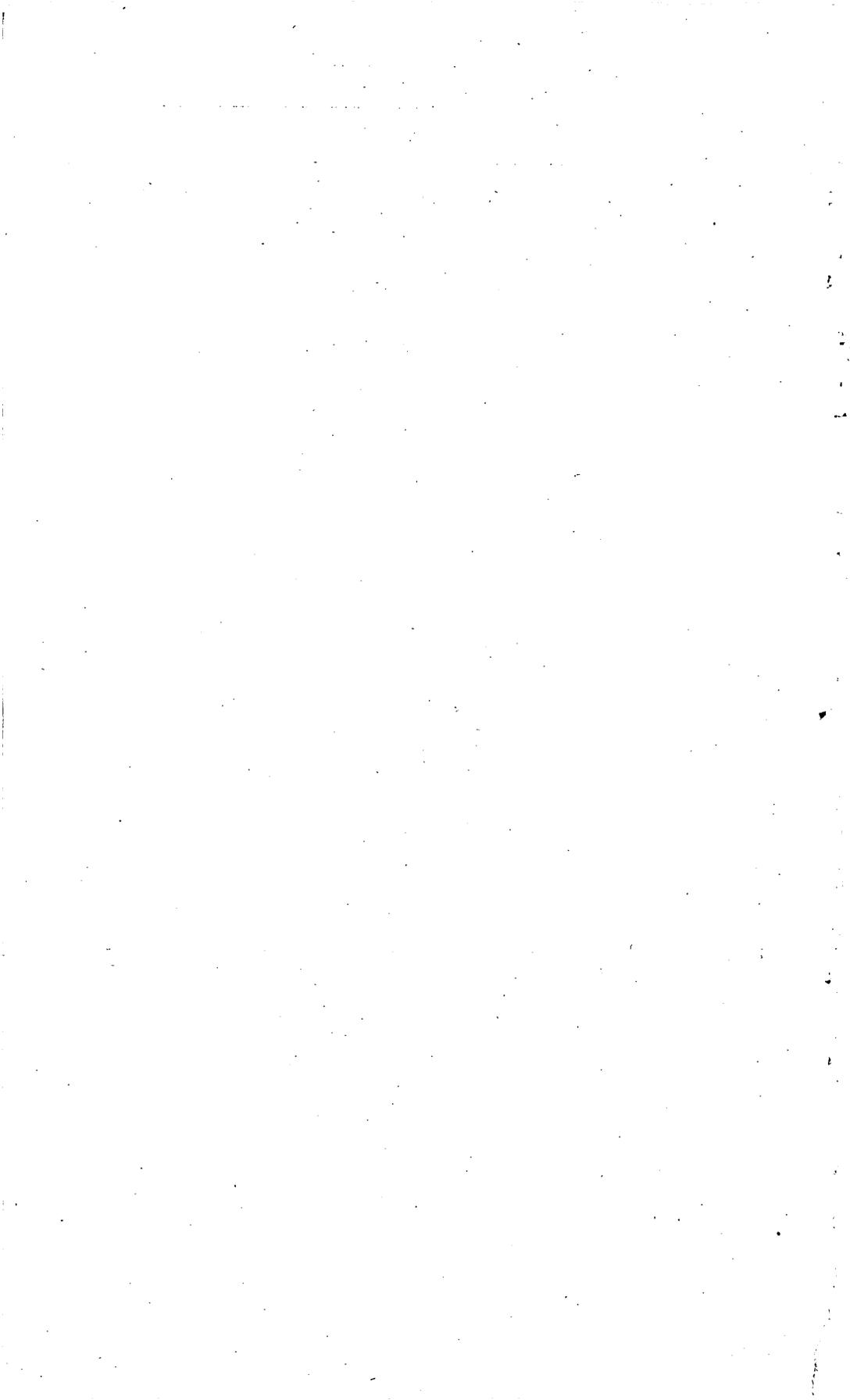
APPENDIX B.

SECONDARY ELEVATIONS.

Secondary elevations from records and topographic maps of the United States Geological Survey, including altitudes of well-known summits, water-surface elevations of prominent lakes, and other useful elevations are given below. These elevations are approximate and should not be used for accurate work.

Place.	Quadrangle.	County.	Elevation.
Angelus Lake, water surface	Pontiac	Oakland	<i>Fect.</i> 950
Annie Lake, water surface	Calumet	Houghton	967
Bald Mountain	Rochester	Oakland	1,193
Base Line Lake, water surface	Dexter	Livingston-Washtenaw	851
Bass Lake, water surface	do	Livingston	855
Beach Lake, water surface	Milford	do	949
Bear Lake, water surface	Calumet	Houghton	623
Big Lake, water surface	Milford	Oakland	1,017
Boston Pond, water surface	Calumet	Houghton	1,067
Brophy Lake, water surface	Howell	Livingston	945
Buckhorn Lakes, water surface	Milford	Oakland	972
Cass Lake, water surface	Pontiac	do	931
Cedar Island Lake, water surface	do	do	934
Cemetery Lake, water surface	do	do	969
Columbia Lake, water surface	Saline	Washtenaw	867
Commerce Lake, water surface	Pontiac	Oakland	908
Cooley Lake, water surface	do	do	933
Crescent Lake, water surface	do	do	934
Crooked Lake, water surface	Howell	Livingston	939
Deer Lake, water surface	Pontiac	Oakland	969
Delhi Mills	Dexter	Washtenaw	828
Detroit River, water surface	Wyandotte	Wayne	574
Do	Detroit	do	575
Duck Lake, water surface	Milford	Oakland	1,014
Dunham Lake, water surface	do	Livingston-Oakland	1,001
Earl Lake, water surface	Howell	Livingston	923
Fish Lake, water surface	Milford	Oakland	1,035
Fourmile Lake, water surface	Dexter	Washtenaw	885
Grass Lake, water surface	Milford	Oakland	1,015
Greenock Lake, water surface	South Lyon	Livingston	877
Greens Lake, water surface	Pontiac	Oakland	968
Hamburg Lake, water surface	Dexter	Livingston	884
Hawlett	Detroit	Wayne	629
Hogback Mountain, triangulation station	Marquette	Marquette	1,237
Horseshoe Lake, water surface	Dexter	Washtenaw	898
Inchwagh Lake, water surface	South Lyon	Livingston	886
Independence Lake, water surface	Dexter	Washtenaw	888
Island Lake, water surface	Pontiac	Oakland	913
Isle Royal	Passage Island	Isle Royal	897
Judah Lake, water surface	Pontiac	Oakland	990
Kearsarge	Calumet	Houghton	1,130
Kellogg Lake, water surface	Milford	Oakland	1,017
Kent Lake, water surface	do	do	871
Long Lake, water surface	Howell	Livingston	960
Do	Milford	Oakland	1,015

Place.	Quadrangle.	County.	Elevation.
			<i>Feet.</i>
Loon Lake, water surface.....	Pontiac.....	Oakland.....	949
Lord Lake, water surface.....	do.....	do.....	921
Lower Long Lake, water surface.....	do.....	do.....	912
Lower Pettibone Lake, water surface.....	do.....	do.....	955
Lower Straits Lake, water surface.....	do.....	do.....	930
Mesnard Mountain, triangulation station.....	Marquette.....	Marquette.....	1,123
Middle Straits Lake, water surface.....	Pontiac.....	Oakland.....	932
Novi.....	Wayne.....	do.....	912
Orchard Lake, water surface.....	Oakland.....	Pontiac.....	932
Ora Lake, water surface.....	Dexter.....	Livingston.....	856
Oxbow Lake, water surface.....	Pontiac.....	Oakland.....	942
Parshallville.....	Howell.....	Livingston.....	908
Pickerei Lake, water surface.....	Marquette.....	Marquette.....	618
Pinckney.....	Dexter.....	Livingston.....	904
Pine Lake, water surface.....	Pontiac.....	Oakland.....	932
Pleasant Lake, water surface.....	Howell.....	Livingston.....	947
do.....	Saline.....	Washtenaw.....	953
Pond Lake, water surface.....	Pontiac.....	Oakland.....	957
Portago Lake, water surface.....	Dexter.....	Livingston-Washtenaw.....	851
Royal Oak.....	Detroit.....	Oakland.....	657
St. Clair Lake, water surface.....	Grossepoint.....	Macomb-Wayne.....	576
Salem.....	South Lyon.....	Oakland.....	936
Silver Lake, water surface.....	Dexter.....	Washtenaw.....	873
South Lyon.....	South Lyon.....	Oakland.....	940
Square Lake, water surface.....	Pontiac.....	do.....	933
State Sanitarium.....	Howell.....	Livingston.....	1,086
Strawberry Lake, water surface.....	Dexter.....	do.....	853
Sugarloaf Mountain.....	Marquette.....	Marquette.....	1,079
Superior Lake, water surface.....	Calumet.....	Houghton-Keweenaw.....	602
Sylvan Lake, water surface.....	Pontiac.....	Oakland.....	930
Tecumseh.....	Saline.....	Sewanee.....	813
Thompson Lake, water surface.....	Howell.....	Livingston.....	905
Torch Lake, water surface.....	Calumet.....	Houghton.....	603
Union Lake, water surface.....	Pontiac.....	Oakland.....	928
Upper Long Lake, water surface.....	do.....	do.....	914
Upper Pettibone Lake, water surface.....	Milford.....	do.....	998
Upper Straits Lake, water surface.....	Pontiac.....	do.....	933
Voorheis Lake, water surface.....	do.....	do.....	983
Walled Lake, water surface.....	do.....	do.....	934
Walnut Lake, water surface.....	do.....	do.....	881
Waterford Hill.....	do.....	do.....	1,149
Watkins Lake, water surface.....	do.....	do.....	951
White Lake, water surface.....	Milford.....	do.....	1,016
Whitmore Lake, water surface.....	Dexter.....	Livingston-Washtenaw.....	894
Williams Lake, water surface.....	Pontiac.....	Oakland.....	969
Winans Lake, water surface.....	Dexter.....	Livingston.....	858
Woodhull Lake, water surface.....	Pontiac.....	Oakland.....	957
Woodruff Lake, water surface.....	Milford.....	do.....	1,015
Zukey Lake, water surface.....	Dexter.....	Livingston.....	853



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