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## Precise Levelling

BY

F. B. REID, B.A.Sc., D.L.S.

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OTTAWA

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# PRECISE LEVELLING.

BY F. B. REID, B.A.Sc., D.L.S.

*Supervisor of Levelling.*

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## PRECISE LEVELLING.

This publication is the sixth of the "Publications of the Dominion Observatory" on the subject of precise levelling by the Geodetic Survey of Canada, the ones previously issued being as follows:—

Vol. I, No. 2,	issued in 1913*
Vol. I, No. 3,	" 1913
Vol. I, No. 8,	" 1914
Vol. II, No. 1,	" 1915
Vol. III, No. 6,	" 1916

Previous to the above a set of results was published as an appendix to the Chief Astronomer's report for the year 1910; these results have now been revised and are reprinted in standard form in this issue.

The present publication is arranged in the same general form as the previous ones, the results of the levelling being set forth in three tables; each table, however, has been subdivided into two sections, the first section containing work now published for the first time and the second containing the reprint of the work published in 1910. The index and map included herein are complete for all the work previously published, as well as that in the present publication; the index indicates in which publication descriptions and elevations of bench-marks published before this may be found.

Tables I and I-A indicate the routes followed between terminal points and give complete descriptions of all bench-marks established along these routes.

Tables II and II-A show in the first two columns the numbers of the bench-marks; in the third and fourth columns the approximate distance (in miles) between bench-marks, and from the initial bench-mark of the line; the fifth and sixth columns (headed "Discrepancy") give the difference (in feet) between the forward levelling and the backward levelling for each section between bench-marks and the accumulated difference from the

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\*Levelling in Yukon territory only.

initial bench-mark. The seventh column gives the elevations of the bench-marks shown in the second column; for convenience, these bench-marks are repeated (in the eighth column) in order that the number of any bench-mark and its elevation may be in adjoining columns. In these tables are shown also the elevations determined by the Geodetic Survey for certain bench-marks established by other surveys and connected with our levelling.

Tables III and III-A show the elevations at railway stations and at crossings of intersecting railways; also on the bridges over rivers and lakes and the more important streams. Rail elevations were in all cases taken on top of the rail, in front of the telegraph office at telegraph stations and opposite the shelter or platform at flag-stations.

The results are given (in Tables I, II and III) for the following lines of new levelling:—

1. St. Anselme, Que., to Edmundston, N.B.
2. Harlaka Jct. to Rivière-du-Loup, Que., with branch to Bretagne.
3. Ottawa to Renfrew, Ont.
4. Kempton to Ivanhoe, Ont., with branches to Carleton Place, Brockville, Renfrew, Kingston and Belleville.
5. Steelton to Franz, Ont., with branch to Michipicoten.
6. Kipp, Alta., to Golden, B.C.
7. Bull River to Kootenay Landing, B.C.
8. Field to Revelstoke, B.C.
9. Edmonton to Jasper, Alta.

Results for the following lines are reprinted (in Tables I-A, II-A and III-A):—

- a. St. Stephen, N.B., to Rivière-du-Loup, Que.
- b. Brunswick to St. John, N.B.
- c. Rouse Point, N.Y., to Sherbrooke, Que.
- d. Farnham to St. Armand, Que.
- e. Foster to Abercorn, Que.
- f. Sherbrooke, Que., to Norton Mills, Vt.
- g. Rouse Point, N.Y., to Colborne, Ont.

Lines 1 and 2 were started from the Megantic-Levis line (1913 publication) and closed upon the St. Stephen-Rivière-du-Loup line at Edmundston and Rivière-du-Loup respectively; the new elevations are at the former place 0.102 foot and at the latter 0.432 foot lower than those formerly carried from St. Stephen. The large circuit—St. Anselme-Edmundston-Rivière-du-Loup-Harlaka Jct.—is divided by the cross-country line from St. Philippe-de-Neri to Bretagne, the closing errors of the two smaller circuits thus formed being 0.087 and 0.243 foot. The levelling along line 2 has been connected with a large number of bench-marks established by the Public Works Department of Canada; these bench-marks are designated by Roman numerals. For their descriptions the reader is referred to that department. Table II in the present publication gives their elevations as determined by the Geodetic Survey.

Line 3 forms the closing link in a large circuit of levels extending through Renfrew, Depot Harbour, Toronto, Prescott and Ottawa. The closing error of the circuit is 0.196 foot—the difference between the two elevations for the junction bench-mark at Renfrew. Line 4 was started from the Rouse Point-Toronto line; five subsidiary lines branch north and south from it, each terminating at a point on the circumference of the large circuit referred to in connection with line 3. The five small circuits thus formed at the easterly end of the main circuit have closures varying from 0.028 to 0.162 foot.

Line 5 commences at bench-mark 634 on the Sudbury-Sault Ste. Marie line (1916 publication). In Table II connections are shown with three bench-marks of the United States Lake Survey; two of these appeared in last year's publication, but owing to incorrect information the elevation there given for "P.B.M.—B." was in error. At Michipicoten a connection was made with a bench-mark of the Hydrographic Survey, Department of the Naval Service; the elevation of this, derived by water transfers during the years 1915 and 1916, between automatic gauges at Michipicoten and Port Arthur is 626.352; the elevation obtained by us by our line of precise levels from Rouse Point, N.Y., via Toronto, Sudbury, etc., is 625.079.

Line 6 commences at bench-mark 81-D on the Lethbridge-Calgary line (1915 publication); line 7 is a branch from line 6 and is connected at Port-hill, Idaho, with a bench-mark of the United States Coast and Geodetic Survey. At Golden, B.C., line 6 is closed upon line 8—a continuation of the Calgary-Field line (1916 publication). The closing error of the 623-mile circuit, Calgary-Kipp-Bull River-Golden, is 0.115 foot. Line 9 is a continuation of the Saskatoon-Wainwright-Edmonton line (1915 and 1916 publications).

The elevations along lines *a* and *b* are based, as formerly, upon a provisional datum at St. Stephen, N.B., established by United States engineers; these elevations have now been checked by precise level connections with the Naval Service Department's tide-gauge at Halifax and with the United States Coast and Geodetic Survey bench-mark at Rouse Point, N.Y.. The differences are comparatively small—see last year's publication and also lines 1 and 2 of the present publication—consequently it has been considered better to adhere to the originally published figures until such time as more permanent values may be fixed by means of a proper adjustment of the levels.

Line *c* and the branch lines *d*, *e* and *f* are based upon the Coast and Geodetic Survey bench-mark at Rouse Point, N.Y.. Line *g* was also started from this bench-mark; regarding the elevations along line *g*, attention is called to the fact that the originally published elevations of all bench-marks between and including Nos. 124 and 145 have been lowered by one foot, this being due to errors in the field work which were detected only recently. At Kingston the Hydrographic Survey has determined the elevation of G.S.C. bench-mark 142 as 259.506, this value being obtained by water transfers from Tibbets Point, N.Y., during six years between the years 1909 and 1915. The elevation obtained by us by our line of precise levels from Rouse Point is 258.688—see page 321.

As in previous publications all elevations are instrumental and have had no adjustments applied to them, consequently changes may be made in the

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future; it should be noted, however, that in almost all cases where circuits have been closed, the closing errors are quite small.

The standard bench-mark adopted consists of a copper bolt, three-quarters of an inch in diameter and four inches long, stamped on the end with the letters "G.S.C., B.M." (Geodetic Survey of Canada, Bench-mark). The bolt is sunk horizontally in rock or masonry so that only the circular end is visible; the number of the bench-mark is stamped on this end as well as the letters mentioned above, and a horizontal chisel line is cut, upon which the elevation is taken. At certain points concrete bench-mark piers have been built; these project from six inches to one foot above the ground and extend below the frost line; the copper bolt upon which the elevation is taken is placed horizontally as in other cases, and is about nine inches below the top of the pier.

TABLE I.

## BENCH-MARKS BETWEEN ST. ANSELME, QUE., AND EDMUNDSTON, N.B., VIA NATIONAL TRANSCONTINENTAL RAILWAY.

*Elevations on page 289.*

- 223-B In east face of coping on south end of large concrete arch culvert under National Transcontinental railway, 3 miles east of St. Anselme and at mileage 76.3 from Monk.
- 224-B In east face—6 inches below top—of coping on north end of concrete arch culvert under National Transcontinental railway,  $\frac{1}{2}$  mile west of Ste. Claire and at mileage 73.3 from Monk.
- 225-B In east end of south face of concrete coping on south end of iron-pipe culvert under National Transcontinental railway, between first and second telegraph poles east of mile-post 71 from Monk.
- 226-B Destroyed.
- 227-B In west end of south face—15 inches below top—of southwest concrete retaining wall of National Transcontinental railway bridge over Etchemin river, immediately west of Ste. Malachie.
- 228-B In centre of south face of small stone culvert under National Transcontinental railway, 50 feet west of a private crossing at mileage 63.2 from Monk.
- 229-B In west face of northwest concrete retaining wall of National Transcontinental railway bridge over Abenakis river, 2 miles east of Abenakis.
- 230-B In west face—14 inches below top—of south face-wall of concrete culvert under National Transcontinental railway, in a deep fill, at sixth telegraph pole west of mile-post 57 from Monk.
- 231-B In west face of north face-wall of concrete arch culvert under National Transcontinental railway,  $1\frac{1}{2}$  miles east of St. Damien and at mileage 54.7 from Monk.
- 232-B Destroyed.
- 233-B In west end of south face of small concrete arch culvert under National Transcontinental railway, at mileage 49.1 from Monk.
- 234-B In east end of north face of small concrete arch culvert under National Transcontinental railway,  $\frac{1}{2}$  mile west of Armagh and at mile-post 46 from Monk.
- 235-B In west face of north face-wall of concrete arch culvert under National Transcontinental railway, at third telegraph pole east of mile-post 43 from Monk.
- 236-B In east end of south face of small concrete arch culvert under National Transcontinental railway, at sixteenth telegraph pole east of mile-post 40 from Monk.
- 237-B In east end of south face of small concrete arch culvert under National Transcontinental railway,  $\frac{1}{2}$  mile east of St. Euphemie and at thirteenth telegraph pole east of mile-post 37 from Monk.
- 238-B In west face of coping on north end of large concrete arch culvert under National Transcontinental railway, 2 miles west of Rosaire and at mileage 33.6 from Monk.
- 239-B In east face—8 inches below top—of coping on north end of large concrete arch culvert under National Transcontinental railway,  $1\frac{1}{2}$  miles east of Rosaire and at mileage 30.4 from Monk.
- 240-B In west face of coping on south end of concrete arch culvert under National Transcontinental railway,  $4\frac{1}{2}$  miles east of Rosaire and at mileage 27.2 from Monk.

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- 241-B In west face of southeast concrete retaining wall—8 inches below bridge-seat—of plate-girder bridge on National Transcontinental railway, at mile-post 25 from Monk.
- 242-B Destroyed.
- 243-B In north sloping face—5 inches below top—of concrete retaining wall behind east abutment of plate-girder bridge over Méchant-pouce river, 0.4 mile west of Ste. Appoline.
- 244-B In north face of half buried boulder, in an earth cut, at south side of National Transcontinental railway track and at fourth telegraph pole west of mile-post 18 from Monk.
- 245-B In west face of concrete retaining wall behind west abutment of plate-girder bridge over Bras d'Apic river (west),  $\frac{1}{2}$  mile west of Bras d'Apic. The bench-mark is 8 feet south of track and 6 inches below top of retaining wall.
- 246-B In west end of south face—7 inches below top—of concrete arch culvert under National Transcontinental railway,  $2\frac{1}{2}$  miles east of Bras d'Apic and at mileage 12.3 from Monk.
- 247-B In east face of large prominent boulder in ditch at south side of National Transcontinental railway track, between eleventh and twelfth telegraph poles east of mile-post 10 from Monk.
- 248-B In south face of boulder—12 feet by 8 feet—6 feet north of north line of National Transcontinental railway right-of-way, 500 feet east of a wooden culvert and between twentieth and twenty-first telegraph poles east of mile-post 7 from Monk.
- 249-B In south face of flat boulder—9 feet by 7 feet—35 feet north of National Transcontinental railway track and at eighth telegraph pole west of mile-post 3 from Monk.
- 385-B In rear (or south) concrete foundation wall—9 inches below woodwork and 40 inches from southeast corner—of station-house at Monk.
- 384-B In west face of north face-wall—9 inches below top—of very large concrete arch culvert through which rivière Ouelle flows under National Transcontinental railway,  $\frac{1}{2}$  mile west of Lafontaine.
- 383-B In east face of south face-wall—15 inches below top—of concrete arch culvert under National Transcontinental railway, at sixth telegraph pole west of mile-post 116 from Edmundston.
- 382-B In north side of rock cut on National Transcontinental railway—165 feet east of west end of cut and at rail level—1,023 feet east of mile-post 114 from Edmundston.
- 381-B In north face of boulder, 10 feet south of National Transcontinental railway track—near centre of shallow earth cut—1 mile west of Lefebvre and between sixth and seventh telegraph poles west of mile-post 109 from Edmundston.
- 380-B In east concrete foundation wall—20 inches below woodwork and 22 inches from southeast corner—of station-house at Lefebvre.
- 379-B In east face of south face-wall—11 inches below top—of large concrete arch culvert under National Transcontinental railway,  $2\frac{1}{2}$  miles east of Lefebvre and at mileage 105.7 from Edmundston.
- 378-B In south end of east face of concrete retaining wall behind west abutment of plate-girder bridge on National Transcontinental railway,  $1\frac{1}{2}$  miles west of Holliday and at mileage 101.3 from Edmundston.
- 377-B In south face of boulder, 10 feet north of National Transcontinental railway track, 2 miles west of Bretagne and 110 feet west of mile-post 97 from Edmundston.
- 376-B In north end of east face of concrete retaining wall behind west abutment—32 inches above bridge-seat—of three-span bridge over rivière-du-Loup, 3 miles east of Bretagne.

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- 375-B In south end of east face of concrete retaining wall behind west abutment of plate-girder bridge over river Manie,  $\frac{1}{2}$  mile east of River Manie station.
- 288-B In east face of boulder, 15 feet south of National Transcontinental railway track—in small cut—1 mile east of Lapointe and between fourth and fifth telegraph poles west of mile-post 81 from Edmundston.
- 287-B Destroyed.
- 286-B In south side of rock cut on National Transcontinental railway—at rail level and near first rock exposure from west end of cut— $1\frac{1}{2}$  miles west of Picard and between sixth and seventh telegraph poles west of mile-post 76 from Edmundston.
- 285-B In south end of west face of concrete retaining wall behind east abutment of plate-girder bridge over rivière Fourchu,  $\frac{1}{2}$  mile east of Picard.
- 284-B In east face of north face-wall of very large concrete arch culvert under National Transcontinental railway, 600 feet west of a deep rock cut,  $1\frac{1}{2}$  miles east of Picard and at mileage 73.7 from Edmundston.
- 283-B In south end of west face of concrete retaining wall behind east abutment of plate-girder bridge over rivière Rocheuse,  $1\frac{1}{2}$  miles west of Pelletier.
- 282-B In west concrete foundation wall—4 inches below woodwork and 1 foot from northwest corner—of station-house at Pelletier.
- 281-B In west end of south face of small concrete arch culvert under National Transcontinental railway, 4 miles east of Pelletier.
- 280-B In north end of east face of concrete retaining wall behind west abutment of long steel trestle bridge on National Transcontinental railway,  $2\frac{1}{2}$  miles west of St. Eleuthère.
- 279-B In east face of south face-wall—1 foot below top—of large concrete arch culvert under National Transcontinental railway,  $1\frac{1}{2}$  miles west of St. Eleuthère and at mileage 61.3 from Edmundston.
- 278-B In east end of north face of large concrete arch culvert under National Transcontinental railway,  $1\frac{1}{2}$  miles east of St. Eleuthère and at mileage 58.4 from Edmundston.
- 277-B In north face of concrete base of international boundary monument No. 178, 10 feet south of south line of National Transcontinental railway right-of-way and  $\frac{1}{2}$  mile west of Estcourt—on west bank of St. Francis river.
- 276-B In south end of west face of concrete retaining wall behind east abutment—9 inches above bridge-seat—of National Transcontinental railway bridge over St. Francis river,  $\frac{1}{2}$  mile west of Estcourt.  
NOTE.—Check levelling in 1916 indicates that the abutment has shifted slightly since the original levelling was done; the elevation of this bench-mark must therefore be considered unreliable.
- 275-B In south end of west face of concrete retaining wall behind east abutment—14 inches above bridge-seat—of plate-girder bridge on National Transcontinental railway,  $2\frac{1}{2}$  miles east of Estcourt.
- 274-B In south end of west face of concrete retaining wall behind east abutment—3 feet 6 inches above bridge-seat—of plate-girder bridge over Blue river, 1 mile west of Blue River station.
- 273-B In east end of south face of small concrete arch culvert under National Transcontinental railway, 3 miles east of Blue River station and at mileage 42.4 from Edmundston.
- 272-B In north face—directly above northeast wing-wall—of concrete arch culvert under National Transcontinental railway,  $3\frac{1}{2}$  miles west of Glendyne and at mileage 38.8 from Edmundston.
- 271-B In south end of east face of concrete retaining wall behind west abutment—30 inches above bridge-seat—of plate-girder bridge over the narrows of Long lake,  $1\frac{1}{2}$  miles east of Glendyne.

- 270-B In east face of north face-wall of large concrete arch culvert under National Transcontinental railway,  $\frac{1}{2}$  mile west of Courchesne.
- 269-B In south end of east face of concrete retaining wall behind west abutment—27 inches above bridge-seat—of plate-girder bridge on National Transcontinental railway,  $4\frac{1}{2}$  miles west of Lac Baker.
- 268-B In north face of small concrete arch culvert under National Transcontinental railway,  $2\frac{1}{2}$  miles west of Lac Baker.
- 267-B In east face—7 feet 6 inches below bridge-seat—of north concrete abutment of highway bridge over National Transcontinental railway, 0.6 mile east of Lac Baker.
- 266-B In east face of coping on south end of large concrete arch culvert under National Transcontinental railway,  $2\frac{1}{2}$  miles east of Lac Baker.
- 265-B In east face of coping on north end of concrete arch culvert under National Transcontinental railway, 3 miles west of Baker Brook.
- 264-B In east face—north side of track—of concrete retaining wall behind east abutment of plate-girder bridge on National Transcontinental railway,  $\frac{1}{4}$  mile west of Baker Brook.
- 263-B In east face of coping on south end of large concrete arch culvert under National Transcontinental railway,  $1\frac{1}{4}$  miles east of Baker Brook and  $\frac{1}{2}$  mile east of Temiscouata railway diamond crossing.
- 262-B In north face of small concrete arch culvert under National Transcontinental railway, 270 feet west of a highway crossing, 1 mile west of St. Hilaire and at mileage 8.5 from Edmundston.
- 261-B In east face of north face-wall of large concrete arch culvert under National Transcontinental railway,  $1\frac{1}{2}$  miles east of St. Hilaire and at fifth telegraph pole west of mile-post 6 from Edmundston.
- 260-B In west face of south face-wall of large concrete arch culvert under National Transcontinental railway, at first telegraph pole east of mile-post 3 from Edmundston.
- 58-B In Temiscouata railway bridge over Madawaska river at Edmundston—see line from St. Stephen to Rivière-du-Loup.

BENCH-MARKS BETWEEN HARLAKA JUNCTION AND RIVIERE-DU-LOUP, QUE.,  
VIA INTERCOLONIAL RAILWAY, WITH CROSS-COUNTRY BRANCH  
LINE FROM ST. PHILIPPE-DE-NERI TO BRETAGNE.

*Elevations on page 291.*

- 563-B In north face-wall of concrete tile culvert under Intercolonial railway, immediately west of La Durantaye station.
- 564-B In side of concrete bench-mark pier, 6 feet south of north line of Intercolonial railway right-of-way,  $1\frac{1}{4}$  miles west of St. Pierre and 1,050 feet west of mile-post 84 from Rivière-du-Loup—about midway between two farm crossings 600 feet apart.
- 565-B In second course below top, in north face of west abutment of small square stone culvert under Intercolonial railway,  $\frac{3}{4}$  mile east of St. Pierre and 870 feet west of mile-post 82 from Rivière-du-Loup.
- 566-B In south end of east face of concrete retaining wall behind west abutment—18 inches above bridge-seat—of plate-girder bridge over bras St. Nicholas, rivière-du-Sud,  $\frac{1}{2}$  mile east of Montmagny.
- 567-B In north face of very large flat boulder, immediately south of north line of Intercolonial railway right-of-way and 70 feet west of easterly switch of passing-track at Cap St. Ignace—0.6 mile east of the station.

- 568-B In stone water-table course, in west foundation wall of Intercolonial station-house at L'Islet—10 feet from southwest corner of building.
- 569-B In south end of east face of concrete retaining wall behind west abutment—27 inches above bridge-seat—of plate-girder bridge on Intercolonial railway, 1 mile east of L'Islet and at mileage 63.6 from Rivière-du-Loup.
- 570-B In north end of east face of concrete retaining wall behind west abutment—13 inches above bridge-seat—of plate-girder bridge on Intercolonial railway,  $1\frac{1}{4}$  miles west of St. Jean Port Joli and immediately east of a highway crossing.
- 571-B In east end of south face-wall of concrete tile culvert under Intercolonial railway—at a farm crossing—1 mile west of Elgin Road flag-station and at mileage 53.3 from Rivière-du-Loup.
- 572-B In south face of large irregular boulder, 10 feet north of south line of Intercolonial railway right-of-way, 120 feet east of a farm crossing and 2,000 feet east of mile-post 46 from Rivière-du-Loup.
- 573-B In east end—20 inches below top—of south face-wall of (double) concrete tile culvert under Intercolonial railway, 170 feet east of railway section post between sections 8 and 9 and at mileage 43.7 from Rivière-du-Loup.
- 574-B In side of concrete bench-mark pier, 4 feet south of north line of Intercolonial railway right-of-way, 130 feet east of one and 270 feet west of another farm crossing,  $1\frac{1}{4}$  miles west of St. Pacôme and between fifteenth and sixteenth telegraph poles east of mile-post 39 from Rivière-du-Loup.

#### Cross-country branch line to Bretagne.

- 27-G In west end—1 foot below top—of south face-wall of concrete tile culvert under Intercolonial railway, 450 feet east of St. Philippe-de-Neri station.
- 28-G In third course of stonework above ground, in south wall—3 feet from front (or west) wall—of Roman Catholic church at Mont Carmel.
- 29-G In northeast face of large mass of rock, 20 feet from southeast corner of George Russell's house and 3 miles south of Mont Carmel Roman Catholic church.
- 30-G In east face of large boulder in field belonging to Antoine St. Onge, 100 feet from northwest corner of his house and on opposite side of road. This is about  $3\frac{1}{4}$  miles north of Bretagne—on road to St. Philippe-de-Neri.
- 377-B In boulder beside National Transcontinental railway, 2 miles west of Bretagne—see line from St. Anselme to Edmundston.

#### Main line, continued.

- 575-B In east end—3 feet 8 inches below top—of north face-wall of (triple) concrete tile culvert under Intercolonial railway,  $1\frac{1}{4}$  miles east of St. Philippe-de-Neri and at mileage 29.7 from Rivière-du-Loup.
- 576-B In south end of east face of concrete retaining wall behind west abutment—22 inches above bridge-seat—of plate-girder bridge on Intercolonial railway,  $1\frac{1}{4}$  miles west of St. Paschal and at mileage 26.6 from Rivière-du-Loup.
- 577-B In north face—5 feet 3 inches from east end—of concrete coping on northeast masonry retaining wall of plate-girder bridge on Intercolonial railway,  $\frac{1}{2}$  mile east of Dessaint and at mileage 21.7 from Rivière-du-Loup.
- 578-B In east end—2 feet below top—of north face-wall of concrete tile culvert under Intercolonial railway, 80 feet east of station-house at Ste. Hélène.

NOTE.—This bench-mark has been rendered inaccessible by a timber extension constructed at north end of culvert.

- 579-B In second course of stonework below top, in south face of east abutment of old stone culvert under Intercolonial railway,  $1\frac{1}{2}$  miles east of St. André and at mileage 14.6 from Rivière-du-Loup.
- 579-B-2 In west end—19 inches below top—of south face-wall of concrete tile culvert under Intercolonial railway, 1 mile east of Old Lake Road station and 440 feet west of mile-post 5 from Rivière-du-Loup.
- 580-B In side of concrete bench-mark pier, 4 feet north of south line of Intercolonial railway right-of-way, 12 feet east of a farm crossing, 945 feet west of mile-post 2 from Rivière-du-Loup and 25 feet west of a small rocky knoll between track and south fence of right-of-way.
- 77-B In Intercolonial railway bridge immediately north of Rivière-du-Loup station—see line from St. Stephen to Rivière-du-Loup.

BENCH-MARKS BETWEEN OTTAWA AND RENFREW, ONT.,  
VIA CANADIAN PACIFIC RAILWAY TO ARNPRIOR  
AND GRAND TRUNK RAILWAY TO RENFREW.

*Elevations on page 293.*

**Note.**—These descriptions are written with the assumption that the railway runs in a southwesterly direction from Ottawa to Carleton Place, thence northwesterly to Arnprior and thence westerly to Renfrew.

- 50-G In northeast end of northwest face of small square concrete culvert under Canadian Pacific railway, at mileage 1.7 west of Ottawa (Broad street station).
- 51-G In northeast end of northwest face of (double) square concrete culvert under Canadian Pacific railway,  $\frac{3}{4}$  mile northeast of Britannia flag-station and at mileage 4.4 from Ottawa.
- 52-G In northwest face of masonry retaining wall beside Canadian Pacific railway track along the shore of lake Deschênes. The bench-mark is 14 inches below top of concrete coping of wall and immediately northeast of culvert at mileage 6.1 from Ottawa.
- 53-G In north end of east face of west concrete abutment—18 feet below bridge-seat—of bridge by which Canadian Northern railway passes over Canadian Pacific railway, at mileage 8.2 from Ottawa (Broad street station).
- 54-G In northeast end of northwest face of square concrete culvert under Canadian Pacific railway, 110 feet southwest of southwesterly switch of Nepean passing-track and at mileage 10.9 from Ottawa.
- 55-G In northeast end of northwest face of square concrete culvert under Canadian Pacific railway,  $\frac{3}{4}$  mile northeast of Stittville and at mileage 14.1 from Ottawa.
- 56-G In northeast end of northwest face of square concrete culvert under Canadian Pacific railway, at mileage 17.5 from Ottawa.
- 57-G In northeast end of northwest face of square concrete culvert under Canadian Pacific railway, at mileage 20.5 from Ottawa.
- 58-G In southwest end of northwest face of square concrete culvert under Canadian Pacific railway,  $\frac{3}{4}$  mile northeast of Ashton and at mileage 22.8 from Ottawa.
- 59-G In southwest face—10 inches below top—of northwest face-wall of square concrete culvert under Canadian Pacific railway,  $2\frac{1}{2}$  miles northeast of Carleton Place and at northeast line of a highway crossing at mile-post 26 from Ottawa.
- 60-G In east end of north wall—31 inches below water-table—of Canadian Pacific machine shop at Carleton Place—a large stone building immediately west of the station.

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- 61-G In fourth course of stonework below water-table course, in north end of front (or west) wall of Carleton Place post-office.
- 62-G In fourth course of stonework below top, in west face of coping on east end of first pier from southerly abutment of Canadian Pacific railway bridge over Mississippi river,  $\frac{1}{4}$  mile northwest of station at Carleton Place.
- 63-G In southeast end of northeast face of large square concrete culvert under Canadian Pacific railway, 4 miles northwest of Carleton Place and at mileage 32.5 from Ottawa.
- 64-G In eighth course of stonework below water-table course, in south end of front (or east) wall of Almonte town-hall.
- 65-G In west foundation wall—2 feet 3 inches above concrete sidewalk and 3 feet from southwest corner—of Almonte post-office.
- 66-G In southwest end of northwest face of concrete retaining wall behind southeast abutment of Canadian Pacific railway bridge over Mississippi river,  $\frac{1}{4}$  mile northwest of station at Almonte.
- 67-G In side of concrete bench-mark pier, 8 feet northeast of southwest line of Canadian Pacific railway right-of-way, at fifth telegraph pole northwest of mile-post 40 from Ottawa, 1 mile northwest of Snedden flag-station and 30 feet southeast of a private crossing leading to James Temmen's (red brick) farm house which is situated about 100 yards northeast of the railway.
- 68-G In northwest face—22 inches above bridge-seat—of concrete retaining wall behind southeast abutment of subway under Canadian Pacific railway, 800 feet southeast of Pakenham station. The bench-mark is 5 feet northeast of northeasterly girder of bridge.
- 69-G In second course of stonework below iron sheeting, in east end of north foundation wall of Renfrew Flour Company's flour shed at Pakenham—a sheet-iron covered building immediately east of Canadian Pacific railway and  $\frac{1}{4}$  mile north of the station.
- 70-G In southeast end of northeast face of square concrete culvert under Canadian Pacific railway—at a diagonal highway crossing—between third and fourth telegraph poles northwest of mile-post 46 from Ottawa.
- 71-G In northwest end of northeast face of square concrete culvert under Canadian Pacific railway—at a highway crossing—100 feet southeast of southeasterly switch of Waba passing-track and between first and second telegraph poles northwest of mile-post 48 from Ottawa.
- 72-G In top course of stonework, in northeast face—near centre—of east retaining wall of plate-girder subway under Canadian Pacific railway,  $1\frac{1}{2}$  miles southeast of Arnprior and at mileage 50.4 from Ottawa.
- 73-G In front (or west) wall of Canadian Pacific station-house at Arnprior, 15 inches below plinth course and 4 feet from northwest corner of building.
- 74-G In ninth course of stonework below brickwork, in north wall of Arnprior town-hall—facing Madawaska street. The bench-mark is 38 feet from northwest corner of building and is in north face of corner stone at northwest corner of a projection from the north wall.
- 75-G In second course of stonework below water-table course, in west wall of Arnprior post-office, between the two basement windows which are between the letter-drop and the doorway of custom-office.
- 76-G In second course of stonework below top, in west end of south face of southwest retaining wall of plate-girder bridge on Grand Trunk railway,  $2\frac{1}{2}$  miles east of Glasgow and at mileage 176.6 from Alburgh Junction.
- 77-G In second course of stonework below top, in west end of north face of northwest retaining wall of plate-girder bridge on Grand Trunk railway, 1 mile west of Glasgow.

- 78-G In north face of rock exposure at northerly side of a rocky hill skirted by Grand Trunk railway,  $5\frac{1}{2}$  miles east of Renfrew and at mileage 182.4 from Alburgh Jct. The bench-mark is 15 feet south of south line of right-of-way, 340 feet east of a small wooden culvert and 55 feet east of a whistle-post.
- 79-G In side of concrete bench-mark pier, 7 feet south of north line of Grand Trunk railway right-of-way, 490 feet west of a small culvert, 2 miles east of Renfrew and 350 feet west of mile-post 186 from Alburgh Junction.
- 505 In third course of stonework below water-table course, in front (or west) wall of Renfrew post-office, 8 feet to the south of the letter-drop.

BENCH-MARKS BETWEEN KEMPTON AND IVANHOE, ONT., VIA CANADIAN PACIFIC RAILWAY,  
WITH BRANCH LINES FROM SMITHS FALLS TO CARLETON PLACE AND  
BROCKVILLE, SHARBOT LAKE TO RENFREW AND KINGSTON AND  
(ALONG GRAND TRUNK RAILWAY) FROM  
IVANHOE TO BELLEVILLE.

*Elevations on pages 295 to 301.*

- 80-G In second course of stonework below top, in east end of north face of northeast retaining wall of Canadian Pacific railway bridge over Kemptville creek, 2 miles west of Kempton.
- 81-G In west face of coping on north end of small concrete arch culvert under Canadian Pacific railway, at the east line of a highway crossing at mileage 108.4 from Montreal West.
- 82-G In east face of coping on south end of concrete arch culvert under Canadian Pacific railway,  $\frac{1}{4}$  mile east of Burritt flag-station and at mileage 110.6 from Montreal West.
- 83-G In west end of north face of square concrete culvert under Canadian Pacific railway, at mile-post 113 from Montreal West.
- 84-G In north face—8 inches below top—of concrete retaining wall behind east abutment of subway under Canadian Pacific railway, 0.6 mile east of Merrickville and 400 feet east of east end of bridge over Rideau river.
- 85-G In west end of north face—1 foot below top—of square concrete culvert under Canadian Pacific railway, 50 feet east of a farm crossing at mileage 116.7 from Montreal West.
- 86-G In north end of west face—4 inches below top—of concrete retaining wall behind west abutment of plate-girder bridge on Canadian Pacific railway, 500 feet east of Rosedale flag-station and at mileage 119.8 from Montreal West.
- 87-G In east face of coping on south end of small concrete arch culvert under Canadian Pacific railway,  $1\frac{1}{2}$  miles east of Smiths Falls station and at mileage 122.5 from Montreal West.
- 88-G In concrete foot-subway under Canadian Pacific railway at north end of station platform at Smiths Falls. The bench-mark is in east wall of Herbert street approach—from the direction of the station, 15 inches below top of wall and 36 feet south of south side of passageway under tracks. (The railway is assumed to run north and south at Smiths Falls).
- 89-G In southeast face of concrete retaining wall behind north abutment—3 feet above bridge-seat—of subway by which Canadian Northern railway passes under Canadian Pacific railway (main line and branch to Carleton Place),  $\frac{1}{2}$  mile north of Smiths Falls station. The bench-mark is 2 feet east of easterly girder on Carleton Place line.

**Branch line to Carleton Place.**

- 90-G In west face—near centre—of square concrete culvert under Canadian Pacific railway,  $1\frac{1}{2}$  miles north of Smiths Falls station and at mileage 15.2 from Carleton Place.

- 91-G In south end of east face of square concrete culvert under Canadian Pacific railway,  $\frac{1}{2}$  mile north of Welsh flag-station and between second and third telegraph poles north of mile-post 13 from Carleton Place.
- 92-G In north end of east face of square concrete culvert under Canadian Pacific railway,  $1\frac{1}{2}$  miles south of Franktown and at mileage 9.4 from Carleton Place.
- 93-G In north end of west face of square concrete culvert under Canadian Pacific railway, at ninth telegraph pole south of mile-post 5 from Carleton Place.
- 94-G In east face—near centre—of small square concrete culvert under Canadian Pacific railway,  $2\frac{1}{2}$  miles south of Carleton Place and at the south line of a highway crossing.
- 60-G In Canadian Pacific machine shop at Carleton Place—see line from Ottawa to Renfrew.

#### Branch line to Brockville.

- 95-G In second course of stonework below top, in south end of east face of southwest retaining wall of subway under Canadian Pacific railway, 200 feet south of bridge over Rideau river and  $1\frac{1}{2}$  miles south of Smiths Falls station.
- 96-G In south face of west face-wall of square concrete culvert under Canadian Pacific railway,  $2\frac{1}{2}$  miles north of Jasper and at mileage 21.7 from Carleton Place.
- 97-G In east end of south face of concrete retaining wall behind north abutment of Canadian Pacific railway bridge over Irish creek, immediately south of Jasper station.
- 98-G In north end of west face of coping on west end of small concrete arch culvert under Canadian Pacific railway,  $2\frac{1}{2}$  miles south of Jasper and at mileage 26.5 from Carleton Place.
- 99-G In second course of stonework below top, in south end of east face of small masonry culvert under Canadian Pacific railway, at second telegraph pole south of mile-post 30 from Carleton Place.
- 100-G In north end of west face of square concrete culvert under Canadian Pacific railway,  $\frac{1}{2}$  mile north of Jelly flag-station and at mileage 32.5 from Carleton Place.
- 101-G In south end of east face of large square concrete culvert under Canadian Pacific railway,  $\frac{1}{2}$  mile north of Bellamy and at mileage 34.6 from Carleton Place.
- 102-G In south end of west face of square concrete culvert under Canadian Pacific railway at south line of highway crossing at Hawkens flag-station.
- 103-G In south end of east face of square concrete culvert under Canadian Pacific railway,  $4\frac{1}{2}$  miles north of Brockville and at mileage 40.5 from Carleton Place.
- 104-G In side of concrete bench-mark pier, 7 feet west of east line of Canadian Pacific railway right-of-way,  $2\frac{1}{2}$  miles north of Brockville and 33 feet south of sixth telegraph pole south of a highway crossing—the road allowance between concessions II and III.
- 123 In culvert under Grand Trunk railway in Brockville—see line from Rouse Point to Colborne.
- 105-G In south end of west wall of Brockville court-house, 1 foot below sills of basement windows facing on William street.
- 106-G In first course of stonework above concrete sidewalk, in north wall of Brockville post-office. The bench-mark is in north side of pillar between the two arches at northeast corner of building.

#### Main line, continued.

- 107-G In first course of stonework below water-table course, in east (or Market street) wall of Smiths Falls post-office—28 feet from southeast corner of building.

- 108-G In first course of stonework above water-table, in south face of pilaster at southeast corner of Smiths Falls town-hall—at northeast corner of Church and Beckwith streets.
- 109-G In east end of south face-wall of concrete tile culvert under Canadian Pacific railway,  $3\frac{1}{2}$  miles west of Smiths Falls and 630 feet east of a farm crossing.
- 110-G In east end of south face of eight-foot concrete culvert under Canadian Pacific railway,  $\frac{1}{2}$  mile east of Elmsley and at mileage 5.2 from Smiths Falls.
- 111-G In west end of north face of square concrete culvert under Canadian Pacific railway, at third telegraph pole east of mile-post 8 from Smiths Falls.
- 112-G In east end of south face of square concrete culvert under Canadian Pacific railway, 1,200 feet east of Perth station.
- 113-G In masonry base of Canadian Pacific water-tank at Perth, 7 feet to the left of the doorway underneath tank and in third course of stonework above doorsill.
- 114-G In south stone foundation wall of Perth public library, 4 feet west of main entrance and 13 inches above concrete sidewalk on Gore street.
- 115-G In water-table course of stonework, in front (or north) wall of Perth town-hall, 10 feet 6 inches from north-east corner of building.
- 116-G In north face-wall of small triangular concrete culvert under Canadian Pacific railway,  $2\frac{1}{2}$  miles west of Perth and at fourth telegraph pole east of mile-post 14 from Smiths Falls.
- 117-G In west end of north face of square concrete culvert under Canadian Pacific railway, 150 feet west of Glentay station.
- 118-G In north face of concrete retaining wall behind west abutment of small plate-girder bridge on Canadian Pacific railway,  $\frac{1}{2}$  mile east of Bathurst.
- 119-G In centre of north face of small square concrete culvert under Canadian Pacific railway—at the east line of a highway crossing—at third telegraph pole west of mile-post 6 from Glentay.
- 120-G In north side of curved rock cut on Canadian Pacific railway, 430 feet east of east line of a highway crossing and 55 feet east of mile-post 9 from Glentay.
- 121-G In west end of north face of large square concrete culvert under Canadian Pacific railway, 140 feet west of westerly switch of Maberley passing-track and 65 feet east of a hand-car house.
- 122-G In south face—slightly below rail level—of large mass of rock on north side of Canadian Pacific railway track, immediately east of a small rock cut; also 380 feet west of mile-post 14 from Glentay and 40 feet west of a wooden culvert.
- 123-G In east end of north face of small concrete arch culvert under Canadian Pacific railway, at mileage 17.4 from Glentay—within the limits of Ungava passing-track.
- 124-G In south side of rock cut on Canadian Pacific railway at Sharbot Lake station—48 feet east of westerly switch leading from main line to passing-track and 370 feet west of water column on main line opposite Union hotel.

#### Branch line to Renfrew.

- 125-G In west side of rock cut on Canadian Pacific railway—100 feet from south end of cut— $2\frac{1}{2}$  miles north of Sharbot Lake station and 160 feet south of mile-post 54 from Renfrew.
- 126-G In east face—near centre—of exposed rock surface immediately west of Canadian Pacific railway track, 1,080 feet south of a wooden culvert at mileage 51.2 from Renfrew; this exposure is on the side of a hill of rock which has been partly cut away to allow the track to pass.

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- 127-G In east side of rock cut on Canadian Pacific railway—near centre of cut— $\frac{1}{2}$  mile north of Clarendon, 200 feet north of a wooden culvert and 370 feet north of a whistle-post for southbound trains.
- 128-G In north end of east face of coping on east end of large square concrete culvert under Canadian Pacific railway,  $1\frac{1}{2}$  miles south of Mississippi and at mileage 45.7 from Renfrew.
- 129-G In east face of concrete retaining wall behind south abutment of plate-girder bridge on Canadian Pacific railway,  $\frac{1}{2}$  mile north of Snow Road and at mileage 41.8 from Renfrew.
- 130-G In north end of east face of square concrete culvert under Canadian Pacific railway, at mileage 39.2 from Renfrew.
- 131-G In west side of small rock cut on Canadian Pacific railway, 520 feet south of mile-post 36 from Renfrew and 420 feet north of a white frame house on east side of track—immediately north of Wilbur station.
- 132-G In east side of rock cut on Canadian Pacific railway, 700 feet south of mile-post 33 from Renfrew and 350 feet north of sign "Lavant 1 mile"—north of station.
- 133-G In west face of concrete retaining wall behind south abutment of plate-girder bridge on Canadian Pacific railway,  $4\frac{1}{2}$  miles north of Lavant and at mileage 30.2 from Renfrew.
- 134-G In east side of rock cut on Canadian Pacific railway—near south end of cut—1,110 feet north of mile-post 27 from Renfrew; this cut is on the first curve (about  $\frac{1}{2}$  mile) north of Clyde Forks.
- 135-G In north end of west face of large square concrete culvert under Canadian Pacific railway, 1 mile north of Flower and at mileage 24.5 from Renfrew; this structure is the farther north of two culverts about 25 feet apart.
- 136-G In north end of west face of square concrete culvert under Canadian Pacific railway, at mileage 22.4 from Renfrew.
- 137-G In east face of half-buried boulder, immediately west of Canadian Pacific Railway track and at south end of a small earth cut at mileage 19.7 from Renfrew. The bench-mark is 90 feet north of a small wooden culvert and 170 feet south of a whistle-post for northbound trains.
- 138-G In east side of rock cut on Canadian Pacific railway—near centre of cut— $\frac{1}{2}$  mile south of Barryvale and 215 feet south of mile-post 17 from Renfrew.
- 139-G In west end of south face of concrete retaining wall behind north abutment of highway bridge over Mada-waska river, 100 yards south of Calabogie station and immediately east of Canadian Pacific railway bridge.
- 140-G In west side of rock cut on Canadian Pacific railway—80 feet from north end of cut—240 feet south of a small stone culvert at mileage 11.6 from Renfrew and 460 feet south of sign "Ashdod 1 mile"—south of station.
- 141-G In east face of large boulder, immediately west of Canadian Pacific railway track at mileage 7.6 from Renfrew—570 feet south of a whistle-post for southbound trains and 870 feet south of a small waterfall on opposite side of track.
- 142-G In east side of rock cut on Canadian Pacific railway—100 feet from north end of cut—580 feet south of mile-post 5 from Renfrew and just at the head of a grade.
- 143-G In south end of west face of coping on west end of concrete arch culvert under Canadian Pacific railway, at mileage 2.3 from Renfrew.
- 505 In third course of stonework below water-table course, in front (or west) wall of Renfrew post-office, 8 feet to the south of the letter-drop.

**Branch line to Kingston.**

- 144-G In west side of small rock cut on Canadian Pacific railway,  $2\frac{1}{2}$  miles south of Sharbot Lake station and at mileage 59.6 from Renfrew. The bench-mark is 9 feet south of a whistle-post for southbound trains and 940 feet south of south line of a highway crossing.
- 145-G In east face—near north end—of large sloping mass of rock immediately west of Canadian Pacific railway track and at mileage 62.4 from Renfrew; this is 200 feet south of a rock cut which is at the south end of a rather deep fill.
- 146-G In south face, 7 inches below top, of disused block of concrete—2 feet by 3 feet—originally used in connection with interlocking plant at Tichborne; this is immediately east of Canadian Pacific railway track (Kingston subdivision) and 300 feet north of diamond crossing of main line.
- 147-G In first course of stonework above bridge-seat, in west face of south abutment of small plate-girder bridge on Canadian Pacific railway,  $1\frac{1}{2}$  miles south of Tichborne and at mileage 66.7 from Renfrew.
- 148-G In west side of small shallow rock cut on Canadian Pacific railway, 40 feet south of a farm crossing, 60 feet north of mile-post 69 from Renfrew and  $2\frac{1}{2}$  miles north of Hinchinbrooke flag-station.
- 149-G In south face of west face-wall of large square concrete culvert under Canadian Pacific railway, 145 feet north of mile-post 71 from Renfrew and 0.4 mile north of Hinchinbrooke.
- 150-G In third course of stonework below bridge-seat, in west face of north abutment of plate-girder bridge on Canadian Pacific railway,  $\frac{1}{2}$  mile north of Godfrey.
- 151-G In west side of shallow rock cut on Canadian Pacific railway—near north end of cut—30 feet south of a whistle-post for northbound trains and between eighth and ninth telegraph poles north of mile-post 77 from Renfrew.
- 152-G In east face—8 inches below top—of north concrete abutment of plate-girder bridge on Canadian Pacific railway, at a water-tank,  $\frac{3}{4}$  mile south of Verona.
- 153-G In east face—near centre—of square concrete culvert under Canadian Pacific railway, 1,850 feet south of Hartington station.
- 154-G In south end of east face of coping on east end of concrete arch culvert under Canadian Pacific and Canadian Northern railways, 220 feet north of Harrowsmith station.
- 155-G In east face of south concrete abutment—6 inches below bridge-seat—of plate-girder bridge on Canadian Pacific railway,  $2\frac{1}{2}$  miles south of Harrowsmith and at mileage 87.3 from Renfrew.
- 156-G In south end of east face of square concrete cattle-pass under Canadian Pacific railway,  $\frac{1}{2}$  mile south of Murvale.
- 157-G In west side of shallow limestone cut on Canadian Pacific railway,  $\frac{3}{4}$  mile north of Glenvale and 330 feet north of an old stone culvert at mileage 92.7 from Renfrew.
- 158-G In west side—near centre—of long curved limestone cut on Canadian Pacific railway,  $1\frac{1}{2}$  miles south of Glenvale and at mileage 94.7 from Renfrew. The bench-mark is at the centre of a smooth clean-cut exposure about 30 feet in length, and is 885 feet north of north line of a highway crossing.
- 159-G In west face of square concrete culvert running diagonally under Canadian Pacific railway—in a rock cut—360 feet south of highway crossing at "Jackson's mill" and at mileage 96.3 from Renfrew. The bench-mark is 15 inches south of northwesterly outlet of culvert and 7 feet east of west side of rock cut.
- 160-G In side of concrete bench-mark pier, 7 feet east of west line of Canadian Pacific railway right-of-way and 235 feet south of a small open culvert with stone abutments; this is at mileage 99.2 from Renfrew and  $2\frac{1}{2}$  miles northwest of Grand Trunk station at Kingston Junction.
- 139 In Grand Trunk station-house at Kingston Junction—see line from Rouse Point to Colborne.

## Main line, continued.

- 161-G In south end of east face of concrete retaining wall behind west abutment of plate-girder bridge on Canadian Pacific railway,  $2\frac{1}{2}$  miles west of Sharbot Lake station and at mileage 23.9 from Glentay.
- 162-G In south face-wall of small triangular concrete culvert under Canadian Pacific railway, at mileage 27.3 from Glentay—within the limits of Olden passing-track.
- 163-G In east end of north face of square concrete culvert under Canadian Pacific railway, at the east line of a highway crossing immediately east of Mountain Grove station.
- 164-G In north side of rock cut on Canadian Pacific railway, 515 feet west of mile-post 33 from Glentay and 450 feet west of a private crossing beside which is situated a square frame house about 200 feet south of the railway.
- 165-G In second course of stonework below coping, in east end of north face of northeast retaining wall of plate-girder bridge on Canadian Pacific railway,  $\frac{1}{4}$  mile east of Ardendale.
- 166-G In south face of exposed rock surface, 10 feet north of Canadian Pacific railway track, 140 feet east of a farm crossing and 200 feet west of a concrete tile culvert at mileage 38.2 from Glentay.
- 167-G In north face of exposed rock surface, 25 feet north of south line of Canadian Pacific railway right-of-way, 860 feet east of westerly switch of Kennebec passing-track and at (approximate) mileage 41.3 from Glentay.
- 168-G In south side of long curved rock cut on Canadian Pacific railway—near centre of cut—370 feet east of a triangular concrete culvert and 225 feet west of mile-post 44 from Glentay.
- 169-G In west end of south face—14 inches below top—of (double) stone and concrete culvert under Canadian Pacific railway,  $2\frac{1}{2}$  miles west of Kaladar and at mileage 48.7 from Glentay.
- 170-G In west end of south face of (double) square concrete culvert under Canadian Pacific railway, at mileage 50.9 from Glentay.
- 171-G In north face of exposed rock surface, 10 feet south of Canadian Pacific railway track—near rail level—740 feet east of easterly switch of Hungerford passing-track and at twenty-second telegraph pole west of mile-post 54 from Glentay.
- 172-G In south face of small stone and concrete culvert under Canadian Pacific railway,  $\frac{1}{4}$  mile west of Sulphide and at mileage 57.6 from Glentay.
- 173-G In third course of stonework above bridge-seat, in south end of west face of retaining wall behind east abutment of plate-girder bridge on Canadian Pacific railway,  $2\frac{1}{2}$  miles east of Tweed and at mileage 60.1 from Glentay.
- 174-G In first course of stonework below cap-stone, in east end of south face of northwest retaining wall of Canadian Pacific railway bridge over Moira river,  $\frac{1}{4}$  mile east of Tweed.
- 175-G In east concrete foundation wall of Orange hall at Tweed, 7 inches below brickwork and at base of first pilaster from southeast corner of building.
- 176-G In east wall of tower of Tweed Methodist church, 5 feet from southeast corner of tower and 6 feet 6 inches below the lowest of the three small windows.
- 177-G In south face of small stone and concrete culvert under Canadian Pacific railway,  $2\frac{1}{2}$  miles west of Tweed and at mileage 65.3 from Glentay.
- 178-G In north side of rock cut on Canadian Pacific railway, 650 feet east of a concrete culvert and 700 feet west of mile-post 68 from Glentay.

- 179-G In south face of concrete coping on stone retaining wall behind east abutment of bridge by which Canadian Pacific railway passes over Grand Trunk railway, 1 mile east of Ivanhoe C.P.R. station and  $\frac{1}{4}$  mile south of Crookston G.T.R. station.

**Branch line to Belleville.**

- 180-G In boulder 13 feet east of Grand Trunk railway track, 520 feet north of a highway crossing, 100 feet north of a red brick farm house and at mileage 18.3 from Belleville harbour.
- 181-G In boulder 17 feet east of Grand Trunk railway track, on north side of public highway immediately north of West Huntingdon station.
- 182-G In north face of large boulder, 93 feet east of Grand Trunk railway track, on south line of public highway immediately north of Madoc Junction station—at the foot of a large elm tree.
- 183-G In side of concrete bench-mark pier on Grand Trunk railway right-of-way, between track and line of telegraph poles, at seventh pole north of a highway crossing or fifteenth pole north of mile-post 10 from Belleville harbour—at the south end of an old gravel pit.
- 184-G In first altar step below top, in east face of southeast concrete retaining wall of Grand Trunk railway bridge over Moira river, immediately south of Foxboro.
- 185-G In first course of stonework below bridge-seat, in east face of south abutment of small plate-girder bridge on Grand Trunk railway, 400 feet south of main road crossing at Corbyville.
- 186-G In south face of very large boulder lying on east line of Grand Trunk railway right-of-way, 1.6 miles north of Belleville station and between seventh and eighth telegraph poles south of mile-post 4 from Belleville harbour.
- 156 In Grand Trunk station-house at Belleville—see line from Rouse Point to Colborne.

**BENCH-MARKS BETWEEN STEELTON AND FRANZ, ONT., VIA ALGOMA  
CENTRAL AND HUDSON BAY RAILWAY, WITH BRANCH LINE TO  
MICHIPICOTEN.**

*Elevations on page 302.*

- 637 In south face—16 inches below top—of west face-wall of concrete arch culvert under Algoma Central railway, at mileage 3.2 from Sault Ste. Marie.
- 638 In north face—8 inches below top—of coping on west end of large concrete arch culvert through which Root river flows under Algoma Central railway, at mileage 6.8 from Sault Ste. Marie.
- 639 In east side of small rock cut on Algoma Central railway—near north end of cut—37 feet south of first telegraph pole south of mile-post 10 from Sault Ste. Marie.
- 640 In west side of small rock cut on Algoma Central railway—2 feet above rail level—380 feet north of Heyden section-house and 15 feet south of mile-post 13 from Sault Ste. Marie.
- 641 In east side of rock cut on Algoma Central railway—near centre of cut—780 feet north of Island Lake station and 45 feet south of mile-post 16 from Sault Ste. Marie.
- 642 In east face of exposed rock surface, 45 feet west of Algoma Central railway track, 180 feet north of north end of a long steel trestle bridge and  $\frac{1}{4}$  mile north of Bellevue.
- 643 In west face of small boulder, 30 feet east of Algoma Central railway track and 25 feet south of second telegraph pole north of mile-post 22 from Sault Ste. Marie.
- 644 In north face—9 inches below top—of east face-wall of concrete arch culvert under Algoma Central railway, at mile-post 25 from Sault Ste. Marie.

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- 645 In east side of rock cut on Algoma Central railway—14 feet from north end of cut—720 feet south of road crossing at Glendale and between second and third telegraph poles south of mile-post 28 from Sault Ste. Marie.
- 646 In south face—18 inches below top—of southeast concrete retaining wall of steel truss bridge over Goulais river,  $\frac{1}{2}$  mile south of Searchmont.
- 647 In west face of mass of rock—12 feet east of Algoma Central railway track and at south end of a clay cut—between third and fourth telegraph poles south of mile-post 33 from Sault Ste. Marie.
- 648 In west face of small boulder, 15 feet west of Algoma Central railway track and at ninth telegraph pole north of mile-post 36 from Sault Ste. Marie.
- 649 In west face of concrete retaining wall behind north abutment of plate-girder bridge over Achigan river,  $2\frac{1}{2}$  miles south of Achigan and at mileage 38.5 from Sault Ste. Marie.
- 650 In east side of rock cut on Algoma Central railway—12 feet from south end of cut and near rail level— $\frac{1}{2}$  mile north of Achigan, 220 feet north of a whistle-post for northbound trains and at mileage 41.5 from Sault Ste. Marie.
- 651 In east face of boulder, half buried in side of clay bank—15 feet west of Algoma Central railway track and 3 feet above rail level—160 feet south of Bucyrus station and between first and second telegraph poles north of mile-post 45 from Sault Ste. Marie.
- 652 In west side of large rock cut on Algoma Central railway—100 feet from south end of cut and near rail level— $\frac{1}{2}$  mile north of Ogadaki and 60 feet north of third telegraph pole south of mile-post 48 from Sault Ste. Marie.
- 653 In east face of concrete retaining wall behind south abutment of plate-girder bridge over south branch of Chippawa river, at mile-post 51 from Sault Ste. Marie.
- 654 In west side of rock cut on Algoma Central railway—50 feet from north end of cut and near rail level—480 feet south of Mashkode south mile-board and at mileage 54.3 from Sault Ste. Marie.
- 655 In west side of rock and clay cut on Algoma Central railway, between first and second telegraph poles north of mile-post 57 from Sault Ste. Marie and 160 feet south of south end of trestle over a small bay of Trout lake.
- 656 In west side of rock cut on Algoma Central railway—near centre of cut and 1 foot above rail level—between first and second telegraph poles north of mile-post 60 from Sault Ste. Marie and 400 feet north of north end of a long trestle over a ravine.
- 657 In west side of rock cut on Algoma Central railway—50 feet from south end of cut and 1 foot above rail level— $\frac{1}{2}$  mile south of Mekatina and at mile-post 63 from Sault Ste. Marie.
- 658 In west side of rock cut on Algoma Central railway—50 feet from south end of cut and 1 foot above rail level— $2\frac{1}{2}$  miles north of Mekatina and 110 feet north of mile-post 66 from Sault Ste. Marie.
- 659 In east face of concrete retaining wall behind south abutment of plate-girder bridge over north branch of Chippawa river, at mileage 69.2 from Sault Ste. Marie.
- 660 In east face of exposed rock surface, 25 feet west of Algoma Central railway track, 200 feet north of south switch of Summit siding and 60 feet south of mile-post 72 from Sault Ste. Marie.
- 661 In west side of rock cut on Algoma Central railway, 360 feet south of stopping-point for "cottages 4 and 5" (owned by railway company), and at third telegraph pole south of mile-post 75 from Sault Ste. Marie.
- 662 In west side of rock cut on Algoma Central railway—near centre of cut—1 mile south of Batchawana and 30 feet south of third telegraph pole north of mile-post 78 from Sault Ste. Marie.

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- 663 In east face of concrete retaining wall behind south abutment of plate-girder bridge over Batchawana river,  $\frac{1}{2}$  mile north of Batchawana.
- 664 In west side of large rock cut on Algoma Central railway—80 feet from south end of cut and 1 foot above rail level—2 miles north of Batchawana and 15 feet south of third telegraph pole north of mile-post 81 from Sault Ste. Marie.
- 665 In east side of rock cut on Algoma Central railway—200 feet from north end of cut—20 feet south of seventh telegraph pole north of mile-post 84 from Sault Ste. Marie.
- 666 In east side of rock cut on Algoma Central railway—near rail level—220 feet south of Regent south mile-board and between first and second telegraph poles south of mile-post 87 from Sault Ste. Marie.
- 667 In south end of east face—6 inches below top—of southeast concrete retaining wall of long steel trestle bridge over Montreal river,  $3\frac{1}{2}$  miles south of Montreal section-house.
- 668 In east face of small boulder, 20 feet west of Algoma Central railway track, 460 feet north of Montreal section-house and at third telegraph pole south of mile-post 95 from Sault Ste. Marie.  
NOTE.—Owing to the danger of this boulder being affected by frost, the elevation of this benchmark must be considered unreliable.
- 669 In west side of rock cut on Algoma Central railway—near rail level—25 feet south of second telegraph pole south of mile-post 98 from Sault Ste. Marie.
- 670 In west face of coffin-shaped mass of rock, about 12 feet in length, 20 feet east of Algoma Central railway track, 1 mile south of Frater and 25 feet south of mile-post 101 from Sault Ste. Marie.  
NOTE.—Owing to the danger of this boulder being affected by frost, the elevation of this benchmark must be considered unreliable.
- 671 In west side of rock cut on Algoma Central railway—75 feet from north end of cut—40 feet south of mile-post 104 from Sault Ste. Marie and 150 feet south of south end of long curved trestle bridge 2 miles north of Frater.
- 672 In east side of rock cut on Algoma Central railway—near north end of cut and at rail level—320 feet south of south end of a trestle bridge and 65 feet north of mile-post 107 from Sault Ste. Marie.
- 673 In east side of rock cut on Algoma Central railway—near rail level—240 feet south of south end of a small trestle and 50 feet south of mile-post 110 from Sault Ste. Marie.
- 674 In vertical rock surface, 20 feet west of Algoma Central railway track and 75 feet south of eighth telegraph pole south of mile-post 113 from Sault Ste. Marie.
- 675 In west side of large rock cut on Algoma Central railway—at extreme north end of cut—30 feet south of first telegraph pole north of mile-post 116 from Sault Ste. Marie and at northerly entrance of Agawa river canyon.
- 676 In north face of exposed rock surface, 25 feet west of Algoma Central railway track and 30 feet south of second telegraph pole north of mile-post 119 from Sault Ste. Marie.
- 677 In west face of exposed rock surface, 20 feet east of Algoma Central railway track, 50 feet north of a small rock cut and at second telegraph pole south of mile-post 121 from Sault Ste. Marie.
- 678 In east face of boulder, half buried in hillside, 30 feet west of Algoma Central railway track and 100 feet south of mile-post 124 from Sault Ste. Marie.
- 679 In west face of exposed rock surface, 40 feet east of Algoma Central railway track, 630 feet north of north end of a trestle bridge and 20 feet north of fourth telegraph pole south of mile-post 128 from Sault Ste. Marie.

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- 680 In west face of exposed rock surface, 30 feet east of Algoma Central railway track,  $\frac{1}{2}$  mile north of Agawa section-house and 25 feet north of twelfth telegraph pole north of mile-post 131 from Sault Ste. Marie.
- 681 In west face of boulder, 30 feet east of Algoma Central railway track and 95 feet south of mile-post 134 from Sault Ste. Marie.
- 682 In west face of large white boulder, half buried in hillside, 12 feet east of Algoma Central railway track and at fifth telegraph pole north of mile-post 137 from Sault Ste. Marie.
- 683 In east face of small boulder, 65 feet west of Algoma Central railway track, 460 feet north of southerly switch of Tabor passing-track and at third telegraph pole north of mile-post 140 from Sault Ste. Marie.
- 684 In west face of large white boulder, partly buried in hillside, 15 feet east of Algoma Central railway track and between first and second telegraph poles south of mile-post 143 from Sault Ste. Marie.
- 685 In east side of rock cut on Algoma Central railway—near centre of cut—450 feet north of north end of a trestle bridge and between fifth and sixth telegraph poles south of mile-post 146 from Sault Ste. Marie.
- 686 In east face of concrete retaining wall behind south abutment of plate-girder bridge over Michipicoten river, at mileage 151.6 from Sault Ste. Marie.
- 687 In east face of large black boulder, 30 feet west of Algoma Central railway track and between fourteenth and fifteenth telegraph poles south of mile-post 155 from Sault Ste. Marie.
- 688 In east face of exposed rock surface—10 feet west of Algoma Central railway track and about 1 foot below rail level—at first telegraph pole south of mile-post 158 from Sault Ste. Marie.
- 689 In west face of exposed rock surface—27 feet east of Algoma Central railway track and near rail level—1 $\frac{1}{2}$  miles south of station at Hawk Junction and at fourth telegraph pole north of mile-post 162 from Sault Ste. Marie.

#### Michipicoten branch line.

- 690 In south face of vertical rock surface of steep rocky hill immediately west of Algoma Central railway track (Michipicoten branch),  $\frac{1}{2}$  mile north of station at Hawk Junction, at eleventh telegraph pole north of mile-post 26 from Michipicoten and opposite a point on main line at mileage 164.8 from Sault Ste. Marie. The bench-mark is 90 feet west of track, 3 feet above ground and about at rail level.
- 691 In south side of rock cut on Algoma Central railway—15 feet south of track and near centre of cut—at mile-post 23 from Michipicoten.
- 692 In north side of wide rock cut on Algoma Central railway, 35 feet north of track, 100 feet west of sixth telegraph pole west of mile-post 20 from Michipicoten and 600 feet east of a concrete culvert—the first one west of spur line to Josephine mine.
- 693 In north face of exposed rock surface, 35 feet south of Algoma Central railway track and 100 feet west of mile-post 17 from Michipicoten.
- 694 In north face of exposed rock surface at the base of a rocky hill, immediately south of Algoma Central railway track and 70 feet east of mile-post 13 from Michipicoten—facing a large muskeg.
- 695 In north side of rock cut on Algoma Central railway, 2 feet above rail level and 60 feet east of mile-post 11 from Michipicoten.
- 696 In west face of flat mass of rock, 100 feet south of Algoma Central railway track and 75 feet west of first telegraph pole west of mile-post 8 from Michipicoten.
- 697 In south side of rock cut on Algoma Central railway, at eleventh telegraph pole east of mile-post 3 from Michipicoten.

- 698 In square-cut mass of rock, 230 feet south of Algoma Central railway track and 275 feet east of hotel at Michipicoten.

**Main line, continued.**

- 699 In east side of small rock cut on Algoma Central railway—30 feet from south end of cut—4 miles north of station at Hawk Junction and at fifth telegraph pole south of mile-post 168 from Sault Ste. Marie. This cut is at the south end of a long muskeg.
- 700 In south face of vertical rock surface, 20 feet west of Algoma Central railway track and at the south end of a rock cut. The bench-mark is 300 feet south of a trestle bridge and at eighth telegraph pole north of mile-post 171 from Sault Ste. Marie.
- 701 In west face of vertical rock exposure—2 feet above ground—200 feet east of Algoma Central railway track and at third telegraph pole south of mile-post 174 from Sault Ste. Marie.
- 702 In west face of large rough mass of rock—at north end of long deep rock cut—50 feet east of Algoma Central railway track and between eighth and ninth telegraph poles south of Goudreau section-house, or south of mile-post 177 from Sault Ste. Marie.
- 703 In east face of boulder, half buried in hillside, 40 feet west of Algoma Central railway track, 50 feet south of a deep rock cut and at first telegraph pole north of mile-post 180 from Sault Ste. Marie—3 miles north of Goudreau section-house.
- 704 In west face of vertical rock surface, 70 feet east of Algoma Central railway track and between first and second telegraph poles south of mile-post 183 from Sault Ste. Marie. This rock surface forms the northwest corner of a rocky hill; a muskeg lies immediately to the north.
- 705 In south face of large pyramid shaped boulder, 90 feet east of Algoma Central railway track, 1½ miles south of Wanda section-house and tank, and between second and third telegraph poles south of mile-post 186 from Sault Ste. Marie. This boulder is also opposite a borrow pit at north end of a long deep fill.
- 706 In east face of exposed rock surface, 37 feet west of Algoma Central railway track, 2 miles north of Wanda section-house and tank, and between thirteenth and fourteenth telegraph poles north of mile-post 189 from Sault Ste. Marie. This exposure forms a small vertical surface in a sloping hill of rock at north end of a large ballast pit.
- 707 In south face of large triangular boulder, 30 feet west of Algoma Central railway track, 2½ miles south of Franz and 100 feet north of mile-post 192 from Sault Ste. Marie.
- 708 In west face of exposed rock surface, 65 feet east of Algoma Central railway track at Franz, 650 feet south of diamond crossing of Canadian Pacific railway and 120 feet south of home semaphore of interlocking plant.

**BENCH-MARKS BETWEEN KIPP, ALTA., AND GOLDEN, B.C., VIA CANADIAN  
PACIFIC RAILWAY THROUGH CROWSNEST AND COLVALLI.**

*Elevations on page 304.*

**Note.**—These descriptions are written with the assumption that the railway runs in a westerly direction from Kipp to Colvalli and thence northerly to Golden.

- 84-D In west concrete foundation wall—16 inches below woodwork and 4 feet from southwest corner—of Canadian Bank of Commerce at Monarch.
- 85-D In west face of southeast concrete retaining wall of steel trestle viaduct over Oldman river, 4 miles west of Monarch.

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- 86-D In side of concrete bench-mark pier, 8 feet south of north line of Canadian Pacific railway right-of-way, 350 feet east of a highway crossing,  $5\frac{1}{2}$  miles east of Macleod and 268 feet west of mile-post 26 from Lethbridge.
- 87-D In second course of stonework below water-table course, in east end of north wall of Macleod court-house.
- 88-D In second course of stonework below water-table course, in east end of north wall of westerly wing of Macleod public school—9 feet west of main entrance.
- 89-D In north concrete foundation wall—6 inches below woodwork and 10 feet 6 inches from northwest corner—of Canadian Pacific section-house, at east end of Stowe passing-track.
- 90-D In south end of east face of west abutment of large square concrete culvert under Canadian Pacific railway, at mileage 40.4 from Lethbridge.
- 91-D In west face of north face-wall of (double) square concrete culvert under Canadian Pacific railway, 100 feet west of westerly switch of Piegan passing-track and at mileage 41.7 from Lethbridge.
- 92-D In side of concrete bench-mark pier, 8 feet south of north line of Canadian Pacific railway right-of-way, 1,000 feet east of Chokio west mile-board and 23 feet west of mile-post 48 from Lethbridge.
- 93-D In north end of east face of concrete retaining wall behind west abutment—3 feet above bridge-seat—of steel trestle bridge over Pincher creek,  $1\frac{1}{2}$  miles west of Bocket.
- 94-D In east stone foundation wall—11 inches below woodwork and 20 inches from northeast corner—of Canadian Pacific section-house at Pincher, 270 feet east of the station.
- 95-D In west face of south face-wall of square concrete culvert under Canadian Pacific railway,  $2\frac{1}{2}$  miles east of Cowley and at mileage 65.3 from Lethbridge.
- 96-D In east face of northwest concrete retaining wall—2 feet 8 inches above bridge-seat—of steel trestle bridge over south fork of Oldman river,  $2\frac{1}{2}$  miles east of Cowley.
- 97-D In north concrete foundation wall—1 foot below top of foundation and 4 feet from northeast corner—of public school at Cowley,  $\frac{1}{4}$  mile southwest of the station.
- 98-D In east end of north face—3 feet below top—of concrete arch culvert under Canadian Pacific railway,  $1\frac{1}{2}$  miles east of Lundbreck and at second telegraph pole west of mile-post 71 from Lethbridge.
- 99-D In west face of concrete retaining wall behind east abutment—2 feet above bridge-seat and almost in line with northerly truss—of Canadian Pacific railway bridge over Crowsnest river,  $2\frac{1}{2}$  miles west of Lundbreck.
- 100-D In west face of south face-wall of concrete arch culvert under Canadian Pacific railway,  $1\frac{1}{2}$  miles west of Burmis and at mileage 80.9 from Lethbridge.
- 101-D In south face of wall of rock, immediately north of Canadian Pacific railway track, 330 feet west of Passburg west mile-board and 120 feet west of mile-post 83 from Lethbridge. The bench-mark is 1 foot above rail level.
- 102-D In south face of triple concrete culvert under Canadian Pacific railway, 400 feet east of Frank station. The bench-mark is in wall between centre and western arches, 4 feet below top of concrete.
- 103-D In north face of east concrete abutment—22 inches below bridge-seat—of plate-girder bridge on Canadian Pacific railway, 0.4 mile east of Blairmore and at mileage 87.8 from Lethbridge.
- 104-D In west end of south face of square concrete culvert under Canadian Pacific railway,  $1\frac{1}{2}$  miles east of Coleman and at mileage 90.1 from Lethbridge.
- 105-D In east end of north face of square concrete culvert under Canadian Pacific railway,  $\frac{1}{4}$  mile west of Coleman and at mileage 92.1 from Lethbridge.

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- 106-D In north face of small square concrete culvert under Canadian Pacific railway, 60 feet east of a highway crossing and at first telegraph pole east of mile-post 94 from Lethbridge.
- 107-D In north face of east concrete abutment—18 inches below bridge-seat—of plate-girder bridge on Canadian Pacific railway, at mileage 95.6 from Lethbridge and at east end of Sentry passing-track.
- 108-D In east face of south face-wall—16 inches below top—of large concrete arch culvert under Canadian Pacific railway,  $2\frac{1}{4}$  miles east of Crowsnest and at mileage 98.3 from Lethbridge; at "The cave, main source of Oldman river."
- 109-D In south face of concrete base of interprovincial boundary monument between Alberta and British Columbia, 50 feet north of Canadian Pacific railway main track at "The Great Divide"—530 feet east of Crowsnest station.
- 110-D In west end of south face of small square concrete culvert under Canadian Pacific railway, at mileage 1.9 from Crowsnest.
- 111-D In west face—10 inches below top—of concrete coping on top of a stone retaining wall lying along north side of Canadian Pacific railway track, at mileage 3.9 from Crowsnest.
- 112-D In south face—20 inches below top—of concrete retaining wall behind west abutment of plate-girder bridge over Michel creek, immediately west of McGillivray station.
- 113-D In north face of concrete retaining wall behind east abutment of plate-girder bridge on Canadian Pacific railway,  $2\frac{1}{2}$  miles west of McGillivray and at mileage 9.2 from Crowsnest.
- 114-D In front (or east) face of concrete platform extending along front of Trites-Wood company's general store at Michel—a large concrete building immediately northwest of the station. The bench-mark is 2 feet 9 inches below top of platform and 6 feet from southeast corner.
- 115-D In north face of west concrete abutment—1 foot below bridge-seat—of plate-girder bridge over Michel creek,  $1\frac{1}{2}$  miles west of Natal and at mileage 15.8 from Crowsnest.
- 116-D In north face of west abutment of square concrete culvert under Canadian Pacific railway, 150 feet east of Wardrop west mile-board and at mileage 21.5 from Crowsnest.
- 117-D In west end of south face of small concrete arch culvert under Canadian Pacific railway, at mileage 24.2 from Crowsnest.
- 118-D In north face of west concrete abutment—10 inches below seat of I-beams—of open culvert under Canadian Pacific railway,  $2\frac{1}{4}$  miles east of Hosmer and at mileage 26.2 from Crowsnest.
- 119-D In east end of north face of concrete arch culvert under Canadian Pacific railway,  $1\frac{1}{2}$  miles west of Hosmer and at mileage 29.6 from Crowsnest.
- 120-D In south face of concrete retaining wall behind west abutment of plate-girder bridge on Canadian Pacific railway,  $3\frac{1}{4}$  miles east of Fernie and at mileage 32.6 from Crowsnest.
- 121-D In third course of stonework below water-table course, in east face of corner stone at southeast corner of Fernie post-office.
- 122-D In north concrete foundation wall—4 feet below brickwork and 8 feet from northeast corner—of Provincial Government building at Fernie.
- 123-D In side of concrete bench-mark pier, 3 feet south of north line of Canadian Pacific railway right-of-way, 180 feet west of a highway crossing, 1 mile west of Fernie and 330 feet west of mile-post 37 from Crowsnest.
- 124-D In north face of east concrete abutment—20 inches below seat of I-beams—of open culvert under Canadian Pacific railway, at mileage 39.8 from Crowsnest.

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- 125-D In south face of concrete retaining wall behind east abutment of plate-girder bridge on Canadian Pacific railway,  $\frac{3}{4}$  mile east of Morrissey and at mileage 43.5 from Crowsnest.
- 126-D In north face of concrete retaining wall behind east abutment of plate-girder bridge on Canadian Pacific railway,  $2\frac{1}{2}$  miles west of Morrissey and at mileage 46.7 from Crowsnest.
- 127-D In north face of concrete retaining wall behind west abutment—4 feet 10 inches above bridge-seat—of through-truss bridge over Elk river,  $1\frac{1}{2}$  miles east of Elko.
- 128-D In west face of exposed rock surface, 55 feet south of north line of Canadian Pacific railway right-of-way, 1,740 feet east of mile-post 57 from Crowsnest and 100 feet west of a rock cut.
- 129-D In west end of north face of concrete arch culvert under Canadian Pacific railway, in a deep fill, 250 feet west of westerly switch of Caithness passing-track and at mileage 59.1 from Crowsnest.
- 130-D In north face of west concrete abutment—6 inches below bridge-seat—of plate-girder bridge on Canadian Pacific railway, 3 miles east of Jaffray and at mileage 63.8 from Crowsnest.
- 131-D In south face of southwest concrete retaining wall—3 feet 6 inches below bridge-seat—of plate-girder bridge on Canadian Pacific railway, at easterly switch of passing-track at Jaffray.
- 132-D In south concrete foundation wall—20 inches below woodwork and 7 inches from southwest corner—of Jaffray public school.
- 133-D In south concrete foundation wall—9 inches below woodwork and 14 inches from southwest corner—of Canadian Pacific section-house at Colvalli.
- 134-D In side of concrete bench-mark pier, 5 feet east of west line of Canadian Pacific railway right-of-way and 100 feet south of mile-post 5 from Colvalli.
- 135-D In south face of south concrete pier—6 inches below top of pier and 2 feet east of easterly girder—of Canadian Pacific railway bridge over Bull river,  $\frac{1}{4}$  mile north of Bull River station.
- 136-D In south face of large square boulder on east bank of Kootenay river, 42 feet west of centre line of Canadian Pacific railway track and 560 feet north of mile-post 14 from Colvalli.
- 137-D In north face of large flat mass of rock on east bank of Kootenay river, 28 feet west of centre line of Canadian Pacific railway track, 600 feet south of Steele south mile-board and between fourteenth and fifteenth telegraph poles north of mile-post 21 from Colvalli.
- 138-D In rear (or east) concrete foundation wall—1 foot below woodwork and 7 feet south of rear entrance—of Canadian Pacific station-house at Steele.
- 139-D In north (vertical) face of large white boulder, 40 feet west of centre line of Canadian Pacific railway track, 520 feet south of a whistle-post for southbound trains and 2080 feet south of mile-post 26 from Colvalli.
- 140-D In north face of large irregular boulder, 15 feet east of Canadian Pacific railway track—in the side of a gravelly cut—150 feet north of a whistle-post for southbound trains and between eighth and ninth telegraph poles north of mile-post 29 from Colvalli.
- 141-D In side of concrete bench-mark pier, 2 feet east of west line of Canadian Pacific railway right-of-way, 450 feet north of highway crossing at northerly end of Wasa passing-track and between fourth and fifth telegraph poles south of mile-post 36 from Colvalli.
- 142-D In south face of concrete retaining wall behind east abutment—2 feet above bridge-seat—of Canadian Pacific railway bridge over Kootenay river, 3 miles north of Wasa.
- 143-D In northwest face of large black boulder, 80 feet east of east line of Canadian Pacific railway right-of-way and between seventeenth and eighteenth telegraph poles south of mile-post 44 from Colvalli.

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- 144-D In south face—3 feet 2 inches below top and 4 feet from east end—of north concrete abutment of steel truss bridge over Skookumchuck creek, at mileage 46.6 from Colvalli.
- 145-D In east face of outcrop of rock, 60 feet west of west line of Canadian Pacific railway right-of-way, 1,250 feet south of a highway crossing and between second and third telegraph poles south of mile-post 50 from Colvalli.
- 146-D In west face of small rock exposure, 20 feet west of east line of Canadian Pacific railway right-of-way, 310 feet south of a whistle-post for southbound trains and between seventh and eighth telegraph poles south of mile-post 54 from Colvalli—opposite the centre of a high rocky hill immediately east of track.
- 147-D In south face—1 foot below top and 5 feet from west end—of north concrete abutment of steel truss bridge on Canadian Pacific railway, at mileage 59.7 from Colvalli.
- 148-D In east face of exposed rock surface, 20 feet west of Canadian Pacific railway track and 115 feet north of mile-post 62 from Colvalli.
- 149-D In exposed rock surface—20 feet west of Canadian Pacific railway track and near rail level—210 feet south of a rock cut and between sixth and seventh telegraph poles north of mile-post 65 from Colvalli.
- 150-D In side of concrete bench-mark pier, 3 feet east of west line of Canadian Pacific railway right-of-way, 18 feet north of a whistle-post for southbound trains and between sixteenth and seventeenth telegraph poles south of mile-post 75 from Colvalli—about 200 feet north of a small inlet which the railway has cut off from Columbia lake.
- 151-D Destroyed.
- 152-D In side of concrete bench-mark pier, 2 feet east of west line of Canadian Pacific railway right-of-way, 1,000 feet north of a private crossing and 730 feet south of bridge over small brook at mileage 86.7 from Colvalli.
- 153-D In south concrete foundation wall—2 feet 9 inches below woodwork and 1 foot 5 inches from southeast corner—of Canadian Pacific section-house at Athalmer,  $\frac{1}{2}$  mile south of the station.
- 154-D In east end of north face of concrete retaining wall behind south abutment—1 foot above bridge-seat—of Canadian Pacific railway swing bridge over a channel of Columbia river,  $1\frac{1}{2}$  miles north of Athalmer and at mileage 94.2 from Colvalli.
- 155-D In north face of boulder on east bank of Columbia river, 85 feet west of Canadian Pacific railway track and between fifteenth and sixteenth telegraph poles south of mile-post 99 from Colvalli—opposite the centre of a steep gravelly bank lying on east side of track.
- 156-D In side of concrete bench-mark pier, 3 feet west of east line of Canadian Pacific railway right-of-way, 1,240 feet north of northerly switch of Edgewater passing-track, 140 feet north of a galvanized iron culvert and 400 feet north of north end of a vertical clay bank about 100 feet in height lying on east side of track.
- 157-D In side of concrete bench-mark pier, 2 feet west of east line of Canadian Pacific railway right-of-way, 27 feet south of a gate in the right-of-way fence and between fourth and fifth telegraph poles north of mile-post 115 from Colvalli.
- 158-D In side of concrete bench-mark pier, 2 feet west of east line of Canadian Pacific railway right-of-way, 760 feet south of a private crossing,  $2\frac{3}{4}$  miles south of Spillimacheen and between eighth and ninth telegraph poles south of mile-post 123 from Colvalli.
- 159-D In south concrete foundation wall—8 inches below woodwork and 22 inches from southwest corner—of Canadian Pacific section-house at Spillimacheen.
- 160-D In south concrete foundation wall—8 inches below woodwork and 2 feet from southwest corner—of Canadian Pacific section-house at south end of Harrogate passing-track.
- 161-D In side of concrete bench-mark pier, 3 feet west of east line of Canadian Pacific railway right-of-way, 25 feet north of a private crossing and 320 feet north of mile-post 140 from Colvalli.

- 162-D In concrete foundation—4 inches below woodwork and 2 feet to the right of the doorway—of Canadian Pacific water-tank at Parson.
- 163-D In west concrete foundation wall—4 inches below woodwork and 2 feet from southwest corner—of Canadian Pacific section-house at Parson.
- 164-D In west concrete foundation wall—4 inches below woodwork and 3 feet from southwest corner—of Canadian Pacific section-house at Mons.
- 165-D In side of concrete bench-mark pier, 3 feet west of east line of Canadian Pacific railway right-of-way, 250 feet north of a rock cut and 750 feet north of mile-post 160 from Colvalli.
- 166-D In north concrete foundation wall—11 inches below woodwork and 18 inches from northeast corner—of Canadian Pacific section-house at Nicholson.
- 273-C In Canadian Pacific railway bridge over Kicking Horse river at Golden—see line from Field to Revelstoke.

BENCH-MARKS BETWEEN BULL RIVER AND KOOTENAY LANDING,  
B.C., VIA CANADIAN PACIFIC RAILWAY, WITH BRANCH  
LINE FROM CRESTON, B.C., TO PORTHILL, IDAHO,  
VIA GREAT NORTHERN RAILWAY.

*Elevations on page 307.*

**Note.**—These levels were carried across the Kootenay river from Bull River to a point on the railway near Wardner and thence westerly. The descriptions are written with the assumption that the railway runs in a westerly direction from Wardner to Creston and thence northerly to Kootenay Landing.

- 167-D In south side of rock cut on Canadian Pacific railway—80 feet from west end of cut—between ninth and tenth telegraph poles east of Tokay west mile-board,  $4\frac{1}{2}$  miles west of Wardner and at mileage 81.6 from Crowsnest.
- 168-D In north face of boulder embedded in steep hillside, 100 feet south of south line of Canadian Pacific railway right-of-way,  $\frac{3}{4}$  mile east of Rampart flag-station and between tenth and eleventh telegraph poles west of mile-post 88 from Crowsnest.
- 169-D In north side of rock cut on Canadian Pacific railway—30 feet from west end of cut and near rail level—400 feet east of a whistle-post for eastbound trains, 2 miles west of Rampart flag-station and at first telegraph pole east of mile-post 91 from Crowsnest.
- 170-D In south face of exposed rock surface in side of steep hill, 20 feet north of Canadian Pacific railway track and 40 feet east of third telegraph pole east of mile-post 94 from Crowsnest—this mile-post being at easterly switch of Eager passing-track.
- 171-D In east end of north face—3 feet below top—of concrete arch culvert under Canadian Pacific railway, 2 miles east of Cranbrook and at mileage 96.9 from Crowsnest.
- 172-D In east end of north face—18 inches below top—of concrete arch culvert under Canadian Pacific railway, 1,600 feet east of Cranbrook station.
- 173-D In third course of stonework above concrete sidewalk, in centre of south (or Baker street) wall of Imperial Bank at Cranbrook.
- 174-D In second course of stonework below brickwork, in north (or Baker street) wall of Cranbrook post-office—2 feet west of west wall of clock tower.
- 175-D In east end of north face—15 inches below top—of concrete arch culvert under Canadian Pacific railway, in a ravine,  $2\frac{1}{2}$  miles west of Cranbrook.

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- 176-D In side of concrete bench-mark pier, 10 feet south of north line of Canadian Pacific railway right-of-way, 670 feet east of easterly switch of Fassiferne passing-track and 30 feet west of third telegraph pole west of mile-post 5 from Cranbrook.
- 177-D In west end of south face of square concrete culvert under Canadian Pacific railway, 150 feet east of easterly switch of Swansea passing-track and at mileage 9.3 from Cranbrook.
- 178-D In south end of west face of concrete retaining wall behind east abutment of plate-girder bridge over Moyie river, at mileage 10.9 from Cranbrook.
- 179-D In north face of concrete retaining wall behind west abutment of plate-girder bridge on Canadian Pacific railway, at mileage 13.3 from Cranbrook.
- 180-D In north face of exposed rock surface—immediately south of Canadian Pacific railway track and 2 feet above rail level—170 feet west of a permanent slow-sign for westbound trains, 3 miles east of Moyie and between fifth and sixth telegraph poles east of mile-post 17 from Cranbrook.
- 181-D In north end of west face of concrete retaining wall behind east abutment of open culvert under Canadian Pacific railway, 0.3 mile east of Moyie.
- 182-D In south face of concrete retaining wall behind east abutment—3 feet above bridge-seat—of plate-girder bridge over Moyie river,  $2\frac{1}{2}$  miles west of Moyie and at mileage 22.5 from Cranbrook.
- 183-D In north end of west face of concrete retaining wall behind east abutment of open culvert under Canadian Pacific railway, at mileage 25.8 from Cranbrook.
- 184-D In south end of east face of concrete retaining wall behind west abutment of open culvert under Canadian Pacific railway, at mileage 29.2 from Cranbrook.
- 185-D In south face—8 inches below top—of concrete retaining wall behind west abutment of plate-girder bridge on Canadian Pacific railway, at mileage 31.9 from Cranbrook.
- 186-D In north face of concrete retaining wall behind east abutment of plate-girder bridge on Canadian Pacific railway,  $3\frac{1}{2}$  miles east of Yahk and at mileage 37.4 from Cranbrook.
- 187-D In west face of south face-wall of small concrete arch culvert under Canadian Pacific railway, 470 feet west of Yahk east mile-board and at mileage 39.6 from Cranbrook.
- 188-D In side of concrete bench-mark pier, 9 feet south of north line of Canadian Pacific railway right-of-way, 100 feet west of a whistle-post for eastbound trains, 3 miles west of Yahk and 540 feet east of a concrete arch culvert at mileage 43.7 from Cranbrook.
- 189-D In north end of west face of concrete retaining wall behind east abutment of open culvert under Canadian Pacific railway, at mileage 46.5 from Cranbrook.
- 190-D In west face—1 foot below top—of south face-wall of concrete arch culvert under Canadian Pacific railway, at mileage 50.8 from Cranbrook.
- 191-D In south face—immediately above southwest wing-wall—of concrete arch culvert under Canadian Pacific railway,  $2\frac{1}{2}$  miles east of Cadorna and at mileage 53.1 from Cranbrook.
- 192-D In north face of concrete retaining wall behind east abutment of two-span open culvert under Canadian Pacific railway, immediately west of Cadorna.
- 193-D In south face—immediately above southwest wing-wall—of concrete arch culvert under Canadian Pacific railway, in a deep fill at an old saw-mill, 3 miles west of Cadorna and at mileage 58.5 from Cranbrook.
- 194-D In north face—14 inches below top—of a concrete pedestal used in connection with electric signal system. The pedestal is on north side of Canadian Pacific railway track, 20 feet east of east end of bridge over Goat river canyon and  $\frac{1}{2}$  mile west of Canyon station.

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- 195-D In concrete footing—18 inches below woodwork and 18 feet to the left of the spout—of Canadian Pacific water-tank at Creston.
- 196-D In west face of small boulder, 30 feet east of west line of Canadian Pacific railway right-of-way, 160 feet south of a farm crossing,  $\frac{1}{2}$  mile north of Creston and between tenth and eleventh telegraph poles north of mile-post 68 from Cranbrook.
- 197-D In east side of rock cut on Great Northern railway—near south end of cut—780 feet north of north end of trestle No. 14 and  $3\frac{1}{2}$  miles north of Porthill, Idaho.
- 198-D In north face of concrete base of international boundary monument No. 207, on top of hill, immediately east of Great Northern railway at Porthill.
- 199-D In south end of east face of concrete arch culvert under Canadian Pacific railway,  $1\frac{1}{2}$  miles north of Creston and at mileage 69.2 from Cranbrook.
- 200-D In east face—immediately above southeast wing-wall—of concrete arch culvert under Canadian Pacific railway, 1 mile south of Duck Creek flag-station and at mileage 72.7 from Cranbrook.
- 201-D In east side of rock cut on Canadian Pacific railway—25 feet from north end of cut and near rail level— $3\frac{1}{2}$  miles south of Sirdar and 90 feet north of mile-post 76 from Cranbrook.
- 202-D In west face of exposed rock surface—immediately east of Canadian Pacific railway track and near rail level— $1\frac{1}{2}$  miles south of Sirdar and at first telegraph pole south of mile-post 78 from Cranbrook.
- 203-D In south end of east face of small concrete arch culvert under Canadian Pacific railway, 0.6 mile north of Sirdar and at mileage 80.4 from Cranbrook.
- 204-D In side of concrete bench-mark pier, 35 feet west of Canadian Pacific railway track, 33 feet north of northerly switch of Atbara passing-track and 890 feet southeast of east end of steel truss bridge over Kootenay river. This bench-mark is about midway between Sirdar and Kootenay Landing.
- 205-D In west side of large rock cut on Canadian Pacific railway—near rail level—660 feet southeast of east end of steel truss bridge over Kootenay river and 10 feet north of point at which abandoned Great Northern railway to Kuskonook diverges from Canadian Pacific railway, *i.e.*, north of point of rock separating the two tracks. This bench-mark is about midway between Sirdar and Kootenay Landing.

BENCH-MARKS BETWEEN FIELD AND REVELSTOKE, B.C.,  
VIA CANADIAN PACIFIC RAILWAY.

*Elevations on page 309.*

- 261-C In east end of north face of cap-stone on northeast retaining wall of plate-girder bridge on Canadian Pacific railway, at mileage 3.8 from Field.
- 262-C In east end of south concrete face-wall of tile pipe culvert under Canadian Pacific railway, at mileage 6.17 from Field.
- 263-C In north end of west face of concrete retaining wall behind east abutment of through-truss bridge over Kicking Horse river, 1 mile west of Ottertail and at mileage 9.25 from Field.
- 264-C In south face—in top course of stonework—of retaining wall behind west abutment of plate-girder bridge on Canadian Pacific railway, at mileage 11.56 from Field.
- 265-C In west end of south face of square concrete culvert under Canadian Pacific railway,  $\frac{1}{2}$  mile east of Leancoil and at mileage 16.4 from Field.

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- 266-C In east end of north concrete face-wall of tile culvert under Canadian Pacific railway,  $2\frac{1}{2}$  miles west of Leanchoil and at mileage 19.45 from Field.
- 267-C In south end of east face—in top course of stonework—of retaining wall behind east abutment of through-truss bridge over Kicking Horse river, at mileage 21.6 from Field.
- 268-C In north face of southeast retaining wall of tunnel on Canadian Pacific railway, at mileage 24.5 from Field. The bench-mark is 2 feet above ground and 47 feet east of head-wall at eastern portal of tunnel.
- 269-C In second course of stonework above bridge-seat, in north end of west face of retaining wall behind east abutment of deck-truss bridge over Kicking Horse river,  $2\frac{1}{4}$  miles east of Glenogle and at mileage 25.7 from Field.
- 270-C In first course of stonework below coping, in west end of north face of stone arch bridge on Canadian Pacific railway,  $\frac{1}{4}$  mile east of Glenogle and at mileage 27.25 from Field.
- 271-C In west face of concrete head-wall at western portal of tunnel on Canadian Pacific railway, 3 miles west of Glenogle and at mileage 31.08 from Field. The bench-mark is near rail level and 1 foot 6 inches south of south side of tunnel.
- 272-C In centre of south face of stone coping on southeast retaining wall of through-truss bridge over Kicking Horse river, 2 miles east of Golden and at mileage 33.24 from Field.
- 273-C In northeast face of concrete retaining wall behind southeast abutment—2 feet 7 inches above bridge-seat—of two-span truss bridge over Kicking Horse river, 0.3 mile east of Golden—on Kootenay Central subdivision of Canadian Pacific railway.
- 274-C In south face of concrete retaining wall behind east abutment of plate-girder bridge on Canadian Pacific railway,  $1\frac{1}{2}$  miles west of Golden and at mileage 36.93 from Field.
- 275-C In east end of north concrete face-wall of galvanized iron pipe culvert under Canadian Pacific railway,  $3\frac{1}{2}$  miles west of Golden and at mile-post 39 from Field.
- 276-C In side of concrete bench-mark pier, 47 feet north of Canadian Pacific railway main track, 2,175 feet west of Moberly station-house and 153 feet west of mile-post 42 from Field.
- 277-C In east end of south face of stone coping on southeast retaining wall of through-truss bridge over Blaeberry river, at mile-post 45 from Field.
- 278-C In east end of north concrete face-wall of tile pipe culvert under Canadian Pacific railway, at mileage 48.2 from Field.
- 279-C In west end of north concrete face-wall of tile pipe culvert under Canadian Pacific railway,  $\frac{1}{2}$  mile east of Donald and at mileage 51.23 from Field.
- 280-C In second course of stonework above bridge-seat, in north end of west face of retaining wall behind east abutment of plate-girder bridge over Columbia river, 1 mile west of Donald.
- 281-C In north face of southeast retaining wall of tunnel on Canadian Pacific railway,  $2\frac{1}{4}$  miles west of Donald and at mileage 54.32 from Field. The bench-mark is 2 feet above ground and 15 feet east of head-wall at eastern portal of tunnel.
- 282-C In south face of northeast retaining wall of tunnel on Canadian Pacific railway, at mileage 57.81 from Field. The bench-mark is 2 feet above ground and 27 feet east of head-wall at eastern portal of tunnel.
- 283-C In face of northwest wing-wall of square concrete culvert under Canadian Pacific railway, at mileage 59.25 from Field.
- 284-C In south end of west face of retaining wall behind east abutment of plate-girder bridge over Quartz creek, immediately east of Beaver mouth.

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- 285-C In second course of stonework above bridge-seat, in south face of retaining wall behind east abutment of through-truss bridge over Beaver river, 3 miles west of Beavermouth.
- 286-C In west face of concrete retaining wall behind east abutment of plate-girder bridge over Sixmile creek, at mileage 68.3 from Field. The bench-mark is 1 foot 4 inches below top of concrete—between guard timber and southerly girder.
- 287-C In east end of north face of coping on north end of stone arch culvert under Canadian Pacific railway,  $1\frac{1}{2}$  miles east of Sturdee and at mileage 72.13 from Field.
- 288-C In east end of south face of coping on south end of stone arch culvert under Canadian Pacific railway,  $\frac{1}{2}$  mile west of Sturdee and at mileage 74.1 from Field.
- 289-C In east end of north face of stone coping on northeast retaining wall of Canadian Pacific railway bridge over Stony creek,  $1\frac{1}{2}$  miles east of Bear Creek station and at mileage 76.4 from Field.
- 290-C In west end of south face of coping on south end of stone arch culvert under Canadian Pacific railway, 2 miles west of Bear Creek station and at mile-post 80 from Field.
- 291-C In east face of coping on south end of concrete arch culvert under Canadian Pacific railway, 1 mile east of Rogers Pass station and at mileage 83.26 from Field.
- 292-C In side of concrete bench-mark pier on abandoned grade lying immediately to the north of present (1915) track of Canadian Pacific railway. The pier is 81 feet north of present track, 366 feet east of east end of a snow-shed, 1 mile west of Rogers Pass station and 97 feet east of mile-post 85 from Field.
- 293-C In north face-wall of (double) pipe culvert under Canadian Pacific railway,  $1\frac{1}{2}$  miles east of Glacier station and at mile-post 86 from Field.
- 294-C In east end of north face of coping on north end of stone arch culvert under Canadian Pacific railway, at mileage 87.1 from Field—near east end of platform at Glacier station.
- 295-C In north face of stone coping on northwest retaining wall of plate-girder bridge on Canadian Pacific railway at Cambie—mileage 90.1 from Field.
- 296-C In southwest face of southeast concrete wing-wall—1 foot above bridge-seat—of through-truss bridge over Illecillewaet river,  $1\frac{1}{2}$  miles west of Cambie and at mileage 91.84 from Field.
- 297-C In south face of stone coping on southeast retaining wall of through-truss bridge over Illecillewaet river,  $\frac{1}{2}$  mile west of Ross Peak station and at mileage 94.7 from Field.
- 298-C In top course of stonework, in south end of west face of retaining wall behind west abutment of through-truss bridge over Illecillewaet river,  $3\frac{1}{2}$  miles west of Ross Peak and at mileage 97.6 from Field.
- 299-C In west end of south face of (double) square concrete culvert under Canadian Pacific railway,  $3\frac{1}{2}$  miles east of Illecillewaet and at mileage 99.5 from Field.
- 300-C In top course of stonework, in north end of east face of retaining wall behind east abutment of deck-truss bridge over Illecillewaet river,  $\frac{1}{2}$  mile east of Illecillewaet and at mileage 102.2 from Field.
- 301-C In top course of stonework, in east face of northeast retaining wall of stone arch bridge on Canadian Pacific railway,  $1\frac{1}{2}$  miles west of Illecillewaet and at mile-post 104 from Field.
- 302-C In centre of south face of square concrete culvert under Canadian Pacific railway,  $1\frac{1}{2}$  miles east of Albert Canyon and at mileage 107.4 from Field.
- 303-C In south end of west face of concrete retaining wall behind east abutment—2 feet above bridge-seat—of plate-girder bridge on Canadian Pacific railway, immediately west of Albert Canyon station.

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- 304-C In east face of concrete head-wall at eastern portal of tunnel on Canadian Pacific railway,  $1\frac{1}{2}$  miles west of Albert Canyon and at mileage 110.75 from Field. The bench-mark is 2 feet above ground and 8 inches north of north side of tunnel.
- 305-C In east end of north face-wall of concrete tile culvert under Canadian Pacific railway, at mileage 114.35 from Field—150 feet east of telephone house at Lauretta.
- 306-C In north end of west face of concrete retaining wall behind east abutment—1 foot 6 inches above bridge-seat—of plate-girder bridge on Canadian Pacific railway,  $1\frac{1}{2}$  miles east of Twin Butte and at mile-post 118 from Field.
- 307-C In west end of south face—4 feet below top—of square concrete culvert under Canadian Pacific railway, 0.4 mile west of Twin Butte and at mileage 119.9 from Field.
- 308-C In first course of stonework below bridge-seat, in west face—4 feet from south end—of east abutment of plate-girder bridge on Canadian Pacific railway,  $3\frac{1}{2}$  miles west of Twin Butte and at mileage 123.3 from Field.
- 309-C In north face of solid rock cliff—adjacent to a rocky mountain—130 feet south of Canadian Pacific railway track,  $4\frac{1}{2}$  miles east of Revelstoke and 1,600 feet east of mile-post 126 from Field.
- 310-C In east face of mass of rock, 47 feet north of Canadian Pacific railway track,  $2\frac{1}{2}$  miles east of Revelstoke and at mileage 127.45 from Field.
- 311-C In second course of stonework below brickwork, in east wall of Canadian Pacific station-house at Revelstoke, 16 feet from southeast corner of building.
- 312-C In west end of north face of small square concrete culvert under Canadian Pacific railway, 1,600 feet west of station and 35 feet west of west line of Campbell avenue, Revelstoke.
- 313-C In east concrete foundation wall—6 feet below brickwork and 4 feet from northeast corner—of Revelstoke high school, on south side of Second street.
- 314-C In first course of stonework below basement window sills, in north wall of Revelstoke court-house, 4 feet from northeast corner of building.

BENCH-MARKS BETWEEN EDMONTON AND JASPER, ALTA.,  
VIA GRAND TRUNK PACIFIC RAILWAY.

*Elevations on page 311.*

- 62-H In south face of concrete footing of semaphore on north side of Grand Trunk Pacific railway track. This is the first (or home) semaphore east of diamond crossing of Canadian Northern railway,  $\frac{3}{4}$  mile east of Bissell.
- 63-H In side of concrete bench-mark pier, 4 feet south of north line of Grand Trunk Pacific railway right-of-way, 1,260 feet east of a highway crossing,  $1\frac{1}{2}$  miles east of Acheson and 275 feet west of mile-post 806 from Winnipeg.
- 64-H In south concrete foundation wall—1 foot below woodwork and 8 inches from southwest corner—of front (or southerly) section of Sprucegrove public school.
- 65-H In north concrete foundation wall—6 inches below woodwork and 29 feet from northwest corner—of planing mill at Stonyplain, immediately south of Grand Trunk Pacific railway.
- NOTE.—This bench-mark has been rendered inaccessible by a covered driveway constructed along north side of building.

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- 66-H In side of concrete bench-mark pier, 7 feet south of north line of Grand Trunk Pacific railway right-of-way, 275 feet east of mile-post 822 from Winnipeg,  $4\frac{1}{2}$  miles west of Stonyplain and at twenty-first telegraph pole east of a highway crossing.
- 67-H In concrete foundation—5 inches below woodwork and 3 feet 6 inches to the right of the spout—of Grand Trunk Pacific water-tank, 0.6 mile west of Carvel.
- 68-H In side of concrete bench-mark pier, 5 feet south of north line of Grand Trunk Pacific railway right-of-way, 18 feet west of a farm crossing, 1 mile west of Duffield and between fifth and sixth telegraph poles east of mile-post 833 from Winnipeg.
- 69-H In east concrete foundation wall—3 feet below woodwork and 8 inches from southeast corner—of Wabamun hotel, Wabamun.
- 70-H In side of concrete bench-mark pier, 36 feet south of Grand Trunk Pacific railway track,  $1\frac{1}{2}$  miles west of Fallis and 10 feet east of fifth telegraph pole west of mile-post 847 from Winnipeg—at east side of small gully which crosses track in centre of a long clay cut.
- 71-H In concrete foundation—1 foot below woodwork and 2 feet to the right of the spout—of Grand Trunk Pacific water-tank at Gainford.
- 72-H In south end of west face of concrete retaining wall behind east abutment—4 feet 8 inches above bridge-seat—of steel trestle bridge over Pembina river, 1 mile west of Entwistle.
- 73-H In side of concrete bench-mark pier, 4 feet north of south line of Grand Trunk Pacific railway right-of-way, 330 feet west of a farm crossing,  $2\frac{1}{2}$  miles east of Junkins and 60 feet east of mile-post 868 from Winnipeg.
- 74-H In side of concrete bench-mark pier, 3 feet south of north line of Grand Trunk Pacific railway (or south line of Canadian Northern railway) right-of-way, 100 feet west of a gate in the right-of-way fence, 220 feet west of mile-post 873 from Winnipeg and opposite eleventh telegraph pole east of C.N.R. mile-post 85 from Edmonton.
- 75-H In west face—6 inches below top—of concrete footing of semaphore on north side of Grand Trunk Pacific railway track. This is the first (or home) semaphore east of diamond crossing of Canadian Northern railway,  $1\frac{1}{2}$  miles east of Leaman and  $\frac{1}{2}$  mile west of C.N.R. station at Chiplake.
- 76-H In concrete foundation—3 inches below woodwork and directly beneath the spout—of Grand Trunk Pacific water-tank,  $1\frac{1}{2}$  miles west of Leaman.
- 77-H In side of concrete bench-mark pier, 49 feet north of Grand Trunk Pacific railway track, 2 miles east of Niton and 4 feet east of mile-post 891 from Winnipeg.
- 78-H In concrete foundation—4 inches below woodwork and directly beneath the spout—of Grand Trunk Pacific water-tank,  $2\frac{1}{2}$  miles west of Otley.
- 79-H In side of concrete bench-mark pier, 65 feet south of Grand Trunk Pacific railway track, 920 feet east of a small wooden culvert,  $2\frac{1}{2}$  miles east of Rosevear and between fifth and sixth telegraph poles west of mile-post 907 from Winnipeg.
- 80-H In south end of east face—3 feet below top—of concrete retaining wall behind west abutment of steel trestle bridge over McLeod river,  $1\frac{1}{2}$  miles east of Yates.
- 81-H In west concrete foundation wall—5 feet 9 inches below brickwork and 5 inches from southwest corner—of Edson public school.
- 82-H In north face of concrete foundation—5 inches below woodwork and 3 feet to the left of the spout—of Grand Trunk Pacific water-tank at Edson,  $\frac{1}{2}$  mile west of the station.

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- 83-H In northwest face of west concrete retaining wall of north abutment of bridge by which Grand Trunk Pacific railway passes over Canadian Northern railway,  $6\frac{1}{2}$  miles west of Edson. The bench-mark is 3 feet below G.T.P. rails and 4 feet 6 inches from northerly end of retaining wall—it being assumed that the G.T.P. railway at this point runs in a southwesterly direction.
- 84-H In side of concrete bench-mark pier, 52 feet south of Grand Trunk Pacific railway track—at west end of a long clay cut—between fifth and sixth telegraph poles east of mile-post 935 from Winnipeg and opposite a point between twelfth and thirteenth poles east of C.N.R. mile-post 12 from Tollerton.
- 85-H In side of concrete bench-mark pier, 35 feet south of Grand Trunk Pacific railway track at mile-post 941 from Winnipeg—opposite a point between sixth and seventh telegraph poles east of C.N.R. mile-post 18 from Tollerton.
- 86-H In concrete foundation—5 inches below woodwork and 3 feet 6 inches to the right of the spout—of Grand Trunk Pacific water-tank at Medicine Lodge.
- 87-H In side of concrete bench-mark pier, 60 feet south of Grand Trunk Pacific railway track and between seventh and eighth telegraph poles east of mile-post 957 from Winnipeg—on top of a gently sloping bank about 300 feet east of east end of a curve.
- 88-H In north side of sandstone rock cut on Grand Trunk Pacific railway—160 feet from west end of cut—620 feet east of east end of a trestle bridge,  $1\frac{1}{2}$  miles east of Roundcroft and 37 feet east of eighth telegraph pole west of mile-post 962 from Winnipeg.
- 89-H In southwest face of smooth white boulder, 20 feet north of Grand Trunk Pacific railway track—in the side of a long clay cut—1 mile west of Roundcroft and at mile-post 965 from Winnipeg.
- 90-H In side of concrete bench-mark pier, 40 feet north of south line of Grand Trunk Pacific railway right-of-way, 200 feet west of west end of a trestle bridge, 0.6 mile west of Pedley and between third and fourth telegraph poles east of mile-post 971 from Winnipeg.
- 91-H In circular concrete base of inlet pipe of steel water-tank on Grand Trunk Pacific railway, at west end of Hinton passing-track. The bench-mark faces south.
- 92-H In south end of east face of concrete retaining wall behind west abutment—4 feet 6 inches above bridge-seat—of long steel trestle bridge over Prairie creek, 3 miles west of Hinton.
- 93-H In south side of deep rock cut on Grand Trunk Pacific railway—near west end of cut and at rail level—1 mile west of Dyke and 12 feet west of mile-post 984 from Winnipeg. This is on a quarter-mile section of straight track about midway between two sharp curves.
- 94-H In northwest face of vertical rock surface, 20 feet south of Grand Trunk Pacific railway track and at third telegraph pole east of mile-post 987 from Winnipeg—about 300 feet west of a rock cut and at east end of a sharp curve on a deep fill.
- 95-H In side of concrete bench-mark pier, 28 feet north of Grand Trunk Pacific railway track,  $\frac{3}{4}$  mile east of Parkgate and 12 feet east of mile-post 991 from Winnipeg—on a small point of land on shore of Brûlé lake.
- 96-H In south end of west face of concrete retaining wall behind east abutment—4 feet 3 inches above bridge-seat—of two-span truss bridge over Fiddle creek, at mileage 997.5 from Winnipeg.
- 97-H In south side of long curved rock cut on Grand Trunk Pacific railway—150 feet from west end of cut and near rail level— $2\frac{3}{4}$  miles west of Pocahtontas,  $\frac{1}{4}$  mile east of a lime kiln and between fifteenth and sixteenth telegraph poles east of mile-post 1004 from Winnipeg.
- 98-H In north end of west face of concrete retaining wall behind east abutment—5 feet above bridge-seat—of through-truss bridge over Rocky river,  $\frac{3}{4}$  mile east of Hawes.
- 99-H In south side of rock cut on Grand Trunk Pacific railway, 60 feet west of a prominent point of rock—the highest in the cut—1 mile east of Interlachen and between fifth and sixth telegraph poles east of mile-post 1011 from Winnipeg.

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- 100-H In north end of west face of concrete retaining wall behind east abutment—5 feet above bridge-seat—of through-truss bridge over Athabaska river, at mileage 1015.1 from Winnipeg.
- 101-H In east face of concrete retaining wall behind west abutment—4 feet 4 inches above bridge-seat and immediately north of southerly truss—of two-span truss bridge on Grand Trunk Pacific railway, 2 miles east of Henry House and at mileage 1017.2 from Winnipeg.
- 102-H In north end of east face of concrete retaining wall behind west abutment—4 feet 5 inches above bridge-seat—of bridge by which Grand Trunk Pacific railway passes over Canadian Northern railway, 1 mile west of Henry House and at mileage 1020.3 from Winnipeg. This is at C.N.R. mile-post 99 from Tollerton.
- 103-H In north side of rock cut on Grand Trunk Pacific railway—70 feet from west end of cut, in projection of rock facing east— $3\frac{1}{4}$  miles east of Jasper, 30 feet west of fourth telegraph pole east of mile-post 1024 from Winnipeg and 100 yards west of C.N.R. water-tank at Maligne.
- 104-H In southeast corner of Jasper Park administration building, immediately west of Grand Trunk Pacific station at Jasper. The bench-mark is 1 foot above ground, in large stone in south face of buttress at southeast corner of a one-story extension from main building.

## TABLE I-A.

BENCH-MARKS BETWEEN ST. STEPHEN, N.B., AND RIVIERE-DU-LOUP,  
QUE., VIA CANADIAN PACIFIC RAILWAY THROUGH BRUNSWICK,  
McADAM, AROOSTOOK AND EDMUNSTON; THENCE  
TEMISCOUATA RAILWAY TO RIVIERE-DU-LOUP.

*Elevations on page 313.*

**Note.**—These descriptions are written with the assumption that the railway runs in an easterly direction from St. Stephen to Brunswick, thence northerly to Grand Falls and thence northwesterly to Rivière-du-Loup.

- 1-B In northeast wall of rear section of City Building—on Church street—Calais, Maine. The bench-mark is 2 feet above ground and 3 feet 7 inches to the rear of front section of building.
- 2-B In first course of stonework below water-table course, in south end of east wall of Bank of British North America at St. Stephen, N.B.
- 3-B In first course of stonework below water-table course, in front (or north) wall of St. Stephen post-office—to the west of easterly doorway.
- 4-B In north face of large boulder, 10 feet south of Canadian Pacific railway track,  $\frac{1}{2}$  mile west of Oak Bay station and 1040 feet east of mile-post 5 from St. Stephen.
- 5-B In top course of stonework, in south face of east abutment of small plate-girder bridge on Canadian Pacific railway,  $4\frac{1}{4}$  miles west of Brunswick and 200 feet east of mile-post 10 from St. Stephen.
- 6-B In north face of boulder, 10 feet north of Canadian Pacific railway track and 200 feet west of diamond crossing at Brunswick.
- 7-B In east face of boulder, 25 feet west of Canadian Pacific railway track and at seventh telegraph pole north of mile-post 5 from Watt.
- 8-B In small boulder 8 feet east of west line of Canadian Pacific railway right-of-way, 65 feet north and 85 feet west of northwest corner of station-house at Watt.
- 9-B In boulder 18 feet east of Canadian Pacific railway track,  $4\frac{1}{4}$  miles north of Watt and 100 feet north of mile-post 10 from McAdam.
- 10-B In boulder 15 feet west of Canadian Pacific railway track and 390 feet south of mile-post 5 from McAdam—at north end of a small cut.
- 11-B In third course of stonework above platform, in north wall of Canadian Pacific station-house at McAdam, between fifth and sixth doorways from east end of building.
- 12-B In sixth course of stonework below bridge-seat, in north end of west face of east abutment of subway under main line of Canadian Pacific railway,  $5\frac{1}{2}$  miles west of McAdam and 330 feet east of bridge over St. Croix river.
- 13-B In third course of stonework below top, in south face of southeast retaining wall of bridge over St. Croix river, on main line of Canadian Pacific railway,  $5\frac{1}{2}$  miles west of McAdam.
- 14-B In west face of large mass of granite, 12 feet east of Canadian Pacific railway track, 580 feet north of northerly switch at Sugar Brook siding and between eleventh and twelfth telegraph poles north of mile-post 10 from McAdam.

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- 15-B In south face of large granite boulder, 40 feet east of Canadian Pacific railway track, 480 feet south of northerly switch at Deer Lake siding and between twelfth and thirteenth telegraph poles north of mile-post 16 from McAdam.
- 16-B In northwesterly concrete footing under Canadian Pacific water-tank at Canterbury.
- 17-B In exposed rock surface, 10 feet east of west line of Canadian Pacific railway right-of-way,  $\frac{1}{2}$  mile south of Scott, 20 feet south of a small gate in right-of-way fence and at tenth telegraph pole south of mile-post 27 from McAdam.
- 18-B In third course of stonework below top, in east end of south face of retaining wall behind north abutment of plate-girder bridge over Eel river, 300 feet south of Benton station.
- 19-B In east side of small rock cut on Canadian Pacific railway, 25 feet north of mile-post 37 from McAdam.
- 20-B In northwesterly concrete footing under Canadian Pacific water-tank at Debec.
- 21-B In south face of boulder, 15 feet north of Canadian Pacific railway track (Houlton branch), 4.6 miles west of Debec and at twelfth telegraph pole east of international boundary monument No. 14-A.
- 22-B In north face of international boundary monument No. 14-A, 5 miles west of Debec, on Houlton branch of Canadian Pacific railway.
- 23-B In top course of stonework, in south end of west face of easterly footing of highway bridge over Canadian Pacific railway, 450 feet north of Teeds Mill and at mileage 45.1 from McAdam.
- 24-B In south end of west face of coping on west end of stone arch culvert under Canadian Pacific railway,  $1\frac{1}{2}$  miles south of Woodstock.
- 25-B In second course of stonework below top, in south end of west face of southwest retaining wall of Canadian Pacific railway bridge over Meduxnekeag river at Woodstock.
- 26-B In second course of stonework above ground, in north end of west wall of Woodstock post-office.
- 27-B In third course of stonework below water-table course, in north end of east wall of Armoury at Woodstock.
- 28-B In south face—3 feet 3 inches below top—of concrete retaining wall behind east abutment of Canadian Pacific railway bridge over westerly channel of St. John river at Upper Woodstock.
- 29-B In north face of coping on east end of concrete arch culvert under Canadian Pacific railway,  $2\frac{1}{2}$  miles north of Newburg and at mileage 57.7 from McAdam.
- 30-B In third course of stonework below top, in north end of east face of northeast retaining wall of small bridge on Canadian Pacific railway,  $2\frac{1}{2}$  miles south of Hartland.
- 31-B In second course of stonework above bridge-seat, in east end of south face of retaining wall behind north abutment of plate-girder bridge over Becaguimec river,  $\frac{1}{2}$  mile north of Hartland.
- 32-B In second course of stonework below cap-stone, in east face of south abutment of plate-girder bridge on Canadian Pacific railway, 450 feet north of Stickney station.
- 33-B In west face of exposed rock surface at east side of Canadian Pacific railway track, 120 feet south of a small culvert, 780 feet south of a farm crossing and  $1\frac{1}{2}$  miles south of Florenceville.
- 34-B In west face of concrete retaining wall behind north abutment of plate-girder bridge on Canadian Pacific railway at Bristol.
- 35-B In third course of stonework below top, in south end of west face of southwest retaining wall of Canadian Pacific railway bridge over Monquart river,  $\frac{1}{2}$  mile north of Bath.

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- 36-B In south end of west face of concrete arch culvert under Canadian Pacific railway, in a deep ravine, 1 mile north of Beechwood.
- 37-B In top course of stonework, in west end of south face of retaining wall behind north abutment of plate-girder bridge on Canadian Pacific railway, at Muniac flag-station—mileage 91.9 from McAdam.
- 38-B In south face of north concrete abutment—26 inches below bridge-seat—of small plate-girder bridge on Canadian Pacific railway,  $1\frac{1}{4}$  miles south of Perth.
- 39-B In north end of west face—19 inches below top—of concrete retaining wall behind east abutment of Canadian Pacific railway bridge over St. John river, between Perth and Andover.
- 40-B In south wall of Victoria county court-house at Andover—15 inches above water-table and 2 feet from southeast corner of building.
- 41-B In west face—9 inches below top—of concrete retaining wall behind south abutment of bridge over Aroostook river,  $\frac{1}{2}$  mile north of Aroostook, on Edmundston branch of Canadian Pacific railway.
- 42-B In south face of concrete base of international boundary monument No. 82,  $4\frac{1}{4}$  miles west of Aroostook, on Aroostook branch of Canadian Pacific railway.
- 43-B In boulder in field, 220 feet west of Canadian Pacific railway track (Edmundston branch) and 430 feet south of mile-post 5 from Aroostook—behind a small frame schoolhouse.
- 44-B In south face of small boulder, 15 feet west of Canadian Pacific railway track and 160 feet south of southerly switch at Limestone siding.
- 45-B In face of northeast wing-wall of concrete arch culvert under Canadian Pacific railway at Argosy flag-station—mileage 13.8 from Aroostook.
- 46-B In west wall of south transept of Grand Falls Roman Catholic church, in corner stone of fourth course below water-table.
- 47-B In east end of north face of concrete retaining wall behind north abutment of Canadian Pacific railway bridge over St. John river,  $1\frac{1}{4}$  miles north of Grand Falls.
- 48-B In southwest face of small concrete arch culvert under National Transcontinental railway, opposite a point on Canadian Pacific railway at tenth telegraph pole northwest of mile-post 24 from Aroostook.
- 49-B In northeast face of small concrete arch culvert under National Transcontinental railway, opposite a point on Canadian Pacific railway 2,100 feet northwest of mile-post 28 from Aroostook.
- 50-B In northeast face of concrete retaining wall behind southeast abutment of Canadian Pacific railway bridge over Grand river,  $2\frac{1}{4}$  miles northwest of St. Leonard and at mileage 33.4 from Aroostook.
- 51-B In easterly concrete footing under Canadian Pacific water-tank at Siegas.
- 52-B In northwest face of coping on northeast end of concrete arch culvert under National Transcontinental railway, opposite a point on Canadian Pacific railway at mileage 38.9 from Aroostook.
- 53-B In southwest concrete face-wall of tile culvert under National Transcontinental railway, opposite a point on Canadian Pacific railway at second telegraph pole northwest of mile-post 43 from Aroostook.
- 54-B In southwest end of southeast face—23 inches below top—of concrete retaining wall behind northwest abutment of Canadian Pacific railway bridge over Green river,  $\frac{3}{4}$  mile southeast of Green River station.
- 55-B In northeast concrete face-wall of tile culvert under National Transcontinental railway, opposite a point on Canadian Pacific railway at eighth telegraph pole northwest of mile-post 50 from Aroostook.

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- 56-B In southeast end of northeast face of concrete arch culvert under Canadian Pacific railway,  $\frac{1}{2}$  mile southeast of St. Basil and between first and second telegraph poles northwest of mile-post 52 from Aroostook.
- 57-B In exposed rock surface in field, about 150 feet northeast of Canadian Pacific railway track, 2 miles southeast of Edmundston and opposite fifth telegraph pole northwest of mile-post 55 from Aroostook.
- 58-B In second course of stonework above bridge-seat, in east end of north face of northwest retaining wall of Temiscouata railway bridge over Madawaska river, at Edmundston.
- 59-B In face of northeast concrete wing-wall of subway under National Transcontinental railway, 300 feet west of bridge over Madawaska river, at Edmundston.
- 60-B In face of rock cut at north side of railway track, 140 feet west of west wall of Canadian Pacific station-house at Edmundston.
- 61-B In southwest face of cap-stone on south retaining wall of Temiscouata railway bridge over Madawaska river,  $2\frac{1}{2}$  miles northwest of Edmundston.
- 62-B In first course of stonework below water-table course, in south wall of Roman Catholic church at Ste. Rose, 10 feet from front (or east) wall of building.
- 63-B In southwest side of rock cut on Temiscouata railway—near centre of cut—435 feet southeast of a trestle bridge, 3 miles northwest of Ste. Rose and at ninth telegraph pole southeast of mile-post 57 from Rivière-du-Loup.
- 64-B In southwest side of rock cut on Temiscouata railway, 70 feet northwest of a blacksmith shop, 1 mile southeast of Notre-Dame-du-Lac and 220 feet northwest of mile-post 53 from Rivière-du-Loup.
- 65-B In northeast side of rock cut on Temiscouata railway, 2 miles northwest of Notre-Dame-du-Lac and 250 feet southeast of mile-post 50 from Rivière-du-Loup.
- 66-B In east face of granite boulder, 10 feet southwest of Temiscouata railway track,  $2\frac{1}{2}$  miles southeast of Cabano and at ninth telegraph pole northwest of mile-post 46 from Rivière-du-Loup.
- 67-B In northeast side of rock cut on Temiscouata railway—42 feet from northwest end of cut— $3\frac{1}{2}$  miles northwest of Cabano; this is the first rock cut northwest of Cabano.
- 68-B In west face of boulder, 6 feet northeast of northeast line of Temiscouata railway right-of-way,  $1\frac{1}{2}$  miles southeast of Vauban and opposite fifth telegraph pole southeast of mile-post 35 from Rivière-du-Loup.
- 69-B In exposed rock surface at northeast side of Temiscouata railway track,  $2\frac{1}{2}$  miles northwest of Vauban and 360 feet southeast of mile-post 31 from Rivière-du-Loup.
- 70-B In east face of small boulder, 9 feet northeast of Temiscouata railway track and  $\frac{1}{4}$  mile northwest of St. Honoré.
- 71-B In exposed rock surface at southwest side of Temiscouata railway track,  $4\frac{1}{2}$  miles northwest of St. Honoré and close to first telegraph pole southeast of mile-post 22 from Rivière-du-Loup.
- 72-B In northeast side of rock cut on Temiscouata railway—on curve at summit of grade— $3\frac{1}{2}$  miles southeast of Whitworth and  $\frac{1}{2}$  mile northwest of mile-post 20 from Rivière-du-Loup.
- 73-B In northeast side of shallow rock cut on Temiscouata railway,  $2\frac{1}{2}$  miles northwest of Whitworth and at first telegraph pole northwest of mile-post 14 from Rivière-du-Loup.
- 74-B In east face of large boulder, 25 feet northeast of Temiscouata railway track,  $1\frac{1}{2}$  miles southeast of Ste. Modeste and between fifteenth and sixteenth telegraph poles southeast of mile-post 8 from Rivière-du-Loup.
- 75-B In large piece of rock, 8 feet southwest of southwest line of Temiscouata railway right-of-way and 250 feet southeast of mile-post 3 from Rivière-du-Loup.

76-B In sixth course of stonework below bridge-seat, in northeast face of northwest abutment of Temiscouata railway bridge over rivière-du-Loup, 1 mile southeast of Rivière-du-Loup station.

77-B In second course of stonework below top, in north end of west face of northwest retaining wall of Intercolonial railway bridge over rivière-du-Loup, immediately north of Rivière-du-Loup station.

NOTE.—In this description the railway is assumed to run north and south.

78-B In first course of stonework above water-table, in south wall of St. François-Xavier Roman Catholic church at Rivière-du-Loup, 3 feet 3 inches from front (or west) wall of building.

BENCH-MARKS BETWEEN BRUNSWICK AND ST. JOHN, N.B., VIA  
CANADIAN PACIFIC RAILWAY, SHORE LINE SUBDIVISION.

*Elevations on page 316.*

79-B In large piece of rock, 70 feet south of Canadian Pacific railway track, on east side of public highway,  $1\frac{1}{2}$  miles west of Dyer and at seventeenth telegraph pole west of mile-post 20 from St. Stephen.

80-B In south face of large boulder at south side of Canadian Pacific railway track,  $1\frac{1}{2}$  miles east of Dyer and at sixteenth telegraph pole west of mile-post 23 from St. Stephen.

81-B In north face of boulder, 8 feet south of Canadian Pacific railway track,  $1\frac{1}{2}$  miles west of Bonny River station and 65 feet east of mile-post 28 from St. Stephen.

82-B In exposed rock surface, 25 feet south of Canadian Pacific railway track,  $1\frac{1}{2}$  miles east of Bonny River station and 135 feet west of mile-post 31 from St. Stephen.

83-B In second course of stonework below woodwork, in front (or north) wall of Roman Catholic church at St. George—8 feet 6 inches from northeast corner of building.

84-B In boulder—8 feet by 12 feet—12 feet south of south line of Canadian Pacific railway right-of-way and  $\frac{1}{2}$  mile east of Utopia.

85-B In west face of vertical rock surface in side of rocky hill, 75 feet north of Canadian Pacific railway track and  $1\frac{1}{4}$  miles west of Pennfield.

86-B In boulder—6 feet by 8 feet—37 feet south of Canadian Pacific railway track, 3 miles west of Pocologan and 1,750 feet west of mile-post 48 from St. Stephen.

87-B In fourth course of stonework below concrete, in north end of west face of east abutment of Canadian Pacific railway bridge over Little New river,  $2\frac{1}{2}$  miles east of Pocologan.

88-B In east face of boulder, 16 feet south of Canadian Pacific railway track, 2 miles east of New River station and 2,400 feet west of mile-post 56 from St. Stephen.

89-B In second course of stonework below bridge-seat, in north face of east abutment of steel truss bridge over Lepreau river,  $\frac{1}{2}$  mile east of Lepreau.

90-B In south side of small rock cut on Canadian Pacific railway,  $3\frac{1}{2}$  miles east of Lepreau and 420 feet east of mile-post 62 from St. Stephen.

91-B In third course of stonework below bridge-seat, in south face of west abutment of Canadian Pacific railway bridge over west branch of Musquash river,  $1\frac{1}{2}$  miles west of Musquash.

92-B In south end of west face of block of concrete on top of east pier of swing span in Canadian Pacific railway bridge over east branch of Musquash river, 1 mile east of Musquash.

- 93-B In south side of rock cut on Canadian Pacific railway,  $2\frac{1}{2}$  miles east of Prince of Wales and 1,220 feet east of mile-post 72 from St. Stephen.
- 94-B In exposed rock surface at south side of Canadian Pacific railway track, 35 feet east of west end of rock and 1,400 feet east of Allan Cot station.
- 95-B In southwest corner of rocky hill, 33 feet north of north line of Canadian Pacific railway right-of-way, 1,500 feet west of Duck Cove station and immediately east of lane leading to St. John Asylum annex.
- 96-B In second course of stonework above bridge-seat, in north end of east face of retaining wall behind west abutment of steel trestle approach at Fairville end of cantilever bridge over St. John river—on Canadian Pacific railway—between Fairville and St. John.
- 97-B In first course of stonework above sidewalk, in south wall—immediately to the rear of portico—of St. John union station.
- 98-B In granite foundation stone of rear (or west) wall of St. John post-office, 16 inches from southwest corner of building.
- 99-B In second course of stonework above sidewalk, in south end of front (or east) wall of St. John custom-house.
- 100-B In water-table course of stonework, in centre of north wall of Nase's grocery store, at southwest corner of Bridge and Main streets—near Indiantown wharf—St. John.

BENCH-MARKS BETWEEN ROUSE POINT, N.Y., AND SHERBROOKE, QUE.,  
VIA GRAND TRUNK RAILWAY TO ST. JOHNS, QUE., AND  
CANADIAN PACIFIC RAILWAY THROUGH FARNHAM  
AND FOSTER TO SHERBROOKE.

*Elevations on page 317.*

- ⊕ United States Coast and Geodetic Survey bench-mark in Chapman Block, Rouse Point.
- 81 In north stone abutment of plate-girder bridge on Grand Trunk railway,  $2\frac{1}{2}$  miles south of Lacolle Junction.
- 80 Destroyed.
- 79 In third course of stonework below water-table course, in north face of pilaster at northeast corner of Roman Catholic church at Stottsville.
- 78 In south face of corner-stone—second course above ground—at southwest corner of central section of Roman Catholic church at Grand Ligne.
- 77 In second course of stonework below top, in southeast face of southeast curved retaining wall of plate-girder bridge on Grand Trunk railway,  $1\frac{1}{2}$  miles south of St. Johns.
- 76 In water-table course of stonework, in west end of south wall of Grand Trunk station-house at St. Johns.
- 75 In third course of stonework below water-table course, in south end of west wall of St. Johns post-office.
- 74 In north end of east face of west concrete abutment—3 feet above roadway—of subway under Canadian Pacific railway, 200 feet east of bridge over Richelieu river, between St. Johns and Iberville.
- 73 Destroyed.
- 72 In boulder 15 feet south of Canadian Pacific railway track and 20 feet west of highway crossing at Versailles.
- 71 In boulder 25 feet north of Canadian Pacific railway track and 60 feet east of highway crossing at St. Brigid.

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- 62 In top course of stonework, in east end of front (or south) wall of Canadian Pacific station-house at Farnham.
  - 61 In second course of stonework below top, in southwest retaining wall of small bridge on Canadian Pacific railway, 3.1 miles west of Brookport.
  - 60 In northeasterly concrete footing under Canadian Pacific water-tank at Brookport.
  - 59 In boulder beside elm tree, 45 feet east and 100 feet south of southeast corner of Adamsville station-house.
  - 58 In boulder 10 feet south of Canadian Pacific railway track, 3½ miles east of Adamsville and at second telegraph pole east of mile-post 118 from Megantic.
  - 57 In west face of stone coping on northwest retaining wall of Canadian Pacific railway bridge over north branch of Yamaska river, 1¼ miles east of West Shefford.
  - 56 In south side of rock cut on Canadian Pacific railway, 800 feet east of Fulford station and 230 feet east of mile-post 109 from Megantic.
  - 47 In west foundation wall of Railroad hotel at Foster, 4 feet south of northwest corner of building.
  - 46 In west face of stone coping on southwest retaining wall of plate-girder bridge on Canadian Pacific railway, 2 miles east of Foster and at mileage 103.7 from Megantic.
  - 45 In south end of west face of east abutment of small concrete culvert under Canadian Pacific railway, ½ mile east of South Stukely and at mileage 100.3 from Megantic.
  - 44 In boulder 6 feet south of north line of Canadian Pacific railway right-of-way, 150 feet east of a tool house and 1,200 feet west of Eastray station.
  - 43 In exposed rock surface on north side of Canadian Pacific railway track, 18 feet east of sixth telegraph pole west of mile-post 93 from Megantic.
  - 42 In west face of stone coping on northwest retaining wall of Canadian Pacific railway bridge over Castle creek, 3 miles west of Magog and at mileage 89.8 from Megantic.
  - 41-A In third course of stonework below water-table course, in west end of south wall of Magog post-office.
  - 41 In second course of stonework above ground, in masonry base of Canadian Pacific water-tank at Magog, 15 feet to the right of the doorway underneath tank.
  - 40 In boulder 200 feet south of southwest corner of Magog station-house, 50 feet west of main line of Canadian Pacific railway, and on south street line of road to Magog wharf.
  - 39 In north end of west face of concrete retaining wall behind west abutment of plate-girder bridge on Canadian Pacific railway, 1½ miles east of Magog and at mileage 85.4 from Megantic.
  - 38 In boulder at north side of Canadian Pacific railway track, 1¼ miles west of Scaswan flag-station and close to culvert at mileage 79.23 from Megantic.
  - 37 In east face of south face-wall of stone culvert under Canadian Pacific railway at mileage 74.5 from Megantic.
  - 36 In east face of stone coping on southeast retaining wall of Canadian Pacific railway bridge over Magog river, about 1 mile west of Sherbrooke station.
  - 35 In water-table course of stonework, in south end of west wall of old Canadian Pacific station-house at Sherbrooke—at the corner of Belvidere and Frontenac streets.
  - 1 In Sherbrooke post-office—see line from Sherbrooke to Norton Mills.

BENCH-MARKS BETWEEN FARNHAM AND INTERNATIONAL BOUNDARY  
NEAR ST. ARMAND, QUE., VIA CANADIAN PACIFIC RAILWAY TO  
STANBRIDGE AND CENTRAL VERMONT RAILWAY FROM  
STANBRIDGE TO BOUNDARY.

*Elevations on page 318.*

- 63 Destroyed.
- 64 In top course of granite foundation, in south end of west wall of Canadian Bank of Commerce at Farnham.
- 65 In exposed rock surface, 15 feet west of Canadian Pacific railway track and 720 feet south of Mystic station.
- 66 In top course of granite foundation, in south end of west wall of Canadian Bank of Commerce at Bedford.
- 67 In top course of stone foundation, in west end of south wall of post-office and general store at Stanbridge station.
- 68 In second course of brickwork below water-table, in east end of north wall of Central Vermont station-house at St. Armand.
- 69 In second course below top, in west face of north abutment of old stone culvert under Central Vermont railway,  $\frac{1}{2}$  mile south of St. Armand.
- 70 In small granite boulder, 20 feet west of Central Vermont railway track, 190 feet south of international boundary post and  $1\frac{1}{4}$  miles south of St. Armand.

BENCH-MARKS BETWEEN FOSTER AND INTERNATIONAL BOUNDARY  
NEAR ABERCORN, QUE., VIA CANADIAN PACIFIC RAILWAY.

*Elevations on page 318.*

- 48 In east side of rock cut on Canadian Pacific railway,  $1\frac{1}{4}$  miles north of Knowlton and 20 feet north of fourth telegraph pole north of mile-post 8 from Enlaugra.
- 49 In fourth course of stonework below water-table, in northeast end of northwest wall of Knowlton Academy, about 500 feet south of Canadian Pacific station.
- 50 In west face of second foundation pier from north end of oil tank, directly opposite Canadian Pacific station at Brome.
- 51 In square boulder, 15 feet west of Canadian Pacific railway track at Enlaugra and 70 feet south of south end of station platform.
- 52 In first course of stonework below brickwork, in west end of north wall of Mountain View hotel at Sutton.
- 53 In cap-stone on west end of old granite culvert under Canadian Pacific railway,  $1\frac{1}{4}$  miles north of Abercorn and at mileage 23.4 from Brookport.
- 54 In west face of concrete culvert under Canadian Pacific railway, 960 feet north of Abercorn station and at mileage 24.7 from Brookport.
- 55 In east face of concrete culvert under Canadian Pacific railway, 250 feet north of a diagonal highway crossing, 1 mile south of Abercorn and at mileage 25.8 from Enlaugra.

BENCH-MARKS BETWEEN SHERBROOKE, QUE., AND INTERNATIONAL  
BOUNDARY NEAR NORTON MILLS, VERMONT, VIA GRAND TRUNK RAILWAY.

*Elevations on page 319.*

- 1 In first course of stonework below water-table course, in south face of pilaster at southwest corner of Sherbrooke post-office.
- 2 In water-table course of stonework, in north wall of Canadian Bank of Commerce at Sherbrooke—21 feet from northeast corner of building.
- 3 In second course of stonework below top, in west end of south face of retaining wall behind north abutment of Grand Trunk railway bridge over Magog river at Sherbrooke, 2,000 feet north of the station.
- 4 In east side of rock cut on Grand Trunk railway,  $1\frac{1}{2}$  miles south of Sherbrooke station. This is the second rock cut south of Sherbrooke.
- 5 In second course below top, in south end of east face of stone culvert under Canadian Pacific railway, at mileage 66.2 from Megantic— $\frac{1}{4}$  mile north of diamond crossing of Grand Trunk and Canadian Pacific railways between Sherbrooke and Lennoxville.
- 6 In top course of stonework, in west end of north face of retaining wall behind north abutment of Grand Trunk railway bridge over Massawippi river,  $\frac{1}{2}$  mile south of Lennoxville.
- 7 In top course of stonework, in west end of north face of retaining wall behind north abutment of Grand Trunk railway bridge over Salmon river,  $1\frac{1}{2}$  miles south of Lennoxville.
- 8 In large stone—58 feet from south end—of dry stone retaining wall lying along east side of Grand Trunk railway track,  $1\frac{1}{2}$  miles north of Waterville; this is the farther north of the two retaining walls near this point.
- 9 In north face of cap-stone on northwest retaining wall of Grand Trunk railway bridge over Coaticook river,  $\frac{1}{2}$  mile north of Waterville.
- 10 In west side of rock cut on Grand Trunk railway, 200 feet south of a farm crossing,  $\frac{3}{4}$  mile north of Compton and 1,925 feet north of mile-post 114 from Montreal.
- 11 In west side of rock cut on Grand Trunk railway—2 feet from south end of cut—420 feet north of a subway,  $1\frac{1}{2}$  miles south of Compton and 2,040 feet north of mile-post 116 from Montreal.
- 12 Destroyed.
- 13 In top course of stonework, in rear (or northwest) face of retaining wall behind north abutment of subway under Grand Trunk railway,  $\frac{1}{2}$  mile south of Hillhurst.
- 14 In north face of northwest cap-stone of subway under Grand Trunk railway at Coaticook.
- 15 In first course of stonework below water-table course, in centre of west wall of Canadian Bank of Commerce at Coaticook.
- 16 In first course of stonework below water-table course, in west wall of Coaticook post-office, 8 feet south of main entrance.
- 17 In west side of rock cut on Grand Trunk railway—near south end of cut—1 mile south of Coaticook. This is the first rock cut south of Coaticook.
- 18 In east side of rock cut on Grand Trunk railway,  $2\frac{1}{2}$  miles south of Coaticook and 278 feet north of mile-post 125 from Montreal.

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- 19 In centre of east side of rock cut on Grand Trunk railway,  $1\frac{1}{2}$  miles north of Dixville and 870 feet south of mile-post 126 from Montreal.
  - 20 Destroyed.
  - 21 In west side of rock cut on Grand Trunk railway—50 feet from north end of cut—on a sharp curve,  $1\frac{1}{2}$  miles south of Dixville and 225 feet north of mile-post 129 from Montreal.
  - 22 In west side of rock cut on Grand Trunk railway—20 feet from south end of cut—on a sharp curve,  $1\frac{1}{2}$  miles south of Dixville and 2,440 feet south of mile-post 129 from Montreal.
  - 23 In second course of stonework below top, in southeast face of southeast curved retaining wall of Grand Trunk railway bridge at international boundary, 400 feet north of Norton Mills station.
  - 24 In second course of stonework above ground, in east end of south face of north abutment of Grand Trunk railway bridge at international boundary, 400 feet north of Norton Mills station.
  - 25 In first course of stonework above ground, in east end of north face of south abutment of Grand Trunk railway bridge at international boundary, 400 feet north of Norton Mills station.

BENCH-MARKS BETWEEN ROUSE POINT, N.Y., AND COLBORNE, ONT.,  
VIA GRAND TRUNK RAILWAY TO ST. POLYCARPE JUNCTION,  
CANADIAN PACIFIC RAILWAY TO PRESCOTT AND GRAND  
TRUNK RAILWAY TO COLBORNE.

*Elevations on page 320.*

- ⊕ United States Coast and Geodetic Survey bench-mark in Chapman Block, Rouse Point.
- 81 In north stone abutment of plate-girder bridge on Grand Trunk railway,  $2\frac{1}{2}$  miles south of Lacolle Junction.
- 82 Destroyed.
- 83 In second course of stonework below cap-stone, in north face of east abutment of small culvert under Grand Trunk railway,  $1\frac{1}{2}$  miles west of Henrysburg and 1,560 feet west of mile-post 16 from Alburgh Junction.
- 84 Destroyed.
- 85 In south side of small rock cut on Grand Trunk railway, 120 feet east of a farm crossing and  $\frac{1}{2}$  mile east of Holton.
- 86 In third course below cap-stone, in south face of west abutment of small dry stone culvert under Grand Trunk railway,  $1\frac{1}{2}$  miles west of Aubrey and at twelfth telegraph pole east of mile-post 33 from Alburgh Junction.
- 87 In third course of stonework below top, in southwest face of southwest retaining wall of circular stone culvert under Grand Trunk railway,  $\frac{1}{2}$  mile east of Howick Junction and at third telegraph pole west of a highway crossing.
- 88 In top course of stonework, in northeast face of northeast retaining wall of circular cattle-pass under Grand Trunk railway, 720 feet east of St. Louis station.
- 89 In first course above platform, in west face of corner stone at southwest corner of Grand Trunk station-house at Valleyfield.
- 90 In north face of northeasterly stone footing under Grand Trunk water-tank at Coteau Junction.

- 91 In southwest face—1 foot below top—of south concrete retaining wall of open culvert under Grand Trunk railway,  $1\frac{1}{2}$  miles southeast of St. Polycarpe.
- 92 In fourth course of stonework below top, in southwest face of northwest abutment of open culvert under Grand Trunk railway, 1,600 feet southeast of St. Polycarpe Junction.
- 93 In west face of stone coping on southwest retaining wall of Canadian Pacific railway bridge over Delisle river, 1 mile west of St. Polycarpe Junction.
- 94 In top of south end of 36-inch concrete tile culvert under Canadian Pacific railway,  $\frac{1}{2}$  mile west of St. Téléphore flag-station.
- 95 In masonry base of Canadian Pacific water-tank at Dalhousie Mills, 7 feet to the left of the doorway underneath tank and 7 inches above door sill.
- 96 In south face of concrete arch culvert under Canadian Pacific railway,  $2\frac{1}{2}$  miles west of Dalhousie Mills and at mileage 44.5 from Montreal West.
- 97 In south face of boulder—6 feet by 6 feet—15 feet south of north line of Canadian Pacific railway right-of-way and 1 mile east of Green Valley.
- 98 In north face of boulder—4 feet by 4 feet—9 feet north of south line of Canadian Pacific railway right-of-way, 220 feet east of a concrete tile culvert and  $\frac{1}{2}$  mile east of Glenroy flag-station.
- 99 In east face of boulder, 15 feet north of south line of Canadian Pacific railway right-of-way, 3 miles west of Glenroy flag-station and 460 feet west of mile-post 55 from Montreal West.
- 100 In west face of stone coping on northwest retaining wall of plate-girder bridge on Canadian Pacific railway,  $\frac{3}{4}$  mile east of Apple Hill.
- 101 In north face of boulder, 10 feet north of south line of Canadian Pacific railway right-of-way, 1,000 feet east of a subway, 2 miles west of Apple Hill and 650 feet east of mile-post 60 from Montreal West.
- 102 In masonry base of Canadian Pacific water-tank at Monckland, 18 inches to the left of the doorway underneath tank and 20 inches above door sill.
- 103 In first course of stonework below brickwork, in east end of north wall of Avonmore Presbyterian church.
- 104 In south face of square concrete culvert under Canadian Pacific railway,  $1\frac{1}{2}$  miles west of Avonmore.
- 105 In south face of stone coping on retaining wall behind west abutment of plate-girder bridge over Payne river,  $\frac{1}{4}$  mile east of Finch.
- 106 In south face of square concrete culvert under Canadian Pacific railway, 3 miles west of Finch and  $\frac{1}{4}$  mile east of east end of a long curve.
- 107 In masonry base of Canadian Pacific water-tank at Chesterville, 15 feet to the left of the doorway underneath tank and 4 feet above ground.
- 108 In south face of concrete retaining wall behind west abutment of subway under Canadian Pacific railway,  $2\frac{1}{2}$  miles east of Winchester.
- 109 In south face of boulder on Canadian Pacific railway right-of-way—close to north fence—50 feet west of road from Winchester station to village.
- 110 In south face of square concrete culvert under Canadian Pacific railway,  $\frac{1}{2}$  mile west of Inkerman.
- 111 In east stone foundation wall—5 feet 3 inches from southeast corner—of frame schoolhouse at Mountain station.

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- 112 In south face of small square concrete culvert under Canadian Pacific railway, 2 miles east of Kempton.
  - 113 In masonry base of Canadian Pacific water-tank at Kempton, 2 feet 5 inches to the right of the doorway underneath tank and 3 feet 8 inches above doorsill.
  - 114 In east face of square concrete culvert under Canadian Pacific railway, 1 mile north of Oxford.
  - 115 In north face of boulder—6 feet by 6 feet—on east side of Canadian Pacific railway track, 3 miles south of Oxford and 750 feet south of mile-post 38 from Ottawa.
  - 116 In south wall of stone schoolhouse, 200 feet east of Canadian Pacific railway track and  $1\frac{1}{2}$  miles north of Spencerville. The bench-mark is 30 inches below water-table and 10 inches from southwest corner of building.
  - 117 In east face of square concrete culvert under Canadian Pacific railway,  $2\frac{1}{2}$  miles south of Spencerville.
  - 118 In north face of east stone abutment of bridge by which Grand Trunk railway main line passes over Canadian Pacific railway,  $1\frac{1}{2}$  miles east of Prescott. The bench-mark is a few inches above Canadian Pacific rails.
  - 119 In third course of stonework above water-table, in east end of front(or north) wall of Grand Trunk station-house at Prescott.
  - 120 In east face of cap-stone on south end of stone arch culvert under Grand Trunk Railway,  $3\frac{1}{2}$  miles west of Prescott.
  - 121 In south face of southeast cap-stone of plate-girder bridge on Grand Trunk railway, 1 mile east of Maitland.
  - 122 In south face of southwest cap-stone of plate-girder bridge on Grand Trunk railway,  $1\frac{1}{2}$  miles west of Maitland.
  - 123 In south face of cap-stone on south end of small stone culvert under Grand Trunk railway, 100 feet east of Ormond street, Brockville, and 190 feet west of mile-post 209 from Toronto.
  - 124 In centre of north face of south stone abutment of bridge by which Canadian Northern railway (Brockville-Westport line) passes over Grand Trunk railway,  $1\frac{1}{2}$  miles west of Brockville. The bench-mark is 1 foot above Grand Trunk rails.
  - 125 In east end of south face of stone coping on southeast retaining wall of plate-girder bridge on Grand Trunk railway, 1000 feet west of Lyn.
  - 126 In top course of stonework, in south face of east abutment of cattle-pass under Grand Trunk railway,  $2\frac{1}{2}$  miles west of Lyn.
  - 127 In top course of stonework, in south face of west abutment of cattle-pass under Grand Trunk railway, 2 miles east of Mallorytown.
  - 128 In south face of cap-stone on south end of square stone culvert under Grand Trunk railway, 1 mile west of Mallorytown and 400 feet east of a highway crossing.
  - 129 In west end of south face of coping on south end of square stone culvert under Grand Trunk railway,  $3\frac{1}{2}$  miles west of Mallorytown and 1,000 feet east of mile-post 192 from Toronto.
  - 130 In top course of stonework, in north face of east abutment of open culvert under Grand Trunk railway,  $\frac{1}{2}$  mile east of Lansdowne.
  - 131 In first course of stonework above water-table, in west end of south wall of Lansdowne town-hall.
  - 132 In top course of stonework, in north face of east abutment of open culvert under Grand Trunk railway—beside a highway crossing— $4\frac{1}{2}$  miles east of Gananoque Junction.

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- 133 In top course of stonework, in north face of east abutment of open culvert under Grand Trunk railway, 2 miles east of Gananoque Junction.
  - 134 In east end of north face of stone coping on northeast retaining wall of Grand Trunk railway bridge over Gananoque river,  $1\frac{1}{2}$  miles west of Gananoque Junction.
  - 135 In south face of southwest cap-stone of plate-girder bridge on Grand Trunk railway,  $1\frac{1}{2}$  miles east of Findley.
  - 136 In north face of northeast cap-stone of plate-girder bridge on Grand Trunk railway, 2 miles west of Findley.
  - 137 In east end of north face of cap-stone on north end of square stone culvert under Grand Trunk railway, 5 miles west of Findley and 1,200 feet west of a highway crossing.
  - 138 In east face of stone coping on northeast retaining wall of Grand Trunk railway bridge over Rideau canal at Kingston Mills,  $\frac{1}{2}$  mile west of Rideau station.
  - 139 In first course of stonework above water-table, in east end of front (or north) wall of Grand Trunk station-house at Kingston Junction.
  - 140 In south face of southwest cap-stone of Grand Trunk railway bridge over Little Cataraqui creek,  $2\frac{1}{2}$  miles west of Kingston Junction, 870 feet east of mile-post 158 from Toronto and  $\frac{1}{2}$  mile east of crossing of main road from Kingston to Cataraqui.
  - 141 In second course of stonework above concrete sidewalk, in south face of pilaster on south wall of Kingston city-hall. The pilaster referred to is immediately east of rounded southwest corner of building.
  - 141-A In second course above concrete sidewalk, in north face of large corner stone at northeast corner of Kingston post-office—at southeast corner of Clarence and Wellington streets. The bench-mark is 28 feet east of centre line of the three arches forming main entrance to building.
  - 142 In first course of stonework below water-table course, in west end of south wall of Canadian Pacific station-house at Kingston.
  - 143 In south face of southwest cap-stone of open culvert under Grand Trunk railway,  $1\frac{1}{2}$  miles east of Collins Bay and 1,220 feet east of mile-post 155 from Toronto.
  - 144 In west face of cap-stone on southwest retaining wall of plate-girder bridge on Grand Trunk railway, 0.4 mile west of Collins Bay.
  - 145 In west end of south face of coping on south end of stone arch culvert under Grand Trunk railway,  $3\frac{1}{2}$  miles west of Collins Bay and 1,100 feet east of a highway crossing which is at mile-post 150 from Toronto.
  - 146 In first course of stonework above water-table, in front (or south) wall of Grand Trunk station-house at Ernestown—3 feet west of waiting-room door.
  - 147 In first course of stonework below southwest cap-stone, in east face of west abutment of small square culvert under Grand Trunk railway, 4 miles west of Ernestown and 470 feet west of mile-post 142 from Toronto.
  - 148 In west face of coping on south end of stone arch subway under Grand Trunk railway, 3 miles east of Napanee.
  - 149 In first course of stonework below water-table course, in east wall of Napanee court-house, 1 foot 6 inches south of first window from northeast corner of building.
  - 150 In front (or north) wall of Grand Trunk station-house at Napanee, 1 foot east of westerly doorway.
  - 150-A In first course of stonework above ground, in west wall of Napanee post-office, 8 feet 6 inches south of centre line of main entrance.
  - 150-A-2 In fifth course of stonework below water-table course, in east face of pilaster at southeast corner of Armoury at Napanee.

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- 151 In east face of southwest cap-stone of plate-girder bridge on Grand Trunk railway,  $3\frac{1}{2}$  miles west of Napanee. This bridge is the farther east of the two bridges near this point.
- 152 In west face of coping on north end of stone arch culvert under Grand Trunk railway,  $\frac{1}{2}$  mile east of Marysville.
- 153 In east face of stone coping on northeast retaining wall of Grand Trunk railway bridge over Salmon river,  $1\frac{1}{2}$  miles east of Shannonville.
- 154 In first course above water-table, in north face of corner stone at northwest corner of Grand Trunk station-house at Shannonville.
- 155 In north face of northeast cap-stone of plate-girder bridge on Grand Trunk railway,  $4\frac{1}{2}$  miles east of Belleville and 1,000 feet west of a highway crossing.
- 156 In first course of stonework above water-table, in front (or north) wall of Grand Trunk station-house at Belleville—immediately west of easterly doorway.
- 157 In rear (or east) foundation wall of Belleville city-hall, 16 inches below water-table course of stonework and 4 feet 6 inches south of first basement window from northeast corner of building.
- 157-A In third course of stonework below brickwork, in west end of north wall of Armoury at Belleville.
- 157-A-2 In north face—33 inches below top of coping—of concrete pier of Canadian Pacific railway bridge over Moira river at Belleville. The pier referred to is immediately east of small subway leading to park.
- 158 In east face of northeast cap-stone of plate-girder bridge on Grand Trunk railway, 3 miles west of Belleville and at mileage 110.4 from Toronto.
- 159 In southeast face of southwest cap-stone of open culvert under Grand Trunk railway,  $5\frac{1}{2}$  miles west of Belleville.
- 160 In north face of northeast cap-stone of open culvert under Grand Trunk railway,  $3\frac{1}{2}$  miles east of Trenton and at mile-post 105 from Toronto.
- 161 In top course of stonework, in rounded southeast corner of east abutment of bridge by which Grand Trunk railway passes over Canadian Northern railway (Trenton-Maynooth line), at Trenton station.
- 162 In north face of northeast cap-stone of open culvert under Grand Trunk railway, 1 mile east of Smithfield flag-station.
- 163 In east face of northeast cap-stone of open culvert under Grand Trunk railway,  $\frac{1}{2}$  mile east of Brighton.
- 164 In north face of northeast cap-stone of open culvert under Grand Trunk railway,  $1\frac{1}{2}$  miles west of Brighton and midway between two highway crossings.
- 165 In east face of coping on north end of stone arch culvert under Grand Trunk railway,  $4\frac{1}{2}$  miles west of Brighton.
- 166 In fourth course of stonework below top, in north end of west face of east abutment of open culvert under Grand Trunk railway, 0.4 mile east of Colborne.

TABLE II.

## RESULTS OF PRECISE LEVELLING.

ST. ANSELME, QUE., TO EDMUNDSTON, N.B.

*Run by T. C. Dennis and J. E. Ratz.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 214-B.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	214-B					553.825	214-B
214-B	223-B	2.4	2.4	+ .026	+ .026	604.835	223-B
223-B	224-B	3.2	5.6	+ .025	+ .051	671.009	224-B
224-B	225-B	2.4	8.0	- .011	+ .040	710.349	225-B
225-B	227-B	5.1	13.1	- .013	+ .027	765.004	227-B
227-B	228-B	2.6	15.7	+ .019	+ .046	810.759	228-B
228-B	229-B	3.4	19.1	- .026	+ .020	869.029	229-B
229-B	230-B	2.7	21.8	+ .007	+ .027	900.590	230-B
230-B	231-B	2.5	24.3	+ .010	+ .037	948.882	231-B
231-B	232-B	2.8	27.1	+ .003	+ .040	970.240	232-B
232-B	233-B	2.8	29.9	.000	+ .040	989.834	233-B
233-B	234-B	3.1	33.0	+ .015	+ .055	984.248	234-B
234-B	235-B	3.1	36.1	+ .020	+ .075	1007.299	235-B
235-B	236-B	3.4	39.5	+ .009	+ .084	1061.743	236-B
236-B	237-B	2.9	42.4	- .004	+ .080	1116.177	237-B
237-B	238-B	3.2	45.6	- .005	+ .075	1170.944	238-B
238-B	239-B	3.1	48.7	- .020	+ .055	1230.211	239-B
239-B	240-B	3.2	51.9	+ .013	+ .068	1280.157	240-B
240-B	241-B	2.3	54.2	- .008	+ .060	1300.981	241-B
241-B	242-B	2.5	56.7	- .021	+ .039	1281.969	242-B
242-B	243-B	2.3	59.0	- .002	+ .037	1225.149	243-B
243-B	244-B	2.1	61.1	+ .010	+ .047	1266.834	244-B
244-B	245-B	2.7	63.8	+ .014	+ .061	1222.519	245-B
245-B	246-B	3.0	66.8	+ .006	+ .067	1230.500	246-B
246-B	247-B	2.8	69.6	+ .012	+ .079	1292.751	247-B
247-B	248-B	3.3	72.9	+ .026	+ .105	1253.525	248-B
248-B	249-B	3.2	76.1	+ .002	+ .107	1209.387	249-B
249-B	385-B	3.2	79.3	- .029	+ .078	1160.619	385-B
385-B	384-B	2.5	81.8	- .011	+ .067	1064.415	384-B
384-B	383-B	5.1	86.9	- .019	+ .048	1129.830	383-B
383-B	382-B	2.4	89.3	- .020	+ .028	1122.474	382-B
382-B	381-B	4.6	93.9	- .011	+ .017	1195.343	381-B
381-B	380-B	1.0	94.9	+ .003	+ .020	1200.772	380-B
380-B	379-B	2.6	97.5	- .019	+ .001	1143.835	379-B
379-B	378-B	4.2	101.7	- .028	- .027	1082.654	378-B
378-B	377-B*	4.3	106.0	- .010	- .037	1094.480	377-B*
377-B*	376-B	4.9	110.9	+ .020	- .017	1003.001	376-B

\*See also elevation of this bench-mark on page 292.

## RESULTS OF PRECISE LEVELLING.

ST. ANSELME, QUE., TO EDMUNDSTON, N.B.—*Concluded.**Run by T. C. Dennis and J. E. Ratz.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 214-B.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
376-B	375-B	6.5	117.4	+0.034	+0.017	1079.260	375-B
375-B	288-B	4.4	121.8	+0.033	+0.050	1142.737	288-B
288-B	287-B	0.6	122.4	-0.001	+0.049	1144.473	287-B
287-B	286-B	4.5	126.9	+0.020	+0.069	1209.691	286-B
286-B	285-B	1.7	128.6	+0.017	+0.086	1197.271	285-B
285-B	284-B	0.8	129.4	-0.017	+0.069	1177.829	284-B
284-B	283-B	4.2	133.6	-0.016	+0.053	1231.385	283-B
283-B	282-B	1.7	135.3	-0.010	+0.043	1259.350	282-B
282-B	281-B	4.0	139.3	-0.025	+0.018	1173.841	281-B
281-B	280-B	1.9	141.2	-0.007	+0.011	1078.238	280-B
280-B	279-B	0.9	142.1	-0.004	+0.007	1020.236	279-B
279-B	278-B	2.8	144.9	+0.007	+0.014	874.645	278-B
278-B	276-B	3.1	148.0	+0.016	+0.030	709.119	276-B
276-B	277-B	.....	148.0	-0.002	+0.028	685.581	277-B
276-B	275-B	3.3	151.3	+0.017	+0.047	706.983	275-B
275-B	274-B	5.9	157.2	.000	+0.047	644.351	274-B
274-B	273-B	3.9	161.1	+0.016	+0.063	675.274	273-B
273-B	272-B	3.6	164.7	+0.030	+0.093	662.967	272-B
272-B	271-B	4.7	169.4	-0.001	+0.092	669.176	271-B
271-B	270-B	4.7	174.1	+0.023	+0.115	704.845	270-B
270-B	269-B	3.7	177.8	+0.011	+0.126	680.706	269-B
269-B	268-B	2.2	180.0	.000	+0.126	676.659	268-B
268-B	267-B	2.9	182.9	-0.004	+0.122	696.228	267-B
267-B	266-B	2.0	184.9	+0.022	+0.144	651.596	266-B
266-B	265-B	3.6	188.5	-0.020	+0.124	579.532	265-B
265-B	264-B	2.8	191.3	+0.018	+0.142	514.403	264-B
264-B	263-B	1.5	192.8	+0.001	+0.143	493.481	263-B
263-B	262-B	3.0	195.8	-0.009	+0.134	497.273	262-B
262-B	261-B	2.5	198.3	+0.013	+0.147	488.485	261-B
261-B	260-B	3.2	201.5	-0.006	+0.141	470.438	260-B
260-B	58-B*	3.1	204.6	+0.001	+0.142	473.540	58-B*

\*See also elevation of this bench-mark on page 314.

## RESULTS OF PRECISE LEVELLING.

## HARLAKA JUNCTION TO RIVIERE-DU-LOUP, QUE.

*Run by G. F. Dalton.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 219-B	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	219-B					177.096	219-B
219-B	MCXXXV	1.0	1.0	+0.007	+0.007	239.622	MCXXXV
MCXXXV	MCXXXIV	2.1	3.1	-0.010	-0.003	299.144	MCXXXIV
MCXXXIV	MCXXXIII	2.7	5.8	-0.002	-0.005	306.637	MCXXXIII
MCXXXIII	MCXXXII	2.5	8.3	+0.011	+0.006	322.696	MCXXXII
MCXXXII	MCXXXI	2.1	10.4	-0.007	-0.001	283.202	MCXXXI
MCXXXI	MCXXX	2.1	12.5	-0.001	-0.002	205.189	MCXXX
MCXXX	MCXXIX	1.1	13.6	-0.010	-0.012	167.476	MCXXIX
MCXXIX	MCXXVIII	1.7	15.3	+0.004	-0.008	178.004	MCXXVIII
MCXXVIII	563-B	1.0	16.3	+0.003	-0.005	169.441	563-B
563-B	MCXXVI	1.0	17.3	+0.011	+0.006	164.310	MCXXVI
MCXXVI	MCXXV	2.1	19.4	+0.004	+0.010	146.516	MCXXV
MCXXV	MCXXIV	1.2	20.6	+0.018	+0.028	151.125	MCXXIV
MCXXIV	MCX	3.6	24.2	-0.011	+0.017	128.817	MCX
MCX	MCXI	1.7	25.9	+0.004	+0.021	127.714	MCXI
MCXI	564-B	0.9	26.8	-0.001	+0.020	135.892	564-B
564-B	565-B	2.0	28.8	+0.012	+0.032	123.193	565-B
565-B	MCXIII	2.4	31.2	-0.013	+0.019	90.969	MCXIII
MCXIII	566-B	2.2	33.4	-0.016	+0.003	53.498	566-B
566-B	MCXV	1.2	34.6	+0.008	+0.011	53.781	MCXV
MCXV	MCXVI	0.5	35.1	+0.003	+0.014	54.231	MCXVI
MCXVI	MCXVII	1.0	36.1	+0.004	+0.018	72.703	MCXVII
MCXVII	MCXVIII	2.0	38.1	-0.003	+0.015	105.921	MCXVIII
MCXVIII	567-B	2.2	40.3	-0.004	+0.011	122.619	567-B
567-B	MCXIX	3.5	43.8	+0.023	+0.034	107.889	MCXIX
MCXIX	MCXX	1.5	45.3	+0.017	+0.051	104.350	MCXX
MCXX	568-B	0.8	46.1	+0.001	+0.052	104.842	568-B
568-B	MCXXI	0.3	46.4	+0.001	+0.053	91.620	MCXXI
MCXXI	569-B	0.8	47.2	-0.001	+0.052	77.130	569-B
569-B	MCXXII	0.3	47.5	-0.003	+0.049	71.749	MCXXII
MCXXII	MCXXIII	2.0	49.5	+0.010	+0.059	79.246	MCXXIII
MCXXIII	MCIX	0.9	50.4	-0.013	+0.046	99.455	MCIX
MCIX	MCVIII	1.6	52.0	-0.022	+0.024	136.074	MCVIII
MCVIII	570-B	1.2	53.2	+0.004	+0.028	153.267	570-B
570-B	MCVI	0.7	53.9	+0.008	+0.036	162.109	MCVI
MCVI	571-B	3.6	57.5	+0.019	+0.055	165.734	571-B
571-B	MCV	1.9	59.4	+0.007	+0.062	146.827	MCV
MCV	MCIV	1.5	60.9	+0.005	+0.067	129.746	MCIV
MCIV	MCII	2.6	63.5	-0.000	+0.067	108.366	MCII
MCII	572-B	1.7	65.2	-0.006	+0.061	101.465	572-B
572-B	573-B	1.9	67.1	-0.002	+0.059	93.964	573-B

## RESULTS OF PRECISE LEVELLING.

HARLAKA JUNCTION TO RIVIERE-DU-LOUP, QUE.—*Concluded.**Run by G. F. Dalton.†*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 219-B.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
573-B	MXCIX	2.4	69.5	+0.006	+0.065	96.158	MXCIX
MXCIX	MXCVIII	1.9	71.4	-0.017	+0.048	70.388	MXCVIII
MXCVIII	574-B	0.9	72.3	+0.002	+0.050	74.210	574-B
574-B	MXCVI	1.7	74.0	-0.020	+0.030	53.766	MXCVI
MXCVI	MXCV	1.4	75.4	+0.008	+0.038	35.158	MXCV
MXCV	MCXXXVII	0.6	76.0	+0.005	+0.043	48.384	MCXXXVII
MCXXXVII	MCXXXVIII	1.1	77.1	-0.010	+0.033	62.546	MCXXXVIII
MCXXXVIII	MCXXXIX	1.2	78.3	+0.011	+0.044	97.899	MCXXXIX
MCXXXIX	MCXLII	1.1	79.4	-0.011	+0.033	135.937	MCXLII
MCXLII	27-G	0.4	79.8	+0.002	+0.035	145.018	27-G
27-G	28-G	2.5	82.3	+0.003	+0.038	564.311	28-G
28-G	29-G	3.0	85.3	+0.010	+0.048	740.743	29-G
29-G	30-G	2.5	87.8	+0.012	+0.060	1045.489	30-G
30-G	377-B*	5.4	93.2	+0.027	+0.087	1094.393	377-B*
MCXLII	575-B	1.8	81.2	-0.005	+0.028	178.186	575-B
575-B	MCXLIII	1.5	82.7	-0.004	+0.024	191.738	MCXLIII
MCXLIII	576-B	1.7	84.4	+0.003	+0.027	173.478	576-B
576-B	MCXLIV	1.0	85.4	-0.007	+0.020	184.767	MCXLIV
MCXLIV	MCXLVI	0.5	85.9	+0.008	+0.028	183.841	MCXLVI
MCXLIV	MCXLV	1.3	86.7	-0.018	+0.002	219.395	MCXLV
MCXLV	577-B	2.6	89.3	+0.001	+0.003	308.741	577-B
577-B	MCXLVIII	1.0	90.3	-0.006	-0.003	311.482	MCXLVIII
MCXLVIII	578-B	0.9	91.2	-0.016	-0.019	314.473	578-B
578-B	MCXLIX	3.1	94.3	+0.017	-0.002	338.183	MCXLIX
MCXLIX	579-B	2.1	96.4	-0.019	-0.021	345.261	579-B
579-B	MCL	2.0	98.4	+0.016	-0.005	370.612	MCL
MCL	MCLI	0.7	99.1	-0.002	-0.007	369.472	MCLI
MCLI	MCLII	2.0	101.1	-0.006	-0.013	414.476	MCLII
MCLII	MCLXVII	2.3	103.4	-0.007	-0.020	376.160	MCLXVII
MCLXVII	MCLXVI	1.4	104.8	+0.001	-0.019	336.502	MCLXVI
MCLXVI	579-B-2	1.0	105.8	+0.005	-0.014	350.611	579-B-2
579-B-2	MCLXV	1.2	107.0	+0.008	-0.006	329.949	MCLXV
MCLXV	MCLXIV	1.5	108.5	-0.009	-0.015	321.892	MCLXIV
MCLXIV	580-B	0.2	108.7	-0.004	-0.019	329.674	580-B
580-B	MCLXIII	2.4	111.1	-0.010	-0.029	311.262	MCLXIII
MCLXIII	77-B†	.....	111.1	+0.003	-0.026	313.176	77-B†

†Branch from MCXLII to 377-B was run by H. P. Moulton.

\*See also elevation of this bench-mark on page 289.

†See also elevation of this bench-mark on page 315.

## RESULTS OF PRECISE LEVELLING.

## OTTAWA TO RENFREW, ONT.

*Run by H. P. Moulton.*

BENCH-MARK.		Distance between successive bench-marks.	Distance from bench-mark 125-A	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	125-A					277.639	125-A
125-A	50-G	3.0	3.0	-.004	-.004	201.410	50-G
50-G	51-G	2.7	5.7	-.016	-.020	186.753	51-G
51-G	52-G	1.7	7.4	+.001	-.019	197.594	52-G
52-G	53-G	2.2	9.6	+.021	+.002	272.271	53-G
53-G	54-G	2.7	12.3	+.021	+.023	367.718	54-G
54-G	55-G	3.1	15.4	+.014	-.037	366.885	55-G
55-G	56-G	3.5	18.9	+.010	+.047	433.497	56-G
56-G	57-G	2.9	21.8	-.004	+.043	445.745	57-G
57-G	58-G	2.4	24.2	-.002	+.041	450.023	58-G
58-G	59-G	3.1	27.3	+.020	+.061	427.484	59-G
59-G	60-G*	2.4	29.7	+.004	+.065	449.509	60-G*
60-G*	61-G	0.4	30.1	+.003	+.068	451.241	61-G
61-G	62-G	0.2	30.3	-.001	+.067	443.194	62-G
62-G	63-G	3.5	33.8	+.002	+.069	411.347	63-G
63-G	64-G	2.8	36.6	-.021	+.048	393.084	64-G
64-G	65-G	.....	36.6	+.002	+.050	393.769	65-G
64-G	66-G	0.1	36.7	+.002	+.050	399.567	66-G
66-G	67-G	4.7	41.4	-.025	+.025	377.820	67-G
67-G	68-G	3.8	45.2	-.019	+.006	317.560	68-G
68-G	69-G	0.4	45.6	-.002	+.004	337.535	69-G
69-G	70-G	1.6	47.2	+.015	+.019	332.174	70-G
70-G	71-G	2.0	49.2	+.002	+.021	333.625	71-G
71-G	72-G	2.4	51.6	-.022	-.001	317.131	72-G
72-G	73-G	1.5	53.1	-.003	-.004	300.415	73-G
73-G	74-G	0.1	53.2	+.001	-.003	299.031	74-G
74-G	75-G	0.2	53.4	.000	-.003	278.255	75-G
74-G	76-G	5.0	58.2	+.012	+.009	389.915	76-G

\*See also elevation of this bench-mark on page 297.

## RESULTS OF PRECISE LEVELLING.

OTTAWA TO RENFREW, ONT.—*Concluded.**Run by H. P. Moulton.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 125-A	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
76-G	77-G	3.8	62.0	+0.031	+0.040	452.091	77-G
77-G	78-G	2.0	64.0	+0.003	+0.043	490.863	78-G
78-G	79-G	3.7	67.7	+0.024	+0.067	468.449	79-G
79-G	505*	1.9	69.6	-0.004	+0.063	425.824	505*

\*The elevation of bench-mark 505 given on page 32, 1915 publication, is 425.628—see introduction (this publication) page 241. See also elevation on page 299.

Connections with Public Works Dept's bench-marks:—

B.M.—CCCCLXVI—C.P.R. Broad St. station, Ottawa, Elev. 184.059.

B.M.—CCCCLXII—J. Whitton's house, Britannia, Elev. 202.728.

B.M.—CCCCLXXVII—C.P.R. station, Arnprior, Elev. 300.060.

B.M.—CCCCLXXXV—C.P.R. water-tank, Renfrew, Elev. 418.065.

## RESULTS OF PRECISE LEVELLING.

## KEMPTON TO IVANHOE, ONT.

*Run by H. P. Moulton.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 113.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	113					337.269	113
113	80-G	2.0	2.0	+ .016	+ .016	323.710	80-G
80-G	81-G	3.4	5.4	- .005	+ .011	321.933	81-G
81-G	82-G	2.2	7.6	+ .015	+ .026	350.790	82-G
82-G	83-G	2.4	10.0	+ .007	+ .033	363.035	83-G
83-G	84-G	1.1	11.1	- .005	+ .028	358.640	84-G
84-G	85-G	2.5	13.6	+ .005	+ .033	348.847	85-G
85-G	86-G	3.1	16.7	- .004	+ .029	355.646	86-G
86-G	87-G	2.6	19.3	- .022	+ .007	397.618	87-G
87-G	88-G	1.5	20.8	+ .010	+ .017	425.121	88-G
88-G	107-G	0.5	21.3	+ .005	+ .022	427.273	107-G
107-G	108-G	0.1	21.4	+ .001	+ .023	430.201	108-G
88-G	89-G	0.5	21.3	.000	+ .017	427.737	89-G
89-G	109-G	2.8	24.1	- .015	+ .002	413.572	109-G
109-G	110-G	1.8	25.9	- .004	- .002	423.687	110-G
110-G	111-G	2.6	28.5	- .009	- .011	437.342	111-G
111-G	112-G	3.6	32.1	- .005	- .016	434.536	112-G
112-G	113-G	0.2	32.3	+ .002	- .014	439.743	113-G
113-G	114-G	0.5	32.8	+ .004	- .010	440.201	114-G
114-G	115-G	.....	32.8	+ .001	- .009	440.729	115-G
113-G	116-G	2.4	34.7	- .018	- .032	458.781	116-G
116-G	117-G	1.6	36.3	+ .021	- .011	466.709	117-G
117-G	118-G	3.5	39.8	- .004	- .015	480.003	118-G
118-G	119-G	2.7	42.5	+ .011	- .004	518.327	119-G
119-G	120-G	2.9	45.4	+ .015	+ .011	617.126	120-G
120-G	121-G	2.6	48.0	.000	+ .011	576.661	121-G
121-G	122-G	2.5	50.5	- .012	- .001	584.383	122-G
122-G	123-G	3.4	53.9	- .011	- .012	690.278	123-G
123-G	124-G	4.1	58.0	- .014	- .026	649.083	124-G
124-G	161-G	2.5	60.5	+ .004	- .022	641.982	161-G
161-G	162-G	3.3	63.8	- .019	- .041	732.765	162-G
162-G	163-G	3.1	66.9	+ .007	- .034	682.448	163-G
163-G	164-G	2.7	69.6	.000	- .034	654.117	164-G
164-G	165-G	2.2	71.8	- .017	- .051	618.937	165-G
165-G	166-G	3.0	74.8	+ .007	- .044	663.797	166-G
166-G	167-G	3.0	77.8	+ .011	- .033	666.962	167-G
167-G	168-G	2.8	80.6	+ .008	- .025	690.759	168-G
168-G	169-G	4.5	85.1	+ .009	- .016	649.942	169-G

RESULTS OF PRECISE LEVELLING.  
 KEMPTON TO IVANHOE, ONT.—*Concluded.*

*Run by H. P. Moulton.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 113.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
169-G	170-G	2.3	87.4	+ .002	- .014	585.077	170-G
170-G	171-G	3.6	91.0	+ .020	+ .006	564.168	171-G
171-G	172-G	3.0	94.0	+ .007	+ .013	478.677	172-G
172-G	173-G	2.5	96.5	.000	+ .013	466.853	173-G
173-G	174-G	2.2	98.7	+ .014	+ .027	476.576	174-G
174-G	175-G	0.2	98.9	- .004	+ .023	481.256	175-G
175-G	176-G	.....	98.9	+ .001	+ .024	484.292	176-G
175-G	177-G	2.8	101.7	+ .018	+ .041	588.355	177-G
177-G	178-G	2.9	104.6	+ .021	+ .062	615.686	178-G
178-G	179-G	2.5	107.1	+ .005	+ .067	586.659	179-G

## RESULTS OF PRECISE LEVELLING.

SMITHS FALLS TO CARLETON PLACE, ONT.

*Run by H. P. Moulton.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 89-G	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	89-G					427.737	89-G
89-G	90-G	1.3	1.3	-.004	-.004	410.329	90-G
90-G	91-G	2.3	3.6	-.004	-.008	433.082	91-G
91-G	92-G	3.5	7.1	-.007	-.015	451.164	92-G
92-G	93-G	4.2	11.3	+.004	-.011	457.718	93-G
93-G	94-G	2.5	13.8	+.023	+.012	457.743	94-G
94-G	60-G*	2.7	16.5	+.029	+.041	449.669	60-G*

\*See also elevation of this bench-mark on page 293.

## RESULTS OF PRECISE LEVELLING.

## SMITHS FALLS TO BROCKVILLE, ONT.

*Run by H. P. Moulton.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 88-G.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	88-G					425.121	88-G
88-G	95-G	1.5	1.5	-.014	-.014	379.402	95-G
95-G	96-G	3.3	4.8	-.019	-.033	346.176	96-G
96-G	97-G	2.3	7.1	+.009	-.024	342.737	97-G
97-G	98-G	2.5	9.6	+.005	-.019	363.710	98-G
98-G	99-G	3.5	13.1	-.002	-.021	383.546	99-G
99-G	100-G	2.5	15.6	+.011	-.010	374.064	100-G
100-G	101-G	2.0	17.6	+.006	-.004	364.479	101-G
101-G	102-G	2.3	19.9	-.027	-.031	391.039	102-G
102-G	103-G	3.6	23.5	+.025	-.006	371.084	103-G
103-G	104-G	2.1	25.6	-.004	-.010	342.052	104-G
104-G	123*	2.7	28.3	+.003	-.007	295.605	123*
123*	105-G	0.7	29.0	+.005	-.002	313.075	105-G
105-G	106-G	0.1	29.1	-.001	-.003	298.690	106-G

\*The elevation of bench-mark 123 given on page 321, this publication, is 295.634; hence, to reduce all Brockville bench-marks to that datum, 0.029 foot should be added to the elevations given above for bench-marks 123, 105-G, 106-G.

RESULTS OF PRECISE LEVELLING.  
SHARBOT LAKE TO RENFREW, ONT..

*Run by H. P. Moulton.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 124-G.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	124-G					649.083	124-G
124-G	125-G	2.8	2.8	.000	.000	692.028	125-G
125-G	126-G	2.6	5.4	+ .001	+ .001	668.016	126-G
126-G	127-G	3.7	9.1	- .027	- .026	765.733	127-G
127-G	128-G	2.2	11.3	+ .007	- .019	727.814	128-G
128-G	129-G	3.8	15.1	- .012	- .031	695.775	129-G
129-G	130-G	2.7	17.8	+ .006	- .025	801.096	130-G
130-G	131-G	3.0	20.8	- .004	- .029	889.065	131-G
131-G	132-G	3.0	23.8	+ .015	- .014	830.892	132-G
132-G	133-G	3.0	26.8	+ .018	+ .004	685.272	133-G
133-G	134-G	3.3	30.1	+ .017	+ .021	612.298	134-G
134-G	135-G	2.3	32.4	- .003	+ .018	630.209	135-G
135-G	136-G	2.2	34.6	- .006	+ .012	648.393	136-G
136-G	137-G	2.8	37.4	+ .005	+ .017	608.257	137-G
137-G	138-G	2.5	39.9	+ .002	+ .019	552.131	138-G
138-G	139-G	2.6	42.5	- .017	+ .002	512.589	139-G
139-G	140-G	2.9	45.4	- .011	- .009	569.709	140-G
140-G	141-G	4.0	49.4	- .013	- .022	572.130	141-G
141-G	142-G	2.6	52.0	- .013	- .035	529.917	142-G
142-G	143-G	2.7	54.7	+ .007	- .028	407.692	143-G
143-G	505*	2.3	57.0	+ .017	- .011	426.025	505*

\*See also elevations of this bench-mark on page 294.

## RESULTS OF PRECISE LEVELLING.

## SHARBOT LAKE TO KINGSTON, ONT.

*Run by H. P. Moulton.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 124-G	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	124-G					649.083	124-G
124-G	144-G	2.7	2.7	-.014	-.014	656.086	144-G
144-G	145-G	2.8	5.5	-.019	-.033	665.324	145-G
145-G	146-G	2.6	8.1	+.006	-.027	651.287	146-G
146-G	147-G	1.7	9.8	.000	-.027	593.025	147-G
147-G	148-G	2.3	12.1	-.015	-.042	603.290	148-G
148-G	149-G	2.0	14.1	-.002	-.044	561.739	149-G
149-G	150-G	3.0	17.1	+.002	-.042	500.977	150-G
150-G	151-G	2.9	20.0	+.012	-.030	469.018	151-G
151-G	152-G	2.5	22.5	-.002	-.032	452.715	152-G
152-G	153-G	3.1	25.6	-.003	-.035	518.949	153-G
153-G	154-G	2.5	28.1	+.014	-.021	483.895	154-G
154-G	155-G	2.4	30.5	-.019	-.040	411.662	155-G
155-G	156-G	2.4	32.9	-.020	-.060	464.888	156-G
156-G	157-G	3.0	35.9	+.012	-.048	454.625	157-G
157-G	158-G	2.0	37.9	-.016	-.064	398.001	158-G
158-G	159-G	1.5	39.4	-.011	-.075	317.368	159-G
159-G	160-G	3.0	42.4	-.004	-.079	265.285	160-G
160-G	139*	2.7	45.1	+.020	-.059	276.749	139*

\*See also elevation of this bench-mark on page 321.

## RESULTS OF PRECISE LEVELLING.

## IVANHOE TO BELLEVILLE, ONT.

*Run by W. N. McGrath.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 179-G.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	179-G					586.659	179-G
179-G	180-G	4.7	4.7	-.026	-.026	457.339	180-G
180-G	181-G	1.9	6.6	-.009	-.035	447.381	181-G
181-G	182-G	1.8	8.4	+.014	-.021	509.318	182-G
182-G	183-G	4.1	12.5	+.025	+.004	363.930	183-G
183-G	184-G	2.0	14.5	+.016	+.020	356.684	184-G
184-G	185-G	3.6	18.1	+.021	+.041	329.160	185-G
185-G	186-G	1.1	19.2	+.001	+.042	324.461	186-G
186-G	156*	1.6	20.8	-.001	+.041	288.337	156*

\*See also elevation of this bench-mark on page 322.

## RESULTS OF PRECISE LEVELLING.

## STEELTON TO FRANZ, ONT.

*Run by A. J. Rainboth.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 634	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	634					601.622	634
634	637	3.0	3.0	-.017	-.017	660.677	637
637	638	3.8	6.8	+.018	+.001	869.863	638
638	639	3.1	9.9	-.021	-.020	1024.359	639
639	640	3.1	13.0	+.016	-.004	1074.048	640
640	641	3.0	16.0	+.014	+.010	1100.973	641
641	642	3.3	19.3	+.015	+.025	1142.893	642
642	643	2.8	22.1	-.004	+.021	1091.677	643
643	644	3.0	25.1	+.012	+.033	1011.648	644
644	645	2.9	28.0	.000	+.033	845.407	645
645	646	2.5	30.5	-.006	+.027	776.692	646
646	647	2.5	33.0	+.003	+.030	904.036	647
647	648	3.4	36.4	+.008	+.038	995.795	648
648	649	2.3	38.7	-.002	+.036	1080.422	649
649	650	3.1	41.8	+.017	+.053	1103.066	650
650	651	3.5	45.3	+.008	+.061	1153.723	651
651	652	2.9	48.2	-.001	+.060	1207.961	652
652	653	3.1	51.3	+.007	+.067	1026.701	653
653	654	3.3	54.6	+.038	+.105	1106.150	654
654	655	2.8	57.4	+.017	+.122	1129.000	655
655	656	3.1	60.5	-.019	+.103	1284.159	656
656	657	2.9	63.4	+.037	+.140	1431.139	657
657	658	3.0	66.4	+.021	+.161	1369.153	658
658	659	3.1	69.5	+.024	+.185	1236.084	659
659	660	2.8	72.3	+.007	+.192	1426.144	660
660	661	2.9	75.2	+.013	+.205	1249.215	661
661	662	3.3	78.5	+.024	+.229	1070.833	662
662	663	1.5	80.0	-.009	+.220	1031.592	663
663	664	1.4	81.4	+.004	+.224	1146.968	664
664	665	3.0	84.4	+.015	+.239	1369.639	665
665	666	2.7	87.1	-.015	+.224	1344.305	666
666	667	4.6	91.7	+.027	+.251	1277.914	667
667	668	3.3	95.0	-.028	+.223	1514.793	668
668	669	3.0	98.0	-.021	+.202	1477.079	669
669	670	3.1	101.1	+.004	+.206	1457.502	670
670	671	2.9	104.0	+.001	+.207	1348.433	671
671	672	3.0	107.0	.000	+.207	1153.807	672
672	673	2.8	109.8	+.037	+.244	964.321	673
673	674	2.9	112.7	-.014	+.230	938.798	674
674	675	3.3	116.0	+.010	+.240	1025.757	675
675	676	3.0	119.0	+.019	+.259	1034.951	676

RESULTS OF PRECISE LEVELLING.  
STEELTON TO FRANZ, ONT.—*Concluded.*

*Run by A. J. Rainboth.*

BENCH-MARK.		Distance between successive bench-marks.	Distance from bench-mark 634.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
676	677	1.9	120.9	+ .007	+ .266	1047.723	677
677	678	3.1	124.0	— .002	+ .264	1058.819	678
678	679	3.8	127.8	— .031	+ .233	1081.673	679
679	680	3.5	131.3	+ .010	+ .243	1110.034	680
680	681	2.7	134.0	+ .004	+ .247	1234.044	681
681	682	3.2	137.2	+ .001	+ .248	1236.272	682
682	683	3.0	140.2	— .022	+ .226	1266.619	683
683	684	2.8	143.0	— .017	+ .209	1181.477	684
684	685	2.9	145.9	— .003	+ .206	1075.012	685
685	686	5.7	151.6	— .005	+ .201	923.567	686
686	687	3.1	154.7	+ .031	+ .232	1031.080	687
687	688	3.3	158.0	+ .033	+ .265	1080.570	688
688	689	4.1	162.1	+ .009	+ .274	1080.833	689
689	690	2.6	164.7	+ .003	+ .277	1078.301	690
690	691	2.8	167.5	— .014	+ .263	1191.273	691
691	692	3.2	170.7	— .027	+ .236	1141.068	692
692	693	2.8	173.5	+ .019	+ .255	1070.233	693
693	694	4.0	177.5	+ .013	+ .268	1077.015	694
694	695	2.0	179.5	— .017	+ .251	1122.188	695
695	696	3.1	182.6	— .012	+ .239	961.024	696
696	697	4.6	187.2	+ .028	+ .267	944.688	697
697	698	3.0	190.2	— .007	+ .260	626.615	698
699	699	3.1	167.8	— .021	+ .256	1126.566	699
699	700	3.4	171.2	+ .018	+ .274	1162.643	700
700	701	2.7	173.9	+ .021	+ .295	1179.952	701
701	702	2.8	176.7	+ .002	+ .297	1216.295	702
702	703	3.2	179.9	+ .024	+ .321	1187.550	703
703	704	2.9	182.8	— .029	+ .292	1118.551	704
704	705	3.0	185.8	+ .022	+ .314	1140.025	705
705	706	3.5	189.3	+ .013	+ .327	1198.549	706
706	707	2.6	191.9	+ .014	+ .341	1219.895	707
707	708	2.3	194.2	+ .021	+ .362	1219.304	708

Connections at Sault Ste. Marie, Mich., with bench-marks of United States Lake Survey:—

P.B.M.—A—On Weitzel lock, Elev. 605.122.

P.B.M.—B—On Poe lock, Elev. 587.678.

P.B.M.—“Meridian,” Elev. 606.876.

For connection at Michipicoten with Hydrographic Survey bench-mark, see Introduction.

## RESULTS OF PRECISE LEVELLING.

KIPP, ALTA., to GOLDEN, B.C.

*Run by G. S. Raley and D. McMillan.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 81-D	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	81-D					3058.150	81-D
81-D	84-D	7.4	7.4	+ .032	+ .032	3102.276	84-D
84-D	85-D	4.1	11.5	+ .016	+ .048	3075.079	85-D
85-D	86-D	6.4	17.9	- .022	+ .026	3091.696	86-D
86-D	87-D	6.3	24.2	- .005	+ .021	3106.486	87-D
87-D	88-D	0.4	24.6	- .007	+ .014	3112.798	88-D
87-D	89-D	5.4	29.6	+ .022	+ .043	3225.298	89-D
89-D	90-D	4.0	33.6	+ .016	+ .059	3290.749	90-D
90-D	91-D	1.3	34.9	+ .002	+ .061	3320.100	91-D
91-D	92-D	6.2	41.1	- .001	+ .060	3450.363	92-D
92-D	93-D	5.9	47.0	+ .013	+ .073	3506.058	93-D
93-D	94-D	7.2	54.2	.000	+ .073	3766.492	94-D
94-D	95-D	4.3	58.5	+ .013	+ .086	3732.968	95-D
95-D	96-D	0.4	58.9	- .007	+ .079	3724.339	96-D
96-D	97-D	2.7	61.6	- .012	+ .067	3838.602	97-D
97-D	98-D	2.6	64.2	+ .005	+ .072	3870.277	98-D
98-D	99-D	4.0	68.2	+ .022	+ .094	3821.005	99-D
99-D	100-D	6.1	74.3	+ .030	+ .124	3988.433	100-D
100-D	101-D	2.0	76.3	+ .013	+ .137	4059.478	101-D
101-D	102-D	3.1	79.4	+ .004	+ .141	4208.259	102-D
102-D	103-D	1.8	81.2	+ .009	+ .150	4224.045	103-D
103-D	104-D	2.2	83.4	+ .024	+ .174	4275.968	104-D
104-D	105-D	2.1	85.5	+ .007	+ .181	4311.156	105-D
105-D	106-D	1.8	87.3	- .016	+ .165	4367.586	106-D
106-D	107-D	1.6	88.9	- .001	+ .164	4440.254	107-D
107-D	108-D	2.7	91.6	+ .020	+ .184	4428.622	108-D
108-D	109-D	2.6	94.2	+ .016	+ .200	4457.336	109-D
109-D	110-D	2.0	96.2	- .012	+ .188	4406.208	110-D
110-D	111-D	2.0	98.2	- .011	+ .177	4308.578	111-D
111-D	112-D	2.8	101.0	- .001	+ .176	4167.831	112-D
112-D	113-D	2.5	103.5	+ .016	+ .192	4036.765	113-D
113-D	114-D	3.4	106.9	+ .006	+ .198	3855.557	114-D
114-D	115-D	3.1	110.0	+ .012	+ .210	3720.381	115-D
115-D	116-D	5.7	115.7	- .025	+ .185	3581.059	116-D
116-D	117-D	2.7	118.4	- .006	+ .179	3509.572	117-D
117-D	118-D	2.0	120.4	+ .006	+ .185	3468.157	118-D
118-D	119-D	3.4	123.8	- .003	+ .182	3408.799	119-D

## RESULTS OF PRECISE LEVELLING.

KIPP, ALTA., TO GOLDEN, B.C.—*Continued.**Run by G. S. Raley and D. McMillan.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 81-D	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
119-D	120-D	3.0	126.8	+ .011	+ .193	3341.058	120-D
120-D	121-D	3.3	130.1	- .003	+ .190	3310.423	121-D
121-D	122-D	.....	130.1	+ .005	+ .195	3304.053	122-D
121-D	123-D	1.1	131.2	- .023	+ .167	3279.586	123-D
123-D	124-D	2.7	133.9	- .010	+ .157	3209.702	124-D
124-D	125-D	3.8	137.7	+ .013	+ .170	3145.325	125-D
125-D	126-D	3.2	140.9	+ .020	+ .190	3106.222	126-D
126-D	127-D	5.9	146.8	+ .011	+ .201	3034.338	127-D
127-D	128-D	4.0	150.8	+ .011	+ .212	2961.349	128-D
128-D	129-D	2.5	153.3	+ .032	+ .244	2792.003	129-D
129-D	130-D	4.7	158.0	+ .033	+ .277	2855.681	130-D
130-D	131-D	2.8	160.8	+ .018	+ .295	2707.558	131-D
131-D	132-D	0.2	161.0	- .001	+ .294	2705.436	132-D
132-D	133-D	4.4	165.4	+ .025	+ .319	2661.577	133-D
133-D	134-D	4.9	170.3	+ .022	+ .341	2523.666	134-D
134-D	135-D	4.3	174.6	+ .017	+ .358	2473.546	135-D
135-D	136-D	4.9	179.5	+ .015	+ .373	2463.583	136-D
136-D	137-D	7.3	186.8	+ .024	+ .397	2493.512	137-D
137-D	138-D	1.7	188.5	+ .002	+ .399	2523.630	138-D
138-D	139-D	2.5	191.0	+ .016	+ .415	2526.141	139-D
139-D	140-D	3.7	194.7	- .005	+ .410	2529.938	140-D
140-D	141-D	6.6	201.3	+ .005	+ .415	2538.475	141-D
141-D	142-D	2.6	203.9	- .006	+ .409	2537.633	142-D
142-D	143-D	5.0	208.9	+ .019	+ .428	2604.384	143-D
143-D	144-D	3.1	212.0	+ .007	+ .435	2617.416	144-D
144-D	145-D	3.4	215.4	+ .005	+ .440	2592.025	145-D
145-D	146-D	3.9	219.3	+ .021	+ .461	2600.105	146-D
146-D	147-D	5.9	225.2	+ .007	+ .468	2643.120	147-D
147-D	148-D	2.3	227.5	+ .002	+ .470	2665.501	148-D
148-D	149-D	3.2	230.7	- .009	+ .461	2663.485	149-D
149-D	150-D	9.3	240.0	- .004	+ .457	2668.285	150-D
150-D	151-D	1.0	241.0	- .010	+ .447	2676.955	151-D
151-D	152-D	11.0	252.0	+ .009	+ .456	2644.197	152-D
152-D	153-D	5.7	257.7	+ .051	+ .507	2640.726	153-D
153-D	154-D	2.1	259.8	+ .012	+ .519	2629.188	154-D
154-D	155-D	4.3	264.1	- .010	+ .509	2619.097	155-D
155-D	156-D	9.0	273.1	+ .028	+ .537	2613.083	156-D
156-D	157-D	7.6	280.7	+ .049	+ .586	2614.559	157-D
157-D	158-D	7.7	288.4	+ .022	+ .608	2607.519	158-D

## RESULTS OF PRECISE LEVELLING.

KIPP, ALTA., TO GOLDEN, B.C.—*Concluded.**Run by G. S. Raley and D. McMillan.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 81-D	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
158-D	159-D	2.7	291.1	+ .001	+ .609	2601.229	159-D
159-D	160-D	6.8	297.9	- .021	+ .588	2598.619	160-D
160-D	161-D	7.7	305.6	- .013	+ .575	2591.049	161-D
161-D	162-D	3.3	308.9	+ .004	+ .579	2590.390	162-D
162-D	163-D	0.3	309.2	- .006	+ .573	2592.847	163-D
163-D	164-D	7.8	317.0	- .018	+ .555	2597.521	164-D
164-D	165-D	8.8	325.8	+ .009	+ .564	2582.033	165-D
165-D	166-D	1.5	327.3	- .013	+ .551	2579.101	166-D
166-D	273-C*	4.7	332.0	- .003	+ .548	2591.580	273-C*

\*See also elevation of this bench-mark on page 309.

## RESULTS OF PRECISE LEVELLING.

BULL RIVER TO KOOTENAY LANDING, B.C.

*Run by N. H. Smith.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 135-D	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	135-D					2473.546	135-D
135-D	167-D	1.9	1.9	+ .020	+ .020	2620.056	167-D
167-D	168-D	6.7	8.6	+ .018	+ .038	2723.528	168-D
168-D	169-D	2.8	11.4	+ .008	+ .046	2750.348	169-D
169-D	170-D	2.9	14.3	- .023	+ .023	2888.570	170-D
170-D	171-D	2.9	17.2	+ .002	+ .025	2929.369	171-D
171-D	172-D	1.8	19.0	- .016	+ .009	3003.235	172-D
172-D	173-D	0.2	19.2	- .001	+ .008	3019.608	173-D
173-D	174-D	.....	19.2	+ .004	+ .012	3013.399	174-D
173-D	175-D	2.4	21.6	- .021	- .013	3080.361	175-D
175-D	176-D	2.9	24.5	+ .021	+ .008	3256.448	176-D
176-D	177-D	4.2	28.7	- .008	.000	3192.616	177-D
177-D	178-D	1.6	30.3	+ .006	+ .006	3140.735	178-D
178-D	179-D	2.5	32.8	- .003	+ .003	3052.584	179-D
179-D	180-D	3.5	36.3	+ .014	+ .017	3057.054	180-D
180-D	181-D	2.7	39.0	+ .010	+ .027	3051.615	181-D
181-D	182-D	2.9	41.9	+ .003	+ .030	3046.584	182-D
182-D	183-D	3.4	45.3	- .026	+ .004	3006.049	183-D
183-D	184-D	3.4	48.7	+ .017	+ .021	2978.601	184-D
184-D	185-D	2.8	51.5	+ .007	+ .028	2969.604	185-D
185-D	186-D	5.5	57.0	+ .033	+ .061	2885.327	186-D
186-D	187-D	2.1	59.1	- .020	+ .041	2831.406	187-D
187-D	188-D	4.0	63.1	.000	+ .041	2844.076	188-D
188-D	189-D	2.9	66.0	- .005	+ .036	2895.026	189-D
189-D	190-D	4.4	70.4	+ .006	+ .042	2650.748	190-D
190-D	191-D	2.2	72.6	+ .016	+ .058	2550.985	191-D
191-D	192-D	2.3	74.9	- .001	+ .057	2440.468	192-D
192-D	193-D	3.1	78.0	- .009	+ .048	2267.750	193-D
193-D	194-D	4.2	82.2	+ .033	+ .081	2087.332	194-D
194-D	195-D	4.5	86.7	+ .023	+ .104	1986.302	195-D
195-D	196-D	0.8	87.5	+ .010	+ .114	1944.967	196-D
196-D	197-D	4.7	92.2	- .034	+ .080	1798.797	197-D
197-D	198-D	3.7	95.9	- .022	+ .058	1793.914	198-D
196-D	199-D	1.0	88.5	- .016	+ .098	1883.951	199-D
199-D	200-D	3.4	91.9	+ .012	+ .110	1853.324	200-D
200-D	201-D	3.4	95.3	+ .029	+ .139	1827.310	201-D
201-D	202-D	1.9	97.2	+ .001	+ .140	1816.340	202-D

## RESULTS OF PRECISE LEVELLING.

BULL RIVER TO KOOTENAY LANDING, B.C.—*Concluded.**Run by N. H. Smith.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 135-D	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
202-D	203-D	2.5	99.7	-.022	+.118	1786.853	203-D
203-D	204-D	0.9	100.6	+.005	+.123	1773.349	204-D
204-D	205-D	.....	100.6	+.002	+.125	1774.669	205-D

Connection at Porthill with bench-mark of U.S. Coast and Geodetic Survey:—

B.M.—V-10, iron pipe 4 ft. west of international boundary monument No. 207, Elev. 1794.336.

## RESULTS OF PRECISE LEVELLING.

FIELD TO REVELSTOKE, B.C

*Run by G. S. Raley and D. McMillan.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 51-D	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	260-C	.....	137.2	.....	+0.097	4074.638	260-C
260-C	261-C	3.8	141.0	+0.023	+0.120	3923.040	261-C
261-C	262-C	2.4	143.4	+0.017	+0.137	3785.203	262-C
262-C	263-C	3.0	146.4	-0.010	+0.127	3700.990	263-C
263-C	264-C	2.6	149.0	+0.014	+0.141	3696.099	264-C
264-C	265-C	4.8	153.8	+0.010	+0.151	3649.049	265-C
265-C	266-C	3.0	156.8	-0.008	+0.143	3484.402	266-C
266-C	267-C	2.1	158.9	-0.010	+0.133	3308.334	267-C
267-C	268-C	2.8	161.7	+0.007	+0.140	3224.611	268-C
268-C	269-C	1.2	162.9	.000	+0.140	3153.075	269-C
269-C	270-C	1.6	164.5	-0.008	+0.132	3041.706	270-C
270-C	271-C	3.8	168.3	+0.005	+0.137	2752.568	271-C
271-C	272-C	2.1	170.4	-0.005	+0.132	2643.855	272-C
272-C	273-C*	1.7	172.1	-0.010	+0.122	2591.465	273-C*
273-C*	274-C	2.0	174.1	+0.008	+0.130	2566.916	274-C
274-C	275-C	2.0	176.1	+0.004	+0.134	2557.387	275-C
275-C	276-C	3.0	179.1	+0.011	+0.145	2554.282	276-C
276-C	277-C	3.0	182.1	+0.022	+0.167	2575.942	277-C
277-C	278-C	3.2	185.3	+0.040	+0.207	2557.044	278-C
278-C	279-C	3.0	188.3	+0.023	+0.230	2571.953	279-C
279-C	280-C	1.4	189.7	-0.001	+0.229	2555.582	280-C
280-C	281-C	1.7	191.4	-0.003	+0.226	2591.855	281-C
281-C	282-C	3.4	194.8	.000	+0.226	2502.041	282-C
282-C	283-C	1.5	196.3	-0.007	+0.219	2455.669	283-C
283-C	284-C	3.8	200.1	.000	+0.219	2432.623	284-C
284-C	285-C	3.1	203.2	+0.015	+0.234	2552.448	285-C
285-C	286-C	2.0	205.2	-0.006	+0.228	2607.820	286-C
286-C	287-C	3.8	209.0	+0.015	+0.243	3009.581	287-C
287-C	288-C	2.0	211.0	-0.009	+0.234	3230.756	288-C
288-C	289-C	2.2	213.2	-0.006	+0.228	3486.262	289-C
289-C	290-C	3.6	216.8	-0.002	+0.226	3896.121	290-C
290-C	291-C	3.3	220.1	-0.021	+0.205	4225.922	291-C
291-C	292-C	2.0	222.1	+0.014	+0.219	4350.362	292-C
292-C	293-C	1.0	223.1	-0.007	+0.212	4222.220	293-C
293-C	294-C	1.0	224.1	+0.014	+0.226	4096.983	294-C
294-C	295-C	2.8	226.9	+0.001	+0.227	3795.070	295-C
295-C	296-C	1.9	228.8	+0.002	+0.229	3583.514	296-C
296-C	297-C	2.9	231.7	+0.018	+0.247	3400.350	297-C
297-C	298-C	2.9	234.6	+0.004	+0.251	3104.002	298-C
298-C	299-C	1.9	236.5	-0.002	+0.249	2982.068	299-C

\*See also elevation of this bench-mark on page 306.

## RESULTS OF PRECISE LEVELLING.

FIELD TO REVELSTOKE, B.C.—*Concluded.**Run by G. S. Raley and D. McMillan.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 51-D	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
299-C	300-C	2.7	239.2	+0.008	+0.257	2759.404	300-C
300-C	301-C	1.8	241.0	+0.008	+0.265	2644.203	301-C
301-C	302-C	3.5	244.5	+0.016	+0.281	2415.733	302-C
302-C	303-C	1.9	246.4	-0.003	+0.278	2224.159	303-C
303-C	304-C	1.4	247.8	-0.004	+0.274	2120.964	304-C
304-C	305-C	3.6	251.4	+0.008	+0.282	1959.266	305-C
305-C	306-C	3.7	255.1	+0.015	+0.297	1944.805	306-C
306-C	307-C	1.9	257.0	+0.002	+0.299	1853.800	307-C
307-C	308-C	3.4	260.4	+0.003	+0.302	1693.148	308-C
308-C	309-C	2.4	262.8	.000	+0.302	1646.930	309-C
309-C	310-C	1.8	264.6	+0.002	+0.304	1610.926	310-C
310-C	311-C	2.7	267.3	-0.027	+0.277	1498.698	311-C
311-C	312-C	0.3	267.6	+0.001	+0.278	1500.262	312-C
312-C	313-C	0.3	267.9	-0.005	+0.273	1500.294	313-C
312-C	314-C	0.6	268.2	-0.012	+0.266	1512.387	314-C

## RESULTS OF PRECISE LEVELLING.

## EDMONTON TO JASPER, ALTA.

*Run by N. H. Smith.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 28-D.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	60-H		331.3		+ .141	2168.315	60-H
60-H	62-H	6.5	337.8	- .026	+ .115	2227.347	62-H
62-H	63-H	6.2	344.0	- .030	+ .085	2316.466	63-H
63-H	64-H	7.3	351.3	+ .038	+ .123	2324.926	64-H
64-H	65-H	4.2	355.5	- .016	+ .107	2327.306	65-H
65-H	66-H	4.5	360.0	.000	+ .107	2405.293	66-H
66-H	67-H	4.7	364.7	+ .013	+ .120	2454.116	67-H
67-H	68-H	6.2	370.9	- .020	+ .100	2375.798	68-H
68-H	69-H	4.9	375.8	+ .032	+ .132	2398.127	69-H
69-H	70-H	9.3	385.1	- .012	+ .120	2433.818	70-H
70-H	71-H	4.3	389.4	+ .013	+ .133	2443.358	71-H
71-H	72-H	9.5	398.9	- .005	+ .128	2556.447	72-H
72-H	73-H	7.1	406.0	+ .009	+ .137	2586.859	73-H
73-H	74-H	5.0	411.0	+ .017	+ .154	2606.514	74-H
74-H	75-H	7.1	418.1	- .047	+ .107	2597.338	75-H
75-H	76-H	2.4	420.5	+ .005	+ .112	2609.379	76-H
76-H	77-H	8.4	428.9	- .002	+ .110	2701.454	77-H
77-H	78-H	7.9	436.8	- .013	+ .097	2746.646	78-H
78-H	79-H	8.2	445.0	+ .030	+ .127	2841.548	79-H
79-H	80-H	9.0	454.0	+ .048	+ .175	2874.836	80-H
80-H	81-H	6.8	460.8	+ .038	+ .213	3043.192	81-H
81-H	82-H	0.4	461.2	+ .008	+ .221	2984.703	82-H
82-H	83-H	6.0	467.2	+ .022	+ .243	3062.350	83-H
83-H	84-H	5.7	472.9	+ .042	+ .285	3164.177	84-H
84-H	85-H	6.0	478.9	+ .019	+ .304	3243.383	85-H
85-H	86-H	7.8	486.7	+ .008	+ .312	3390.290	86-H
86-H	87-H	8.0	494.7	+ .005	+ .317	3558.488	87-H
87-H	88-H	5.4	500.1	+ .018	+ .335	3490.786	88-H
88-H	89-H	2.8	502.9	+ .006	+ .341	3477.472	89-H
89-H	90-H	5.9	508.8	- .012	+ .329	3467.128	90-H
90-H	91-H	7.4	516.2	+ .001	+ .330	3320.343	91-H
91-H	92-H	2.7	518.9	+ .003	+ .333	3265.260	92-H
92-H	93-H	3.0	521.9	- .001	+ .332	3292.605	93-H
93-H	94-H	2.9	524.8	+ .022	+ .354	3305.813	94-H
94-H	95-H	4.1	528.9	- .005	+ .349	3305.551	95-H
95-H	96-H	6.4	535.3	+ .025	+ .374	3252.325	96-H
96-H	97-H	6.2	541.5	+ .029	+ .403	3267.050	97-H
97-H	98-H	2.6	544.1	+ .017	+ .420	3293.750	98-H
98-H	99-H	4.6	548.7	- .017	+ .403	3295.985	99-H
99-H	100-H	4.3	553.0	- .020	+ .383	3302.979	100-H
100-H	101-H	2.3	555.3	- .014	+ .369	3316.640	101-H

RESULTS OF PRECISE LEVELLING.  
EDMONTON TO JASPER, ALTA.—*Concluded.*

*Run by N. H. Smith.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 28-D.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
101-H	102-H	3.0	558.3	+ .005	+ .374	3345.163	102-H
102-H	103-H	3.6	561.9	- .016	+ .358	3420.654	103-H
103-H	104-H	3.4	565.3	+ .003	+ .361	3483.531	104-H

Connection at Jasper with bench-mark of Irrigation Branch, Dept. of the Interior:—  
On N.W.  $\frac{1}{4}$  sec. 15, tp. 45, rge. 1, W. 6th mer. (iron post), Elev. 3382.654.

TABLE II-A.

RESULTS OF PRECISE LEVELLING.

ST. STEPHEN, N.B., TO RIVIERE-DU-LOUP, QUE.

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 1-B.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	1-B					53.578	1-B
1-B	2-B	1.0	1.0	+ .005	+ .005	26.064	2-B
2-B	3-B	....	1.0	+ .001	+ .006	23.239	3-B
3-B	4-B	5.3	6.3	+ .011	+ .017	82.584	4-B
4-B	5-B	4.7	11.0	+ .013	+ .030	135.118	5-B
5-B	6-B	4.7	15.7	+ .008	+ .038	275.905	6-B
6-B	7-B	5.8	21.5	- .025	+ .013	216.340	7-B
7-B	8-B	4.7	26.2	- .028	- .015	313.253	8-B
8-B	9-B	5.0	31.2	- .028	- .043	412.622	9-B
9-B	10-B	5.0	36.2	- .023	- .066	421.679	10-B
10-B	11-B	5.0	41.2	+ .017	- .049	461.832	11-B
11-B	12-B	5.5	46.7	+ .010	- .039	382.637	12-B
12-B	13-B	.....	46.7	.000	- .039	388.423	13-B
11-B	14-B	10.2	51.4	+ .018	- .031	484.243	14-B
14-B	15-B	6.0	57.4	+ .018	- .013	541.108	15-B
15-B	16-B	6.3	63.7	- .018	- .031	563.625	16-B
16-B	17-B	4.2	67.9	+ .025	- .006	464.068	17-B
17-B	18-B	6.2	74.1	- .008	- .014	412.210	18-B
18-B	19-B	4.0	78.1	- .026	- .040	549.955	19-B
19-B	20-B	3.5	81.6	- .017	- .057	548.292	20-B
20-B	21-B	4.6	86.2	+ .013	- .044	544.508	21-B
21-B	22-B	0.4	86.6	- .002	- .046	530.198	22-B
20-B	23-B	4.5	86.1	- .017	- .074	394.075	23-B
23-B	24-B	4.5	90.6	+ .022	- .052	189.781	24-B
24-B	25-B	2.0	92.6	+ .003	- .049	142.014	25-B
25-B	26-B	0.5	93.1	+ .004	- .045	197.885	26-B
26-B	27-B	.....	93.1	+ .003	- .042	186.200	27-B
26-B	28-B	2.3	95.4	- .010	- .055	149.367	28-B
28-B	29-B	4.0	99.4	+ .016	- .039	132.082	29-B
29-B	30-B	4.0	103.4	- .020	- .059	143.431	30-B
30-B	31-B	2.8	106.2	+ .018	- .041	158.366	31-B
31-B	32-B	6.0	112.2	+ .015	- .026	172.021	32-B
32-B	33-B	3.0	115.2	- .015	- .041	181.791	33-B

## RESULTS OF PRECISE LEVELLING.

ST. STEPHEN, N.B., TO RIVIERE-DU-LOUP, QUE.—*Continued.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 1-B	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
33-B	34-B	4.5	119.7	+013	-028	200.344	34-B
34-B	35-B	3.5	123.2	-018	-046	202.812	35-B
35-B	36-B	4.5	127.7	-019	-065	213.799	36-B
36-B	37-B	5.8	133.5	-004	-069	237.576	37-B
37-B	38-B	6.9	140.4	-031	-100	285.937	38-B
38-B	39-B	1.5	141.9	-001	-101	257.296	39-B
39-B	40-B	0.3	142.2	-002	-103	261.503	40-B
40-B	41-B	5.5	147.7	+002	-101	279.292	41-B
41-B	42-B	4.7	152.4	-002	-103	373.065	42-B
41-B	43-B	4.5	152.2	+020	-081	407.970	43-B
43-B	44-B	3.7	155.9	-010	-091	334.720	44-B
44-B	45-B	5.0	160.9	+002	-089	287.758	45-B
45-B	46-B	5.5	166.4	-017	-106	513.117	46-B
46-B	47-B	1.5	167.9	+002	-104	467.698	47-B
47-B	48-B	4.2	172.1	+001	-103	497.302	48-B
48-B	49-B	4.5	176.6	+031	-072	442.633	49-B
49-B	50-B	5.0	181.6	-014	-086	449.126	50-B
50-B	51-B	2.5	184.1	+015	-071	451.834	51-B
51-B	52-B	3.0	187.1	+019	-052	439.205	52-B
52-B	53-B	4.0	191.1	+002	-050	459.917	53-B
53-B	54-B	3.5	194.6	+021	-029	457.010	54-B
54-B	55-B	3.8	198.4	+015	-014	478.167	55-B
55-B	56-B	1.8	200.2	-013	-027	475.713	56-B
56-B	57-B	3.0	203.2	+006	-021	511.944	57-B
57-B	60-B	2.0	205.2	-014	-035	482.942	60-B
60-B	58-B*	0.5	205.7	+003	-032	473.642	58-B*
58-B*	59-B	.....	205.7	+004	-028	461.816	59-B
60-B	61-B	2.5	207.7	+009	-026	485.214	61-B
61-B	62-B	18.7	226.4	-019	-045	531.111	62-B
62-B	63-B	3.3	229.7	+021	-024	513.118	63-B
63-B	64-B	4.2	233.9	-024	-048	521.975	64-B
64-B	65-B	3.0	236.9	+002	-046	512.770	65-B
65-B	66-B	4.3	241.2	+013	-033	514.376	66-B
66-B	67-B	6.2	247.4	-027	-060	709.814	67-B
67-B	68-B	4.5	251.9	+014	-046	987.119	68-B
68-B	69-B	4.0	255.9	-006	-052	1118.094	69-B
69-B	70-B	4.5	260.4	+009	-043	1295.992	70-B

\*See also elevation of this bench-mark on page 290.

## RESULTS OF PRECISE LEVELLING.

ST. STEPHEN, N.B., TO RIVIERE-DU-LOUP, QUE.—*Concluded.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 1-B.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
70-B	71-B	4.5	264.9	-.007	-.050	1165.164	71-B
71-B	72-B	2.5	267.4	-.022	-.072	1081.000	72-B
72-B	73-B	5.5	272.9	+.021	-.051	846.736	73-B
73-B	74-B	5.5	278.4	-.024	-.075	653.057	74-B
74-B	75-B	5.5	283.9	+.032	-.043	338.673	75-B
75-B	76-B	2.5	286.4	+.023	-.020	307.535	76-B
76-B	77-B†	1.0	287.4	-.013	-.033	313.608	77-B†
77-B†	78-B	0.2	287.6	-.001	-.034	412.589	78-B

†See also elevation of this bench-mark on page 292.

## RESULTS OF PRECISE LEVELLING.

## BRUNSWICK TO ST. JOHN, N.B.

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 6-B.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	6-B					275.905	6-B
6-B	79-B	4.7	4.7	+ .028	+ .028	127.400	79-B
79-B	80-B	3.0	7.7	+ .018	+ .046	159.387	80-B
80-B	81-B	5.5	13.2	- .024	+ .022	98.941	81-B
81-B	82-B	3.0	16.2	- .019	+ .003	68.744	82-B
82-B	83-B	4.5	20.7	+ .021	+ .024	88.274	83-B
83-B	84-B	3.0	23.7	- .021	+ .003	128.680	84-B
84-B	85-B	4.8	28.5	+ .028	+ .031	262.279	85-B
85-B	86-B	4.5	33.0	+ .013	+ .044	236.010	86-B
86-B	87-B	4.5	37.5	- .004	+ .040	168.028	87-B
87-B	88-B	3.3	40.8	- .006	+ .034	179.420	88-B
88-B	89-B	3.5	44.3	- .005	+ .029	60.782	89-B
89-B	90-B	3.0	47.3	+ .021	+ .050	86.890	90-B
90-B	91-B	3.3	50.6	- .020	+ .030	33.126	91-B
91-B	92-B	2.3	52.9	- .020	+ .010	15.928	92-B
92-B	93-B	4.7	57.6	- .004	+ .006	204.967	93-B
93-B	94-B	3.0	60.6	- .026	- .020	204.662	94-B
94-B	95-B	5.0	65.6	+ .002	- .018	68.498	95-B
95-B	96-B	2.5	68.1	- .026	- .044	86.440	96-B
96-B	97-B	1.7	69.8	+ .008	- .036	21.776	97-B
97-B	98-B	0.5	70.3	- .008	- .044	20.770	98-B
98-B	99-B	0.3	70.6	- .007	- .051	42.722	99-B
96-B	100-B	1.8	69.9	- .008	- .052	20.352	100-B

## RESULTS OF PRECISE LEVELLING.

ROUSE POINT, N.Y., TO SHERBROOKE, QUE.

BENCH-MARK.		Distance between successive bench-marks.	Distance from bench-mark $\oplus$	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	$\oplus$					107.950	$\oplus$
$\oplus$	81	3.3	3.3	-.022	-.022	111.595	81
81	79	7.2	10.5	+.016	-.006	156.371	79
79	78	6.0	16.5	-.059	-.065	140.678	78
78	77	5.0	21.5	+.023	-.042	121.014	77
77	76	1.5	23.0	+.015	-.027	122.124	76
76	75	0.3	23.3	-.005	-.032	123.885	75
76	74	0.5	23.5	-.008	-.035	103.856	74
74	72	6.3	29.8	+.013	-.022	182.229	72
72	71	2.3	32.1	-.008	-.030	159.204	71
71	62	4.4	36.5	-.008	-.038	195.121	62
62	61	3.0	39.5	+.012	-.026	225.117	61
61	60	2.3	41.8	+.016	-.010	264.818	60
60	59	4.8	46.6	-.034	-.044	377.565	59
59	58	3.9	50.5	+.005	-.039	357.644	58
58	57	4.8	55.3	.000	-.039	432.236	57
57	56	4.2	59.5	-.042	-.081	589.078	56
56	47	3.5	63.0	+.051	-.030	703.135	47
47	46	1.9	64.9	+.011	-.019	731.218	46
46	45	3.5	68.4	+.007	-.012	859.930	45
45	44	2.7	71.1	+.012	.000	914.749	44
44	43	4.4	75.5	-.005	-.005	934.811	43
43	42	3.3	78.8	+.015	+.010	814.758	42
42	41	3.0	81.8	-.037	-.027	689.780	41
41	41-A	0.5	82.3	-.002	-.029	707.298	41-A
41	40	0.1	81.9	-.001	-.028	689.123	40
40	39	1.4	83.3	+.002	-.026	676.635	39
39	38	6.2	89.5	-.030	-.056	651.376	38
38	37	4.7	94.2	-.055	-.111	660.471	37
37	36	5.0	99.2	-.051	-.162	595.667	36
36	35	1.2	100.4	-.011	-.173	611.198	35
35	1	0.5	100.9	-.004	-.177	541.862	1

 $\oplus$  United States bench-mark on Chapman Block, Rouse Point, N.Y.

Connections with Public Works Dept's bench-marks:—

B.M.—DCI—D. &amp; H. station, Rouse Point, Elev. 123.761.

B.M.—DCII—G.T.R. bridge, Elev. 109.310.

B.M.—DCIII—G.T.R. bridge, Elev. 129.930.

B.M.—DCIV—G.T.R. culvert, Elev. 137.118.

B.M.—MCCCXXV—St. Johns post-office, Elev. 125.776.

## RESULTS OF PRECISE LEVELLING.

## FARNHAM TO ST. ARMAND, QUE.

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 62.	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No. 62	Miles.	Miles.	Feet.	Feet.	Feet. 195.121	No. 62
62	63	0.2	0.2	-.002	-.002	193.031	63
63	64	0.1	0.3	-.003	-.005	192.787	64
62	65	9.3	9.3	+.001	+.001	186.334	65
65	66	2.4	11.7	+.020	+.021	178.185	66
66	67	2.6	14.3	-.006	+.015	167.611	67
67	68	6.4	20.7	+.010	+.025	123.626	68
68	69	0.6	21.3	+.003	+.028	107.323	69
69	70	0.7	22.0	+.003	+.031	108.161	70

## RESULTS OF PRECISE LEVELLING.

## FOSTER TO ABERCORN, QUE.

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 47	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No. 47	Miles.	Miles.	Feet.	Feet.	Feet. 703.135	No. 47
47	48	4.2	4.2	-.033	-.033	666.742	48
48	49	1.2	5.4	-.038	-.071	690.592	49
49	50	3.4	8.8	-.025	-.096	679.176	50
50	51	3.7	12.5	+.015	-.081	554.849	51
51	52	3.1	15.6	+.010	-.071	591.272	52
52	53	4.0	19.6	+.002	-.069	492.870	53
53	54	1.2	20.8	+.014	-.055	485.656	54
54	55	1.1	21.9	+.013	-.042	492.526	55

## RESULTS OF PRECISE LEVELLING.

SHERBROOKE, QUE., TO NORTON MILLS, VERMONT.

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark 1	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	1					541.862	1
1	2	.....	.....	-.001	-.001	533.543	2
2	3	0.2	0.2	-.007	-.008	484.318	3
3	4	1.9	2.1	+.008	.000	498.756	4
4	5	0.7	2.8	-.003	-.003	488.547	5
5	6	1.4	4.2	+.003	.000	495.522	6
6	7	1.2	5.4	+.010	+.010	495.050	7
7	8	3.5	8.9	-.056	-.046	597.624	8
8	9	1.5	10.4	+.008	-.038	643.148	9
9	10	2.7	13.1	+.018	-.020	707.196	10
10	11	2.0	15.1	+.015	-.005	747.534	11
11	13	2.1	17.2	+.029	+.024	829.940	13
13	14	4.8	22.0	+.036	+.060	1005.416	14
14	15	0.4	22.4	+.017	+.077	963.679	15
15	16	.....	22.4	.000	+.077	963.015	16
14	17	1.1	23.1	+.018	+.078	1040.109	17
17	18	1.4	24.5	+.022	+.100	1069.878	18
18	19	1.2	25.7	+.007	+.107	1101.157	19
19	21	2.8	28.5	+.025	+.132	1166.804	21
21	22	0.5	29.0	-.009	+.123	1187.171	22
22	23	2.6	31.6	+.008	+.131	1247.750	23
23	24	.....	31.6	.000	+.131	1213.468	24
24	25	.....	31.6	.000	+.131	1212.040	25

## RESULTS OF PRECISE LEVELLING.

## ROUSE POINT, N.Y., TO COLBORNE, ONT.

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark ⊕	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
	⊕					107.950	⊕
⊕	81	3.3	3.3	-.022	-.022	111.595	81
81	83	8.9	12.2	-.024	-.046	192.365	83
83	85	9.2	21.4	+.062	+.016	200.904	85
85	86	7.2	28.6	-.010	+.006	132.917	86
86	87	3.6	32.2	-.006	.000	125.239	87
87	88	6.1	38.3	+.007	+.007	130.729	88
88	89	8.9	47.2	-.004	+.003	162.081	89
89	90	5.5	52.7	-.011	-.008	157.040	90
90	91	1.9	54.6	-.013	-.021	162.816	91
91	92	3.8	58.4	-.008	-.029	186.360	92
92	93	1.4	59.8	-.017	-.046	193.504	93
93	94	3.0	62.8	+.021	-.025	213.997	94
94	95	2.1	64.9	-.006	-.031	226.446	95
95	96	2.8	67.7	+.005	-.026	263.469	96
96	97	3.9	71.6	+.001	-.025	268.499	97
97	98	3.3	74.9	-.023	-.048	277.283	98
98	99	3.5	78.4	+.013	-.035	271.914	99
99	100	2.3	80.7	-.020	-.055	286.115	100
100	101	2.8	83.5	+.009	-.046	317.830	101
101	102	3.2	86.7	-.012	-.058	335.602	102
102	103	5.0	91.7	.000	-.058	327.566	103
103	104	1.7	93.4	-.001	-.059	297.254	104
104	105	4.3	97.7	-.032	-.091	275.786	105
105	106	3.4	101.1	+.007	-.084	247.071	106
106	107	4.5	105.6	-.025	-.109	242.401	107
107	108	3.3	108.9	-.005	-.114	268.870	108
108	109	2.6	111.5	-.018	-.132	250.268	109
109	110	3.7	115.2	-.026	-.158	258.740	110
110	111	4.3	119.5	+.010	-.148	270.325	111
111	112	5.2	124.7	+.011	-.137	329.122	112
112	113	1.9	126.6	-.002	-.139	337.269	113
113	114	3.4	130.0	+.001	-.138	335.400	114
114	115	4.1	134.1	-.009	-.147	338.808	115
115	116	2.7	136.8	+.034	-.113	335.573	116
116	117	4.5	141.3	-.022	-.135	300.295	117
117	118	5.3	146.6	-.029	-.164	288.676	118
118	119	1.5	148.1	-.022	-.186	313.837	119
119	120	3.3	151.4	-.008	-.194	284.563	120
120	121	2.4	153.8	-.002	-.196	302.944	121
121	122	2.9	156.7	-.009	-.205	323.077	122

⊕ United States bench-mark on Chapman Block, Rouse Point, N.Y.

## RESULTS OF PRECISE LEVELLING.

ROUSE POINT, N.Y., TO COLBORNE, ONT.—*Continued.*

BENCH-MARK.		Distance between successive bench- marks.	Distance from bench- mark ⊕	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
122	123*	2.6	159.3	+ .013	— .192	295.634	123*
123*	124	2.0	161.3	+ .011	— .181	283.149	124
124	125	2.9	164.2	+ .009	— .172	285.823	125
125	126	2.7	166.9	— .021	— .193	320.389	126
126	127	3.4	170.3	— .017	— .210	289.107	127
127	128	3.1	173.4	+ .018	— .192	319.552	128
128	129	2.7	176.1	— .024	— .216	315.413	129
129	130	4.2	180.3	— .017	— .233	324.846	130
130	131	0.7	181.0	+ .001	— .232	375.174	131
131	132	3.5	184.5	— .032	— .264	313.225	132
132	133	2.2	186.7	— .016	— .280	324.320	133
133	134	3.8	190.5	+ .009	— .271	292.687	134
134	135	3.0	193.5	— .022	— .293	342.482	135
135	136	3.3	196.8	+ .024	— .269	350.746	136
136	137	2.9	199.7	+ .013	— .256	314.551	137
137	138	4.2	203.9	— .038	— .294	309.785	138
138	139†	3.7	207.6	— .003	— .297	276.940	139†
139†	141	2.3	209.9	— .036	— .333	263.699	141
141	141-A	.....	209.9	+ .003	— .330	275.986	141-A
141	142	.....	209.9	.000	— .333	258.688	142
139†	140	2.8	210.4	— .018	— .315	254.646	140
140	143	2.9	213.3	+ .003	— .312	264.945	143
143	144	2.1	215.4	+ .002	— .310	271.991	144
144	145	3.0	218.4	— .001	— .311	314.191	145
145	146	4.3	222.7	— .030	— .341	327.440	146
146	147	4.0	226.7	— .023	— .364	340.144	147
147	148	3.9	230.6	+ .016	— .348	296.034	148
148	149	2.8	233.4	+ .016	— .332	314.333	149
149	150	0.4	233.8	— .006	— .338	316.141	150
150	150-A	0.4	234.2	+ .005	— .333	304.699	150-A
150-A	150-A-2	0.1	234.3	— .006	— .339	294.646	150-A-2
150	151	3.4	237.2	— .008	— .346	290.623	151
151	152	4.4	241.6	+ .024	— .322	338.579	152
152	153	5.3	246.9	— .008	— .330	284.481	153
153	154	1.5	248.4	+ .007	— .323	337.466	154
154	155	2.9	251.3	— .024	— .347	317.206	155

\*See also elevation of this bench-mark on page 298.

†See also elevation of this bench-mark on page 300.

## RESULTS OF PRECISE LEVELLING.

ROUSE POINT, N.Y., TO COLBORNE, ONT.—*Concluded.*

BENCH-MARK.		Distance between successive bench-marks.	Distance from bench-mark $\oplus$	DISCREPANCY.		Elevation above mean sea level.	BENCH-MARK.
From	To			Partial.	Total.		
No.	No.	Miles.	Miles.	Feet.	Feet.	Feet.	No.
155	156*	4.2	255.5	+ .009	— .338	288.567	156*
156*	157	1.5	257.0	— .001	— .339	257.005	157
157	157-A	0.1	257.1	+ .013	— .326	261.329	157-A
157-A	157-A-2	0.3	257.4	+ .008	— .318	250.813	157-A-2
156*	158	2.9	258.4	+ .012	— .326	307.205	158
158	159	2.6	261.0	+ .023	— .303	306.755	159
159	160	2.8	263.8	+ .001	— .302	306.251	160
160	161	3.8	267.6	— .035	— .337	283.887	161
161	162	4.5	272.1	— .023	— .360	314.101	162
162	163	3.8	275.9	+ .003	— .357	306.996	163
163	164	2.1	278.0	+ .003	— .354	310.872	164
164	165	3.1	281.1	+ .003	— .351	283.401	165
165	166	2.7	283.8	+ .007	— .344	298.946	166

\*See also elevation of this bench-mark on page 301.

## Connections with Public Works Dept's bench-marks—

Between Rouse Point and Coteau Jct.:—

DCI.....Elev. 123.761

DCII....." 109.310

DCCCXIX....." 156.782

DCCCXX....." 161.906

DCCCXXIV....." 182.666

DCCCXXV....." 187.814

DCCCXXVI....." 192.284

DCCCXXV....." 204.208

DCCCXXVIII....." 137.755

DCCCXV.....Elev. 129.406

DCCCXIV....." 129.363

DCCCXIII....." 135.688

DCCCXII....." 130.097

DCCCX....." 153.200

DCCCVII....." 142.900

DCCCV....." 157.285

DCCXCVII....." 174.176

CCCCXXVIII....." 160.901

East and west of Coteau Jct. on G.T.R. main line:—

DCCCLXIV—Bridge over Delisle river, Elev. 158.849

DLXXVIII—Bridge at St. Zotique, Elev. 154.703

DLXXVII—Bridge at River Beaudette, Elev. 169.517

Between Trenton and Brighton:—

MCXCIX=G.S.C. bench-mark 161.

MCXCVII=G.S.C. bench-mark 163.

For connection at Kingston with Hydrographic Survey levels, see Introduction.

TABLE III.

## RAIL ELEVATIONS, ST. ANSELME, QUE., TO EDMUNDSTON, N.B.

(Elevations taken in 1915 and 1916).

	FEET
National Transcontinental Ry.—St. Anselme.....	566.7
“ Ste. Claire.....	682.9
“ Frampton.....	746.0
“ Etchemin river; water, July 17, 1915, 710.0; rail.....	767.5
“ Ste. Malachie.....	769.8
“ Abenakis.....	837.3
“ Abenakis river; water, July 21, 1915, 822.0; rail.....	871.3
“ St. Damien.....	935.7
“ St. Lazare.....	959.9
“ Armagh.....	998.1
“ Rivière-du-Pin; water, July 24, 1915, 984; rail.....	1046.6
“ St. Euphemie.....	1115.9
“ Rosarie.....	1215.4
“ Langelier (water-tank).....	1315.2
“ Méchant-pouce river; water, July 28, 1915, 1185.1; rail.....	1227.3
“ Ste. Appoline.....	1233.0
“ Bras d'Apic.....	1215.8
“ Bras d'Apic river (east); water, July 28, 1915, 1177.4; rail.....	1208.9
“ Therien.....	1266.2
“ Monk.....	1162.1
“ Lafontaine.....	1092.2
“ Lefebvre.....	1202.7
“ Holliday.....	1110.4
“ Bretagne.....	1093.6
“ Rivière-du-Loup; water, Aug. 7, 1916, 966.2; rail.....	1010.9
“ River Manie (station).....	1090.5
“ River Manie; water, Aug. 8, 1916, 1066.6; rail.....	1087.1
“ Lapointe.....	1139.6
“ Picard.....	1207.1
“ Pelletier.....	1260.3
“ St. Eleuthère.....	946.7
“ St. Francis river; water, Aug. 21, 1916, 678; rail.....	715.0
“ Estcourt.....	710.5
“ Blue river; water, Aug. 24, 1916, 591; rail.....	650.5
“ Blue River (station).....	670.0
“ Long Lake.....	695.1
“ Glendyne.....	675.2
“ Long lake narrows; water, Sept. 1, 1916, 648.4; rail.....	671.4
“ Courchesne.....	728.3
“ Lac Baker.....	682.3
“ Caron Brook.....	608.6
“ Baker brook; water, Sept. 6, 1916, 493.4; rail.....	516.1
“ Baker Brook (station).....	517.4
“ Temiscouata railway (diamond crossing).....	521.6
“ St. Hilaire.....	493.1

## RAIL ELEVATIONS, HARLAKA JUNCTION TO RIVIERE-DU-LOUP, QUE.

(Elevations taken in 1915).

	FEET
Intercolonial Railway—Harlaka Junction.....	241.2
“ Ville Marie.....	324.4
“ Lake Beaumont; water, Aug. 8, 1915.....	320.2
“ St. Charles Junction.....	297.1
“ Boyer river; water, Aug. 12, 1915, 121.4; rail.....	171.4
“ La Durantaye.....	172.0
“ St. Vallier.....	156.7
“ St. Francois.....	134.8
“ St. Pierre.....	132.1
“ Montmagny.....	55.0
“ Rivière-du-Sud; water, Aug. 19, 1915, 44.4; rail.....	56.8
“ Bras St. Nicholas, rivière-du-Sud; water, Aug. 19, 1915, 43.1; rail.....	57.1
“ Cap St. Ignace.....	130.1
“ L'Anse-à-Giles.....	118.3
“ L'Islet.....	104.0
“ Trois Saumons.....	99.9
“ St. Jean Port Joli.....	176.7
“ Elgin Road.....	163.5
“ Ste. Louise.....	120.4
“ Pointe Rouge.....	97.6
“ Ste. Anne.....	101.4
“ St. Pacôme.....	54.3
“ Rivière Ouelle; water, Sept. 8, 1915, 18.6; rail.....	42.8
“ Rivière Ouelle Junction.....	46.9
“ St. Philippe-de-Neri.....	143.9
“ St. Paschal.....	192.4
“ Dessaint.....	301.5
“ Ste. Hélène.....	319.1
“ St. André.....	345.9
“ St. Alexandre.....	369.7
“ Old Lake Road.....	349.9
“ Rivière-du-Loup.....	315.1

## RAIL ELEVATIONS, OTTAWA TO RENFREW, ONT.

(Elevations taken in 1915).

	FEET.
Canadian Pacific Railway—Ottawa (Broad street station).....	181.0
“ Ottawa river, below Deschênes rapids; water, May 29, 1915.....	182.4
“ Britannia.....	202.4
“ Lake Deschênes; water, May 29, 1915.....	192.5
“ Grand Trunk railway, Ottawa division (overhead crossing) rail 241.5; C.P.R. rail.....	217.1
“ Canadian Northern railway, main line (overhead crossing) rail 299.9; C.P.R. rail.....	272.7
“ Stittville.....	398.6
“ Ashton.....	448.6
“ Carleton Place.....	450.2
“ Mississippi river; water, May 19, 1915, 428.6; rail.....	445.9
“ Almonte.....	397.4
“ Mississippi river; water, May 20, 1915, 385.1; rail.....	401.7
“ Snedden.....	378.8
“ Mississippi river; water, May 28, 1915, 289.1; rail.....	322.5
“ Pakenham.....	321.4
“ Madawaska river; water, June 5, 1915, 254.6; rail.....	288.3
“ Arnprior.....	298.3

RAIL ELEVATIONS, OTTAWA TO RENFREW, ONT.—*Concluded.*

(Elevations taken in 1915).

	FEET.
Grand Trunk Railway—Arnprior.....	298.1
“ Canadian Pacific railway (diamond crossing).....	299.7
“ Glasgow.....	445.1
“ Goshen.....	494.2
“ Renfrew.....	421.1

## RAIL ELEVATIONS, KEMPTON TO IVANHOE, ONT.

(Elevations taken in 1915).

	FEET.
Canadian Pacific Railway—Kempton.....	332.8
“ Canadian Pacific railway, Ottawa-Prescott line (diamond crossing).....	333.2
“ Kemptville creek; water, June 21, 1915, 304.1; rail.....	326.6
“ Swan.....	338.1
“ Burritt.....	366.6
“ Rideau river; water, June 25, 1915, 312.2; rail.....	357.6
“ Merrickville.....	355.1
“ Rosedale.....	360.2
“ Smiths Falls.....	426.6
“ Canadian Northern railway, Toronto-Ottawa line (under crossing) rail 403.4; C.P.R. rail.....	429.4
“ Elmsley.....	441.9
“ Perth.....	439.2
“ Glentay.....	472.6
“ Bathurst.....	484.0
“ Maberley.....	578.1
“ Fall river; water, Aug. 17, 1915, 578.5; rail.....	595.6
“ Sharbot Lake (main line).....	647.9
“ Sharbot lake; water, Oct. 21, 1915.....	636.8
“ Olden.....	733.6
“ Mountain Grove.....	683.2
“ Ardendale.....	620.1
“ Salmon river; water, Oct. 27, 1915, 613; rail.....	632.1
“ Kennebec.....	667.2
“ Kaladar.....	704.8
“ Addington.....	590.6
“ Hungerford.....	557.5
“ Sulphide.....	485.2
“ Bogart.....	477.9
“ Moira river; water, Nov. 9, 1915, 458.2; rail.....	475.0
“ Tweed.....	478.2
“ Canadian Northern railway, Bannockburn branch (diamond crossing).....	484.4
“ Buller.....	592.6
“ Grand Trunk railway, Madoc branch (under crossing) rail 562.1; C.P.R. rail..	587.6
“ Ivanhoe.....	610.3

## RAIL ELEVATIONS, CARLETON PLACE TO BROCKVILLE, ONT.

(Elevations taken in 1915).

	FEET
Canadian Pacific Railway—Carleton Place (main line).....	450.3
“ Beckwith.....	464.1
“ Franktown.....	480.6
“ Welsh.....	433.0

RAIL ELEVATIONS, CARLETON PLACE TO BROCKVILLE, ONT.—*Concluded.*

(Elevations taken in 1915).

	FEET
Canadian Pacific Railway—Canadian Northern railway, Toronto-Ottawa line (under crossing) rail 403.4;	
C.P.R. rail.....	429.4
“ Smiths Falls.....	426.6
“ Rideau river; water, July 14, 1915, 348.6; rail.....	382.3
“ Jasper.....	343.4
“ Irish creek; water, July 15, 1915, 337.3; rail.....	343.8
“ Yule.....	398.5
“ Bell.....	390.0
“ Jelly.....	375.9
“ Bellamy.....	397.0
“ Hawkens.....	392.7
“ Clark.....	417.9
“ Fairfield.....	397.8

## RAIL ELEVATIONS, RENFREW TO KINGSTON, ONT.

(Elevations taken in 1915 and 1916).

	FEET
Canadian Pacific Railway—Renfrew.....	416.4
“ Grand Trunk railway, Ottawa division (diamond crossing).....	402.9
“ Ashdod.....	567.1
“ Madawaska river; water, Sept. 8, 1915, 492.8; rail.....	518.4
“ Calabogie.....	515.8
“ Madawaska river; water, Sept. 8, 1915, 499.9; rail.....	515.1
“ Barryvale.....	533.9
“ Flower.....	625.0
“ Clyde Forks.....	608.2
“ Folger.....	809.0
“ Lavant.....	841.4
“ Wilbur.....	884.0
“ Snow Road.....	695.7
“ Mississippi river; water, Aug. 30, 1915, 645.7; rail.....	656.4
“ Mississippi.....	683.0
“ Clarendon.....	759.5
“ Oso.....	679.4
“ Sharbot Lake (Kingston subdivision).....	647.3
“ Sharbot lake; water, Sept. 22, 1915.....	637.0
“ Oconto.....	674.7
“ Canadian Pacific railway, main line (diamond crossing at Tichborne).....	650.5
“ Hinchinbrooke.....	560.3
“ Godfrey.....	498.6
“ Verona.....	459.0
“ Hartington.....	530.5
“ Harrowsmith.....	491.2
“ Murvale.....	478.5
“ Glenvale.....	419.4
“ Grand Trunk railway, main line (diamond crossing).....	287.1
“ Grand Trunk railway, Kingston branch (diamond crossing).....	254.7
“ Kingston.....	253.7
“ Lake Ontario; water, Sept. 26, 1916.....	245.5

## RAIL ELEVATIONS, IVANHOE TO BELLEVILLE, ONT.

(Elevations taken in 1916).

	FEET
Grand Trunk Railway—Ivanhoe.....	468.7
" West Huntingdon.....	446.0
" Madoc Junction.....	503.9
" Holloway.....	426.1
" Foxboro.....	358.2
" Moira river; water, April 26, 1916, 335.0; rail.....	358.2
" Corbyville.....	332.8
" Belleville.....	285.8

## RAIL ELEVATIONS, STEELTON TO FRANZ, ONT.

(Elevations taken in 1915).

	FEET
Algoma Central Railway—Steelton.....	616.3
" Odena.....	926.1
" Granite.....	1018.4
" Root river; water, June 23, 1915, 1030.4; rail.....	1046.0
" Heyden.....	1070.7
" Gilbert.....	1076.6
" Island Lake.....	1088.8
" Bellevue.....	1140.6
" Northfield.....	1080.4
" Glendale.....	836.5
" Goulais.....	768.9
" Goulais river; water, June 30, 1915, 755.6; rail.....	778.8
" Searchmont.....	779.7
" Wabos.....	944.1
" Superior Jct.....	1104.3
" Achigan.....	1112.2
" Achigan lake; water, July 7, 1915, 1103.7; rail (on bridge).....	1112.8
" Lunar.....	1114.7
" Bucyrus.....	1151.6
" Ogadaki.....	1227.3
" South branch, Chippawa river; water, July 8, 1915, 1017.1; rail.....	1027.7
" Chippawa.....	1029.4
" Mashkode.....	1143.0
" Trout lake; water, July 15, 1915, 1118.9; rail.....	1127.6
" Alva.....	1278.8
" Mekatina.....	1452.9
" Pangis.....	1279.8
" North branch, Chippawa river; water, July 23, 1915, 1188.2; rail.....	1237.5
" Spruce.....	1325.3
" Summit.....	1412.9
" Mongoos lake; water, July 27, 1915, 1230.9; rail (on bridge).....	1241.9
" Mongoos.....	1242.2
" Batchawana.....	1022.2
" Batchawana river; water, July 26, 1915, 1000.9; rail.....	1033.9
" Rand.....	1395.4
" Regent.....	1337.6
" Montreal river; water, Aug. 3, 1915, 1181; rail.....	1283.4
" Montreal.....	1514.3
" Frater.....	1462.0
" Little Agawa river (mileage 109.1 from Sault Ste. Marie); water, Aug. 11, 1915, 998.3; rail.....	1017.0
" Agawa river (mileage 111.5 from Sault Ste. Marie); water, Aug. 19, 1915, 911.7; rail.....	933.9

RAIL ELEVATIONS, STEELTON TO FRANZ, ONT.—*Concluded.*

(Elevations taken in 1915).

	FEET
Algoma Central Railway—Canyon.....	937.3
“ Eton.....	1030.6
“ Agawa river (mileage 119.9 from Sault Ste. Marie); water, Aug. 19, 1915, 1016.4; rail.....	1034.9
“ Agawa river (mileage 122.0 from Sault Ste. Marie); water, Aug. 20, 1915, 1030.0; rail.....	1045.7
“ Agawa river (mileage 125.0 from Sault Ste. Marie); water, Aug. 20, 1915, 1036.9; rail.....	1049.4
“ Agawa river (mileage 126.9 from Sault Ste. Marie); water, Aug. 20, 1915, 1049.7; rail.....	1060.1
“ Agawa river (mileage 127.4 from Sault Ste. Marie); water, Aug. 20, 1915, 1060.1; rail.....	1076.8
“ Agawa river (mileage 127.9 from Sault Ste. Marie); water, Aug. 20, 1915, 1067.7; rail.....	1085.7
“ Agawa.....	1109.9
“ Agawa river (mileage 130.8 from Sault Ste. Marie); water, Sept. 1, 1915, 1099.0; rail.....	1110.2
“ Agawa river (mileage 131.8 from Sault Ste. Marie); water, Sept. 1, 1915, 1099.3; rail.....	1114.4
“ Sand lake; water, Sept. 2, 1915, 1214.0; rail.....	1224.4
“ Tabor.....	1260.9
“ Perry.....	989.3
“ Michipicoten river; water, Sept. 16, 1915, 901.3; rail.....	924.6
“ Limer.....	1062.3
“ Hawk Junction (station).....	1040.1
Michipicoten branch:—	
“ Magpie Junction.....	1055.9
“ Helen Junction.....	1108.8
“ Magpie river; water, Oct. 1, 1915, 847.0; rail.....	871.8
“ Brient.....	745.3
Main line, continued:—	
“ Alden.....	1173.7
“ Goudreau.....	1211.9
“ Wanda.....	1167.7
“ Canadian Pacific railway (diamond crossing at Franz).....	1216.5

## RAIL ELEVATIONS, KIPP, ALTA., TO GOLDEN, B.C.

(Elevations taken in 1914 and 1915).

	FEET
Canadian Pacific Railway—Kipp.....	3059.5
“ Monarch.....	3103.7
“ Oldman river; water, Aug. 26, 1914, 2934.4; rail.....	3079.6
“ Pearce.....	3099.2
“ Macleod.....	3116.1
“ Stowe.....	3230.6
“ Piegan.....	3321.9
“ Chokio.....	3433.9
“ Brocket.....	3512.4
“ Pincher creek; water, Sept. 16, 1914, 3394.1; rail.....	3511.1
“ Maunsell.....	3619.9
“ Pincher.....	3771.2
“ South fork, Oldman river; water, Sept. 25, 1914, 3590.0; rail.....	3731.0
“ Cowley.....	3842.4

RAIL ELEVATIONS, KIPP, ALTA., TO GOLDEN, B.C.—*Concluded.*

(Elevations taken in 1914 and 1915).

	FEET
Canadian Pacific Railway—Lundbreck.....	3918.3
“ Crownsnest river (first crossing); water, Oct. 2, 1914, 3805.0; rail.....	3825.3
“ Burmis.....	4004.5
“ Passburg.....	4044.3
“ Hillcrest.....	4122.5
“ Frank.....	4212.2
“ Crownsnest river (second crossing); water, Oct. 8, 1914, 4182.2; rail.....	4192.7
“ Blairmore.....	4235.9
“ Crownsnest river (third crossing); water, Oct. 9, 1914, 4266.8; rail.....	4277.0
“ Coleman.....	4312.3
“ Sentry.....	4448.5
“ Crownsnest.....	4450.8
“ Loop.....	4249.3
“ McGillivray.....	4172.8
“ Michel creek; immediately west of McGillivray; water, May 5, 1915, 4149.2; rail.....	4169.8
“ Michel.....	3861.8
“ Natal.....	3782.4
“ Sparwood.....	3648.3
“ Hosmer.....	3457.8
“ Fernie.....	3313.4
“ Coal creek; water, May 20, 1915, 3287.1; rail.....	3312.2
“ Cokato.....	3232.8
“ Morrissey.....	3139.4
“ Morrissey creek; water, May 24, 1915, 3099.6; rail.....	3109.2
“ Courier.....	3084.0
“ Elk river; water, May 29, 1915, 3016.1; rail.....	3036.9
“ Elko.....	3089.0
“ Great Northern railway (overhead crossing) rail 3116.3; C.P.R. rail.....	3089.4
“ Caithness.....	2851.5
“ Galloway.....	2849.1
“ Jaffray.....	2703.4
“ Colvalli.....	2660.7
“ Bull River (station).....	2476.0
“ Bull river; water, June 11, 1915, 2468.8; rail.....	2479.3
“ Fenwick.....	2485.5
“ Steele.....	2524.0
“ Wasa.....	2537.2
“ Kootenay river; water, June 25, 1915, 2522.4; rail.....	2540.7
“ Skookumchuck creek; water, July 6, 1915, 2607.5; rail.....	2624.7
“ Torrent (section-house).....	2607.3
“ Canalfat.....	2666.4
“ Radium.....	2659.2
“ Athalmer.....	2633.3
“ Columbia river (mileage 98.6 from Colvalli); water, Aug. 4, 1915.....	2617.8
“ Columbia river (mileage 102.0 from Colvalli); water, July 30, 1915, 2610.2; rail.....	2617.7
“ Columbia river (mileage 102.7 from Colvalli); water, July 30, 1915, 2609.3; rail.....	2616.9
“ Edgewater.....	2613.3
“ Brisco.....	2601.5
“ Spillimacheen.....	2603.6
“ Harrogate.....	2594.8
“ Parson.....	2588.4
“ Mons.....	2585.9
“ Nicholson.....	2580.5
“ Kicking Horse river; water, Sept. 2, 1915, 2584.1; rail.....	2594.1
“ Golden.....	2583.8

## RAIL ELEVATIONS, BULL RIVER TO KOOTENAY LANDING, B.C.

(Elevations taken in 1916).

	FEET
Canadian Pacific Railway—Bull River.....	2476.0
“ Mayook.....	2710.1
“ Rampart.....	2691.9
“ Eager.....	2897.0
“ Cranbrook.....	3019.3
“ Fassiferne.....	3262.8
“ Wattsburg.....	3236.3
“ Swansea.....	3195.6
“ Moyie river (mileage 10.9 from Cranbrook); water, May 15, 1916, 3133.5; rail.....	3144.4
“ Moyie river (mileage 13.1 from Cranbrook); water, May 15, 1916, 3042.6; rail.....	3055.3
“ Pea Vine creek (mileage 13.3 from Cranbrook); water, May 15, 1916, 3042.3; rail.....	3054.2
“ Jerome.....	3056.6
“ Moyie.....	3051.7
“ Aldridge.....	3057.3
“ Moyie river; water, May 17, 1916, 3037.4; rail.....	3048.5
“ Tochty.....	2970.0
“ Ryan.....	2903.8
“ Yahk.....	2823.1
“ Curzon.....	2815.8
“ Goatfell.....	2909.6
“ Cadorna.....	2441.1
“ McNeillie.....	2130.0
“ Canyon.....	2096.8
“ Goat river; water, June 17, 1916, 1948; rail.....	2088.8
“ Erickson.....	2112.7
“ Creston.....	1988.5
“ Wynndel.....	1856.7
“ Duck Creek.....	1850.5
“ Sirdar.....	1807.9
“ Kootenay lake; water, June 21, 1916.....	1760.2

## RAIL ELEVATIONS, FIELD TO REVELSTOKE, B.C.

(Elevations taken in 1915 and 1916.)

	FEET
Canadian Pacific Railway—Field.....	4076.1
“ Emerald.....	3899.9
“ Ottertail river (mileage 6.25 from Field); water, Aug. 6, 1915, 3749.0; rail....	3780.6
“ Ottertail.....	3703.8
“ Kicking Horse river (mileage 9.25 from Field); water, Aug. 14, 1915, 3691.2; rail.....	3703.8
“ Leancoil.....	3685.6
“ Kicking Horse river (mileage 21.6 from Field); water, Aug. 17, 1915, 3296.5; rail.....	3309.7
“ Palliser.....	3288.6
“ Kicking Horse river (mileage 25.7 from Field); water, Aug. 24, 1915, 3120.4; rail.....	3156.6
“ Glenogle.....	3009.8

RAIL ELEVATIONS, FIELD TO REVELSTOKE, B.C.—*Concluded.*

(Elevations taken in 1915 and 1916).

	FEET
Canadian Pacific Railway—Kicking Horse river (mileage 31.6 from Field); water, Aug. 25, 1915, 2701.8; rail.....	2719.9
" Kicking Horse river (mileage 32.0 from Field); water, Aug. 25, 1915, 2683.1; rail.....	2702.3
" Kicking Horse river (mileage 32.75 from Field); water, Aug. 25, 1915, 2654.5; rail.....	2668.9
" Kicking Horse river (mileage 33.24 from Field); water, Aug. 25, 1915, 2629.0; rail.....	2645.4
" Golden.....	2583.7
" Moberly.....	2559.4
" Donald.....	2581.3
" Columbia river (mileage 52.7 from Field); water, Sept. 6, 1915, 2519.4; rail..	2561.2
" Redgrave.....	2535.1
" Beaver mouth.....	2434.4
" Beaver river (mileage 66.1 from Field); water, Sept. 16, 1915, 2527.4; rail..	2556.9
" Anzac.....	2592.7
" Sturdee.....	3168.9
" Cutbank.....	3329.1
" Bear Creek.....	3665.7
" Rogers Pass.....	4306.8
" Summit of Selkirk range (rail).....	4341.6
" Glacier.....	4091.1
" Cambie.....	3779.3
" Illecillewaet river (mileage 90.4 from Field); water, Oct. 22, 1915, 3690.7; rail.....	3740.7
" Illecillewaet river (mileage 90.8 from Field); water, Oct. 21, 1915, 3652.4; rail	3701.8
" Illecillewaet river (mileage 91.8 from Field); water, Oct. 21, 1915, 3572.3; rail.....	3584.8
" Ross Peak.....	3435.2
" Illecillewaet river (mileage 94.7 from Field); water, Oct. 21, 1915, 3388.2; rail.....	3401.4
" Illecillewaet river (mileage 95.1 from Field); water, Oct. 21, 1915, 3330.8; rail.....	3363.8
" Illecillewaet river (mileage 97.6 from Field); water, Oct. 15, 1915, 3095.0; rail.....	3106.3
" Flat Creek.....	3094.7
" Illecillewaet river (mileage 98.9 from Field); water, Oct. 15, 1915, 2994.1; rail.....	3017.7
" Illecillewaet river (mileage 102.2 from Field); water, Oct. 23, 1915, 2716.6; rail.....	2758.5
" Illecillewaet.....	2713.6
" Illecillewaet river (mileage 106.2 from Field); water, Oct. 25, 1915, 2424.7; rail.....	2480.1
" Albert Canyon.....	2227.1
" Laurretta.....	1962.3
" Twin Butte.....	1879.9
" Illecillewaet river (mileage 126.8 from Field); water, July 25, 1916, 1602.4; rail	1635.9
" Revelstoke.....	1496.7

## RAIL ELEVATIONS, EDMONTON TO JASPER, ALTA.

(Elevations taken in 1915 and 1916).

	FEET
Canadian Northern Railway—Edmonton.....	2185.4
Grand Trunk Pacific Ry.—Canadian Northern railway, main line (diamond crossing).....	2229.5
“ Bissell.....	2235.8
“ Acheson.....	2339.7
“ Sprucegrove.....	2325.5
“ Stonyplain.....	2323.4
“ Carvel.....	2460.0
“ Duffield.....	2382.2
“ Wabamun lake; water, Sept. 3, 1915, 2376.8; rail (on bridge).....	2388.1
“ Wabamun.....	2384.1
“ Fallis.....	2395.7
“ Seba Beach.....	2452.3
“ Gainford.....	2440.0
“ Entwistle.....	2570.9
“ Pembina river; water, Sept. 20, 1915, 2356; rail.....	2562.5
“ Imrie.....	2580.9
“ Junkins.....	2622.8
“ Keston.....	2621.1
“ Canadian Northern railway (diamond crossing).....	2599.5
“ Leaman.....	2613.0
“ Mackay.....	2657.6
“ Niton.....	2737.4
“ Otley.....	2767.6
“ Peers.....	2786.3
“ Rosevear.....	2840.7
“ Thornton.....	2854.1
“ Wolf river; water, Oct. 14, 1915, 2754; rail.....	2879.2
“ McLeod river; water, Oct. 14, 1915, 2760; rail.....	2879.1
“ Yates.....	2892.1
“ Edson.....	2985.6
“ Ansell.....	3036.7
“ Canadian Northern railway (under crossing) rail, 3034.4; G. T. P. Ry. rail....	3065.4
“ Sundance creek; water, Oct. 22, 1915, 2943.8; rail.....	3067.3
“ Bickerdike.....	3117.5
“ Dandurand.....	3194.5
“ Galloway.....	3271.7
“ Medicine Lodge.....	3396.5
“ Hargwen.....	3486.2
“ Obed.....	3562.6
“ Roundcroft.....	3467.2
“ Pedley.....	3471.5
“ Hinton.....	3326.6
“ Dyke.....	3288.3
“ Parkgate.....	3308.0
“ Fiddle creek; water, July 27, 1916, 3241.4; rail.....	3256.5
“ Pocahontas.....	3260.0
“ Rocky river; water, Aug. 1, 1916, 3282.2; rail.....	3296.1
“ Hawes.....	3287.7
“ Interlachen.....	3290.2
“ Athabaska river; water, Aug. 4, 1916, 3288.8; rail.....	3305.1
“ Henry House.....	3333.8
“ Canadian Northern railway (under crossing) rail, 3320.9; G. T. P. Ry. rail....	3348.8
“ Jasper.....	3469.7

TABLE III-A.

## RAIL ELEVATIONS, ST. STEPHEN, N.B., TO RIVIERE-DU-LOUP, QUE.

(Elevations taken in 1909).

	FEET
Canadian Pacific Railway—St. Stephen.....	15.1
“ Oak Bay.....	72.5
“ Brunswick.....	279.6
“ Hewitt.....	303.8
“ Dumbarton.....	230.0
“ Watt.....	312.3
“ McAdam.....	458.6
“ Canterbury.....	563.1
“ Benton.....	415.6
“ Debec.....	551.3
“ International boundary (on Houlton Branch).....	525.9
“ Woodstock (old yard station).....	148.3
“ Upper Woodstock.....	158.7
“ Hartland.....	169.1
“ Florenceville.....	191.5
“ Bristol.....	206.1
“ Bath.....	218.0
“ Kilburn.....	286.0
“ Perth.....	257.8
“ Andover.....	268.6
“ Aroostook.....	276.0
“ International boundary (on Aroostook branch).....	372.9
“ Grand Falls.....	504.8
“ St. Leonard.....	509.4
“ Green River.....	485.6
“ Edmundston.....	478.9
Temiscouata Railway—Edmundston.....	478.4
“ Ste. Rose.....	505.8
“ Notre-Dame-du-Lac.....	529.9
“ Cabano.....	563.1
“ Vauban.....	1058.0
“ St. Honoré.....	1302.0
“ Whitworth.....	879.2
“ Ste. Modeste.....	547.6
Intercolonial Railway—Rivière-du-Loup.....	315.6

## RAIL ELEVATIONS, BRUNSWICK TO ST. JOHN, N.B.

(Elevations taken in 1909).

	FEET
Canadian Pacific Railway—Brunswick.....	279.6
“ Dyer.....	104.1
“ Bonny River.....	72.4
“ St. George.....	89.4
“ Utopia.....	112.0
“ Pennfield.....	226.5
“ Pocologan.....	203.8
“ New River.....	172.5
“ Lepreau.....	78.2
“ Musquash.....	16.6
“ Prince of Wales.....	118.2
“ Allan Cot.....	208.0
“ Spruce Lake.....	205.6
“ Duck Cove.....	68.6
Intercolonial Railway—St. John.....	20.6

## RAIL ELEVATIONS, ST. JOHNS TO SHERBROOKE, QUE.

(Elevations taken in 1907).

	FEET
Canadian Pacific Railway—Iberville.....	109.3
“ Iberville Junction.....	114.9
“ Versailles.....	186.5
Branch line to international boundary:—	
“ Mystic.....	180.8
“ Bedford.....	179.0
Central Vermont Railway— St. Armand.....	122.0
Main line, continued:—	
Canadian Pacific Railway—Brookport.....	267.7
“ Adamsville.....	376.0
“ West Shefford.....	428.0
“ Fulford.....	584.3
“ Foster.....	696.4
Branch line to international boundary:—	
“ Knowlton.....	680.2
“ Brome.....	676.9
“ Enlaugra.....	557.8
“ Sutton.....	581.2
“ Abercorn.....	485.7
Main line, continued:—	
“ South Stukely.....	837.0
“ Eastray.....	910.2
“ Magog.....	688.7
“ Scaswan.....	647.7
“ Rock Forest.....	700.5

## RAIL ELEVATIONS, SHERBROOKE, QUE., TO NORTON MILLS, VERMONT.

(Elevations taken in 1907).

	FEET
Grand Trunk Railway—Sherbrooke.....	485.1
“ Lennoxville.....	498.6
“ Waterville.....	645.0
“ Compton.....	733.0
“ Hillhurst.....	818.7
“ Coaticook.....	1006.2
“ Dixville.....	1126.8

## RAIL ELEVATIONS, COTEAU JUNCTION, QUE., TO COLBORNE, ONT.

(Elevations taken in 1908).

	FEET
Grand Trunk Railway—Coteau Junction.....	160.1
“ St. Polycarpe.....	176.0
Canadian Pacific Railway—St. Polycarpe Junction.....	194.0
“ St. Télesphore.....	213.7
“ Dalhousie Mills.....	226.5
“ Glen Norman.....	253.0
“ Green Valley.....	281.5
“ Apple Hill.....	301.5

RAIL ELEVATIONS, COTEAU JUNCTION, QUE., TO COLBORNE, ONT.—*Concluded.*

(Elevations taken in 1908).

	FEET
Canadian Pacific Railway—Monckland.....	330.8
“ Avonmore.....	327.0
“ Ottawa & New York railway (diamond crossing at Finch).....	274.9
“ Chesterville.....	240.1
“ Winchester.....	249.9
“ Inkerman.....	267.1
“ Mountain.....	272.5
“ Kempton.....	332.8
“ Canadian Pacific railway, Ottawa-Prescott line (diamond crossing).....	333.2
“ Oxford.....	354.5
“ Spencerville.....	318.5
Grand Trunk Railway—Prescott.....	310.9
“ Maitland.....	329.7
“ Brockville.....	282.6
“ Lyn.....	287.4
“ Yonge Mills.....	301.9
“ Lansdowne.....	336.6
“ Gananoque Junction.....	345.6
“ Findley.....	367.7
“ Rideau.....	305.2
“ Kingston Junction.....	274.8
“ Canadian Pacific railway, Kingston-Renfrew line (diamond crossing).....	287.3
“ Collins Bay.....	284.1
“ Ernestown.....	325.0
“ Fredericksburg.....	308.2
“ Napanee.....	314.3
“ Canadian Northern railway, Toronto-Ottawa line (diamond crossing).....	326.5
“ Marysville.....	335.8
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“ Belleville.....	286.0
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“ Colborne.....	321.8

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ALPHABETICAL LIST OF CITIES, TOWNS AND VILLAGES AT OR NEAR WHICH BENCH-MARKS  
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Note.—“Year of Publication” refers to the “Publications of the Dominion Observatory” as follows:—

1913*—Vol. I, No. 2	1915—Vol. II, No. 1
1913—Vol. I, No. 3	1916—Vol. III, No. 6
1914—Vol. I, No. 8	1917—this publication.

Place.	B.M. Number.	Year of Publication.	Description.	Elevation.
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Barrington Passage, N.S.....	446-B	1915	12	29
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Beeton, Ont.....	379	1913	64	86
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Bow Island, Alta.....	178-C, 179-C	1915	23	35
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" ".....	39-F	1916	163	187
" ".....	217-C, 218-C	1916	166	188
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Campbellton, N.B.....	25-G, 26-G	1916	151	177
Camrose, Alta.....	70-F, 71-F	1916	165	187
Canmore, Alta.....	235-C	1916	167	188
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Dominion Observatory,  
Ottawa,

February, 1917.