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Magnetic Results, 1907-1920

BY

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## PAGE

Introduction.....	131
Instruments.....	133
Description of instruments.....	133
Magnetometers.....	133
Dip circles.....	133
Earth inductor.....	134
Methods of observing.....	134
Astronomical work.....	134
Latitude.....	134
Azimuth and time.....	135
Magnetic work.....	136
Declination.....	136
Horizontal intensity.....	137
Dip.....	138
Magnetic standards.....	139
Reduction of observations to International Magnetic Standard.....	141
Methods of work.....	143
Secular change data.....	144
Reduction of observations to epoch.....	145
Descriptions of stations.....	147
Diagrams A, B and C.....	148
Diagrams D, E and F.....	149
Diagram G.....	150
Results of observations at repeat stations.....	151
Magnetic observations, 1907-20.....	162
Magnetic stations and descriptions.....	172
Three declination charts of Canada (in pocket)	

## MAGNETIC RESULTS, 1907-1920

### INTRODUCTION

In 1907 the Dominion Observatory began systematic observations for the magnetic survey of Canada. Prior to that date magnetic work had been confined, for the most part, to the activities of explorers, surveyors and to the Toronto Magnetic Observatory, which, from 1841 to 1898, was in operation at Toronto and from 1898 to the present at Agincourt, Ont. In 1905 the Department of Terrestrial Magnetism of the Carnegie Institution of Washington, D.C., first undertook some magnetic observations in Canada. The extent of their work since that date is summarized as follows: (1) 1905-1910, 162 different stations and 14 repeat stations<sup>1</sup>; (2) 1911-1913, 38 different stations and 2 repeat stations<sup>2</sup>.

Practically all of the Canadian observations, some 300, included in the records of the Dominion Observatory up to the year 1908 are summarized in the Report of the Chief Astronomer for the year ending March 31, 1909. The observations secured by the Dominion Observatory in 1909 and 1910 are given in the Chief Astronomer's Report for the years ending March 31, 1910 and 1911, respectively. Since 1910 no results have been published in a departmental report, though they are annually given in the *Journal of the Royal Astronomical Society of Canada*.

This report is intended to cover in a general way the work of the magnetic survey for the period 1907-1920. Certain phases, such, for example, as the derivation of formulæ, determination of constants of instruments, etc., which may be found in text books, will be touched upon very briefly, if at all. The methods followed, both in the observing and the reduction of observations, which are peculiar to the work as carried on by this branch will be explained. The primary purpose, however, is to assemble and publish all the observed values of the three magnetic elements, declination, inclination or dip, and horizontal intensity, as well as the corresponding values referred to the epoch 1921.0, so that the data will be readily available for public use.

The following summary gives the number of stations occupied by this branch between 1907 and 1920, and the approximate region in which those of a particular year are located. The summary does not include the base station at Ottawa, which is occupied in the spring and fall of each year; nor does it include Agincourt, where comparison observations for standardizing the field instruments are made before and after the field observations each year. Quite a number of the repeat stations were occupied originally by the Carnegie Institution and a few by the Meteorological Service of Canada.

<sup>1</sup> Researches Department Terrestrial Magnetism, vol. 1, p. 55.

<sup>2</sup> Researches Department Terrestrial Magnetism, vol. 2, p. 25.

## SUMMARY SHOWING THE DISTRIBUTION OF MAGNETIC STATIONS, 1907-1920.

Year	No. of Stations			Locality
	New	Repeat	Total	
1907	30	2	32	East of longitude 84° and south of latitude 48°.
1908	14	5	19	One in Manitoba, one in Alberta and the remainder in British Columbia.
1909	30	1	31	Along north shore of St. Lawrence river between Quebec and Labrador.
1910	36	8	44	Ontario, from Napanee to Windsor. Interval between stations about 25 miles.
1910	33	15	48	Along main line of C.P.R. from Chapleau to Moose Jaw at intervals of approximately 25 miles.
1911	52	6	58	Main line of C.P.R. from Moose Jaw to Banff; C.P.R. from Calgary to Edmonton; and along C.N.R. from Edmonton to Winnipeg by way of Prince Albert and Hudson Bay Junction.
1912	46	14	60	Along C.P.R. from Ottawa to Quebec; I.C.R. Quebec to Halifax; Halifax to Yarmouth and Yarmouth to Sydney; and Moncton to Edmundston by way of St. John and Fredericton. Interval between stations about 25 miles.
1913	36	17	53	Lake St. John district in Quebec; Ottawa to Chapleau along C.P.R.; and Edmonton to Prince George along G.T.P.
1914	33	4	37	Quebec to Winnipeg; Winnipeg to Fort William along C.N.R.
1915	42	6	48	Southern Alberta and British Columbia from Medicine Hat to Vancouver; Prince Rupert to Prince George along G.T.P.
1916	49	6	55	Ontario and Manitoba between longitude 79° and 99°, and latitude 43° and 52°.
1917	..	1	1	Ottawa only.
1918	4	37	41	Area included between longitude 60° and 97°·2, and latitude 44°·6 and 50°·2.
1919	6	58	64	Western Canada between longitude 97°·2 and 130°·4, and latitude 49° and 54°·8.
1920	13	36	49	Eleven repeat and five new stations along the north shore of the St. Lawrence river between Quebec and Blanc Sablon; one repeat station in Newfoundland and six repeat stations along the I.C.R. between Sydney and Rivière du Loup. The remaining, eight of which are new and eighteen repeat, are in Ontario south of latitude 46°·5 and east of longitude 83°·4.

The total number of stations occupied between 1907 and 1920 is 640; of these, 424 represent the number of distinct localities and 216 the number of repeat observations.

## INSTRUMENTS

From 1907 to 1920 the magnetic results have been obtained with the aid of the following instruments:

*Magnetometers:* (1) Tesdorpf magnetometer No. 1977, which was used from 1907 to 1915 and in 1920.

(2) Cooke magnetometer No. 15, used in 1910.

(3) Combined magnetometer and dip circle C.I.W. No. 20, used from 1916 to 1920.

*Dip circles:* (1) Tesdorpf dip circle No. 1977, used in 1907.

(2) Dover dip circle No. 145, used from 1908 to 1915 and in 1920.

(3) Combined magnetometer and dip circle No. 20, used from 1916 to 1920.

*Earth inductor:* Earth inductor No. 1911<sup>1</sup> by Toepfer. This was used only for standardizing dip circles.

## DESCRIPTION OF INSTRUMENTS

## a.—Magnetometers

(1) *Tesdorpf magnetometer No. 1977.* This instrument is of the universal type of the style designed by Eschenhagen and constructed by Tesdorpf. A detailed description, with illustrations, of this instrument is given by Dr. Klotz in the Report of the Chief Astronomer and International Boundary Commissioner, Appendix 1, pp. 43-47, for the year ending March 31, 1908. The dip circle belonging to this instrument was, however, discarded in 1908, as it was found that, for certain values of dip which are quite common in Canada, the standards supporting the agate planes obstructed the view of the lower end of the needle.

(2) *Cooke magnetometer No. 15.* This instrument is a type of the Kew design of magnetometer. A general description of this design is given in an article entitled "Magnetometer" in Encyclopædia Britannica, eleventh edition, vol. xvii, pp. 386-388.

(3) *Combined magnetometer and dip circle No. 20.* The combined magnetometer and dip circle No. 20, which is of the universal type, was constructed in the workshop of the Department of Terrestrial Magnetism of the Carnegie Institution of Washington, D.C. The detailed description of this type of magnetometer is given on pages 9-12 of the journal *Terrestrial Magnetism and Atmospheric Electricity*, vol. xvi, 1911. In one respect the above description does not apply to this instrument, namely, in regard to the arrangements for determining total intensity by Lloyd's method; these are lacking.

## b.—Dip Circles

(1) *Tesdorpf dip circle No. 1977.* A detailed description of this instrument is given by Dr. Klotz in the Report of the Chief Astronomer, Appendix 1, pp. 45-46, for the year ending March 31, 1908.

<sup>1</sup> This number was assigned to the instrument after its purchase in 1911, as the maker's number was lacking. The number "84" was, however, subsequently discovered on the galvanometer, which accompanied the instrument.



For a general description of dip instruments, see an article on "Inclinometer" in *Encyclopædia Britannica*, eleventh edition, vol. xiv, pp. 354-355.

(2) *Dover dip circle No. 145*. This instrument is of the Kew pattern and was constructed by Dover. It is provided with the necessary attachments for the determination of total intensity by Lloyd's method. Of the four needles provided, two, No. 1 and No. 2, are for regular dip observations and two, No. 3 and No. 4, are for total intensity determinations.

(3) *Combined magnetometer and dip circle No. 20*. The combined magnetometer and dip circle used as a dip instrument is described in the journal *Terrestrial Magnetism and Atmospheric Electricity*, pp. 9-12, vol. xvi, 1911.

#### c.—Earth Inductor.

The principle of the earth inductor used as a dip instrument is described in *Encyclopædia Britannica*, eleventh edition, vol. xiv, p. 355. Earth inductor No. 1911 is of the type designed by Wild and constructed by Toepfer. An illustration of this type of instrument is given on p. 72 of *Directions for Magnetic Measurements* by Daniel L. Hazard, Government Printing Office, Washington, D.C., 1911.

### METHODS OF OBSERVING

#### a.—Astronomical Work

The astronomical work consists in making a determination at each place of the latitude, the astronomical meridian and the true bearing of some well defined object, and the local mean time from which the longitude is obtained, the error of the chronometer being known. With very few exceptions the method of sun observations has been adhered to throughout, mainly on account of the convenience in making observations during daylight.

*Latitude:* The method adopted for determining latitude involves the measurement of the sun's altitude at or near the time of meridian passage. The observations are begun at least five minutes before the sun reaches the meridian. With the vertical circle of the instrument left, the lower (apparent) limb of the sun's disc is brought in contact with the horizontal line of the diaphragm. The time of contact is noted and recorded, also the reading of the vertical circle. Reverse the instrument and bring the upper limb in contact with the horizontal line and, as before, record the time of contact and also the vertical circle reading. The mean of the two circle readings gives the apparent altitude of the sun corresponding to the time as derived from the mean of the two time readings. Make another setting with circle right, then reverse and make two settings with circle left and the sun above the horizontal line, continuing in this manner until well after meridian passage. As the change in the altitude of the sun for several minutes about the time of meridian passage is small, a preliminary value of latitude is computed from the observed maximum altitude, the correction for refraction and parallax having been applied, and the declination of the sun, which is obtained from an Ephemeris. The formula employed is:

$$\varphi = \delta + (90^\circ - h)$$

where  $\varphi$  = latitude of place,  $\delta$  = declination of sun at time of observation, and  $h$  = the observed altitude corrected for refraction and parallax. For purposes of magnetic work the value derived by this method is, as a rule, quite accurate enough, but it is customary to utilize all the observations by adopting the circum-meridian method<sup>1</sup> of reduction.

*Azimuth and time:* The method followed throughout has been to determine the altitude of the sun at, or about, 9 a.m. and again at 3 p.m., local time, and employ, for the reduction, the fundamental formula<sup>2</sup>:

$$\tan^2 \frac{1}{2}A = \sec s \sec (s-p) \sin (s-h) \sin (s-\varphi)$$

where  $A$  = azimuth of sun, reckoned from north through east in the morning and from north through west in the afternoon.

$$s = \frac{1}{2} (h + \varphi + p).$$

$h$  = altitude of sun corrected for refraction and parallax.

$\varphi$  = latitude of place.

$p$  = polar distance of sun at time of observation.

The local apparent hour angle,  $t$ , expressed in arc, is determined from the formula:

$$\tan \frac{t}{2} = \frac{\sin (s-h) \sec (s-p)}{\tan \frac{1}{2}A}$$

The local mean time is obtained by applying to the local apparent time, derived by converting the hour angle  $t$  into time, the equation of time,  $E$ . From the standard time of an observation, which is known from the record of comparisons between standard time and chronometer time, and the corresponding local mean time of the observation, the longitude of the place is deduced.

To determine the altitude it is usual to commence by making two settings with the circle left and the apparent lower and right limbs of the sun's disc tangent to the horizontal and vertical lines respectively, of the diaphragm, recording after each setting the time, and the corresponding horizontal circle and vertical circle readings; reverse the instrument and make two settings with the sun's disc in the lower right quadrant and with the left and upper limbs tangent to the vertical and horizontal lines of the diaphragm. Record as before the time, and the horizontal and vertical circle readings. These four settings constitute a set, from which, with the aid of the formula given above, the true meridian may be determined. The procedure, as outlined, really applies to the forenoon observations, though the selection of the quadrant for the first setting is quite arbitrary. For the afternoon observations the lower left quadrant is selected for the initial setting. The rule is to select the quadrant so that the sun's disc will be approaching, or receding from, the two lines of the diaphragm simultaneously. The custom has been to take at each station two such sets in the forenoon and two in the afternoon.

<sup>1</sup>The circum-meridian method is explained in detail in text books on spherical astronomy. The following, among others, may be mentioned: Chauvenet, vol. i, p. 235; Doolittle, p. 238. The method, as applied to the reduction of observations for use in magnetic work, is very concisely explained in *Directions for Magnetic Measurements*, by Daniel L. Hazard, Government Printing Office, Washington, D. C., 1911.

<sup>2</sup>Doolittle, pp. 543-545; *Directions for Magnetic Measurements*, by Daniel L. Hazard, pp. 10-12.

*b.—Magnetic Work*<sup>1</sup>

*Declination.* The procedure usually adopted for making a declination determination is to make two settings with the magnet suspended in the erect position, four in the inverted, or reverse position, and two in the erect. The mean of the eight readings constitutes a set. This method has, however, been modified in certain respects in carrying on the field work. This is due to the method adopted of determining the mean declination at a station from the mean of the eastern and western elongations. For eastern elongation which usually occurs between 7 a.m. and 8.30 a.m., local time, observations are begun as early in the morning as convenient and continued until it seems certain the magnet has reached its maximum easterly pointing. Instead of observing as indicated above, the magnet is suspended in the erect position and readings are taken at intervals of five or ten minutes, the former interval being adhered to as a rule, and a correction is applied to reduce the readings to axis. For a determination of western elongation, which usually occurs between 12.30 p.m. and 2 p.m., it is customary to commence observing not later than 1 p.m., and as much earlier as possible, and continue until it seems certain the extreme westerly pointing has been reached. It has been found that elongations may occur, even when magnetic conditions appear normal, an hour or even more outside the limits as given for the respective elongations. This being the case, the so-called elongations may not always be the actual values. However, since the change in declination, when normal magnetic conditions exist, is usually slow the custom is to consider the observed values of the extreme easterly and westerly pointings as the values of eastern and western elongations. It is not to be inferred, however, from what precedes that the value of elongation used in the reductions is necessarily derived from a single observation or reading. As the magnet may for an hour or more remain practically stationary, or exhibit a tendency to vibrate, the custom is to take from three to five, or even seven, observations at 5-minute intervals and consider the mean of these as the value of elongation. This is done for both eastern and western elongations, and the mean of the two determinations is taken as the adopted value of declination. In addition, a set is usually taken at 10.30 a.m. and another about 4.30 p.m. to serve as a check on the constancy of the difference between magnet erect and magnet reversed, as well as to ascertain the nature of the daily change of the declination.

The method of reducing the declinations of the past two years (1919 and 1920) has been modified somewhat, though the method of observing has not varied. In systematic surveys it is usual to make use of all the observations regardless of the time of day the observation is taken, by applying a correction for diurnal variation and also for disturbance. This<sup>2</sup> involves a knowledge of the diurnal inequality for the locality, which may be obtained from the results of a magnetic observatory equipped for obtaining continuous records. In Canada there are only two observatories from which the necessary data can be obtained. These are under the supervision of Sir Frederic Stupart, Director of the Meteorological Service of Canada, one being at Agincourt, Ont. (Lat.  $43^{\circ} \cdot 8$  and Long.  $79^{\circ} \cdot 3W$ ) and the other at Meanook, Alta. (Lat.  $54^{\circ} \cdot 6$  and Long.  $113^{\circ} \cdot 4$ ). From a paper

<sup>1</sup> For reference to the theory and methods of magnetic measurements the following publications, among others, may be mentioned: *Theory of Magnetic Measurements*, by F. E. Nipher, New York, 1886; *Land Magnetic Observations, 1905-10*, by L. A. Bauer, Carnegie Institution, Washington, D.C.; *Directions for Magnetic Measurements*, by Daniel L. Hazard, Government Printing Office, Washington, D.C., 1911.

<sup>2</sup> *Terrestrial Magnetism*, vol. xiii, p. 161.



entitled "A Comparative Study of Magnetic Declination at Agincourt and Meanook for 1917"<sup>1</sup> by Mr. W. E. W. Jackson, it is evident that, for stations far removed from a base station, considerable uncertainty is to be attached to corrections, both for diurnal variation and disturbance. In spite of this, it was decided to apply the method to the work of 1919, which covered the area lying between longitude  $97^{\circ}.2$  and  $130^{\circ}.3$  W, and latitude  $49^{\circ}.0$  to  $54^{\circ}.8$ , and extended over a period of about four and one-half months. The results were reduced by applying corrections both for diurnal variation and disturbance from Meanook data very kindly supplied by Sir Frederic Stupart. As was to be expected, the mean results for the stations differed quite consistently from the values derived from elongations. In order, therefore, to make the results comparable with those taken previously, which were reduced from elongations, it was decided to make, if possible, the diurnal variation corrections independent of the base station. For each station the values of declination were plotted and a mean curve drawn. Taking the mean of the eastern and western elongations (as observed) as the adopted value for the station, the difference between this value and the value on the curve was tabulated for each hour from 7 a.m. to 5.30 p.m. The stations observed during each month were grouped and a mean monthly value was obtained for each hour, thus furnishing for the part of the day usually devoted to field work what corresponds to a diurnal inequality. The values were plotted and a mean curve drawn from which the correction for diurnal variation for any time could be obtained. The observations were then reduced by applying diurnal variation corrections derived from the field station data. As the range of dip for each month was small no allowance was made for possible error due to this source. The disturbance corrections were derived as before from the base station (Meanook) data. The results were then compared with those obtained from the first reduction. In so far as the agreement among the values at individual stations is concerned, there is little to choose between the two methods, the second being quite as satisfactory as the first. The advantage in favour of the second is that the results are directly comparable with those obtained prior to 1919, in that they are referred to elongations. For general survey purposes the difference between the two methods is negligible compared with possible errors due to station difference, but appreciable when deriving secular change data.

In addition to the records of Meanook and Agincourt supplied by the Meteorological Service, the U.S. Coast and Geodetic Survey very kindly furnished the necessary data from the records of the Sitka Observatory for reducing the results at a number of stations along the G.T.P. in British Columbia.

The results of 1920 were reduced by applying corrections for diurnal variation derived from field observations, and disturbance corrections obtained from Agincourt data.

*Horizontal intensity:* The determination of horizontal intensity involves two operations, oscillations and deflections. The purpose of observing oscillations is to ascertain the time it takes a suspended magnet (intensity magnet) to complete one vibration. The usual method has been followed. First, the approximate time of an oscillation is determined for the purpose of estimating the time of any particular transit. The program as arranged is to observe every fifth transit of the magnet over the centre line of the

<sup>1</sup>Terrestrial Magnetism, vol. xxiii, pp. 127-134.



telescope from 0 to 45, then from 80 to 125, or 100 to 145; the selection of the number for the beginning of the second part of the series is quite arbitrary, though 80 and 100 are the numbers that predominate throughout the work covered by this report. This furnishes ten determinations of 80, or some multiple of 10, oscillations, from which the time of one oscillation is determined. Corrections for rate of chronometer, torsion, temperature and induction are applied to the observed value. The product of the magnetic moment,  $M$ , of the magnet and the horizontal component of the earth's intensity,  $H$ , is then determined from the fundamental equation:

$$MH = \frac{\pi^2 K}{T^2}$$

where  $K$  = moment of inertia of the magnet

$T$  = time of one oscillation of the magnet after all corrections have been applied.

Deflections involve the determinations of the angle a magnet is turned out of the meridian by the intensity magnet, which is set at a known distance from the centre of the suspended magnet. Almost invariably this angle has been determined with the intensity magnet at two, and frequently at three, distances. From the deflections is determined the ratio of the horizontal force of the earth's magnetism to the magnetic moment of the deflecting magnet, the formula for computing this value being:

$$\frac{H}{M} = \frac{C}{\sin u}$$

where  $u$  = the angle of deflection

$C$  = a constant for a constant temperature and a fixed deflection dis-

$$\text{tance, and is equal to } \frac{2}{r^3} \frac{\left(1 + \frac{P}{r^3} + \dots\right)}{\left(1 + \frac{2\mu}{r^3}\right)},$$

where  $P$  is a constant depending upon the distribution of the magnetism in the intensity magnet,

$r$  is the deflection distance,

and  $\mu$  is the induction factor.

From the two equations,  $MH = \frac{\pi^2 K}{T^2}$  and  $\frac{H}{M} = \frac{C}{\sin u}$ , the value of  $H$  may be found.

*Dip:* Dip is determined according to the usual methods employed in survey work. Having levelled the instrument, re-magnetized the needle with the bar magnets, and determined the magnetic meridian, the observation is carried out as follows:

(1) With vertical circle east, face of needle east and the A end of the needle up, bisect the upper end of the needle, then the lower end, and read the circle corresponding to each setting. Repeat the two settings.

(2) Turn instrument through  $180^\circ$  and repeat the observations with circle west and face of needle west, as in (1).

(3) Reverse the needle on the agate planes and, with circle west and face of needle east, observe as in (1).

(4) Turn instrument  $180^\circ$  in azimuth and with circle east and face of needle west, observe as in (1).

(5) Reverse the polarity of the needle; the end marked B will now be up.

(6), (7), (8) and (9). With B end of needle up, repeat the observations as in (1), (2), (3) and (4).

The mean of all the readings gives the resulting dip.

### MAGNETIC STANDARDS

A magnetic survey carried out systematically involves not only a determination of the magnetic elements at points distributed over the entire area, but also a re-determination of the elements at some of the points for the determination of the secular change of the elements. Since it is known that two instruments may give results which differ by an amount exceeding the observational error, it is important that the results be reduced to a common basis. It has been found also that the same instruments may give different values. It is necessary, therefore, to adopt a standard to which the instruments are frequently referred. For the reduction of all the Dominion Observatory observations since 1907, the standards adopted are: for declination and horizontal intensity, the standard instruments at the Agincourt Magnetic Observatory of the Meteorological Service of Canada; for dip, from 1907 to 1911, Dover dip circle No. 200 of the Meteorological Service; from 1912 to 1918, the D. O. earth inductor Toepfer No. 1911; and for 1919 and 1920 the M.S. earth inductor Toepfer No. 89. Comparisons have been made between the M.S. standards and the D.O. instruments in the spring and fall of each season, that is, before commencing and after completing the field work of the season, with the exception that in 1908 and 1918 there was only one comparison.

The adopted standards have, however, not all remained constant during the period. For example, in February, 1911, a re-determination of the instrumental constants of the M.S. standard magnetometer Elliott No. 98 was made. This introduced a different value for the horizontal intensity, and in order to reduce former results to those obtained with the use of the new constants a correction<sup>1</sup> of  $-0.00116H$  is required. Since, as was stated above, all the D. O. results were reduced to the M. S. standard for horizontal intensity, the same correction,  $-0.00116H$ , in addition to any correction previously applied, must be applied to the observations of the horizontal intensity taken with the D.O. magnetometers prior to 1911. In February, 1916, another standard, known as the International Magnetic Standard<sup>2</sup> (I.M.S.) was adopted, not only for horizontal intensity but also for declination and dip, by the Meteorological Service. The relation between the M.S. standard and I.M.S. is<sup>3</sup>:

(1) I. M. S. = Agincourt + 0.00033 parts of  $H$  (Hor. Int.)

(2) I. M. S. = Agincourt - 0'.93 (Declination)

(3) I. M. S. = Agincourt - 0'.15 (Inclination)

In order, therefore, to reduce the D. O. results obtained previous to 1916 so that they will be comparable with those of 1916 and subsequent years, which were reduced to I.M.S., it will be necessary to apply a correction based on these results in addition to the results of a comparison previously determined, which are<sup>4</sup>:

<sup>1</sup> *Terrestrial Magnetism*, vol. xvi, p. 79.

<sup>2</sup> For preliminary note on "International Magnetic Standard," see *Terrestrial Magnetism*, vol. xii, pp. 161-164.

<sup>3</sup> "International Magnetic Standard" defined: see Researches Department Terrestrial Magnetism, vol. ii, p. 276.

<sup>4</sup> *Journal of the Royal Astronomical Society of Canada*, vol. x, p. 253.

<sup>5</sup> Researches Department Terrestrial Magnetism, vol. ii, p. 216.

- (1) I.M.S. = Agincourt + 0.00008 parts of  $H$  (Hor. Int.)  
 (2) I.M.S. = Agincourt - 1'.1 (Declination)  
 (3) I.M.S. = Agincourt + 0'.8 (Inclination)

It is assumed that the results obtained previous to 1916 have been reduced to the standard adopted for the reductions up to that date. The standard for dip since 1911, as already mentioned, has been the D.O. earth inductor Toepfer No. 1911, hence the change in the standard for dip at Agincourt does not affect the D.O. dip results. From the results of a comparison between earth inductor No. 1911 and the standard earth inductor Schulze No. 48 of the Carnegie Institution in 1915, the correction to No. 1911 on I.M.S. was found to be  $-0'.25$ ; (I.M.S.—D. O. No. 1911 =  $-0'.25$ ). This correction must therefore be applied to all dip observations obtained between 1911 and 1915. Prior to 1911 the standard dip instrument was the M.S. dip circle Dover No. 200. In 1912 a comparison was made between No. 200 and the M. S. earth inductor Toepfer No. 89. The result of the comparison shows that the correction to the dip circle on the earth inductor amounts to  $+0'.1$ ; (M.S. No. 89 - M. S. No. 200 =  $+0'.1$ ). From this result and the value I.M.S. = Agincourt -  $0'.15$ , we obtain: I.M.S. - M.S. No. 200 =  $0'.0$ . The values of dip, therefore, obtained prior to 1911 with D. O. dip circle Dover No. 145 require no additional corrections to reduce them to I.M.S.

The comparison between the earth inductors Toepfer No. 1911 and Schulze No. 48 was only part of a series of standardizing comparisons made, on the invitation of Dr. Bauer, Director of the Department of Terrestrial Magnetism of the Carnegie Institution, Washington, D.C., between the various magnetic instruments of the Dominion Observatory and the standard instruments of the Carnegie Institution. The following D.O. instruments were compared: magnetometers, Tesdorpf No. 1977 and Cooke No. 15, Dover dip circle No. 145, and earth inductor No. 1911. The results of the comparisons were compiled by the Carnegie Institution and communicated in manuscript, and in addition, there was furnished a summary of the comparisons of these instruments with the International Magnetic Standard obtained indirectly, being based on the results of the comparisons of the D.O. instruments with the Agincourt standards, which in turn were referred to I.M.S. by comparison with instruments whose corrections on I.M.S. were known.

The main results deduced from direct comparisons and summarized by the Carnegie Institution are given in Table 1.

TABLE 1.—SUMMARY OF THE CHIEF RESULTS OF THE COMPARISONS AT THE MAGNETIC OBSERVATORY OF THE DEPARTMENT OF TERRESTRIAL MAGNETISM AT WASHINGTON 1915.

I.M.S. - Dominion Observatory (Tesdorpf mag'r No. 1977, magnet 10) =	$+ 1'.5$ (1915)
I.M.S. - Dominion Observatory (Tesdorpf mag'r No. 1977, magnet 14) =	$-0'.5$ (1915)
I.M.S. - Dominion Observatory (Cooke mag'r No. 15) =	$-0'.3$ (1915)
I.M.S. - Dominion Observatory (Tesdorpf mag'r No. 1977) =	$- 0.00253 H$ (1915)
I.M.S. - Dominion Observatory (Cooke mag'r No. 15) =	$+0.00106H$ (1915)

<sup>1</sup> *Journal of the Royal Astronomical Society of Canada*, vol. vii, p. 66.

I.M.S. — Dominion Observatory (Earth inductor No. 1911 by Toepfer) =  $-0' \cdot 25$  (1915)

I.M.S. — Dominion Observatory (Dover dip circle No. 145, needles 1 & 2) =  $+0' \cdot 6$  (1915)

### REDUCTION OF OBSERVATIONS TO INTERNATIONAL MAGNETIC STANDARD, 1907-1920

In order that the results of the comparisons between the Dominion Observatory magnetic instruments and the various standards may be readily available for the purpose of co-ordinating the magnetic results between 1907 and 1920, they are summarized in Table 2.

TABLE 2.—SUMMARY OF CORRECTIONS FOR THE REDUCTION OF OBSERVATIONS TO INTERNATIONAL MAGNETIC STANDARD, 1907-1920.

Date	Corrections applied to observed values <sup>1</sup>			Corrections to be applied to reduce observations to I.M.S. <sup>2</sup>			Corrections to be applied to reduce published values to I.M.S. <sup>3</sup>			Instruments
	Declination	Dip	Hor. Int.	Declination	Dip	Hor. Int.	Declination	Dip	Hor. Int.	
	'	'	Parts of H	'	'	Parts of H	'	'	Parts of H	
1907	.....	.....	.....	.....	.....	.....	-1.0	0.0	-0.00151	Tesdorpf mag'r No. 1977 and Dover dip circle No. 145.
1908	+3.2	.....	-0.00081	+2.2	.....	-0.00232	-1.0	0.0	-0.00151	
1909	+1.8	.....	-0.00104	+0.8	.....	-0.00232	-1.0	0.0	-0.00128	
1910	+3.6	-0.5	-0.00133	+2.6	-0.5	-0.00232	-1.0	0.0	-0.00099	
1910	+1.4	-0.6	+0.00019	+0.4	-0.6	-0.00077	-1.0	0.0	-0.00096	
1911	+1.3	-0.4	-0.00260	+0.3	-0.4	-0.00232	-1.0	0.0	+0.00028	Tesdorpf mag'r No. 1977 and Dover dip circle No. 145.
1912	+1.0	+0.2	-0.00237	0.0	0.0	-0.00232	-1.0	-0.2	+0.00005	
1913	+0.8	-0.2	-0.00243	-0.2	-0.5	-0.00232	-1.0	-0.3	+0.00011	
1914	+2.2	0.0	-0.00240	+1.2	-0.2	-0.00232	-1.0	-0.2	+0.00008	
1915	+3.6	+0.7	-0.00258	+2.6	+0.5	-0.00232	-1.0	-0.2	+0.00026	
1916	-0.9	-0.4 <sup>4</sup>	-0.00048	-0.9	-0.4	-0.00048	.....	.....	.....	Combined mag'r and dip circle C.I.W. No. 20.
1918	-0.9	-0.4 <sup>5</sup>	-0.00011	-0.9	-0.4	-0.00011	.....	.....	.....	
1919	-0.6	0.0	-0.00058	-0.6	0.0	-0.00058	.....	.....	.....	
1920	-0.7	0.0	-0.00076	-0.7	0.0	-0.00076	.....	.....	.....	
1920	+1.5	0.0	-0.00242	+1.5	0.0	-0.00242	.....	.....	.....	
										Tesdorpf mag'r No. 1977 and Dover dip circle No. 145.

<sup>1</sup> These are the corrections which have been applied to the observed values for the corresponding years to reduce them to the adopted standard. Corrected values have already been published either in the Report of the Chief Astronomer, or in the *Journal of the Royal Astronomical Society of Canada*. The publications in which they appear are:

Year	Publication
1907	Report of the Chief Astronomer, for year ending March 31, 1908.
1908	" " " " " 1909.
1909	" " " " " 1910.
1910	" " " " " 1911.
1911	<i>Journal of the Royal Astronomical Society of Canada</i> , vol. vi, pp. 53-55.
1912	" " " " " vol. vii, pp. 292-296.
1913	" " " " " vol. viii, pp. 123-127.
1914	" " " " " vol. ix, pp. 170-172.
1915	" " " " " vol. x, pp. 314-320.
1916	" " " " " vol. xi, pp. 208-212.
1918	" " " " " vol. xiii, pp. 411-418.
1919	" " " " " vol. xiv, pp. 331-334.

<sup>2</sup> These are the corrections, which, if applied to the observed values, would reduce them to I.M.S.

<sup>3</sup> The values are obtained by taking the difference between I.M.S. and the adopted standard; hence, to reduce the published result of any particular year to I.M.S. the correction for the corresponding year must be applied.

<sup>4</sup> This value is the mean of the corrections for the four needles, Nos. 1, 2, 5, and 6.

<sup>5</sup> The correction for the dip, determined in 1916, was adopted as to the value to be applied to the observations of 1918.



The part of the table included between the dates 1907 and 1915 is based on results compiled by the Carnegie Institution, the results, however, being slightly modified due to taking into consideration the series<sup>1</sup> of comparisons made at Agincourt in the spring of 1916. The results from 1916 to 1920 represent the corrections to the various field instruments on I.M.S. These values were applied to the observations of the corresponding years, thus reducing them directly to I.M.S.

The use of the above table may be best illustrated by reference to a particular case, as, for example, the reduction of observations taken at Winnipeg, Man., between 1908 and 1918. These are summarized in Table 3, *a*, and are taken from the publications as indicated in the first footnote to Table 2. These values were reduced to the adopted (provisional) standard by applying the corrections given under "Corrections applied to observed values" for the corresponding years. In order to reduce these values to I.M.S., the adopted standard for all observations, it will be necessary to apply additional corrections; these are given under "Corrections to be applied to reduce published values to I.M.S." Thus to No. 1,  $-1'.0$  must be applied to declination, and  $-0.00151H$  to horizontal intensity; to No. 2,  $-1'.0$  to declination, and  $-0.00099H$  to horizontal intensity; to No. 3,  $-1'.0$  to declination and  $+0.00028H$  to horizontal intensity; and so on with the remaining. The reduced values are given in Table 3, *b*.

TABLE 3.—EXAMPLE SHOWING THE USE OF TABLE 2 FOR REDUCING TO I.M.S. RESULTS REFERRED TO PREVIOUSLY ADOPTED STANDARDS.

Station: WINNIPEG, MAN.

No.	Date.	<i>a</i> .—Values reduced to adopted standard.			<i>b</i> .—Values reduced to I.M.S.		
		Declination.	Dip.	Hor. Int.	Declination.	Dip.	Hor. Int.
		East			East		
		° ' "	° ' "	c.g.s.	° ' "	° ' "	c.g.s.
1.....	1908	13 58.6	78 13.0	.13121	13 57.6	78 13.0	.13101
2.....	1910	56.7	11.3	.13061	55.7	11.3	.13048
3.....	1911	51.9	12.8	.12988	50.9	12.8	.12992
4.....	1913	47.7	11.2	.12986	46.7	10.9	.12987
5.....	1914	42.9	12.2	.12964	41.9	12.0	.12965
6.....	1915	40.4	12.3	.12940	39.4	12.1	.12943
7.....	1916	35.2	10.4	.12929	35.2	10.4	.12929
8.....	1918	29.6	9.3	.12925	29.6	9.3	.12925

<sup>1</sup> *Journal of the Royal Astronomical Society of Canada*, vol. x, p. 258.

## METHODS OF WORK

The methods of observing for the determination of the magnetic elements have already been explained, and from these an idea of the program carried out at each station might be inferred. It may be stated, however, that in general a complete set of observations at a station consists of the following, with the approximate local mean time of each:

	h m	h m
Declination (Eastern Elong.).....	7 30	to 8 30
Azimuth and time.....	9 00	
Dip.....	10 00	
Declination.....	10 30	
Oscillations and deflections.....	11 00	
Latitude.....	Noon	
Declination (Western Elong.).....	13 00	to 14 00
Deflections and oscillations.....	14 30	
Azimuth and time .....	15 00	
Dip.....	15 30	
Declination.....	16 30	

It is not to be understood that the observations at a station were carried out exactly as indicated above. The object in view throughout has been to obtain an observation of each element, as well as azimuth and time, both in the forenoon and afternoon, whether on the same day or on different days. Frequently the magnetic observations were repeated on a second day, especially for declination; as regards dip and horizontal intensity determinations, it was customary to duplicate observations both in the forenoon and afternoon either on the same day, or on different days.

The mean value of an element at a station was almost invariably obtained from the mean of not less than two values, one determined in the forenoon and one in the afternoon. Each of these values was given weight unity regardless of the number of sets of observations employed in deriving the same. The object in thus grouping the observations, rather than taking the mean of all, is apparent in view of the fact that the discrepancy between values determined about the same time on each day, or on different days, is as a rule small compared with the difference, on account of diurnal variation, between values determined in the morning and in the afternoon. The results of the year 1918 will serve to illustrate this. Of the forty-one stations occupied during that season, including all the observations that entered into the final value of each element, it was found that:

- (1) Average range of eastern elongations for two or more days at 27 stations..... 3'.3
- Average range of western elongations for two or more days at 32 stations..... 2'.2
- Average range of declination (difference of eastern and western elongations)  
        at 41 stations..... 17'.6
- (2) Average range of dip for forenoon observations determined on same or dif-  
    ferent days at 35 stations..... 1'.8

Average range of dip for afternoon observations determined on same or different days at 35 stations.....	1'·8
Average range of dip for day (difference, forenoon—afternoon) at 41 stations	3'·1
(3) Average range of $H$ for forenoon observations determined on same or different days at 34 stations.....	15 $\gamma$ <sup>1</sup>
Average range of $H$ for afternoon observations determined on same or different days at 34 stations.....	14 $\gamma$
Average range of $H$ for day (difference, afternoon—forenoon) at 41 stations	47 $\gamma$

In every case the north end of the magnet pointed farther west in the afternoon than it did in the forenoon; in two cases only was the mean value of dip less in the forenoon than in the afternoon; and at every station the horizontal force showed an increase from forenoon to afternoon.

### SECULAR CHANGE DATA.

The results of the "repeat" observations taken since 1907, as well as a few which were obtained as early as 1905, are summarized in the table given on pages 151 to 161, and include those obtained by three different organizations, namely, Dominion Observatory, Meteorological Service of Canada and the Carnegie Institution of Washington. The observers of these organizations responsible for the work are designated by their initials and are as follows:

Organization	Observer	Designation	Organization	Observer	Designation
Dominion Observatory	G. White-Fraser..	G. W-F.	Carnegie Institution	C. C. Craft.....	C. C. C.
	C. A. French....	C. A. F.		P. H. Dike.....	P. H. D.
	J. W. Menzies....	J. W. M.		H. M. W. Edmonds.	H. M. W. E.
Meteorological Service	J. A. Pearce....	J. A. P.		E. Kitson .....	E. K.
Carnegie Institution	W. E. W. Jackson.	W. E. W. J.		J. C. Pearson....	J. C. P.
	L. A. Bauer.....	L. A. B.		C. C. Stewart....	C. C. S.
	E. H. Bowen.....	E. H. B.		D. M. Wise.....	D. M. W.
	J. E. Burbank....	J. E. B.			

The majority of the Carnegie Institution values, which are given in the table, were taken from Magnetic Tables and Magnetic Charts 1915, Special Publication No. 44 of the U.S. Coast and Geodetic Survey. The corresponding values are published in detail in Researches of the Department of Terrestrial Magnetism, vols. i and ii, Carnegie Institution Publication No. 175. In the latter publication, however, the mean values of the elements are not deduced. The results obtained at several stations in 1908 by Mr. C. C. Stewart are not included in the former publication. The declination values at these stations were deduced from the values in the Carnegie Institution publication by applying diurnal variation corrections based on observations taken by the Dominion Observatory in 1911. The dip and horizontal intensity values are the mean of the values given in the publication.

<sup>1</sup> 1  $\gamma$  = 0.00001 c.g.s.

The results of the Meteorological Service, with the exception of Agincourt, were furnished in manuscript. In addition, they are published in Appendix A of the Meteorological Service Report, 1908. The mean values of the elements, where such are given, were taken from Special Publication No. 44 of the U.S. Coast and Geodetic Survey. The other values were taken from the Meteorological Service Report, 1908, the declinations being deduced by applying a correction for diurnal variation, as in the case of the Carnegie Institution results. Dip and horizontal intensity values are the means of all the values obtained at the station, no account being taken of diurnal change. The values for Agincourt, 1906-1919, were taken from the Meteorological Service Reports for the corresponding years.

Where there are two or more stations in the same locality they are designated by the letters A, B, etc., and in the order observed by the Dominion Observatory. These designations correspond to the designations of the stations as given in the tables, pages 151 to 171. The relative position of the stations will be readily ascertained from the descriptions.

In a few cases the limits covered by the actual observations were extended by applying a correction for station difference. For example, at Chalk River the Carnegie Institution station of 1906 was re-occupied in 1913. It was found rather unsuitable at that time, consequently a new point was selected where a series of observations was taken, thus furnishing a value for the station difference for each element. The station difference and the value for 1906 at Station A made it possible to deduce the value for 1906 at Station B.

### REDUCTION OF OBSERVATIONS TO EPOCH

The epoch selected for the reduction of observations obtained since 1907 is 1921.0. The secular change data used for these reductions were obtained from the results given in the table on pages 151 to 161. Owing to the extended area covered by the survey and the irregular nature of the secular change, it was found that there was, for some localities, lack of sufficient data from which to obtain the information desired respecting the secular change for the whole period. For example, between Quebec and Blanc Sablon, Greenly island, along the north shore of the St. Lawrence river and gulf for the eleven years (1909.5 to 1920.5, approximately) the change varies from 42', west declination increasing, at Quebec to 16', west declination decreasing, at Greenly island. The variation in the total change is practically uniform for difference of longitude, as illustrated in Diagram A. Information respecting the change throughout the period is incomplete. It so happened, however, that the only observations to be reduced, in this locality, were taken in 1909, and, for the period 1909-1920, the necessary data are available, though it is difficult to determine a probable value of the annual change, which is desirable, especially from the standpoint of navigation. The same conditions prevail to a greater or less degree in other parts of the country.

The plan adopted for the reduction of observations to epoch was suggested from accounts of surveys of other countries, though the details have been worked out independently, local conditions being to a great extent the governing factor. The country



was divided into areas, each area comprising four degrees of longitude and three degrees of latitude. The parallels of latitude selected for the limits of the areas are  $43^{\circ}$ ,  $46^{\circ}$ ,  $49^{\circ}$ , . . .  $55^{\circ}$ , and the meridians of longitude  $56^{\circ}$ ,  $60^{\circ}$ ,  $64^{\circ}$ , . . .  $132^{\circ}$ . Diagrams D, E or F show the boundaries of the areas. The repeat stations were then grouped according to areas, and a graph made for each station of each of the three elements, declination, dip and horizontal intensity. From these graphs a mean graphical representation was made, which was assumed to represent the magnetic conditions at the point whose position is represented by the mean of the geographical co-ordinates of the stations within the area. The data were then considered according to the periods, (1) 1907-1910, (2) 1910-1915, and (3) 1915-1921. In the selection of 1921.0 as the epoch to which the results are reduced, it was necessary to extrapolate over a period amounting, in some cases, to as much as 1.6 years, which may possibly introduce a small error in some of the results. From the graphs the secular change for the three periods and for each area was plotted, and from the results a value was determined for the centre of each area. This gave a series of values along each parallel of latitude passing through the centres of the areas. The values were then adjusted, thus making the progression from area to area more uniform. From these results tables were compiled from which the necessary data were obtained for reducing the observations to 1921.0.

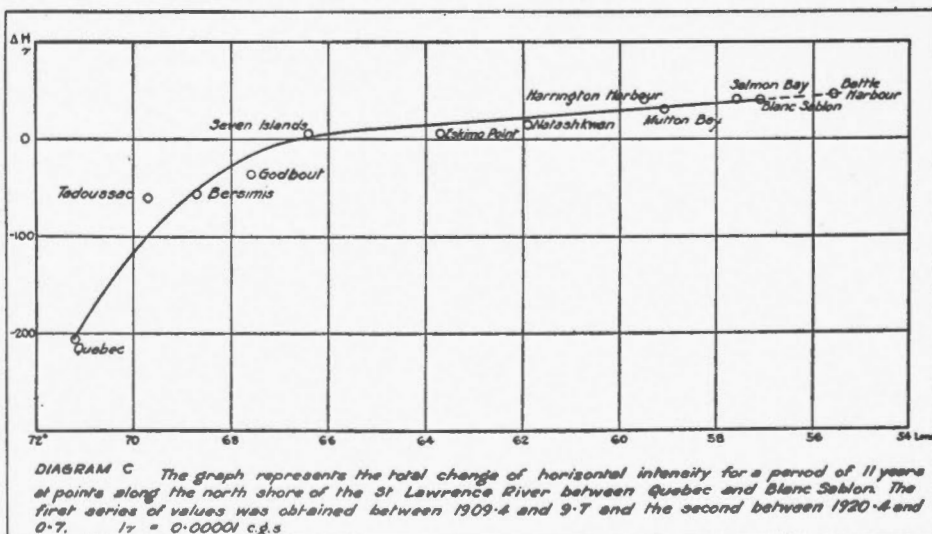
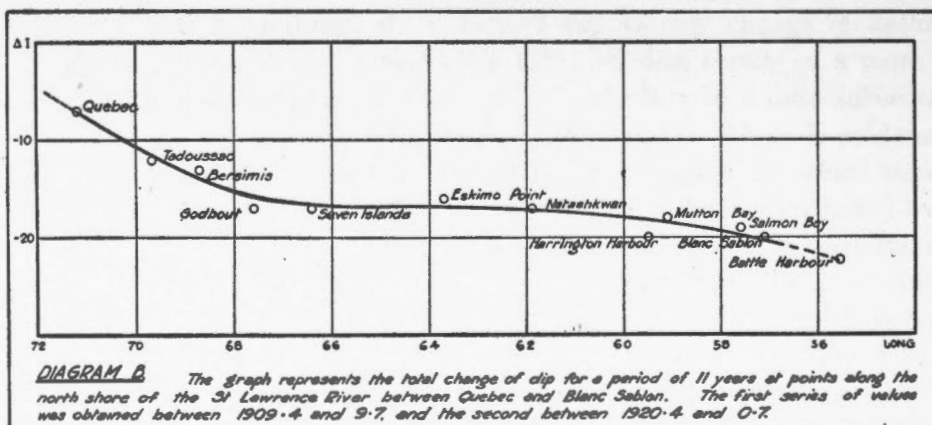
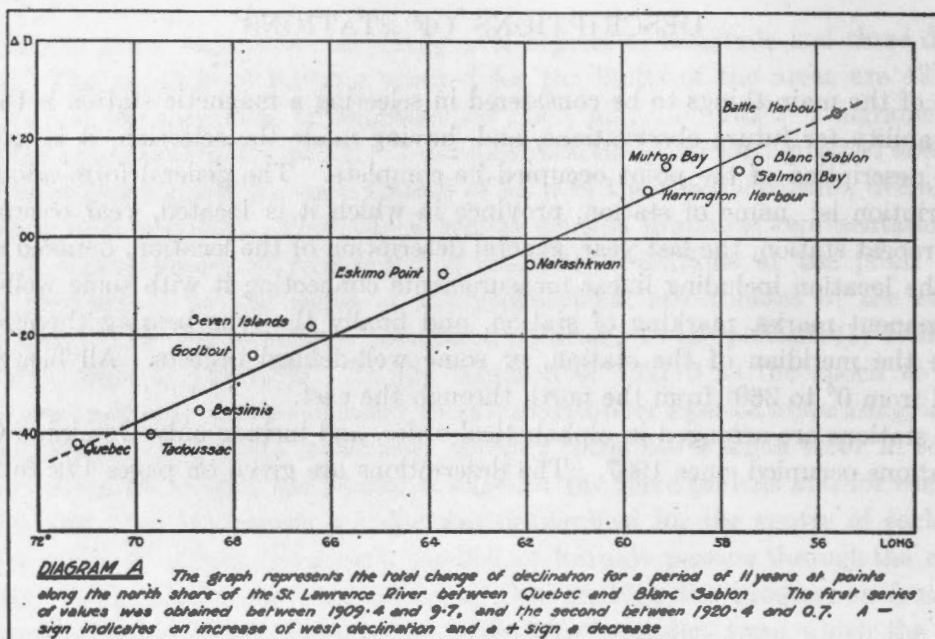
Diagrams D, E and F represent the values of the average change of declination, dip and horizontal intensity for the period 1915-1921. Unless results of a more recent date are available, these values may be used for the reduction to a date subsequent to 1921.0, though it is not claimed the values will strictly apply. There is evidence that these will be only approximate. This is illustrated by Diagram G, which represents the secular change of declination from 1907 to 1921 at a few places distributed over the area covered by the survey. A glance at the curves will suffice to show that the secular change is not uniform. Take, for example, the curve for Sydney. Between 1907 and 1913 the total change is represented by the upward drawn ordinate, which is equal to  $30'$ , representing an average annual increase of west declination amounting to  $5'$ ; from 1913 to 1918 the average increase is  $1'6$ , the total being  $8'$ ; and for the period 1918 to 1921 the average increase is  $3'3$ .

The results of the observations obtained since 1907, and the corresponding values reduced to the epoch 1921.0, are tabulated on pages 162 to 171. Where two or more stations are occupied in the same locality, they are designated by the letters A, B, etc., in the order occupied by the Dominion Observatory. Stations occupied by other organizations, but not occupied by this branch, are designated by the initials of the organization responsible for the same: thus, C.I. and M.S. are designations for Carnegie Institution and Meteorological Service, respectively. If a station of another organization is reoccupied, the only reference to this will be found in the description of the station.

## DESCRIPTIONS OF STATIONS

One of the main things to be considered in selecting a magnetic station is the probable suitability for future observations, and, having made the selection, it is important that the description of the point occupied be complete. The general form adopted for the description is: name of station, province in which it is located, year occupied, or, if it is a repeat station, the last year, general description of the location, detailed description of the location including linear measurements connecting it with some well-defined and permanent marks, marking of station, and finally the true bearing therefrom, referred to the meridian of the station, or some well-defined objects. All bearings are reckoned from  $0^{\circ}$  to  $360^{\circ}$  from the north through the east.

The stations are arranged in alphabetical order, and include only Dominion Observatory stations occupied since 1907. The descriptions are given on pages 172 to 262.



LAT.	132°	128°	124°	120°	116°	112°	108°	104°	100°	96°	92°	88°	84°	80°	76°	72°	68°	64°	60°	56°	Long.
55°	+0.4	+0.4	-0.4	-1.5	-2.7	-3.5	-4.0	-4.2	-4.2												
52			+0.1	-0.6	-1.2	-1.7	-2.3	-2.9	-3.3	-3.6	-3.7	-3.7									
49												-3.7	-4.2	-4.2	-3.9	-3.7	-3.5	-3.3	-3.0	+1.1	
46														-3.3	-3.3	-3.8	-3.7	-3.4	-2.8		
43																					

DIAGRAM D. The values, expressed in minutes, represent the average annual change of declination for the date 1918.0, being based on the results of observations taken between 1915 and 1920. A - sign indicates that west declination is increasing and east declination decreasing, and a + sign the reverse.

LAT.	132°	128°	124°	120°	116°	112°	108°	104°	100°	96°	92°	88°	84°	80°	76°	72°	68°	64°	60°	56°	Long.
55°	-0.4	-0.5	-0.5	-0.5	-0.5	-0.6	-0.6	-0.6	-0.6												
52			-0.5	-0.4	-0.3	-0.2	-0.1	-0.2	-0.6	-0.6	-0.5	-0.4	-0.3								
49												-0.1	0.0	-0.2	-0.5	-0.8	-0.9	-1.0			
46													+0.8	-0.1	-0.5	-0.8	-0.9	-1.0			
43																					

DIAGRAM E. The values, expressed in minutes, represent the average annual change of dip for the date 1918.0, being based on the results of observations taken between 1915 and 1920.

LAT.	132°	128°	124°	120°	116°	112°	108°	104°	100°	96°	92°	88°	84°	80°	76°	72°	68°	64°	60°	56°	Long.
55°	-7	-8	-12	-10	-9	-8	-7	-6	-5												
52			-11	-15	-17	-18	-17	-16	-12	-11	-12	-13	-13								
49												-20	-19	-19	-18						
46													-21	-20	-20	-19	-18	-18	-17		
43														-32	-33	-32	-29	-24	-19		

DIAGRAM F. The values, expressed in units of the fifth decimal, C.G.S., represent the average annual change of horizontal intensity for the date 1918.0, being based on the results of observations taken between 1915 and 1920.

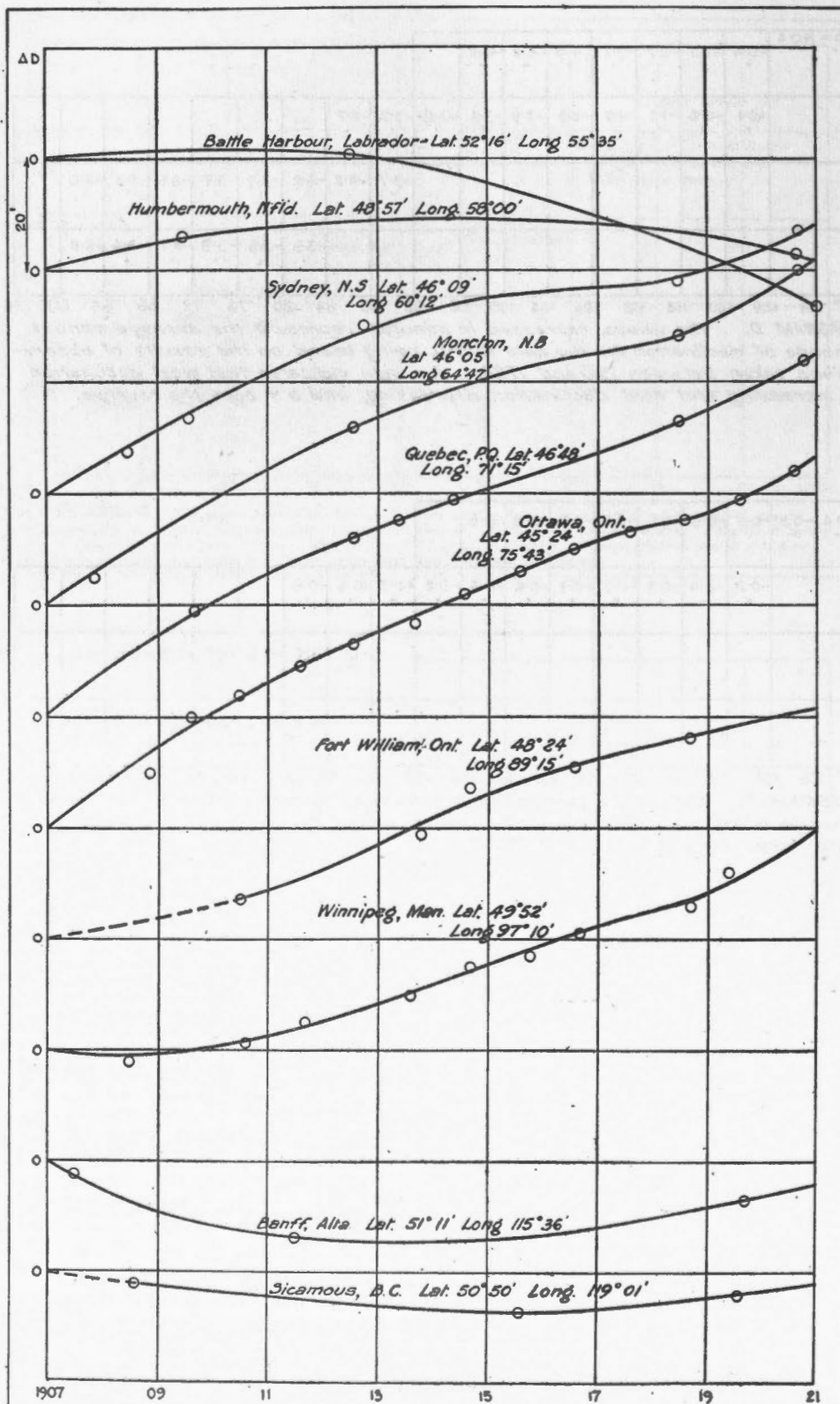


DIAGRAM G. Graphs showing the secular change of declination at a number of stations for the period 1907 to 1921. Ordinates drawn upward indicate an increase in west declination and a decrease in east declination: ordinates drawn downward indicate the reverse.



## RESULTS OF OBSERVATIONS AT REPEAT STATIONS

Station	Lat.	Long.	Date	Value			Observer
				Declin.	Dip	Hor. Int.	
	° ' "	° ' "		West ° ' "	° ' "	c. g. s.	
Blanc Sablon (Greenly Island).	51 23	57 14	1909·7	33 30	76 01	·1394	C.A.F. and J.W.M.
			1920·7	33 14	75 41	·1398	C.A.F.
Salmon Bay.....	51 25	57 39	1909·7	30 39	76 29	·1343	C.A.F. and J.W.M.
			1920·7	30 25	76 10	·1347	C.A.F.
Humbermouth (Bay of Islands), Nfld.	48 58	58 00	1905·7	30 23	75 23	.....	J.E.B.
			1909·6	30 33	75 13	·1472	E.K.
			1920·7	30 30	74 57	·1473	C.A.F.
Mutton Bay.....	50 47	59 06	1909·7	30 14	76 52	·1350	C.A.F. and J.W.M.
			1920·6	29 59	76 34	·1353	C.A.F.
Harrington Harbour...	50 30	59 29	1909·6	31 20	76 24	·1367	C.A.F. and J.W.M.
			1920·6	31 10	76 04	·1371	C.A.F.
Sydney.....	46 09	60 12	1905·7	25 10	74 23	·1565	J.E.B.
			1908·5	25 22	74 18	·1570	C.C.C.
			1909·6	25 28	74 12	·1572	E.K.
			1912·8	25 44	74 12	·1567	C.A.F.
			1918·5	25 53	74 05	·1561	C.A.F.
			1920·7	26 02	74 02	·1558	C.A.F.
Natashkwan.....	50 11	61 56	1909·6	29 36	76 49	·1348	C.A.F. and J.W.M.
			1920·6	29 41	76 32	·1350	C.A.F.
Charlottetown.....	46 14	63 07	1908·8	23 47	74 59	·1535	C.C.C.
			1918·5	24 17	74 45	·1525	C.A.F.
Truro.....	45 20	63 16	1907·8	21 52	73 52	·1616	G.W-F. and J.W.M.
			1912·6	22 32	73 51	·1626	C.A.F.
			1912·8	22 31	73 51		C.A.F.
			1918·5	22 48	73 45	·1614	C.A.F.
			1920·7	22 56	73 42	·1611	C.A.F.
Halifax.....	44 38	63 35	1905·7	20 47	73 59	·1619	J.E.B.
			1911·7	21 35	73 50	·1615	W.E.W.J.
			1912·6	21 39	73 52	·1613	C.A.F.
			1918·5	21 58	73 47	·1602	C.A.F.
Eskimo Point.....	50 15	63 42	1909·6	35 26	76 36	·1383	C.A.F. and J.W.M.
			1920·6	35 33	76 20	·1384	C.A.F.
Black Point.....	44 39	63 59	1905·7	21 01	74 00	·1619	J.E.B.
			1912·6	21 42	73 53	·1615	C.A.F.
Moncton.....	46 05	64 47	1907·9	22 16	75 08	·1513	G.W-F. and J.W.M.
			1912·6	22 42	75 02	·1521	C.A.F.
			1918·5	22 59	74 56	·1512	C.A.F.
			1920·7	23 11	74 55	·1506	C.A.F.
Annapolis.....	44 45	65 31	1912·7	20 50	74 04	·1609	C.A.F.
			1918·5	21 09	73 59	·1598	C.A.F.

PUBLICATIONS OF THE DOMINION OBSERVATORY  
RESULTS OF OBSERVATIONS AT REPEAT STATIONS

Station	Lat.	Long.	Date	Value			Observer
				Declin.	Dip	Hor. Int.	
	° ' "	° ' "		West ° ' "	° ' "	c. g. s.	
Bathurst.....	47 37	65 37	1907.9	23 40	76 04	·1429	G.W-F.and J.W.M.
			1912.5	24 14	76 00	·1436	C.A.F.
St. John.....	45 17	66 03	1907.8	20 12	74 25	·1590	G.W-F.and J.W.M.
			1912.8	20 49	74 21	·1591	C.A.F.
			1918.5	21 07	74 16	·1580	C.A.F.
St. John.....	45 17	66 04	1905.7	20 43	74 23	·1609	J.E.B.
			1909.6	21 08	74 21	·1605	E.K.
Seven Islands.....	50 13	66 25	1909.5	27 04	77 51	·1265	C.A.F. and J.W.M.
			1920.6	27 23	77 34	·1266	C.A.F.
Matapedia.....	47 58	66 57	1907.9	22 54	76 35	·1385	G.W-F.and J.W.M.
			1912.5	23 22	76 28	·1394	C.A.F.
			1918.5	23 37	76 21	·1388	C.A.F.
			1920.7	23 49	76 20	·1386	C.A.F.
Woodstock.....	46 10	67 35	1912.8	20 16	75 29	·1488	C.A.F.
			1918.5	20 37	75 24	·1477	C.A.F.
Godbout, A.....	49 19	67 38	1909.5	24 32	77 37	·1296	C.A.F. and J.W.M.
			1920.5	24 56	77 20	·1293	C.A.F.
Edmundston.....	47 22	68 20	1906.7	21 08	76 19	·1420	L.A.B.
			1912.8	21 41	76 16	·1419	C.A.F.
Rimouski.....	48 30	68 31	1911.7	22 51	76 49	·1381	W.E.W.J.
			1912.5	23 01	.....	.....	W.E.W.J.
			1920.5	23 22	76 41	·1377	C.A.F.
Bersimis.....	48 56	68 40	1909.4	21 01	77 54	·1282	C.A.F. and J.W.M.
			1920.5	21 36	77 41	·1276	C.A.F.
Rivière du Loup, A...	47 52	69 32	1906.7	20 39	76 34	·1407	L.A.B.
			1912.5	21 08	76 33	·1405	C.A.F.
			1918.4	21 24	76 27	·1397	C.A.F.
			1920.5	21 30	76 25	·1393..	.....
Rivière du Loup, B...	47 52	69 32	1918.4	21 28	76 26	·1401	C.A.F.
			1920.5	21 34	76 24	·1397	C.A.F.
Tadoussac.....	48 08	69 42	1909.7	20 18	77 17	·1340	C.A.F.
			1920.5	20 57	77 05	·1334	C.A.F.
Chicoutimi, A.....	48 25	71 04	1906.7	20 17	77 37	·1333	L.A.B.
			1913.4	20 57	77 25	·1329	C.A.F.
			1918.6	21 09	77 17	·1325	C.A.F.
Quebec.....	46 48	71 14	1905.7	17 49	76 03	·1473	L.A.B.
			1906.7	17 53	75 59	·1478	L.A.B.
			1909.7	18 20	76 01	·1477	C.A.F.
			1909.8	18 15	76 03	·1471	C.C.S.

## RESULTS OF OBSERVATIONS AT REPEAT STATIONS

Station	Lat.	Long.	Date	Value			Observer
				Declin.	Dip	Hor. Int.	
	° ' "	° ' "		West ° ' "	° ' "	c. g. s.	
			1912-4	18 28	75 56	·1474	C.A.F.
			1912-8	18 33	75 58	·1469	C.A.F.
			1913-4	18 33	75 57	·1470	C.A.F.
			1914-4	18 38	75 55	·1468	C.A.F.
			1918-5	18 51	75 54	·1459	C.A.F.
			1920-8	19 02	75 54	·1454	C.A.F.
Roberval.....	48 31	72 14	1906-7	19 44	77 34	·1329	L.A.B.
			1913-4	20 51	77 25	·1326	C.A.F.
Three Rivers.....	46 21	72 32	1906-7	15 26	75 57	·1482	L.A.B.
			1912-4	16 01	75 58	·1476	C.A.F.
			1918-5	16 21	75 55	·1459	C.A.F.
La Tuque, A.....	47 27	72 49	1914-4	16 44	76 51	·1380	C.A.F.
			1918-6	16 59	76 48	·1369	C.A.F.
Terrebonne.....	45 43	73 40	1912-4	14 55	75 50	·1485	C.A.F.
			1918-4	15 22	75 49	·1467	C.A.F.
Parent.....	47 55	74 38	1914-4	15 00	77 34	·1315	C.A.F.
			1918-6	15 13	77 30	·1313	C.A.F.
Brockville.....	44 36	75 41	1907-7	10 35	75 04	·1575	G.W-F.and J.W.M.
			1920-7	10 41	75 06	·1544	J.A.P.
Ottawa.....	45 24	75 43	1906-8	12 44	75 38	·1521	P.H.D.
			1907-4	12 37	75 41	·1503	G.W-F.and J.W.M.
			1908-9	12 50	75 42	·1513	C.A.F.
			1908-9	12 52	.....	·1514	C.A.F.
			1909-6	13 00	75 39	·1512	C.A.F.
			1910-5	13 04	75 40	·1509	C.A.F.
			1911-6	13 09	75 40	·1508	C.A.F.
			1912-6	13 13	75 40	·1506	C.A.F.
			1913-6	13 18	75 42	·1503	C.A.F.
			1913-8	13 16	75 41	·1503	H.M.W.E.and D.M.W.
			1914-6	13 22	75 41	·1499	C.A.F.
			1915-6	13 26	75 42	·1495	C.A.F.
			1916-6	13 30	75 42	·1493	C.A.F.
			1917-6	13 33	75 41	·1490	C.A.F.
			1918-6	13 35	75 41	·1488	C.A.F.
			1919-6	13 39	75 41	·1486	C.A.F.
			1920-6	13 44	75 40	·1485	C.A.F.
Kingston Junction.	44 16	76 28	1906-7	13 26	74 58	·1619	P.H.D.
			1907-6	14 18	74 58	·1612	G.W-F.and J.W.M.
Doucet.....	48 14	76 33	1914-5	14 15	77 40	·1312	C.A.F.
			1918-6	14 31	77 39	·1306	C.A.F.
Renfrew.....	45 28	76 41	1913-5	11 46	76 02	·1474	C.A.F.
			1920-6	12 19	76 05	·1449	J.A.P.



PUBLICATIONS OF THE DOMINION OBSERVATORY  
RESULTS OF OBSERVATIONS AT REPEAT STATIONS

Station	Lat.	Long.	Date	Value			Observer
				Declin.	Dip	Hor. Int.	
	° ' "	° ' "		West ° ' "	° ' "	c. g. s.	
Sharbot Lake.....	44 46	76 41	1907.6	11 30	74 55	-1606	G.W-F.andJ.W.M.
			1920.7	12 30	74 54	-1577	J.A.P.
Pembroke.....	45 49	77 07	1907.6	10 18	76 11	-1474	G.W-F.andJ.W.M.
			1913.5	10 43	76 12	-1460	C.A.F.
Chalk River, A.....	46 01	77 28	1906.8	10 20	76 24	-1460	L.A.B.
			1913.5	10 56	76 21	-1447	C.A.F.
Chalk River, B.....	46 01	77 28	1906.8	10 24	76 25	-1460	.....
			1913.5	11 00	76 22	-1448	C.A.F.
			1918.7	11 26	76 23	-1430	C.A.F.
			1920.6	11 27	76 22	-1432	J.A.P.
Newcastle.....	43 54	78 32	1910.9	7 48	74 43	-1607	J.W.M.
			1920.7	8 12	74 46	-1576	J.A.P.
O'Brien.....	48 40	78 41	1914.5	12 17	78 10	-1266	C.A.F.
			1918.6	12 30	78 06	-1260	C.A.F.
Mattawa, A.....	46 20	78 42	1907.6	8 45	76 41	-1427	G.W-F.andJ.W.M.
			1908.8	8 51	76 40	-1430	C.C.S.
			1909.5	8 54	76 40	-1428	C.C.S.
			1918.7	9 38	76 43	-1405	C.A.F.
Mattawa, B.....	46 20	78 42	1913.5	9 28	76 41	-1421	C.A.F.
			1920.6	9 58	76 41	-1397	J.A.P.
Joe Lake.....	45 35	78 46	1907.6	7 32	75 56	-1523	G.W-F.andJ.W.M.
			1920.6	7 48	76 08	-1483	J.A.P.
Port Colborne.....	42 53	79 14	1910.7	5 48	73 58	-1674	J.W.M.
			1920.5	6 26	74 06	-1636	J.A.P.
Agincourt.....	43 47	79 16	1906.5	5 45	74 36	-1640	Mag. Obs.
			1907.5	5 51	74 36	-1637	"
			1908.5	5 54	74 37	-1634	"
			1909.5	5 59	74 39	-1630	"
			1910.5	6 04	74 38	-1627	"
			1911.5	6 09	74 39	-1621	"
			1912.5	6 14	74 40	-1618	"
			1913.5	6 18	74 41	-1613	"
			1914.5	6 24	74 42	-1609	"
			1915.5	6 28	74 43	-1603	"
			1916.5	6 33	74 44	-1599	"
			1917.5	6 36	74 44	-1595	"
			1918.5	6 38	74 45	-1592	"
			1919.5	6 41	74 45	-1588	"
North Bay, B.....	46 19	79 26	1913.5	9 03	76 38	-1426	C.A.F.
			1920.6	9 35	76 37	-1407	J.A.P.

## RESULTS OF OBSERVATIONS AT REPEAT STATIONS

Station	Lat.	Long.	Date	Value			Observer
				Declin.	Dip	Hor. Int.	
	° ' "	° ' "		West ° ' "	° ' "	c. g. s.	
Beamsville.....	43 12	79 28	1910-7	5 52	74 31	-1646	J.W.M.
			1920-5	6 30	74 38	-1610	J.A.P.
Liskeard, A.....	47 31	79 42	1909-5	8 40	77 36	-1340	.....
			1913-5	9 12	77 33	-1332	C.A.F.
			1918-6	9 30	77 31	-1322	C.A.F.
Liskeard, B.....	47 31	79 42	1909-5	8 47	77 34	-1339	C.C.S.
			1913-5	9 19	77 31	-1331	.....
			1918-6	9 37	77 29	-1321	C.A.F.
Timagami.....	47 04	79 47	1906-8	11 54	76 06	-1520	L.A.B.
			1913-5	12 22	76 06	-1503	C.A.F.
Penetanguishene.....	44 46	79 58	1906-7	6 59	75 28	-1554	P.H.D.
			1910-8	7 31	75 32	-1531	J.W.M.
			1920-6	8 06	75 34	-1504	J.A.P.
Parry Sound.....	45 22	80 03	1916-4	7 53	75 41	-1505	C.A.F.
			1920-5	8 09	75 40	-1493	J.A.P.
Kitchener.....	43 27	80 30	1910-7	5 35	74 28	-1645	J.W.M.
			1920-5	6 18	74 33	-1612	J.A.P.
Owen Sound.....	44 35	80 55	1910-8	6 02	75 13	-1569	J.W.M.
			1920-6	6 40	75 16	-1538	J.A.P.
Sudbury, B.....	46 31	81 02	1913-6	7 40	76 34	-1443	C.A.F.
			1916-5	7 46	76 34	-1433	C.A.F.
			1919-4	7 52	76 35	-1430	.....
Sudbury, C.....	46 31	81 02	1916-5	7 50	76 30	-1438	C.A.F.
			1919-4	7 56	76 31	-1435	C.A.F.
Cochrane.....	49 04	81 02	1913-5	9 18	78 29	-1244	C.A.F.
			1914-5	9 24	78 28	-1242	C.A.F.
			1918-6	9 37	78 25	-1236	C.A.F.
Port Stanley.....	42 40	81 14	1910-7	2 42	74 05	-1669	J.W.M.
			1920-5	3 13	74 13	-1629	J.A.P.
London (Hyde Park Junction).	42 59	81 19	1906-8	3 27	73 57	-1702	P.H.D.
			1910-8	3 35	74 00	-1678	J.W.M.
Goderich.....	43 46	81 42	1906-7	4 16	74 27	-1659	P.H.D.
			1910-8	4 33	74 32	-1636	J.W.M.
			1920-5	5 12	74 38	-1601	J.A.P.
Sarnia.....	42 58	82 22	1910-6	3 02	73 50	-1703	J.W.M.
			1920-5	3 19	73 59	-1665	J.A.P.
Kingsville.....	46 02	82 46	1910-7	1 33	73 07	-1765	J.W.M.
			1920-5	2 03	73 19	-1724	J.A.P.

. PUBLICATIONS OF THE DOMINION OBSERVATORY  
RESULTS OF OBSERVATIONS AT REPEAT STATIONS

Station	Lat.	Long.	Date	Value			Observer
				Declin.	Dip	Hor. Int.	
	° ' "	° ' "		West ° ' "	° ' "	c. g. s.	
Algoma.....	46 11	82 49	1906.8	4 35	76 24	-.1466	E.H.B.
			1916.4	5 17	76 32	-.1433	C.A.F.
			1918.7	5 28	76 35	-.1423	C.A.F.
Windsor.....	42 18	83 00	1910.7	2 00	73 15	-.1753	J.W.M.
			1920.5	2 39	73 24	-.1713	J.A.P.
Chapleau.....	47 50	83 24	1906.8	4 04	77 51	-.1328	E.H.B.
			1907.5	3 48	77 54	-.1319	G.W.F. and J.W.M.
			1910.4	4 17	77 52	-.1321	C.A.F.
			1913.6	4 31	77 53	-.1314	C.A.F.
			1918.7	4 55	77 52	-.1301	C.A.F.
Hearst.....	49 41	83 39	1914.6	4 48	79 02	-.1192	C.A.F.
			1918.6	5 02	79 01	-.1184	C.A.F.
Missinaibi.....	48 19	84 05	1905.7	5 19	77 55	-.1322	L.A.B.
			1906.7	5 39	77 52	-.1329	E.H.B.
			1910.4	5 50	77 50	-.1326	C.A.F.
Sault Ste. Marie.....	46 31	84 18	1916.5	3 33	76 59	-.1398	C.A.F.
			1918.7	3 38	77 01	-.1392	C.A.F.
White River.....	48 35	85 16	1906.7	3 01	78 16	-.1289	E.H.B.
			1910.4	3 13	78 19	-.1276	C.A.F.
Grant.....	50 08	86 18	1914.6	2 43	79 21	-.1164	C.A.F.
			1918.6	2 58	79 19	-.1157	C.A.F.
Schreiber.....	48 48	87 17	1906.7	0 22	78 25	-.1270	E.H.B.
			1910.4	0 33	78 26	-.1261	C.A.F.
			1918.7	1 09	78 25	-.1246	C.A.F.
				East			
Nipigon.....	49 01	88 16	1906.7	1 18	78 29	-.1273	E.H.B.
			1910.4	1 06	78 30	-.1264	C.A.F.
Armstrong.....	50 18	89 02	1914.6	0 48	79 39	-.1140	C.A.F.
			1918.6	0 35	79 36	-.1139	C.A.F.
Fort William (C.I.)...	48 24	89 15	1906.7	3 37	77 48	-.1340	E.H.B.
			1907.5	3 48	77 42	-.1333	W.E.W.J.
Fort William.....	48 24	89 15	1910.5	3 16	77 49	-.1321	C.A.F.
			1913.8	3 04	77 51	-.1323	D.M.W.
			1914.8	2 56	77 51	-.1321	C.A.F.
			1916.6	2 52	77 51	-.1315	C.A.F.
			1918.7	2 47	77 50	-.1313	
Twin City Junction....	48 22	89 24	1916.6	2 42	77 53	-.1311	C.A.F.
			1918.7	2 37	77 52	-.1309	C.A.F.

## RESULTS OF OBSERVATIONS AT REPEAT STATIONS

Station	Lat.	Long.	Date	Value			Observer
				Declin.	Dip	Hor. Int.	
	° /	° /		East ° /	° /	c. g. s.	
Savanne.....	48 57	90 14	1906-7	4 34	78 10	.1303	E.H.B.
			1910-5	4 27	78 12	.1294	C.A.F.
Atikokan.....	48 45	91 38	1914-8	5 20	77 42	.1338	C.A.F.
			1918-7	5 09	77 40	.1330	C.A.F.
Ignace.....	49 24	91 40	1906-7	6 15	78 27	.1278	E.H.B.
			1910-5	6 10	78 30	.1266	C.A.F.
Sioux Lookout (Graham).	50 06	91 54	1914-4	5 15	79 14	.1183	C.A.F.
			1916-7	5 06	79 14	.1178	C.A.F.
Eagle.....	49 48	93 11	1906-7	6 40	78 08	.1313	E.H.B.
			1910-6	6 34	78 10	.1305	C.A.F.
Redditt.....	49 59	94 22	1914-7	9 10	78 41	.1249	C.A.F.
			1918-7	8 57	78 38	.1243	C.A.F.
Kenora.....	49 46	94 29	1906-7	9 54	77 59	.1317	E.H.B.
			1910-6	9 59	77 59	.1311	C.A.F.
Rainy River.....	48 43	94 35	1906-8	9 34	77 27	.1376	E.H.B.
			1918-7	9 03	77 30	.1349	C.A.F.
Riverton.....	51 00	97 00	1916-7	11 49	79 01	.1196	C.A.F.
			1919-4	11 42	78 58	.1196	C.A.F.
Winnipeg.....	49 52	97 10	1906-7	13 56	78 08	.1315	E.H.B.
			1907-5	13 54	78 10	.1305	L.A.B.
			1908-4	13 59	78 08	.1309	C.C.S.
			1908-5	13 58	78 13	.1307	C.A.F.
			1910-6	13 56	78 11	.1305	C.A.F.
			1911-7	13 51	78 13	.1299	C.A.F.
			1913-6	13 47	78 11	.1299	C.A.F.
			1914-7	13 42	78 12	.1296	C.A.F.
			1915-8	13 39	78 12	.1294	C.A.F.
			1916-7	13 35	78 10	.1293	C.A.F.
			1918-7	13 30	78 09	.1292	C.A.F.
			1919-4	13 24	78 09	.1290	C.A.F.
Oak Point.....	50 30	98 03	1908-7	13 30	78 20	.1278	C.C.S.
			1916-7	13 06	78 24	.1267	C.A.F.
			1919-4	12 58	78 21	.1264	C.A.F.
Portage la Prairie.....	49 58	98 18	1910-6	9 26	78 29	.1280	C.A.F.
			1911-7	9 23	78 29	.1278	C.A.F.
Gypsumville, A.....	51 46	98 36	1916-7	12 40	78 49	.1225	C.A.F.
			1919-4	12 31	78 46	.1225	C.A.F.
Gladstone.....	50 13	98 57	1911-7	14 14	78 02	.1310	C.A.F.
			1919-4	13 46	77 58	.1300	C.A.F.

PUBLICATIONS OF THE DOMINION OBSERVATORY  
RESULTS OF OBSERVATIONS AT REPEAT STATIONS

Station	Lat.	Long.	Date	Value			Observer
				Declin.	Dip	Hor. Int.	
	° ' "	° ' "		East ° ' "	° ' "	c. g. s.	
Brandon, A.....	49 52	99 59	1910-6	15 03	77 32	-1367	C.A.F.
			1919-8	14 28	77 36	-1346	C.A.F.
Dauphin.....	51 09	100 04	1911-7	15 24	78 24	-1283	C.A.F.
			1919-4	14 52	78 20	-1275	C.A.F.
The Pas.....	53 50	101 14	1908-7	18 59	80 06	-1092	C.C.S.
			1919-5	18 23	80 03	-1082	C.A.F.
Swan River, B.....	52 07	101 16	1908-7	18 40	79 04	-1210	C.C.S.
			1919-5	18 08	79 02	-1198	C.A.F.
Swan River, A.....	52 07	101 16	1911-7	18 42	79 05	-1204	C.A.F.
			1919-4	18 14	79 00	-1198	C.A.F.
Kirkella.....	50 02	101 22	1906-7	16 02	77 17	-1399	E.H.B.
			1910-7	16 13	77 18	-1392	C.A.F.
			1919-7	15 44	77 18	-1375	C.A.F.
Hudson Bay Junction .	52 52	102 24	1911-7	18 59	79 22	-1166	C.A.F.
			1919-5	18 27	79 17	-1159	C.A.F.
Wolseley, A.....	50 26	103 16	1910-7	18 17	77 21	-1384	C.A.F.
			1919-7	17 51	77 21	-1369	C.A.F.
Melfort.....	52 52	104 37	1907-8	20 59	79 00	-1208	C.C.S.
			1911-7	21 03	79 00	-1203	C.A.F.
			1919-5	20 34	78 56	-1198	C.A.F.
Pense.....	50 25	104 59	1910-7	19 44	76 54	-1421	C.A.F.
			1919-7	19 21	76 52	-1405	C.A.F.
Prince Albert.....	53 12	105 47	1911-6	23 24	79 13	-1183	C.A.F.
			1919-5	22 56	79 10	-1176	C.A.F.
Warman.....	52 19	106 34	1911-6	24 15	77 53	-1319	C.A.F.
			1919-5	23 52	77 48	-1310	C.A.F.
Chaplin, A.....	50 28	106 40	1911-4	21 07	76 40	-1446	C.A.F.
			1919-7	20 48	76 40	-1430	C.A.F.
Swift Current.....	50 16	107 48	1907-5	21 00	76 14	-1488	W.E.W.J.
			1911-4	21 14	76 16	-1479	C.A.F.
			1919-7	20 58	76 15	-1467	C.A.F.
Battleford.....	52 44	108 18	1908-8	23 10	77 45	-1335	C.C.S.
			1911-6	23 12	77 41	-1334	C.A.F.
			1919-5	23 53	77 37	-1325	C.A.F.
Maple Creek.....	49 55	109 30	1911-4	22 23	75 27	-1556	C.A.F.
			1919-7	22 13	74 26	-1541	C.A.F.



## RESULTS OF OBSERVATIONS AT REPEAT STATIONS

Station	Lat.	Long.	Date	Value			Observer
				Declin.	Dip	Hor. Int.	
	° ' "	° ' "		East ° ' "	° ' "	c. g. s.	
Lloydminster, A.....	53 17	110 00	1908.8	25 26	78 06	-1290	.....
			1911.6	25 30	78 04	-1292	C.A.F.
			1919.5	25 10	77 59	-1286	C.A.F.
Lloydminster, B.....	53 18	110 00	1908.8	25 25	78 07	-1290	C.C.S.
			1919.5	25 09	77 58	-1286	C.A.F.
Dunmore.....	49 58	110 36	1907.5	21 54	75 25	-1566	.....
			1911.4	21 55	75 24	-1556	.....
			1915.4	21 55	75 24	-1553	C.A.F.
			1919.7	21 48	75 23	-1545	C.A.F.
Medicine Hat.....	50 03	110 40	1907.5	21 56	75 31	-1562	W.E.W.J.
			1911.4	21 57	75 30	-1552	C.A.F.
			1915.4	21 57	75 31	-1548	C.A.F.
Tilley.....	50 27	111 39	1911.4	23 08	75 27	-1546	C.A.F.
			1919.7	22 57	75 26	-1532	C.A.F.
Vegreville.....	53 29	112 02	1911.6	27 16	77 40	-1332	C.A.F.
			1919.5	26 57	77 34	-1326	C.A.F.
Bruderheim.....	53 49	112 55	1911.5	26 57	77 37	-1333	C.A.F.
			1919.5	26 43	77 33	-1326	C.A.F.
Gleichen.....	50 22	113 03	1911.5	24 26	75 28	-1552	C.A.F.
			1919.7	24 17	75 28	-1537	C.A.F.
Meanook.....	54 37	113 21	1917.5	27 46	77 55	-1294	Mag. Obs.
			1918.5	27 44	77 54	-1294	"
			1919.5	27 41	77 54	-1294	"
Macleod.....	49 43	113 25	1908.8	23 37	74 38	-1634	C.C.S.
			1915.4	23 40	74 31	-1631	C.A.F.
			1919.7	23 36	74 33	-1623	C.A.F.
Edmonton, A.....	53 32	113 29	1907.4	27 09	77 21	-1366	W.E.W.J.
			1908.8	27 24	77 22	-1361	C.C.S.
			1911.5	27 23	77 20	-1366	C.A.F.
Lacombe, B.....	52 28	113 43	1908.8	26 01	76 26	-1449	C.C.S.
			1919.5	25 54	76 23	-1439	C.A.F.
Lacombe, A.....	52 28	113 45	1908.8	25 59	76 26	-1450	.....
			1911.5	26 05	76 28	-1447	C.A.F.
			1919.5	25 52	76 23	-1440	C.A.F.
Frank.....	49 36	114 23	1915.4	24 13	74 02	-1667	C.A.F.
			1919.7	24 06	74 03	-1656	C.A.F.
Wabamun.....	53 34	114 28	1913.6	27 03	77 16	-1366	C.A.F.
			1919.5	26 50	77 12	-1359	C.A.F.

PUBLICATIONS OF THE DOMINION OBSERVATORY  
RESULTS OF OBSERVATIONS AT REPEAT STATIONS

Station	Lat.	Long.	Date	Value			Observer
				Declin.	Dip	Hor. Int.	
	°   '   ''	°   '   ''		East °   '   ''	°   '   ''	c. g. s.	
Morley.....	51 09	114 51	1911.5	24 45	75 06	-1581	C.A.F.
			1919.7	24 40	75 08	-1565	C.A.F.
Banff.....	51 10	115 36	1907.5	25 59	74 58	-1591	L.A.B.
			1908.6	26 05	74 59	-1592	C.A.F.
			1911.5	26 12	74 56	-1591	C.A.F.
			1919.7	26 04	74 55	-1580	C.A.F.
Cranbrook, A.....	49 31	115 47	1915.5	24 30	73 31	-1713	C.A.F.
			1919.7	24 27	73 29	-1706	C.A.F.
Edson.....	53 36	116 26	1913.6	28 43	76 37	-1426	C.A.F.
			1919.5	28 37	76 34	-1422	C.A.F.
Proctor.....	49 37	116 57	1915.5	24 31	73 21	-1722	C.A.F.
			1919.7	24 27	73 22	-1716	C.A.F.
Nelson.....	49 30	117 17	1915.5	24 31	72 54	-1765	C.A.F.
			1919.7	24 30	72 54	-1758	C.A.F.
Jasper.....	52 53	118 05	1913.7	27 23	75 28	-1526	C.A.F.
			1919.5	27 16	75 27	-1518	C.A.F.
Midway.....	49 00	118 47	1915.6	24 24	72 18	-1807	C.A.F.
			1919.6	24 24	72 17	-1801	C.A.F.
Sicamous, A.....	50 50	119 01	1908.6	25 52	73 54	-1676	C.A.F.
			1915.6	25 58	73 48	-1675	C.A.F.
Sicamous, B.....	50 50	119 01	1908.6	25 47	73 57	-1670	.....
			1915.6	25 53	73 51	-1669	C.A.F.
			1919.6	25 50	73 49	-1665	C.A.F.
Okanagan Landing....	50 14	119 21	1915.6	25 20	73 07	-1733	C.A.F.
			1919.6	25 18	73 07	-1724	C.A.F.
Penticton.....	49 29	119 36	1915.6	25 31	72 37	-1787	C.A.F.
			1919.6	25 31	72 38	-1778	C.A.F.
McBride.....	53 18	120 10	1913.7	28 22	75 15	-1543	C.A.F.
			1919.5	28 20	75 13	-1536	C.A.F.
Kamloops.....	50 41	120 21	1915.6	25 52	73 14	-1714	C.A.F.
			1919.6	25 52	73 13	-1706	C.A.F.
Ashcroft.....	50 44	121 07	1907.7	27 36	73 22	-1724	J.C.P.
			1908.7	27 46	73 26	-1719	C.A.F.
			1919.6	27 50	73 20	-1714	C.A.F.
North Bend, A.....	49 53	121 27	1908.7	25 47	72 32	-1793	C.A.F.
			1919.6	25 58	72 25	-1728	C.A.F.

## RESULTS OF OBSERVATIONS AT REPEAT STATIONS

Station	Lat.	Long.	Date	Value			Observer
				Declin.	Dip	Hor. Int.	
	° /	° /		East ° /	° /	c. g. s.	
Fort George South....	53 55	122 45	1913.7	28 46	75 10	·1536	C.A.F.
			1915.7	28 46	75 10	·1531	C.A.F.
			1919.5	28 42	75 09	·1528	C.A.F.
Vancouver.....	49 18	123 07	1908.8	25 22	71 43	·1870	C.A.F.
			1915.6	25 37	71 34	·1874	C.A.F.
			1919.6	25 18	71 18	·1885	C.A.F.
Victoria.....	48 24	123 23	1907.8	24 15	71 18	·1882	L.A.B.
			1908.8	24 33	71 18	·1874	C.A.F.
			1919.6	24 44	71 11	·1867	C.A.F.
Nanaimo.....	49 13	123 56	1908.8	25 14	71 21	·1878	C.A.F.
			1919.6	25 27	71 13	·1869	C.A.F.
Endako.....	54 05	125 02	1915.7	29 04	74 56	·1546	C.A.F.
			1919.6	29 07	74 55	·1542	C.A.F.
Smithers.....	54 47	127 12	1915.7	29 35	74 59	·1537	C.A.F.
			1919.6	29 35	74 59	·1536	C.A.F.
Pacific.....	54 46	128 16	1915.7	30 16	74 25	·1587	C.A.F.
			1919.6	30 19	74 24	·1583	C.A.F.
Prince Rupert.....	54 18	130 20	1915.6	29 01	73 38	·1645	C.A.F.
			1919.6	29 01	73 34	·1642	C.A.F.



## MAGNETIC OBSERVATIONS, 1907-20

Station	Lat.	Long.	Date	Observed			Reduced to 1921-0		
				D.	I.	H.	D.	I.	H.
				West ° /	° /	c.g.s.	West ° /	° /	c.g.s.
Blanc Sablon (Labrador) ..	51 25.8	57 12	1920-7	32 19	76 05	-1361	32 19	76 04	-1361
Blanc Sablon (Greenly Island).	51 22.8	57 14	1920-7	33 14	75 41	-1398	33 14	75 40	-1398
Salmon Bay .....	51 25.3	57 39	1920-7	30 25	76 10	-1347	30 25	76 10	-1347
Humbermouth (Bay of Islands, Nfld.).	48 58.3	58 00	1920-7	30 30	74 57	-1473	30 29	74 57	-1473
Rocky Bay .....	51 19.4	58 05	1909-7	31 17	76 34	-1334	31 02	76 15	-1338
St. Augustin (Outer Isl'd).	51 10.2	58 33	1909-7	35 19	76 29	-1352	35 06	76 10	-1356
St. Augustin River .....	51 13.4	58 42	1920-6	33 24	76 05	-1384	33 24	76 05	-1384
Mutton Bay .....	50 46.6	59 06	1920-6	29 59	76 34	-1353	29 58	76 34	-1354
Harrington Harbour .....	50 30.1	59 29	1920-6	31 10	76 04	-1371	31 10	76 03	-1371
Wapitagan .....	50 12.5	60 04	1909-6	26 12	76 07	-1319	26 06	75 49	-1322
Sydney, B. ....	46 08.8	60 12	1920-7	26 02	74 02	-1558	26 03	74 02	-1558
Sydney, A. ....	46 08.8	60 12	1907-8	25 29	74 17	-1561	26 03	74 03	-1546
La Romaine .....	50 12.6	60 44	1909-6	35 46	77 32	-1269	35 43	77 14	-1272
Kegashka .....	50 10.8	61 20	1909-6	30 19	76 44	-1346	30 18	76 26	-1349
Mulgrave, A. ....	45 36.3	61 23	1907-8	24 14	73 54	-1609	25 02	73 41	-1589
Mulgrave, B. ....	45 36.3	61 23	1912-7	24 24	73 47	-1614	24 50	73 39	-1601
Mulgrave, C. ....	45 36.3	61 23	1912-8	24 32	73 46	-1612	24 57	73 38	-1599
Natashkwan .....	50 11.3	61 56	1920-6	29 41	76 32	-1350	29 41	76 31	-1350
Antigonish .....	45 35.6	61 59	1907-9	23 26	74 18	-1594	24 15	74 05	-1573
Pictou .....	45 38.0	62 44	1907-9	23 03	74 31	-1575	23 53	74 19	-1553
Piashti Bay .....	50 17.2	62 52	1909-6	30 14	77 00	-1334	30 20	76 43	-1336
Charlottetown .....	46 14.0	63 07	1918-5	24 17	74 45	-1525	24 25	74 43	-1521
Truro .....	45 21.3	63 17	1920-7	22 56	73 42	-1611	22 57	73 42	-1610
Elmsdale .....	44 59.2	63 31	1912-6	22 17	73 48	-1620	22 48	73 40	-1603
Folleigh Lake .....	45 33.7	63 33	1912-6	23 05	74 18	-1592	23 35	74 10	-1576
Halifax .....	44 37.6	63 35	1918-5	21 58	73 47	-1602	22 09	73 45	-1597
Pugwash .....	45 50.2	63 40	1907-9	22 40	74 49	-1542	23 31	74 36	-1519
Eskimo Point, A. ....	50 14.6	63 42	1920-6	35 33	76 20	-1384	35 34	76 19	-1384
Eskimo Point, B. ....	50 14.6	63 42	1920-6	34 46	76 19	-1384	34 46	76 18	-1384
Oxford Junction .....	45 42.5	63 53	1912-6	22 27	74 42	-1549	22 57	74 33	-1533
Black Point .....	44 39.1	63 59	1912-6	21 42	73 53	-1615	22 14	73 46	-1597
Windsor .....	44 59.6	64 09	1912-7	21 49	73 58	-1611	22 21	73 51	-1594
Amherst .....	45 50.6	64 11	1912-6	22 52	74 37	-1561	23 22	74 29	-1546
Chester .....	44 33.2	64 14	1912-7	21 25	73 50	-1624	21 59	73 42	-1606
Lunenburg .....	44 22.5	64 18	1912-7	20 51	73 53	-1619	21 24	73 45	-1600
Rivière St. Jean .....	50 17.1	64 24	1909-6	27 40	77 10	-1335	27 53	76 52	-1337
Memramcook .....	46 01.0	64 30	1912-6	22 33	74 57	-1526	23 03	74 49	-1511
Shediac .....	46 12.1	64 32	1907-9	22 47	75 04	-1518	23 37	74 50	-1496
New Germany .....	44 33.1	64 43	1912-7	21 02	73 51	-1623	21 36	73 44	-1604
Liverpool .....	44 03.1	64 44	1912-7	19 56	74 49	-1523	20 31	74 41	-1502
Moncton .....	46 05.0	64 47	1920-7	23 11	74 55	-1506	23 12	74 55	-1505
Thunder River .....	50 16.3	64 50	1909-6	27 54	78 05	-1225	28 09	77 48	-1226
Richibucto .....	46 40.6	64 52	1907-9	22 37	75 37	-1476	23 26	75 22	-1456
Canaan .....	46 15.1	65 04	1912-6	22 26	75 23	-1489	22 56	75 14	-1474
Middleton .....	44 57.2	65 04	1912-7	20 54	74 10	-1597	21 27	74 02	-1579
Petitcodiac .....	45 57.5	65 09	1912-8	22 16	75 02	-1527	22 46	74 53	-1512
Shallop .....	50 17.2	65 10	1909-5	30 18	77 43	-1279	30 35	77 26	-1280
Kent Junction .....	46 35.1	65 17	1912-5	22 46	75 25	-1485	23 16	75 16	-1471
Shelburne .....	43 45.5	65 20	1912-7	19 40	73 40	-1636	20 16	73 33	-1614
Annapolis .....	44 45.0	65 31	1918-5	21 09	73 59	-1598	21 19	73 56	-1592
Newcastle, A. ....	47 00.2	65 34	1907-9	22 48	75 36	-1463	23 38	75 21	-1444

## MAGNETIC OBSERVATIONS, 1907-20

Station	Lat.	Long.	Date	Observed			Reduced to 1921.0		
				D.	I.	H.	D.	I.	H.
				West ° /	° /	c.g.s.	West ° /	° /	c.g.s.
Newcastle, B.....	47 00.2	65 34	1912.5	23 29	75 37	-1466	23 59	75 28	-1453
Bartibogue.....	47 18.0	65 34	1912.5	23 24	75 46	-1458	23 53	75 36	-1444
Barrington.....	43 34.2	65 36	1912.7	19 28	73 35	-1643	20 05	73 28	-1620
Bathurst.....	47 37.2	65 37	1912.5	24 14	76 00	-1436	24 43	75 50	-1424
Pigou.....	50 16.2	65 37	1909.5	28 45	77 03	-1335	29 04	76 46	-1336
Norton.....	45 38.4	65 41	1912.8	21 37	74 45	-1552	22 09	74 37	-1535
Weymouth.....	44 25.0	65 58	1912.7	20 00	74 00	-1619	20 33	73 52	-1601
Mispec.....	45 13.3	65 59	1907.8	20 05	75 06	.....	21 07	74 54	.....
Jacquet River.....	47 55.4	66 00	1912.5	24 20	76 19	-1416	24 49	76 10	-1405
St. John.....	45 16.8	66 03	1918.5	21 07	74 16	-1580	21 18	74 14	-1574
St. John, C.I.....	45 17.0	66 04	1909.6	21 08	74 21	-1605	21 59	74 10	-1580
Yarmouth.....	43 49.8	66 06	1912.7	17 27	74 14	-1579	18 03	74 07	-1555
Moisie River.....	50 11.6	66 07	1909.5	28 28	77 51	-1273	28 49	77 34	-1273
Seven Islands (Pointe aux Basques).....	50 11.2	66 24	1920.6	26 54	77 36	-1274	26 55	77 35	-1274
Seven Islands.....	50 12.6	66 25	1920.6	27 23	77 34	-1266	27 24	77 34	-1266
Boiestown.....	46 27.3	66 25	1912.8	22 01	75 29	-1481	22 32	75 21	-1466
Dalhousie Junction.....	48 02.8	66 32	1912.5	24 17	76 19	-1407	24 46	76 09	-1396
Fredericton Junction.....	45 40.5	66 38	1912.8	21 24	75 02	-1531	21 56	74 54	-1514
Fredericton.....	45 57.0	66 38	1912.8	21 11	75 24	-1491	21 43	75 16	-1475
Matapedia.....	47 58.5	66 57	1920.7	23 49	76 20	-1386	23 50	76 20	-1385
Pentecôte River.....	49 46.7	67 12	1909.5	25 52	77 40	-1290	26 18	77 24	-1289
Causapscal.....	48 21.2	67 17	1912.5	23 40	76 32	-1393	24 08	76 22	-1382
Woodstock.....	46 09.6	67 35	1918.5	20 37	75 24	-1477	20 47	75 22	-1472
Godbout, A.....	49 19.0	67 38	1920.5	24 56	77 20	-1293	24 57	77 19	-1293
Godbout, B.....	49 19.0	67 38	1920.5	24 54	77 21	-1294	24 55	77 20	-1294
Sayabec.....	48 34.3	67 44	1912.5	23 48	76 50	-1368	24 17	76 40	-1358
Ste. Flavie.....	48 35.6	68 15	1912.5	23 43	76 51	-1377	24 12	76 41	-1367
Manikouagan.....	49 11.4	68 16	1909.5	25 19	77 30	-1311	25 50	77 16	-1307
Edmundston.....	47 22.1	68 20	1912.8	21 41	76 16	-1419	22 11	76 08	-1405
Rimouski.....	48 29.6	68 31	1920.5	23 22	76 41	-1377	23 24	76 40	-1376
Bersimis.....	48 56.1	68 40	1920.5	21 36	77 41	-1276	21 37	77 40	-1276
Bic.....	48 23.6	68 44	1912.5	22 33	76 45	-1388	23 03	76 36	-1377
Cap Colombier.....	48 50.5	68 54	1909.4	23 46	77 22	-1332	24 20	77 08	-1327
Portneuf.....	48 36.4	69 08	1909.4	20 48	77 28	-1312	21 24	77 16	-1306
Trois Pistoles.....	48 08.5	69 10	1912.5	21 51	76 42	-1392	22 22	76 33	-1381
Rivière du Loup, A.....	47 51.6	69 32	1918.4	21 24	76 27	-1397	21 35	76 25	-1393
Rivière du Loup, B.....	47 51.6	69 32	1920.5	21 34	76 24	-1397	21 37	76 24	-1396
Les Escoumains.....	48 20.9	69 33	1909.4	22 08	76 52	-1386	22 46	76 39	-1378
Tadoussac.....	48 08.5	69 42	1920.5	20 57	77 05	-1334	20 59	77 04	-1334
Ste. Hélène.....	47 36.0	69 44	1912.5	20 55	76 28	-1410	21 27	77 20	-1397
St. Siméon.....	47 50.6	69 52	1909.7	19 55	76 52	-1369	20 33	76 41	-1359
Ste. Anne.....	47 22.7	70 03	1912.5	20 16	76 23	-1421	20 48	76 15	-1407
Murray Bay.....	47 38.4	70 09	1909.7	20 07	76 34	-1408	20 47	76 23	-1397
L'Islet.....	47 07.0	70 20	1912.5	19 32	76 18	-1427	20 05	76 11	-1412
Les Eboulements.....	47 26.7	70 23	1909.7	19 31	76 33	-1409	20 12	76 24	-1396
St. Valier.....	46 52.6	70 48	1912.4	19 11	76 12	-1438	19 45	76 05	-1421
Bagotville.....	48 20.0	70 50	1913.4	21 36	77 46	-1284	22 03	77 39	-1274
St. Joachim.....	47 03.4	70 52	1909.7	18 12	76 11	-1454	18 55	76 04	-1438
Megantic.....	45 34.4	70 53	1907.7	16 34	75 41	-1496	17 33	75 34	-1462
Tring Junction.....	46 15.5	71 00	1907.7	17 23	76 07	-1460	18 20	75 58	-1431
Chicoutimi, A.....	48 25.4	71 04	1918.6	21 09	77 17	-1325	21 17	77 16	-1321

## MAGNETIC OBSERVATIONS, 1907-20

Station	Lat.	Long.	Date	Observed			Reduced to 1921.0		
				D.	I.	H.	D.	I.	H.
	° /	° /		West ° /	° /	c.g.s.	West ° /	° /	c.g.s.
Chicoutimi, B.....	48 25.4	71 04	1918.6	20 51	77 25	.1314	20 59	77 23	.1310
Quebec.....	46 48.0	71 15	1920.8	19 02	75 54	.1454	19 03	75 54	.1454
Lake St. Joseph.....	46 52.5	71 32	1913.4	17 20	76 24	.1426	17 50	76 19	.1411
Pont Rouge.....	46 46.0	71 43	1912.4	17 48	76 30	.1416	18 02	76 24	.1399
Sherbrooke, A.....	45 23.9	71 56	1907.7	16 01	75 27	.1510	17 00	75 21	.1473
Sherbrooke, B.....	45 23.9	71 56	1920.6	15 30	75 14	.1548	15 31	75 14	.1547
Kiskisink.....	47 55.9	72 09	1913.4	18 10	76 43	.1388	18 39	76 37	.1376
Rivière à Pierre.....	46 59.3	72 11	1913.4	15 24	76 17	.1428	15 53	76 12	.1413
Lake Bouchette.....	48 16.7	72 11	1913.4	12 32	78 12	.1233	13 00	78 06	.1223
La Perade.....	46 35.0	72 13	1912.4	17 27	76 07	.1454	18 01	76 02	.1436
Roberval.....	48 30.8	72 14	1913.4	20 51	77 25	.1326	21 20	77 19	.1316
La Tuque Junction.....	47 16.6	72 16	1913.4	17 05	76 18	.1444	17 34	76 12	.1430
Lake Edward, C.I.....	47 39.5	72 16	1906.7	19 34	76 54	.1390	20 34	76 42	.1370
Lake Edward.....	47 39.5	72 16	1913.4	20 16	76 52	.1380	20 45	76 47	.1367
Hervey Junction.....	46 51.4	72 29	1914.4	19 19	76 36	.1411	19 44	76 32	.1397
Three Rivers.....	46 21.0	72 32	1918.5	16 21	75 55	.1459	16 32	75 54	.1454
Garneau Junction.....	46 38.5	72 39	1913.4	17 23	76 17	.1449	17 53	76 12	.1432
Lac Chat.....	47 09.6	72 42	1914.4	16 14	76 39	.1401	16 39	76 35	.1388
La Tuque, A.....	47 26.8	72 49	1918.6	16 59	76 48	.1369	17 09	76 46	.1365
La Tuque, B.....	47 26.8	72 49	1918.6	16 29	76 39	.1386	16 39	76 38	.1382
Louiseville.....	46 16.5	72 56	1912.4	15 57	76 02	.1467	16 32	75 57	.1447
Farnham.....	45 16.1	73 02	1907.7	15 13	75 20	.1538	16 12	75 16	.1499
Berthier.....	46 06.3	73 11	1912.4	16 52	76 02	.1469	17 26	75 58	.1448
Windigo.....	47 46.6	73 22	1914.4	18 53	76 48	.1401	19 18	76 44	.1390
Montreal.....	45 30.3	73 35	1912.4	15 28	75 37	.1503	16 03	75 33	.1479
Terrebonne.....	45 42.8	73 40	1918.4	15 22	75 49	.1467	15 32	75 48	.1460
Manuan.....	47 54.3	73 50	1914.4	18 31	77 18	.1338	18 56	75 15	.1326
Ste. Thérèse.....	45 39.2	73 52	1912.4	15 28	75 42	.1501	16 02	75 39	.1478
Lachute.....	45 40.0	74 20	1912.4	14 00	75 45	.1512	14 35	75 42	.1488
Calumet.....	45 39.6	74 38	1912.4	13 21	75 38	.1519	13 56	75 35	.1495
Parent.....	47 55.4	74 38	1918.6	15 13	77 30	.1313	15 23	77 29	.1308
Cornwall.....	45 01.4	74 43	1920.7	12 52	75 22	.1515	12 53	75 22	.1514
Papineauville.....	45 37.4	75 01	1912.3	13 27	75 46	.1510	14 02	75 43	.1486
Oscaneo.....	48 06.4	75 10	1914.5	16 12	77 56	.1283	16 37	77 53	.1272
Buckingham Junction.....	45 33.5	75 26	1912.3	13 45	75 33	.1528	14 20	75 31	.1503
Brockville, A.....	44 36.3	75 41	1907.7	10 35	75 04	.1575	11 32	75 04	.1527
Brockville, B.....	44 36.3	75 41	1920.7	10 41	75 06	.1544	10 42	75 06	.1542
White Shore Lake.....	48 12.0	75 41	1914.5	15 28	77 42	.1304	15 53	77 39	.1294
Ottawa.....	45 23.6	75 43	1920.6	13 44	75 40	.1485	13 46	75 40	.1484
Maniwaki.....	46 22.5	75 59	1918.4	14 14	76 29	.1415	14 24	76 29	.1409
Carleton Place.....	45 08.7	76 09	1913.4	11 41	75 22	.1535	12 11	75 21	.1511
Arnprior.....	45 26.2	76 23	1913.4	11 56	75 45	.1503	12 26	75 43	.1480
Kingston, R.M.C.....	44 13.8	76 28	1907.6	36 47	73 27	.1706	37 45	73 30	.1654
Kingston Junction.....	44 15.2	76 28	1907.7	14 18	74 58	.1611	15 15	75 00	.1559
Kingston Barracks.....	44 13.0	76 29	1907.7	30 08	74 37	.....	31 05	74 40	.....
Doucet.....	48 13.8	76 34	1918.6	14 31	77 39	.1306	14 41	77 38	.1303
Renfrew, C.I.....	45 29.0	76 40	1906.7	11 14	75 47	.1512	12 15	75 47	.1467
Renfrew.....	45 28.5	76 41	1920.6	12 19	76 05	.1449	12 21	76 05	.1448
Sharbot Lake.....	44 46.0	76 41	1920.7	12 30	74 54	.1577	12 32	74 54	.1576
Napanee.....	44 15.9	77 00	1910.9	10 38	74 25	.1635	11 19	74 26	.1597
Pembroke.....	45 49.3	77 07	1913.5	10 43	76 12	.1460	11 13	76 11	.1438
Bell River.....	48 23.4	77 14	1914.5	13 50	77 57	.1290	14 16	77 54	.1280
Belleville, A.....	44 09.2	77 26	1910.9	8 56	74 55	.1574	9 37	74 57	.1535



## MAGNETIC OBSERVATIONS, 1907-20

Station	Lat.	Long.	Date	Observed			Reduced to 1921.0		
				D.	I.	H.	D.	I.	H.
				West °   '   "	°   '   "	c.g.s.	West °   '   "	°   '   "	c.g.s.
Belleville, B.....	44 07.1	77 26	1920.7	9 45	74 56	.1540	9 46	74 56	.1539
Chalk River, A.....	46 00.8	77 28	1913.5	10 56	76 21	.1447	11 26	76 21	.1426
Chalk River, B.....	46 00.8	77 28	1920.6	11 27	76 22	.1432	11 29	76 22	.1431
Barry Bay.....	45 28.8	77 40	1907.6	8 47	75 54	.1499	9 44	75 55	.1456
Brighton.....	44 02.0	77 44	1910.9	8 43	74 49	.1594	9 24	74 53	.1553
Stonecliffe.....	46 13.8	78 05	1913.5	10 45	76 22	.1447	11 15	76 22	.1427
Harricanaw.....	48 34.5	78 07	1914.5	12 36	78 08	.1271	13 03	78 07	.1262
Peterborough.....	44 18.6	78 18	1910.9	8 46	74 43	.1631	9 27	74 46	.1592
Newcastle, A.....	43 54.3	78 32	1910.9	7 48	74 43	.1607	8 29	74 47	.1565
Newcastle, B.....	43 54.3	78 32	1920.7	8 12	74 46	.1576	8 14	74 46	.1574
Kinmount, A.....	44 47.1	78 38	1910.8	8 42	75 17	.1547	9 23	75 20	.1511
Kinmount, B.....	44 47.6	78 38	1920.7	5 52	74 58	.1593	5 53	74 58	.1592
Kinmount, C.....	44 48.2	78 38	1920.7	9 54	75 22	.1522	9 55	75 22	.1521
O'Brien.....	48 40.2	78 41	1918.6	12 30	78 06	.1260	12 40	78 06	.1257
Mattawa, A.....	46 19.5	78 42	1918.7	9 38	76 43	.1405	9 47	76 43	.1398
Mattawa, B.....	46 19.5	78 42	1920.6	9 58	76 41	.1397	10 00	76 41	.1396
Lindsay.....	44 21.0	78 44	1910.8	7 37	75 10	.1571	8 18	75 13	.1532
Joe Lake.....	45 34.7	78 46	1920.6	7 48	76 08	.1483	7 50	76 08	.1482
Pickering.....	43 51.3	79 04	1910.8	7 09	74 44	.1611	7 50	74 49	.1568
Niagara Falls.....	43 07.7	79 06	1910.7	6 01	74 12	.1647	6 42	74 20	.1599
Beaverton.....	44 26.0	79 07	1910.8	7 33	75 03	.1579	8 14	75 07	.1540
Port Colborne.....	42 53.2	79 14	1920.5	6 26	74 06	.1636	6 28	74 06	.1634
Orillia.....	44 35.8	79 25	1910.8	5 40	75 30	.1537	6 20	75 34	.1499
North Bay, C.I.....	46 18.8	79 26	1906.8	8 44	76 38	.1441	9 43	76 41	.1401
North Bay, A.....	46 18.8	79 26	1907.5	8 57	76 36	.1431	9 53	76 39	.1393
North Bay, B.....	46 18.8	79 26	1920.6	9 35	76 37	.1407	9 36	76 37	.1406
Beamsville.....	43 11.5	79 28	1920.5	6 30	74 38	.1610	6 32	74 38	.1608
Lovering.....	44 45.9	79 37	1916.4	7 46	75 20	.1538	8 02	75 22	.1524
Goodwin.....	48 54.4	79 41	1914.5	11 23	78 21	.1251	11 51	78 19	.1243
Liskeard, C.I.....	47 30.6	79 42	1906.8	8 50	77 35	.1347	9 50	77 36	.1317
Liskeard, A.....	47 30.6	79 42	1918.6	9 30	77 31	.1322	9 40	77 31	.1317
Liskeard, B.....	47 30.6	79 42	1918.6	9 37	77 29	.1321	9 46	77 29	.1316
Barrie.....	44 23.7	79 42	1910.8	6 47	75 20	.1552	7 28	75 25	.1513
Craighurst.....	44 32.5	79 42	1916.4	7 27	75 27	.1532	7 43	75 29	.1517
Bolton.....	43 53.1	79 44	1916.4	6 42	74 48	.1596	6 58	74 50	.1580
MacTier.....	45 08.7	79 46	1916.4	7 13	75 47	.1496	7 30	75 48	.1482
Brampton.....	43 40.9	79 46	1910.6	5 58	74 35	.1628	6 39	74 41	.1583
Timagami.....	47 03.8	79 47	1913.5	12 22	76 06	.1503	12 53	76 06	.1486
Cayuga.....	42 58.0	79 51	1910.7	6 36	73 50	.1703	7 16	73 59	.1654
Alliston.....	44 09.0	79 53	1916.4	6 31	75 04	.1571	6 47	75 06	.1556
Hamilton.....	43 14.4	79 54	1910.7	5 33	74 19	.1652	6 14	74 27	.1604
Englehart, C.I.....	47 49.9	79 53	1906.8	9 06	77 50	.1319	10 06	77 50	.1292
Englehart.....	47 49.6	79 55	1913.5	9 08	77 52	.1304	9 39	77 52	.1290
Sturgeon Falls.....	46 22.2	79 55	1913.6	9 07	76 40	.1431	9 37	76 41	.1411
Penetanguishene.....	44 46.4	79 58	1920.6	8 06	75 34	.1504	8 07	75 34	.1502
Rose Point.....	45 19.1	80 02	1907.6	6 50	75 36	.1523	7 46	75 42	.1477
Parry Sound.....	45 21.6	80 03	1920.6	8 09	75 40	.1493	8 11	75 40	.1492
Orangeville.....	43 54.7	80 05	1910.8	6 03	74 43	.1617	6 43	74 49	.1575
Swastika.....	48 07.7	80 07	1913.5	9 05	78 21	.1251	9 36	78 20	.1238
Low Bush.....	48 55.1	80 10	1914.5	11 05	78 19	.1258	11 33	78 18	.1249
Guelph.....	43 33.0	80 15	1910.6	5 51	74 28	.1642	6 32	74 36	.1596
Brantford.....	43 08.7	80 16	1910.7	4 45	74 14	.1661	5 25	74 22	.1612

## MAGNETIC OBSERVATIONS, 1907-20

Station	Lat.	Long.	Date	Observed			Reduced to 1921-0		
				D.	I.	H.	D.	I.	H.
				West °   '   "	°   '   "	c.g.s.	West °   '   "	°   '   "	c.g.s.
Simcoe.....	42 51.0	80 20	1910.7	4 55	74 06	·1679	5 35	74 15	·1628
Matheson, C.I.....	48 31.5	80 27	1909.5	9 25	78 48	·1213	10 14	78 48	·1194
Matheson, C.I.....	48 32.0	80 27	1909.5	9 42	.....	·1233	10 31	.....	·1214
Matheson.....	48 32.0	80 28	1913.5	9 47	78 33	·1235	10 19	78 32	·1223
Port Rowan.....	42 38.0	80 28	1910.6	4 41	73 49	·1702	5 20	74 00	·1649
Kitchener.....	43 26.9	80 30	1920.5	6 18	74 33	·1612	6 19	74 33	·1610
Markstay.....	46 30.6	80 33	1913.6	7 47	76 36	·1434	8 16	76 37	·1414
Byng Inlet, A.....	45 47.0	80 34	1916.4	8 03	76 06	·1478	8 20	76 07	·1465
Byng Inlet, B.....	45 47.0	80 34	1920.6	7 50	75 50	·1494	7 52	75 50	·1493
Flesherton.....	44 14.9	80 34	1910.8	5 27	74 57	·1558	6 07	75 03	·1517/
Woodstock.....	43 07.5	80 44	1910.7	3 55	74 08	·1671	4 34	74 16	·1623
Mount Forest.....	43 59.2	80 45	1910.8	5 08	74 46	·1607	5 48	74 53	·1565
Iroquois Falls Junction..	48 42.6	80 47	1913.5	9 36	78 33	·1236	10 08	78 32	·1223
Burwash.....	46 19.2	80 47	1916.4	7 38	76 35	·1422	7 55	76 36	·1410
Port Burwell.....	42 38.9	80 49	1910.7	4 16	73 46	·1700	4 55	73 55	·1648
Owen Sound.....	44 35.0	80 55	1920.6	6 40	75 16	·1538	6 41	75 16	·1537
Stratford.....	43 21.8	80 58	1910.6	3 50	74 25	·1653	4 29	74 33	·1605
Sudbury, C.I.....	46 30.0	81 00	1906.7	6 27	76 22	·1476	7 27	76 27	·1436
Sudbury, A.....	46 30.9	81 02	1907.5	6 56	76 35	·1449	7 51	76 40	·1412
Sudbury, B.....	46 30.9	81 02	1916.5	7 46	76 34	·1433	8 04	76 34	·1421/
Sudbury, C.....	46 30.9	81 02	1919.4	7 56	76 31	·1435	8 03	76 32	·1430
Cochrane.....	49 04.0	81 02	1918.6	9 37	78 25	·1236	9 47	78 24	·1232
Caipha (Laforest).....	47 01.8	81 12	1916.5	6 27	77 06	·1372	6 45	77 06	·1362
Port Stanley.....	42 39.9	81 14	1920.5	3 13	74 13	·1629	3 14	74 14	·1627
London (Hyde Park Jet)..	42 59.3	81 19	1910.8	3 35	74 00	·1678	4 14	74 09	·1629
Timmins.....	48 28.6	81 20	1913.5	8 16	78 14	·1273	8 47	78 14	·1260
Wingham.....	43 54.1	81 21	1910.8	4 31	74 40	·1622	5 11	74 47	·1579
Lucan.....	43 10.7	81 25	1910.6	3 57	74 03	·1682	4 37	74 12	·1633
Kashbaw.....	47 25.3	81 32	1916.5	8 24	77 16	·1365	8 43	77 16	·1356
Cartier.....	46 42.4	81 34	1913.6	7 55	77 03	·1395	8 25	77 04	·1376/
Nairn.....	46 20.4	81 35	1916.4	6 09	76 30	·1439	6 27	76 32	·1427
Kincardine.....	44 10.3	81 38	1910.8	5 27	74 38	·1632	6 06	74 45	·1590
Rodney.....	42 34.0	81 41	1910.7	3 31	73 47	·1712	4 09	73 57	·1660
Goderich.....	43 45.7	81 42	1920.5	5 12	74 38	·1601	5 14	74 39	·1599
Gogama.....	47 40.3	81 43	1916.5	7 25	77 31	·1335	7 44	77 31	·1326
Forest.....	43 05.6	82 01	1910.6	3 42	73 58	·1689	4 21	74 07	·1639
Fauquier.....	49 18.8	82 03	1914.6	8 08	78 46	·1220	8 31	78 44	·1209
Massey.....	46 13.2	82 04	1916.4	5 45	76 26	·1444	6 03	76 28	·1431
Bisco, C.I.....	47 17.8	82 08	1906.7	3 07	77 09	·1383	4 07	77 14	·1348
Bisco.....	47 18.0	82 06	1913.6	6 42	77 21	·1365	7 13	77 22	·1349/
Tionaga.....	47 05.7	82 07	1916.5	5 53	78 02	·1290	6 12	78 02	·1282
Chatham.....	42 23.1	82 10	1910.6	2 27	73 38	·1724	3 05	73 47	·1669
Sarnia.....	42 57.7	82 22	1920.5	3 19	73 59	·1665	3 20	73 59	·1664
Foleyet.....	48 15.1	82 24	1916.5	7 18	78 10	·1269	7 36	78 09	·1260
Port Lambton.....	42 39.0	82 30	1910.6	2 50	73 33	·1732	3 28	73 43	·1679
Woman River.....	47 31.5	82 39	1913.6	5 32	77 42	·1331	6 03	77 44	·1315
Belle River.....	42 17.4	82 42	1910.6	1 51	73 22	·1743	2 28	73 32	·1688
Kingsville.....	42 02.2	82 46	1920.5	2 03	73 19	·1724	2 04	73 19	·1722
Algoma.....	46 11.4	82 49	1918.7	5 28	76 35	·1423	5 37	76 36	·1417
Agate.....	48 32.0	82 58	1916.6	6 07	78 13	·1263	6 23	78 12	·1254/
Windsor.....	42 17.9	83 00	1920.5	2 39	73 24	·1713	2 40	73 25	·1711
Mattice.....	49 37.1	83 16	1914.6	6 51	79 00	·1191	7 13	78 57	·1181
Chapleau.....	47 50.3	83 24	1918.7	4 55	77 52	·1301	5 04	77 52	·1297



## MAGNETIC OBSERVATIONS, 1907-20

Station	Lat.	Long.	Date	Observed			Reduced to 1921.0		
				D.	I.	H.	D.	I.	H.
				West ° ' "	° ' "	c.g.s.	West ° ' "	° ' "	c.g.s.
Thessalon.....	46 16.3	83 33	1916.4	4 26	76 32	.1436	4 44	76 34	.1424
Fire River.....	48 46.4	83 36	1916.6	6 05	78 19	.1258	6 21	78 18	.1250
Hearst.....	49 40.9	83 41	1918.6	5 02	79 01	.1184	5 10	79 00	.1180
Wayland.....	48 02.4	83 50	1910.4	5 10	77 58	.1305	5 52	78 00	.1282
Desbarats.....	46 21.3	83 56	1916.5	4 55	76 36	.1434	5 13	76 37	.1422
Searchmont.....	46 47.1	84 02	1916.5	4 09	77 10	.1378	4 26	77 11	.1368
Missinaibi.....	48 18.8	84 05	1910.4	5 50	77 50	.1326	6 32	77 51	.1304
Oba.....	49 04.0	84 07	1916.6	6 05	78 38	.1233	6 20	78 36	.1225
Tatnall.....	48 41.8	84 14	1916.5	5 32	78 25	.1247	5 48	78 23	.1239
Pangis.....	47 08.2	84 16	1916.5	4 12	77 11	.1374	4 29	77 11	.1364/
Sault Ste. Marie.....	46 30.9	84 18	1918.7	3 38	77 01	.1392	3 46	77 02	.1386
Agawa.....	47 40.3	84 30	1916.5	4 08	77 33	.1334	4 25	77 32	.1324
Hawk Junction.....	48 05.7	84 33	1916.5	4 47	77 58	.1300	5 03	77 57	.1291
Frater.....	47 20.4	84 33	1916.5	4 14	77 31	.1341	4 31	77 31	.1331
Grasett.....	48 27.3	84 38	1910.4	3 47	78 10	.1286	4 28	78 10	.1265
Hornepayne.....	49 13.7	84 47	1916.6	4 31	78 52	.1210	4 47	78 50	.1202
Sabinoff.....	49 56.8	85 01	1914.6	East 36 41	86 17	.0407	East 36 18	86 14	.0398
White River, A.....	48 35.2	85 16	1910.4	West 3 13	78 19	.1276	West 3 53	78 20	.1254
White River, B.....	48 35.2	85 16	1918.7	4 17	78 15	.1266	4 25	78 14	.1261
Hillsport.....	49 27.4	85 33	1916.6	3 53	79 14	.1162	4 08	79 12	.1155/
Montizambert.....	48 41.3	85 39	1910.4	2 23	78 25	.1268	3 03	78 26	.1247
Kenogami River.....	50 05.1	85 50	1914.6	4 22	79 14	.1174	4 46	79 12	.1164
Caramat.....	49 37.0	86 08	1916.6	5 05	78 24	.1262	5 21	78 22	.1255
Heron Bay.....	48 39.3	86 17	1910.4	2 34	78 04	.1307	3 13	78 05	.1285
Grant.....	50 07.5	86 18	1918.6	2 58	79 19	.1157	3 07	79 18	.1157
Longuelac.....	49 47.4	86 33	1916.6	1 16	78 48	.1216	1 31	78 46	.1209
Middleton.....	48 47.7	86 40	1910.4	East 17 48	80 22	.1041	East 17 09	80 22	.1019
Bankfield.....	49 44.4	87 01	1916.6	West 2 21	80 11	.1056	West 2 37	80 10	.1048
Schreiber.....	48 48.5	87 17	1918.7	1 09	78 25	.1246	1 17	78 24	.1241
Jellicoe.....	49 41.8	87 31	1916.6	0 40	79 08	.1182	0 56	79 06	.1175/
Gravel.....	48 54.7	87 44	1910.4	East 0 24	78 35	.1244	West 0 14	78 35	.1223
Ombabika.....	50 13.6	87 56	1914.6	West 0 51	79 26	.1159	1 14	79 23	.1150
Beardmore.....	49 36.6	87 57	1916.6	1 48	78 46	.1225	2 03	78 44	.1218
Orient Bay.....	49 22.5	88 08	1916.6	East 0 09	78 43	.1224	West 0 06	78 41	.1216
Nipigon.....	49 00.7	88 16	1910.4	East 1 06	78 30	.1264	East 0 28	78 30	.1243
Dorion.....	48 46.8	88 32	1910.5	1 38	78 17	.1281	1 01	78 17	.1260
Mackenzie.....	48 33.0	88 58	1910.5	2 48	78 14	.1301	2 11	78 14	.1278
Armstrong.....	50 18.5	89 06	1918.6	0 35	79 36	.1139	0 27	79 35	.1136
Fort William, C.I.....	48 23.7	89 15	1907.5	3 48	77 42	.1333	3 00	77 44	.1301
Fort William.....	48 23.9	89 15	1916.6	2 52	77 51	.1315	2 36	77 49	.1305/
Twin City Junction.....	48 22.3	89 24	1918.7	2 37	77 52	.1309	2 29	77 51	.1304
Kaministiquia.....	48 31.5	89 35	1910.5	West 0 24	80 04	.1074	West 0 12	80 04	.1050
Raith.....	48 49.8	89 54	1910.5	East 3 49	78 11	.1294	East 3 13	78 11	.1272

## MAGNETIC OBSERVATIONS, 1907-20

Station	Lat.	Long.	Date	Observed			Reduced to 1921.0		
				D.	I.	H.	D.	I.	H.
				East ° ' "	° ' "	c.g.s.	East ° ' "	° ' "	c.g.s.
Savanne.....	48 57.0	90 14	1910.5	4 27	78 12	-1294	3 52	78 12	-1273
Mack.....	49 09.8	90 23	1916.6	4 27	78 08	-1293	4 13	78 06	-1285
Niblock.....	49 16.3	90 41	1910.5	4 54	78 11	-1300	4 18	78 10	-1281
Petry.....	49 20.5	90 51	1916.7	4 25	78 16	-1278	4 11	78 14	-1271
Tannin.....	49 39.2	91 00	1916.7	4 41	78 52	-1216	4 27	78 50	-1209
Martin.....	49 15.3	91 08	1910.5	4 57	78 09	-1308	4 20	78 09	-1288
Hunt.....	49 53.4	91 28	1916.7	4 52	78 56	-1201	4 37	78 54	-1195
Atikokan.....	48 45.3	91 38	1918.7	5 09	77 40	-1330	5 02	77 38	-1326
Ignace.....	49 25.4	91 40	1910.5	6 10	78 30	-1266	5 34	78 29	-1248
Sioux Lookout, A (Graham)	50 05.5	91 54	1916.7	5 06	79 14	-1178	4 51	79 12	-1172
Sioux Lookout, B.....	50 05.5	91 54	1918.7	5 25	78 46	-1214	5 17	78 45	-1211
Taché.....	49 35.0	92 11	1910.5	6 56	78 23	-1276	6 21	78 21	-1258
Wabigoon.....	49 42.6	92 37	1910.5	7 38	77 50	-1335	7 02	77 48	-1318
Richan.....	49 59.7	92 50	1914.7	7 17	78 36	-1261	6 55	78 33	-1252
Dryden.....	49 47.4	92 50	1910.5	8 13	79 23	-1155	7 37	79 21	-1139
Eagle.....	49 47.7	93 11	1910.5	6 34	78 10	-1304	5 59	78 08	-1287
Vermilion Bay.....	49 51.3	93 24	1910.6	7 42	79 00	-1217	7 07	78 58	-1201
Quibell.....	49 57.6	93 24	1914.7	7 08	78 55	-1222	6 47	78 51	-1214
Fort Frances.....	48 36.7	93 24	1914.8	6 35	77 23	-1375	6 16	77 20	-1361
Hawk Lake.....	49 58.3	94 00	1910.6	7 27	78 27	-1279	6 51	78 24	-1264
Redditt.....	49 59.2	94 22	1918.7	8 57	78 38	-1243	8 49	78 36	-1240
Kenora, C.I.....	49 46.2	94 26	1906.7	9 54	77 59	-1317	9 05	77 57	-1294
Kenora.....	49 46.2	94 29	1910.6	9 59	77 59	-1311	9 24	77 57	-1294
Rainy River, A.....	48 43.3	94 34	1914.7	9 39	77 31	-1359	9 20	77 28	-1346
Rainy River, B.....	48 43.3	94 35	1918.7	9 03	77 30	-1349	9 56	77 29	-1344
Kalmar.....	49 45.7	94 58	1910.6	9 31	77 53	-1333	8 56	77 50	-1316
Malachi.....	49 57.5	94 58	1914.7	8 28	78 32	-1264	8 07	78 28	-1255
Rennie.....	49 51.5	95 33	1910.6	10 19	77 28	-1376	9 44	77 25	-1360
Sprague.....	49 02.2	95 38	1914.7	9 15	77 18	-1386	8 57	77 15	-1373
Whitemouth.....	49 57.0	95 58	1910.6	10 56	78 10	-1307	10 22	78 07	-1291
Vivian.....	49 53.9	96 28	1914.7	11 16	78 13	-1294	10 56	78 10	-1285
Norquay.....	49 59.6	96 34	1910.6	11 22	78 42	-1254	10 48	78 38	-1238
Selkirk.....	50 09.3	96 53	1916.7	10 56	78 14	-1278	10 42	78 11	-1272
Gimli.....	50 38.3	97 00	1916.7	11 52	78 30	-1256	11 38	78 28	-1251
Riverton.....	51 00.0	97 00	1919.4	11 42	78 58	-1196	11 37	78 57	-1195
Winnipeg.....	49 51.9	97 10	1919.4	13 24	78 09	-1290	13 18	78 08	-1287
Ste. Agathe.....	49 33.9	97 11	1916.7	11 44	77 31	-1360	11 31	77 29	-1353
Emerson.....	49 00.2	97 12	1914.7	11 05	77 17	-1380	10 46	77 14	-1367
Rosenfeld.....	49 12.3	97 32	1916.7	11 42	77 16	-1386	11 30	77 13	-1378
Warren.....	50 08.2	97 33	1916.7	13 57	78 33	-1240	13 44	78 31	-1233
Marquette.....	50 04.1	97 43	1910.6	13 17	78 06	-1303	12 44	78 03	-1287
Elie.....	49 54.0	97 44	1911.7	13 12	78 01	-1307	12 43	77 58	-1292
Oak Point.....	50 30.3	98 03	1919.4	12 58	78 21	-1264	12 53	78 20	-1262
Mulvihill.....	50 58.5	98 11	1916.7	13 03	78 41	-1230	12 49	78 39	-1225
Portage la Prairie.....	49 58.5	98 18	1911.7	9 23	78 29	-1278	8 54	78 26	-1263
Grahamdale.....	51 23.6	98 31	1916.7	12 31	78 45	-1230	12 16	78 43	-1225
Gypsumville, A.....	51 46.5	98 36	1919.4	12 31	78 46	-1225	12 25	78 45	-1223
Gypsumville, B.....	51 46.5	98 36	1919.4	12 29	78 46	-1224	12 23	78 45	-1222
MacGregor.....	49 58.4	98 47	1910.6	13 09	77 40	-1349	12 38	77 37	-1332
Gladstone.....	50 13.3	98 57	1919.4	13 46	77 58	-1300	13 41	77 58	-1298
Glenella.....	50 33.8	99 12	1911.7	14 24	78 12	-1299	13 55	78 09	-1286
Carberry.....	49 52.5	99 22	1910.6	15 43	77 39	-1352	15 13	77 36	-1334
Laurier.....	50 53.6	99 33	1911.7	15 07	78 18	-1282	14 37	78 15	-1270

## MAGNETIC OBSERVATIONS, 1907-20

Station	Lat.	Long.	Date	Observed			Reduced to 1921.0		
				D.	I.	H.	D.	I.	H.
				East ° /	° /	c.g.s.	East ° /	° /	c.g.s.
Brandon, A.....	49 52.0	99 59	1919-8	14 28	77 36	·1346	14 24	77 35	·1344
Brandon, B.....	49 52.0	99 59	1919-8	14 36	77 35	·1346	14 33	77 34	·1344
Dauphin.....	51 09.0	100 04	1919-4	14 52	78 20	·1275	14 47	78 19	·1273
Ethelbert.....	51 31.7	100 24	1911-7	15 46	79 01	·1215	15 15	78 58	·1204
Griswold.....	49 46.9	100 29	1910-7	16 04	77 16	·1399	15 36	77 14	·1381
Cowan.....	52 02.6	100 39	1911-7	20 40	78 52	·1234	20 07	78 49	·1224
Virden.....	49 51.3	100 56	1910-7	16 42	77 10	·1396	16 15	77 08	·1378
Mafeking.....	52 41.2	101 07	1911-7	18 26	79 38	·1147	17 51	79 35	·1139
The Pas.....	53 50.0	101 14	1919-5	18 23	80 03	·1082	18 16	80 02	·1082
Swan River, A.....	52 06.8	101 16	1919-4	18 14	79 00	·1198	18 09	79 00	·1196
Swan River, B.....	52 06.8	101 16	1919-5	18 08	79 02	·1198	18 03	79 01	·1196
Kirkella.....	50 01.9	101 22	1919-7	15 44	77 18	·1375	15 40	77 18	·1373
Barrows.....	52 54.0	101 28	1911-7	18 10	79 38	·1142	17 35	79 34	·1134
Wapella.....	50 15.8	101 58	1910-7	17 50	77 23	·1379	17 23	77 21	·1362
Hudson Bay Junction.....	52 51.9	102 24	1919-5	18 27	79 17	·1159	18 21	79 17	·1158
Broadview.....	50 22.3	102 35	1910-7	17 12	77 39	·1350	16 45	77 37	·1333
Prairie River.....	52 52.3	102 59	1911-7	21 51	79 19	·1177	21 18	79 15	·1170
Wolseley, A.....	50 26.3	103 15	1919-7	17 51	77 21	·1369	17 48	77 20	·1367
Wolseley, B.....	50 25.5	103 15	1919-7	17 48	77 20	·1371	17 45	77 20	·1369
Indian Head.....	50 32.2	103 40	1910-7	19 32	77 04	·1413	19 06	77 02	·1397
Tisdale.....	52 51.0	104 02	1911-7	20 00	78 54	·1221	19 28	78 51	·1212
Balgonie.....	50 29.6	104 16	1910-7	18 57	77 04	·1406	18 32	77 02	·1388
Regina, C.I.....	50 26.4	104 36	1906-7	19 12	76 57	·1428	18 56	76 55	·1404
Regina.....	50 26.9	104 37	1910-7	19 26	76 58	·1420	19 02	76 57	·1402
Melfort.....	52 51.5	104 37	1919-5	20 34	78 56	·1198	20 28	78 56	·1197
Pense.....	50 24.7	104 59	1919-7	19 21	76 52	·1405	19 18	76 52	·1403
Kinistino.....	52 57.5	105 01	1911-7	20 16	79 03	·1193	19 45	78 59	·1185
Birch Hills.....	52 59.1	105 26	1911-6	20 54	79 08	·1197	20 24	79 04	·1189
Moose Jaw.....	50 23.9	105 31	1910-7	19 52	77 01	·1408	19 30	77 00	·1390
Prince Albert.....	53 11.7	105 47	1919-5	22 56	79 10	·1176	22 50	79 10	·1175
Macdowall.....	53 01.0	106 01	1911-6	25 47	78 58	·1223	25 18	78 53	·1215
Mortlach.....	50 27.2	106 04	1911-4	20 29	77 01	·1412	20 09	77 00	·1396
Rosthern.....	52 39.6	106 20	1911-6	24 54	78 14	·1298	24 27	78 10	·1289
Warman.....	52 19.2	106 34	1919-5	23 52	77 48	·1310	23 47	77 47	·1309
Chaplin, A.....	50 28.0	106 40	1919-7	20 48	76 40	·1430	20 45	76 40	·1428
Chaplin, B.....	50 28.0	106 40	1919-7	20 47	76 39	·1430	20 44	76 38	·1427
Borden.....	52 24.2	107 14	1911-6	23 57	77 46	·1337	23 32	77 42	·1326
Herbert.....	50 25.6	107 14	1911-4	21 57	76 31	·1463	21 40	76 30	·1447
Swift Current.....	50 16.3	107 48	1919-7	20 58	76 15	·1467	20 56	76 15	·1465
Ruddell.....	52 36.4	107 51	1911-6	24 38	77 48	·1332	24 14	77 43	·1322
Battleford.....	52 43.6	108 18	1919-5	22 53	77 37	·1325	22 48	77 37	·1324
Gull Lake.....	50 06.4	108 29	1911-4	21 31	76 02	·1512	21 17	76 01	·1494
Paynton.....	53 01.0	108 55	1911-6	25 17	78 04	·1295	24 52	77 59	·1284
Crane Lake.....	50 01.2	109 05	1911-4	22 23	75 33	·1551	22 10	75 33	·1533
Maple Creek.....	49 54.6	109 30	1919-7	22 13	75 26	·1541	22 12	75 26	·1538
Lashburn.....	53 07.3	109 37	1911-6	24 43	78 18	·1272	24 18	78 13	·1263
Lloydminster, A.....	53 17.4	110 00	1919-5	25 10	77 59	·1286	25 05	77 58	·1284
Lloydminster, B.....	53 17.6	110 00	1919-5	25 09	77 58	·1286	25 04	77 57	·1284
Walsh.....	49 57.1	110 02	1911-4	21 59	75 29	·1549	21 48	75 29	·1531
Dunmore.....	49 58.5	110 36	1919-7	21 48	75 23	·1545	21 47	75 23	·1542
Medicine Hat.....	50 03.0	110 40	1915-4	21 57	75 30	·1548	21 50	75 29	·1538
Vermilion.....	53 21.0	110 52	1911-6	25 53	77 48	·1319	25 30	77 43	·1311
Seven Persons.....	49 52.8	110 54	1915-4	23 03	75 04	·1594	22 56	75 03	·1538

## MAGNETIC OBSERVATIONS, 1907-20

Station	Lat.	Long.	Date	Observed			Reduced to 1921.0		
				D.	I.	H.	D.	I.	H.
				East ° /	° /	c.g.s.	East ° /	° /	c.g.s.
Suffield.....	50 13.2	111 10	1911.4	24 02	75 05	·1594	23 52	75 04	·1577
Bow Island.....	49 52.4	111 23	1915.4	23 12	74 55	·1596	23 05	74 54	·1585
Innisfree.....	53 22.8	111 32	1911.6	26 14	77 37	·1336	25 53	77 32	·1328
Tilley.....	50 27.2	111 39	1919.7	22 57	75 26	·1532	22 55	75 26	·1530
Vegreville.....	53 29.2	112 02	1919.5	26 57	77 34	·1326	26 52	77 34	·1325
Southesk.....	50 39.6	112 08	1911.4	23 23	75 19	·1564	23 12	75 16	·1549
Taber.....	49 47.6	112 09	1915.4	22 58	74 43	·1619	22 52	74 42	·1608
Hilliard.....	53 38.8	112 29	1911.5	26 43	77 38	·1334	26 22	77 32	·1325
Crowfoot.....	50 49.2	112 39	1911.5	23 38	75 26	·1551	23 28	75 24	·1537
Lethbridge.....	49 41.6	112 47	1915.4	23 11	74 30	·1630	23 06	74 30	·1620
Bruderheim.....	53 48.6	112 55	1919.5	26 43	77 33	·1326	26 38	77 32	·1325
Gleichen.....	50 52.2	113 03	1919.7	24 17	75 28	·1537	24 15	75 28	·1535
Wetaskiwin.....	52 58.2	113 21	1911.5	26 19	76 51	·1410	26 02	76 47	·1400
Macleod.....	49 43.1	113 25	1919.7	23 36	74 33	·1623	23 35	74 32	·1621
Edmonton, A.....	53 32.1	113 29	1911.5	27 22	77 20	·1366	27 04	77 15	·1357
Edmonton, B.....	53 32.1	113 29	1913.8	27 41	77 19	·1361	27 24	77 15	·1354
Cheadle.....	51 01.8	113 33	1911.5	25 06	75 24	·1555	24 56	75 22	·1541
Leduc.....	53 15.9	113 34	1911.5	26 37	77 02	·1398	26 20	76 57	·1388
Lacombe, B.....	52 28.5	113 43	1919.5	25 54	76 23	·1439	25 50	76 22	·1437
Lacombe, A.....	52 27.6	113 45	1919.5	25 52	76 23	·1440	25 48	76 22	·1438
Red Deer.....	52 15.8	113 48	1911.5	25 31	76 16	·1470	25 17	76 12	·1459
Pincher.....	49 31.7	113 57	1915.4	25 08	74 26	·1640	25 05	74 25	·1628
Crossfield.....	51 25.9	114 01	1911.5	25 04	75 33	·1532	24 54	75 29	·1519
Calgary.....	51 04.8	114 04	1911.5	25 19	75 15	·1565	25 11	75 12	·1551
Olds.....	51 47.7	114 07	1911.5	25 19	75 45	·1517	25 08	75 41	·1505
Frank.....	49 36.4	114 23	1915.4	24 13	74 02	·1667	24 10	74 01	·1656
Wabamun.....	53 33.7	114 28	1919.5	26 50	77 12	·1359	26 46	77 12	·1358
Michel.....	49 41.8	114 50	1915.4	24 13	73 57	·1677	24 10	73 56	·1667
Morley.....	51 09.3	114 51	1919.7	24 40	75 08	·1565	24 38	75 08	·1563
Fernie.....	49 30.2	115 04	1915.4	24 11	73 47	·1693	24 08	73 46	·1683
Junkins.....	53 36.9	115 14	1913.6	28 03	76 52	·1408	27 47	76 48	·1400
Jaffray.....	49 21.8	115 18	1915.5	24 21	73 33	·1716	24 18	73 32	·1705
Banff.....	51 10.7	115 36	1919.7	26 04	74 55	·1580	26 03	74 54	·1578
Niton.....	53 39.7	115 47	1913.6	27 18	76 40	·1423	27 04	76 36	·1416
Cranbrook, A.....	49 31.0	115 47	1919.7	24 27	73 29	·1706	24 26	73 29	·1704
Cranbrook, B.....	49 31.0	115 47	1919.7	24 26	73 30	·1708	24 25	73 30	·1706
Moyie.....	49 17.6	115 50	1915.5	24 16	73 24	·1723	24 14	73 22	·1712
Yahk.....	49 05.4	116 05	1915.5	24 07	73 12	·1740	24 05	73 11	·1729
Edson.....	53 35.5	116 26	1919.5	28 37	76 34	·1422	28 34	76 33	·1420
Creston.....	49 05.7	116 31	1915.5	24 03	73 08	·1742	24 01	73 06	·1732
Kaslo.....	49 54.5	116 55	1915.5	24 43	73 37	·1701	24 40	73 35	·1692
Proctor.....	49 37.0	116 57	1919.7	24 27	73 22	·1716	24 26	73 22	·1713
Lardo.....	50 08.5	116 57	1915.5	25 09	73 48	·1681	25 06	73 46	·1672
Golden.....	51 17.8	116 57	1908.6	26 02	74 42	·1613	26 04	74 36	·1599
Coalspur.....	53 11.2	117 01	1913.6	27 51	76 02	·1476	27 40	75 58	·1468
Medicine Lodge.....	53 32.8	117 01	1913.7	27 41	76 29	·1433	27 30	76 26	·1425
Nelson.....	49 29.7	117 17	1919.7	24 30	72 54	·1758	24 29	72 53	·1756
Hinton.....	53 24.0	117 35	1913.7	28 17	76 02	·1478	28 07	75 59	·1470
Castlegar.....	49 19.3	117 39	1915.5	24 45	73 56	·1750	24 44	73 55	·1740
Rossland.....	49 04.6	117 47	1915.5	22 12	74 36	·1769	22 11	74 35	·1759
Pocahontas.....	53 13.1	117 57	1913.7	27 34	75 46	·1501	27 26	75 42	·1493
Jasper.....	52 53.3	118 05	1919.5	27 16	75 27	·1518	27 14	75 26	·1516
Paulson.....	49 12.0	118 07	1915.6	24 32	72 46	·1762	24 31	72 45	·1753



## MAGNETIC OBSERVATIONS, 1907-20

Station	Lat.	Long.	Date	Observed			Reduced to 1921.0		
				D.	I.	H.	D.	I.	H.
				East ° /	° /	c.g.s.	East ° /	° /	c.g.s.
Revelstoke.....	51 00.8	118 12	1908.6	25 48	74 16	.1646	25 51	74 11	.1633
Grand Forks.....	49 01.5	118 25	1915.6	24 32	72 41	.1773	24 32	72 39	.1764
Grant Brook.....	52 54.2	118 46	1913.7	27 50	75 20	.1536	27 44	75 16	.1528
Midway.....	49 00.0	118 47	1919.6	24 24	72 17	.1801	24 24	72 17	.1798
Sicamous, A.....	50 50.3	119 01	1915.6	25 58	73 48	.1675	25 55	73 46	.1668
Sicamous, B.....	50 50.3	119 01	1919.6	25 50	73 49	.1665	25 49	73 48	.1663
Carmi.....	49 29.6	119 07	1915.6	24 28	72 53	.1746	24 28	72 51	.1737
Enderby.....	50 33.0	119 08	1915.6	25 55	73 34	.1696	25 53	73 31	.1689
Okanagan Landing.....	50 13.9	119 21	1919.6	25 18	73 07	.1724	25 18	73 06	.1722
Kelowna.....	49 53.6	119 28	1915.6	25 06	73 09	.1720	25 05	73 07	.1712/
Tête Jaune.....	52 59.2	119 30	1913.7	28 08	75 14	.1547	28 02	75 10	.1539
Penticton.....	49 29.3	119 36	1919.6	25 31	72 38	.1778	25 31	72 37	.1776
Peachland.....	49 46.7	119 43	1915.6	24 51	73 14	.1717	24 50	73 12	.1709
McBride.....	53 18.1	120 10	1919.5	28 20	75 13	.1536	28 18	75 13	.1534
Kamloops.....	50 40.8	120 21	1919.6	25 52	73 13	.1706	25 52	73 12	.1705
Nicola.....	50 09.1	120 40	1908.7	25 02	72 54	.1751	25 10	72 47	.1741
Mile 142 B. C.....	53 45.8	121 02	1913.7	29 00	75 17	.1536	28 56	75 14	.1527
Ashcroft.....	50 43.6	121 07	1919.6	27 50	73 20	.1714	27 50	73 19	.1712
Spence's Bridge.....	50 24.8	121 21	1908.7	26 38	72 58	.1737	26 46	72 52	.1726
Bridge Creek.....	51 39.0	121 27	1908.7	26 26	73 35	.1715	26 33	73 29	.1703/
North Bend, A.....	49 52.7	121 27	1919.6	25 58	72 25	.1782	25 58	72 24	.1780
North Bend, B.....	49 52.7	121 27	1919.6	25 47	72 29	.1777	25 48	72 28	.1775
Barkerville.....	53 04.3	121 30	1908.6	28 06	74 58	.1568	28 11	74 53	.1555
Clinton.....	51 05.5	121 35	1908.6	26 25	73 26	.1711	26 32	73 20	.1700
Grand Canyon.....	53 56.3	121 38	1913.7	28 59	75 22	.1521	28 55	75 19	.1512
Agassiz.....	49 14.5	121 45	1908.8	25 23	71 36	.1888	25 35	71 28	.1879
Williams Lake.....	52 06.3	121 56	1908.7	28 52	74 12	.1649	28 58	74 07	.1637
Alexandria.....	52 34.8	122 28	1908.7	28 15	74 20	.1640	28 21	74 15	.1628
Quesnel.....	52 58.9	122 32	1908.7	28 18	74 50	.1586	28 23	74 45	.1574
Fort George South.....	53 54.6	122 45	1919.5	28 42	75 09	.1528	28 42	75 08	.1526/
Vancouver.....	49 17.8	123 07	1915.6	25 37	71 34	.1874	25 39	71 31	.1869
Victoria.....	48 24.5	123 23	1919.6	24 44	71 11	.1867	24 44	71 11	.1866
Nanaimo.....	49 12.8	123 56	1919.6	25 27	71 13	.1869	25 27	71 12	.1868
Vanderhoof.....	54 01.2	124 02	1915.7	28 51	75 17	.1517	28 52	75 14	.1513
Endako.....	54 04.9	125 02	1919.6	29 07	74 55	.1542	29 08	74 54	.1541
Burns Lake.....	54 13.6	125 47	1915.7	29 47	74 26	.1590	29 49	74 24	.1586
Houston.....	54 24.0	126 40	1915.7	29 05	74 43	.1561	29 07	74 42	.1557
Smithers.....	54 46.7	127 12	1919.6	29 35	74 59	.1536	29 36	74 58	.1535
New Hazelton.....	55 14.6	127 34	1915.7	30 11	75 01	.1526	30 11	75 00	.1522
Ocean Falls.....	52 21.3	127 41	1919.6	27 12	73 01	.1698	27 14	73 01	.1697/
Kitwanga.....	55 05.9	128 03	1915.7	30 20	74 46	.1557	30 22	74 44	.1553
Pacific.....	54 45.8	128 16	1919.6	30 19	74 24	.1583	30 19	74 24	.1582
Terrace.....	54 31.1	128 36	1915.7	30 03	74 02	.1624	30 05	74 01	.1621
Salvus.....	54 18.9	129 20	1915.7	20 10	73 34	.1659	29 12	73 32	.1655
Haysport.....	54 10.3	130 01	1915.7	29 07	73 35	.1649	29 09	73 33	.1646
Prince Rupert.....	54 18.2	130 20	1919.6	29 01	73 34	.1642	29 02	73 34	.1642

## MAGNETIC STATIONS AND DESCRIPTIONS

*Agassiz, B.C., 1908.*—The station is in the grounds of the Agassiz Agricultural Association. It is about 9 feet inside the race-track, is 165·8 feet from a point in east fence which is 167 feet from northeast corner of grounds, and is 173·8 feet from a point in west fence which is 165 feet from northwest corner of grounds; the above distances to the east and west fences are in the same straight line. The point is marked by a stake 2 by 4 inches driven flush with the ground. The following true bearings were determined: gable of porch in front of Presbyterian church,  $207^{\circ} 42' \cdot 0$ ; gable of building in southwest corner of grounds,  $240^{\circ} 49' \cdot 1$ ; top of ventilator on hop barn,  $303^{\circ} 42' \cdot 2$ . The magnetic observations were taken 31 feet north east from station and in line with mark on Presbyterian church.

*Agate, Ont., 1916.*—The station is northwest of the C.N.R. section-house, on a small clearing in the woods on the west side of the railway tracks. It is 884 feet north of the north line of the section-house, and 452 feet west of the main line of the railway. The point is marked by a stake 2 inches in diameter and projecting 1 foot above the surface. A temporary reference mark was used.

*Agawa, Ont., 1916.*—The station is about 500 feet south of the A.C.R. section-house, on the west side of the tracks and almost opposite the north end of the siding, near the west edge of a clearing, which is on the west side of an abandoned ballast pit. At a point in the middle of the A.C.R. main line and over the rod, which controls the two ends of the switch at the north end of the siding and which is opposite the semaphore, turn to the right, from the direction of the railway tangent south, the angle  $60^{\circ} 44' \cdot 0$ ; then at a distance of 102·5 feet south and in the middle of the main line, turn to the right, from the direction of the tangent south, the angle  $78^{\circ} 09' \cdot 0$ . The intersection of these two directions will give the location of the station, which is marked by a stake 3 inches in diameter and projecting 1 foot above the surface. The tip of the semaphore at the north end of the siding bears  $63^{\circ} 48' \cdot 1$ .

*Alexandria, B.C., 1908.*—The station is on a waste piece of land in the northwest corner of a field belonging to Mr. Anders. The field is on the west side of the government road opposite the post office and farm buildings and borders on the Fraser river. The transit station is about 95 feet northeast from the end of the trail which leads to the landing, 56 feet from the bank of the river, 57 feet southeast from a forked tree, and is marked by a brass tack in the top of a fir post 5 inches in diameter and projecting 8 inches above the surface. The following true bearings were determined: west chimney on Mr. Anders's house,  $106^{\circ} 39' \cdot 3$ ; spire of Catholic church on Indian reservation,  $183^{\circ} 30' \cdot 0$ .

Magnetic observations were taken 12 feet northwest from station and in line with west chimney on Mr. Anders's house.

*Algoma, Ont., 1918.*—The station is approximately a relocation of the Carnegie Institution station of 1906. It is on a vacant lot south of the Grand Central hotel, about 500 feet northwest of the C.P.R. tracks and the same distance southwest of the depot; it is 144·5 feet south of the hotel and 11 feet east of the line of the back of the main part of the hotel produced. A brass screw in the top of a stake  $1\frac{1}{2}$  by  $1\frac{1}{2}$  inches set flush with the ground marks the point. The following true bearings were determined: top of pole on C.P.R. water-tank,  $99^{\circ} 17' \cdot 1$ ; southeast corner, at bottom, of Catholic church,  $220^{\circ} 54' \cdot 6$ ; northwest corner, at bottom, of Catholic church,  $228^{\circ} 26' \cdot 8$ .

*Alliston, Ont., 1916.*—The station is north of the town, near the southeast corner of the agricultural grounds. It is near the southeasterly edge of a ridge, which is between a pond on the southerly side and a ravine on the northerly side. It is 100 feet easterly from the east line produced of an exhibit building, which is on the north side of the ravine, 52 feet from the water's edge on the south and 39 feet from the water's edge on the east. The point is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: pole on tower of town hall,  $107^{\circ} 47' \cdot 9$ ; southeast corner of red brick building in grounds,  $302^{\circ} 00' \cdot 2$ ; north gable of Knox church,  $130^{\circ} 06' \cdot 6$ ; west gable of Knox church,  $132^{\circ} 26' \cdot 5$ .

*Amherst, N.S., 1912.*—The station is near the southeast corner of the Amherst Academy grounds. It is 81 feet westerly from the easterly side of the grounds, 41.5 feet from the southerly side and about 330 feet from the southeast corner of the Academy building. The following true bearings were determined: short pole on centre of house near grounds,  $281^{\circ} 31' \cdot 0$ ; southwest corner of Academy building,  $282^{\circ} 47' \cdot 2$ ; northeast corner of Academy building,  $301^{\circ} 51' \cdot 0$ .

*Annapolis, N.S., 1918.*—The station is a relocation of the D.O. station of 1912. It is near the south side of the grounds around the old fort, now designated Anne park. It is southwest of the cemetery and westerly from a vacant lot at the rear of the courthouse. The point is 38.5 feet southwest of the northwest corner of the lot, 35 feet west of the fence along the west side of the lot, 178 feet north of the fence along the south side of the park. The station is marked by a stake  $1\frac{1}{2}$  by  $1\frac{1}{2}$  inches set flush with the ground. The following true bearings were determined: tip of spire on English church,  $1^{\circ} 49' \cdot 8$ ; tip of tower on Methodist church,  $56^{\circ} 01' \cdot 1$ ; chimney on middle of small house across flat,  $179^{\circ} 43' \cdot 3$ .

*Antigonish, N.S., 1907.*—The station is located in old Roman Catholic churchyard. It is 318 feet west of west side of street passing post office, and 242 feet north of north side of Main street. The flagpole on post office bears  $123^{\circ} 16' \cdot 3$ .

*Armstrong, Ont., 1918.*—The station of 1914 was reoccupied. It is about one-fourth of a mile southeasterly from the C.G.R. depot near the upper edge of a steep bank which extends along the south side of the railway yards; it is a short distance west of a gully which breaks the continuity of the bank and which makes access to the elevated land comparatively easy. The point is determined by measuring easterly along the main line of the railway from the easterly side of the depot a distance of 790 feet, thence southerly on a line at right angles to the direction of the main track a distance of 860 feet. A stake, 2 by 2 inches, projecting 2 inches above the surface, marks the point. The following true bearings were determined: top of C.G.R. water-tank,  $245^{\circ} 57' \cdot 5$ ; northeast corner of house for trainmen,  $274^{\circ} 45' \cdot 7$ ; short pole over window on south side of depot,  $279^{\circ} 12' \cdot 7$ .

*Arnprior, Ont., 1913.*—The station is near the south side of the town and about one-fourth of a mile southeast of the C.P.R. depot. It is on the agricultural grounds and near the southwest corner, being 114.5 feet north of the south fence, 115.5 feet east of the west fence around the grounds, and about 225 feet southeasterly from the gate at the entrance to the grounds. The point is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: cross on tower of



Catholic church,  $30^{\circ} 25' \cdot 0$ ; top of standpipe,  $94^{\circ} 26' \cdot 5$ ; pole on judge's stand in front of grand-stand,  $137^{\circ} 10' \cdot 9$ ; bottom of flagstaff on grand-stand,  $141^{\circ} 28' \cdot 8$ .

*Ashcroft, B.C., 1919.*—The station is about 350 feet south of the C.I. station of 1907, now unavailable as an observing station. It is 13 feet west of the west line produced of the street passing in front of the court-house, and 111 feet north of the point where this street line meets the bank of the Thompson river and 26 feet northeasterly from the bank along the river. The station is marked by a copper nail in the top of a stake 2 inches in diameter and projecting 6 inches above the surface. The following true bearings were determined: tip of spire of English church,  $8^{\circ} 59' \cdot 7$ ; spire on tower of court-house,  $14^{\circ} 06' \cdot 6$ ; tip of pole on C.P.R. water-tank,  $28^{\circ} 51' \cdot 2$ ; bottom of white pole bearing mileage board 48,  $177^{\circ} 11' \cdot 0$ .

*Atikokan, Ont., 1918.*—The station is a relocation of the D.O. station of 1914. It is southeasterly from the summit of a rocky ridge 36 feet east of the middle of a trail leading north from the town, 27 feet north of the edge of a prominent rock exposure, and 1,342 feet north of the main line of the C.N.R. A stake  $1\frac{1}{2}$  by  $1\frac{1}{2}$  inches and projecting 3 inches above the surface marks the precise point. The following true bearings were determined: north gable of coal chute,  $147^{\circ} 03' \cdot 9$ ; short pole on C.N.R. water-tank,  $157^{\circ} 52' \cdot 8$ ; pole on centre of water-tank,  $158^{\circ} 16' \cdot 4$ ; north gable of depot,  $164^{\circ} 22' \cdot 2$ ; north gable of jail,  $185^{\circ} 26' \cdot 4$ .

*Bagotville, Que., 1913.*—The station is about 500 feet west of the tracks of the Roberval and Saguenay railway. It is in a small field, which is adjacent to the north side of Bagot street and the west side of Victoria street. The point is 101 feet north of the north side of Bagot street and 116 feet west of the west side of Victoria street, and is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: tip of pole on school,  $8^{\circ} 12' \cdot 2$ ; spire of church in St. Alexia,  $142^{\circ} 27' \cdot 0$ ; spire of Catholic church in Bagotville,  $343^{\circ} 54' \cdot 6$ .

*Balgonie, Sask., 1910.*—The station is in the northeastern part of the town. It is in line with the south side and 119 feet east of the southeast corner of the Methodist church. The point is marked by a stake 2 inches in diameter and 3 inches above ground. The following true bearings were determined: tip of spire of English church,  $228^{\circ} 29' \cdot 3$ ; bottom of pole on town hall,  $254^{\circ} 30' \cdot 2$ ; south gable of elevator No. 77,  $296^{\circ} 26' \cdot 4$ .

*Banff, Alta., 1919.*—The station is a relocation of the C.I. station of 1907. It is in the grounds of the National Park museum, 292 feet southwesterly from the southwest corner of the museum building, midway between and in line with two small spruce trees near the north bank of the Bow river. It is about 10 feet north of the bank of the river and about in line with the west side of a one-story building in the rear of the C.P.R. museum on the north bank of the river. The point is marked by a stake driven flush with the ground. The following true bearings were determined: bottom of pole on Brett hospital,  $127^{\circ} 36' \cdot 6$ ; bottom of flagstaff on east tower of Sanitarium hotel,  $152^{\circ} 39' \cdot 3$ ; bottom of flagstaff on west tower of Sanitarium hotel,  $154^{\circ} 41' \cdot 7$ ; anemometer pole on Meteorological Observatory,  $188^{\circ} 06' \cdot 2$ .

*Bankfield, Ont., 1916.*—The station is on a sandy ridge covered with small pine trees, about 400 feet northwest of the C.N.R. section-house. It is 546 feet east of the switch at the west end of the siding and 318 feet north of the middle of the main line of the railway. The point is marked by a stake 3 inches in diameter and projecting 6 inches above the surface. A temporary reference mark was used.



*Barkerville, B.C., 1908.*—The station is in a small clearing on the west side of the road which leads south from the town, about 336 feet (by way of road) from the bridge over a ditch constructed for conveying water used for mining purposes, 39 feet from the middle of the road and 37 feet north from a spruce tree. The station is marked by a brass tack in the top of a fir post 3 by 3 inches and projecting 3 inches above the surface. The following true bearings were determined from the transit station: pole on fire hall,  $252^{\circ} 08' \cdot 7$ ; pole on Masonic hall,  $279^{\circ} 27' \cdot 7$ ; west gable of belfry of Presbyterian church,  $315^{\circ} 00' \cdot 5$ . Magnetic observations were taken 12 feet from station in line with pole on fire hall and away from it.

*Barrie, Ont., 1910.*—The station is situated in the northwestern portion of the town, in a field belonging to Mr. Hickey, and just west of the field in which Mr. Hickey's house stands. The transit was placed 86.5 feet from the northerly limit of the street marking the southerly boundary of the field and 58 feet from the westerly limit of street marking the easterly boundary. The magnetometer was placed 10.8 feet behind the transit and in line with the transit and cross on R.C. church. The following true bearings were determined from the transit station: cross on separate school,  $232^{\circ} 19' \cdot 0$ ; cross on Roman Catholic church,  $242^{\circ} 00' \cdot 2$ ; north side of water-tower,  $256^{\circ} 36' \cdot 5$ .

*Barrington, N.S., 1912.*—The station is in an open field belonging to Mr. Enos Carrow, on the western slope of a slight elevation southwest of the barn. It is almost in line with the fence marking part of the southerly boundary of the field, this portion of the fence being approximately parallel to the north limit of the farm. The point is 45 feet east of the angle of the fence, 264 feet south of the north side of the field and about 290 feet southwest of the southwest corner of the barn. The northerly corner of the Methodist church appears slightly to the south of Mr. Carrow's house. The point is marked by a stake 2 inches in diameter driven flush with the ground. The following true bearings were determined: west gable of Mr. Carrow's house,  $47^{\circ} 20' \cdot 8$ ; spire of Methodist church,  $51^{\circ} 00' \cdot 9$ ; tip of railway depot,  $322^{\circ} 48' \cdot 8$ ; pole on Hogg's livery stable,  $328^{\circ} 55' \cdot 8$ .

*Barrows, Man., 1911.*—The station is situated northeast of a group of houses occupied by the employees of the Red Deer Lumber Co. It is about 60 feet west and 200 feet south of Red Deer lake, which extends along the east and north sides of the village; it is 20 feet northwesterly from a large poplar tree and 21 feet west of another tree, these two trees being on the northwesterly edge of a small grove. The middle of a large pyramidal-shaped boulder is almost due magnetic north from the station. The point is marked by a stake 1 by 2 inches driven flush with the ground. The gable of the house which is farthest northeast in the village, bears  $288^{\circ} 41' \cdot 5$ .

*Barry Bay, Ont., 1907.*—The station is in open ground near the school house, being 192.5 feet south of the south side of school building and 78.5 feet west of west side of street passing in front of same. The spire of Catholic church bears  $78^{\circ} 10' \cdot 1$ .

*Bartibogue Station, N.B., 1912.*—The station is on a waste piece of ground on Mr. Alex. Doucette's property. It is 222 feet east and 36 feet north of the northeast corner of Mr. Doucette's house, and is approximately 400 feet east of the I.C.R. tracks. The following true bearings were determined: north gable of Mr. Patrick Anger's house,  $197^{\circ} 06' \cdot 3$ ; north gable of I.C.R. depot,  $219^{\circ} 30' \cdot 5$ ; east gable of Mr. Doucette's house,  $261^{\circ} 58' \cdot 8$ .

*Bathurst, N.B., 1912.*—The station is approximately a relocation of the Dominion Observatory station of 1907. It is in the field belonging to Mr. S. Léger, being 560 feet south of the west end of the bridge across the channel and 172 feet east of the west side

of the field. The following true bearings were determined: spire on tower of Roman Catholic church in Bathurst village,  $11^{\circ} 58' \cdot 9$ ; spire on tower of post office,  $71^{\circ} 48' \cdot 5$ ; spire on tower of Roman Catholic church across channel,  $91^{\circ} 28' \cdot 9$ .

*Battleford, Sask., 1919.*—The station is a relocation of the Meteorological Service station of 1907. It is in the grounds of the R.N.W.M.P., and to the west of all their buildings, about 225 feet east of the west line and in line with post near west fence and north side of a rough-cast house farthest south in grounds, 69 feet south of a row of telephone poles which extends across the field, and 14.5 feet northwesterly from a fence around a tennis court. The —SOR of the Windsor hotel sign can be seen to the west of house just outside the northwest corner of grounds. A small stake which was covered with zinc after completing the observations marks the point. The following true bearings were determined: water-tower in North Battleford,  $5^{\circ} 51' \cdot 5$ ; west gable of house farthest west in grounds,  $25^{\circ} 20' \cdot 4$ ; chimney on school on hill across Battle river,  $198^{\circ} 20' \cdot 7$ ; pole on tower of post office,  $334^{\circ} 29' \cdot 0$ ; pole on bell-tower,  $337^{\circ} 15' \cdot 3$ .

*Beamsville, Ont., 1920.*—The station is about 100 feet west of the D.O. station of 1910, in the second field north of the G.T.R. tracks, on the left hand side of the road leading to the lake. The field is owned by Mr. Bartlett. The station is north-northwest from two pine trees, being 102 feet from most northerly tree. The magnetometer was placed 11 feet behind the transit and in line with the reference object, a church spire just seen over the shed near the depot. The following true bearings were determined: church spire seen over shed,  $180^{\circ} 39' \cdot 7$ ; factory chimney,  $268^{\circ} 13' \cdot 4$ .

*Beardmore, Ont., 1916.*—The station is in an open space among the trees north of the C.N.R. tracks. At a point in the middle of the main line of the railway, 432 feet westerly from the water-tank, turn to the left from the railway tangent east the angle  $117^{\circ} 04' \cdot 0$ , and measure along this direction 435 feet to the station, which is marked by a stake 3 inches in diameter and projecting 6 inches above the surface. A temporary reference mark was used.

*Beaverton, Ont., 1910.*—The station is situated in a large open field at the end of the road leading from the G.T.R. tracks on the east side of the G.T.R. station. The field is used as a pasture and is full of small hummocks, the ground being generally of marshy nature. Mr. Trelevan is the owner of the field. The transit was placed 129 feet from the south side of the road running westerly along the southerly boundary of the field, and 28.5 feet from the westerly boundary fence of the field. The above-mentioned boundary road ends at this line fence. The magnetometer was placed 9.2 feet behind the transit and in line with transit and reference object, the spire of St. Andrews church. The following true bearings were determined from the transit station: spire on Roman Catholic church,  $176^{\circ} 04' \cdot 4$ ; spire on St. Andrews (Presbyterian) church,  $187^{\circ} 39' \cdot 4$ ; pole on water-tank,  $238^{\circ} 41' \cdot 4$ .

*Bell River, Que., 1914.*—The station is about 600 feet west of the N.T.R. tracks, on a small island in the river and lying northwest of the railway bridge across the Bell river. It is 28 feet north of the summit of a rocky ridge, which runs parallel to the south side of the island, and is 87 feet north of the south side, 82 feet easterly from the westerly side and 120 feet westerly from the easterly side of the island. The point is marked by a stake 2 by 4 inches projecting 4 inches above the surface. The following true bearings were determined: west gable of Hudson's Bay Co's store,  $94^{\circ} 46' \cdot 9$ ; southwest

corner of north abutment of railway bridge over Bell river,  $103^{\circ} 41' \cdot 1$ ; southwest corner of second abutment from north end of bridge over Bell river,  $107^{\circ} 34' \cdot 9$ .

*Belle River, Ont., 1910.*—The station is situated in a field about one-fourth of a mile east of the town and on the north side of Main street produced. The field is owned by Mr. Dubé and adjoins on the east side a field containing a house and a large vegetable patch. The transit was placed 238 feet from the easterly boundary fence and 246 feet from the northerly limit of the road. The magnetometer was placed 11.3 feet behind the transit and in line with transit and reference object, spire of R.C. church. The following true bearings were determined from the transit station: spire on Roman Catholic church,  $255^{\circ} 49' \cdot 1$ ; tower on school-house,  $265^{\circ} 10' \cdot 5$ ; smokestack on cannery,  $283^{\circ} 49' \cdot 5$ .

*Belleville, A, Ont., 1910.*—The station is situated in West Belleville in rear of a lot owned by Mr. Harris, market gardener. The station is 294.5 feet west of the west side of the road allowance in front of Mr. Harris's. The agricultural grounds are in a southerly direction along this road. It is also 51 feet from the south limit of the road allowance on the south of Mr. Harris's lot and 55 feet from a line fence running north from this limit, the road allowance ending at this fence. Mr. Harris's lot does not extend back to this line fence. A large grove of pine trees is situated in the field south of the station. The following true bearings were determined from the transit station: spire on church in Belleville,  $80^{\circ} 41' \cdot 7$ ; largest spire on tower, which has three smaller ones,  $97^{\circ} 51' \cdot 1$ ; spire of Western Methodist church,  $104^{\circ} 13' \cdot 7$ .

*Belleville, B, Ont., 1920.*—The station is situated in Prince Edward county across the bay from Belleville. It is on the farm owned by Mr. E. Salisbury, being on the Picton road about 3 miles from Rossmore. The station is in the second field from the road, directly opposite to Mr. E. Salisbury's house, which is on the north side of the Picton-Rossmore road. It is in the northeast corner of the field, being 79.2 feet south of the wire fence forming the northern boundary, and 42.7 feet west of the wire fence forming the eastern boundary. It is 21.3 feet from the edge of a small circular gravel pit, this measurement being made parallel to the eastern boundary fence. The point is marked by a stake 2 by 4 inches driven flush with the ground. The magnetometer was placed 16.5 feet behind the transit and in line with the transit and the spire on Methodist church in Belleville. The following true bearings were determined from the transit station: south gable of factory,  $4^{\circ} 57' \cdot 5$ ; south gable of barn,  $281^{\circ} 57' \cdot 7$ ; pole on town hall,  $343^{\circ} 51' \cdot 6$ ; spire on Methodist church (tallest church spire in Belleville),  $345^{\circ} 54' \cdot 5$ .

*Bersimis, Que., 1920.*—The station of 1909 was reoccupied. It is near the southerly end of an irregular depression in the point of land south of the village and west of the wharf, about 125 feet east, 175 feet west and 450 feet north of high-water mark on the west, east and south respectively. The point is marked by a stake 2 inches in diameter and projecting 1 foot above the surface. The following true bearings were determined: top of post at west end of range,  $29^{\circ} 37' \cdot 5$ ; spire of Roman Catholic church,  $34^{\circ} 00' \cdot 9$ ; top of post at east end of range,  $54^{\circ} 06' \cdot 0$ .

*Berthier, Que., 1912.*—The station is northeast of the town in a small field lying between the agricultural grounds and the St. Lawrence river, and belonging to Mr. Fagnan. The north side of the field is adjacent to the street leading to the ferry landing. The point is 69 feet south of the north side of the field, 112 feet east of the west side of



the field, and is marked by a stake 2 inches in diameter driven flush with the ground. The following true bearings were determined: windmill post on barn on island,  $125^{\circ} 47' 5''$ ; north gable of building near southwest corner of agricultural grounds,  $234^{\circ} 24' 1''$ ; top of ventilator on stable just outside the south end of the agricultural grounds,  $242^{\circ} 48' 4''$ .

*Bic, Que., 1912.*—The station is northwest of the village and about one-third of a mile north of the I.C.R. tracks. It is on an elevation lying to the west of the inner wharf, and is almost in line with the post supporting that part of the bridge which is between the eighth and ninth wooden abutments from the south end. The point is 161 feet west of the west side of the bridge, and is marked by a stake 3 by 3 inches driven flush with the ground. The following true bearings were determined: cross on bell-tower of school,  $83^{\circ} 04' 5''$ ; spire on Roman Catholic church,  $93^{\circ} 54' 8''$ .

*Birch Hills, Sask., 1911.*—The station is near the centre of NW.  $\frac{1}{4}$  section 21, tp. 46, range 29, W. 2nd mer. It is near the south corner of the townsite and is approximately in line with the west side of the street passing to the west of the school, 80 feet north of the fence along the south side of the townsite and 260 feet west of the fence along the east side. The point is marked by a stake 2 inches in diameter and projecting 3 inches above the surface. The following true bearings were determined: pole on Presbyterian church,  $284^{\circ} 28' 5''$ ; south gable of the British America Elevator Co.'s elevator,  $298^{\circ} 11' 3''$ ; pole on C.N.R. depot,  $306^{\circ} 20' 8''$ ; bottom of pole on school,  $350^{\circ} 59' 0''$ .

*Bisco, Ont., 1913.*—The station is about 400 feet southwesterly from the C.I. station of 1906. It is 104 feet south, 32 feet west and 108 feet southwest from the southwest corner of the school building. The point is marked by a stake 2 inches in diameter driven flush with the ground. The following true bearings were determined: south gable of house connected with the post office,  $40^{\circ} 51' 9''$ ; pole on front of school,  $62^{\circ} 27' 9''$ ; pole on C.P.R. water-tank,  $105^{\circ} 56' 3''$ ; pole on tower on Episcopal church,  $108^{\circ} 12' 2''$ .

*Black Point, N.S., 1912.*—The station is approximately a relocation of the C. I. station of 1905. It is in the yard of the Black Point house, being 120 feet from the east corner of the building, 60.7 feet south of a flag-pole, 84.8 feet westerly from a summer house and 95.8 feet from the top of a boulder south of the summer house. The following true bearings were determined: west gable of Mr. Colp's house,  $73^{\circ} 51' 4''$ ; tip of pole on summer house,  $94^{\circ} 49' 7''$ ; lighthouse tower on island,  $124^{\circ} 21' 8''$ .

*Blanc Sablon (Greenly Island), Que., 1920.*—The station of 1909 was reoccupied. It is located on Greenly island in a slight depression in the centre of the plateau, which lies between two coves, one on the northerly side and the other on the southerly, and two hillocks on the easterly and westerly sides. The nearest of Job Bros & Co.'s fish buildings is 400 feet to the northeast, but owing to a slight elevation this cannot be seen from the station. There is a mound about 10 feet in height approximately 25 feet to the south. The point is marked by a cement post 4 by 5 inches projecting slightly above the surface. The following true bearings were determined: bottom of flagstaff on hill,  $115^{\circ} 53' 9''$ ; weather-vane on lighthouse,  $185^{\circ} 05' 6''$ ; east gable of small observation house to west,  $324^{\circ} 10' 4''$ .

*Blanc Sablon, Labrador, 1920.*—The station is about 700 feet northwesterly from a small saw-mill, which is one of a group of buildings belonging to Job Bros. & Co.;



about 80 feet east of high-water mark of the stream marking the boundary between Quebec and Labrador, and about 130 feet from high-water mark on the south; the stream changes from a southerly to an easterly course just before the outlet is reached. The lighthouse on Greenly island and the east extremity of a low rocky point (Point au Pot) are seen in line from the station. Observations were taken over the intersection of two grooves in the top of a stone about 12 by 14 inches set flush with the ground. The following true bearings were determined: bell-tower of building belonging to Job Bros. & Co.,  $134^{\circ} 02' \cdot 2$ ; flagstaff on Isle au Bois,  $193^{\circ} 37' \cdot 8$ ; lighthouse on Greenly island,  $210^{\circ} 17' \cdot 7$ ; smoke pipe on house on Point au Pot,  $211^{\circ} 37' \cdot 1$ .

*Boiestown, N.B., 1912.*—The station is on property belonging to the Miramichi Lumber Co. It is north of the I.C.R. depot and about 150 feet north of the Baptist church, and is near the westerly end of a lane, which passes in front of a row of houses belonging to the Lumber Co. The point is 26.5 feet south of the north side of the lane, 27 feet north of the south side and 42.5 feet east of the west end, and is 53 feet west of the east line of the street passing in front of the Baptist church. A stake 2 by 2 inches driven flush with the ground marks the point. The following true bearings were determined: spire on Methodist church,  $229^{\circ} 14' \cdot 9$ ; pole on front of hall,  $211^{\circ} 56' \cdot 7$ ; short pole on west end of Baptist church,  $157^{\circ} 43' \cdot 3$ .

*Bolton, Ont., 1916.*—The station is near the northeast corner of the agricultural grounds, 365 feet west from the east side, 39.5 feet south of the fence along the north side and 41 feet east of the fence along the west side of the grounds. It is 91 feet westerly and 186 feet northerly from the northwesterly corner of a red building used as an exhibit building. The point is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: pole on C.P.R. water-tank,  $222^{\circ} 18' \cdot 3$ ; spire on Methodist church,  $311^{\circ} 34' \cdot 2$ .

*Borden, Sask., 1911.*—The station is about midway between the north and south sides of NE.  $\frac{1}{4}$  sec. 33, tp. 39, rge. 9, W. 3rd mer. It is south of the C.N.R. tracks in an open field and in line with the pole on the top of the C.N.R. depot and the middle of the chimney on the north side of the depot. The point is 365 feet south of the south side of the railway yards and is marked by a stake 3 inches in diameter and projecting 1 inch above the surface. The following true bearings were determined: south gable of British America Elevator Co.'s elevator,  $327^{\circ} 33' \cdot 7$ ; southwest corner of hotel,  $349^{\circ} 14' \cdot 5$ ; south gable of National Elevator Co.'s elevator,  $5^{\circ} 08' \cdot 5$ ; pole on centre of C.N.R. depot,  $22^{\circ} 43' \cdot 4$ .

*Bow Island, Alta., 1915.*—The station is about one-fourth of a mile northwesterly from the C.P.R. depot. It is near the southeast corner of a field, which includes the town park and athletic field. The point is 114.5 feet west and 267 feet north of the southeast corner of the field, and is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: bottom of pole on middle of C.P.R. water-tank,  $125^{\circ} 29' \cdot 0$ ; short pipe on C.P.R. water-tank,  $125^{\circ} 51' \cdot 7$ ; north gable of Ogilvie's elevator,  $144^{\circ} 17' \cdot 0$ ; pole on tower of school,  $154^{\circ} 13' \cdot 7$ ; east gable of white farm house,  $318^{\circ} 54' \cdot 8$ .

*Brampton, Ont., 1910.*—The station is situated in a pasture field at the end of Nelson street. This field is owned by Mr. Ackroyd. The station is on line with the westerly

side of Nelson street produced and is 248 feet from the intersection of this line with the northerly limit of West street. The spire of Grace Methodist church bears  $22^{\circ} 52' \cdot 0$ .

*Brandon A, Man., 1919.*—The station is approximately a relocation of the station of 1910, near the summit of the second small ridge lying to the northeast of the farm buildings. It is 20 feet east of the wire fence around a small field and 4 feet northeasterly from the base of a flagpole. A cement block 2 by 2 inches set flush with the ground marks the point. The flagstaff on central dome of Brandon college bears  $156^{\circ} 40' \cdot 6$ .

Local attraction was found to exist. The results of tests seemed to indicate that the cause of the disturbance is very close to the station not even as far distant as the wire fence.

*Brandon B, Man., 1919.*—The station is in the first field east of the small field in which are a number of poultry houses, near the summit of the slope which begins near the south side of the field, about 60 feet west of the second gully from the west side of the field, about 500 feet east of the west side of the field and about 330 feet north of the south side. The field is used for pasture. The observations were taken over a small hole in top of a cement post 4 by 4 inches and projecting slightly above the surface. The following true bearings were determined: tip of dome of asylum,  $90^{\circ} 24' \cdot 1$ ; spire of Catholic church,  $141^{\circ} 44' \cdot 1$ ; pole of dome of school in city,  $158^{\circ} 47' \cdot 2$ ; flagstaff on central dome of Brandon college,  $165^{\circ} 28' \cdot 6$ .

*Brantford, Ont., 1910.*—The station is situated in the rear of a field owned by Mr. Hull, whose house is at the southwest corner of Market street and Grandview avenue. The station is 27 feet at right angles from the south limit of Grandview avenue and 85 feet from the westerly boundary fence. The station is on a hill overlooking the town to the south. The following true bearings were determined: right hand spire of Congregational church,  $181^{\circ} 34' \cdot 7$ ; tower on market-hall,  $184^{\circ} 07' \cdot 9$ ; pole on belfry,  $191^{\circ} 41' \cdot 0$ .

*Bridge Creek, B.C., 1908.*—The station is located on property belonging to Stephanson Bros., and is on the south edge of a fir grove which is in a field to the northwest of the ranch buildings, being 145 feet from the point where the irrigation ditch passes under the fence adjacent to the Cariboo road, and about at right angles to it. It is marked by a brass nail in a fir post 4 by  $4\frac{1}{2}$  inches, which projects 7 inches above the ground. The following true bearings were determined: northwest corner of chimney on the north of dwelling-house,  $151^{\circ} 29' \cdot 9$ ; gable of house to southwest of dwelling-house,  $165^{\circ} 21' \cdot 1$ ; chimney on machine shop in open field,  $194^{\circ} 16' \cdot 4$ .

The magnetometer was placed 12 feet behind the station and in line with the central reference mark.

*Brighton, Ont., 1910.*—The station is situated on the west side of the town, in a field belonging to Mr. Nesbitt. This field is in the second block west of Station street, and is the second field north of the C.N.R. tracks. The transit was placed 128.5 feet west of the west side of the first street west of Station street and 118 feet north of the line fence on the south side of this field. A large elm tree stands in the northeast corner of this field. The magnetometer was placed 12.3 feet behind the transit and in line with the transit and the spire of St. Andrews church. The following true bearings were determined from the transit station: spire of St. Andrews church,  $42^{\circ} 51' \cdot 8$ ; cross on Roman Catholic church,  $78^{\circ} 54' \cdot 5$ ; ornament on centre of Nesbitt's barn,  $292^{\circ} 54' \cdot 8$ .

*Broadview, Sask., 1910.*—The station is a relocation of the C.I. station of 1906. The point is 54 feet southwest from the southwest corner of the Grenfell Milling Co.'s implement house, and 61 feet northwesterly from the southwest corner of the shed at rear of and adjoining the building. The following true bearings were determined: spire on Baptist church,  $144^{\circ} 55' \cdot 7$ ; southwest corner of stone house on hill,  $282^{\circ} 43' \cdot 1$ ; southwest corner of west abutment of C.P.R. bridge,  $326^{\circ} 06' \cdot 4$ .

*Brockville A, Ont., 1907.*—The station is located in a field belonging to Mr. C. S. Cossitt, near the G.T.R. station and school-house. The spire of the First Presbyterian church bears  $74^{\circ} 13' \cdot 3$ .

*Brockville B., Ont., 1920.*—Station A being no longer available, a new site was selected in a pasture field owned by Mr. G. L. Booth. The field is on the left side of the Perth road, and about one-half mile from the G.T.R. station. The Perth road divides immediately beyond the field. The station is situated in the east corner of the field, being 157·3 feet from the wire fence along the Perth road forming the northeast boundary of the field and 195 feet from the wagon road forming the southeast boundary of the field (the measurements being taken perpendicular to each other and to the boundaries), and 45 feet south from a large elm tree. The point is marked by a stake 2 by 4 inches driven flush with the ground. The magnetometer was placed 20·8 feet behind the transit and in line with transit and spire on First Presbyterian church. The following true bearings were determined from the transit station: cross on tower of asylum,  $71^{\circ} 37' \cdot 3$ ; flagpole on tower of English church,  $109^{\circ} 17' \cdot 9$ ; spire on First Presbyterian church,  $129^{\circ} 05' \cdot 7$ ; south gable of red brick house,  $290^{\circ} 58' \cdot 2$ .

*Bruderheim, Alta., 1919.*—The station of 1911 was reoccupied approximately. It is northwest of the town, being 225 feet west of the west side of First avenue east and 215 feet south of the south side of the government road allowance on the north. The point is marked by a stake  $1\frac{1}{2}$  by  $1\frac{1}{2}$  inches, and projecting 2 inches above the ground. The following true bearings were determined: cross on Moravian church,  $83^{\circ} 46' \cdot 9$ ; cross on Lutheran church,  $166^{\circ} 36' \cdot 7$ ; north gable of Gillespie elevator,  $178^{\circ} 28' \cdot 5$ ; north gable of Alberta Pacific elevator,  $186^{\circ} 08' \cdot 6$ .

*Buckingham Junction, Que., 1912.*—The station is located on property belonging to McLaren Bros., about 1,300 feet north of the C.P.R. tracks, and near the foot of the hill on the east side of the road leading from the depot to the town of Buckingham. It is about 500 feet northwesterly from the northwest corner of a dwelling-house, 64 feet east of the fence along the west side of the field, and 23 feet southwesterly from two elm trees, which are separated by less than a foot for a distance of about ten feet from the base. The point is marked by a stake 2 by 4 inches and projecting 2 inches above the surface. The following true bearings were determined: tower of church in Rockland,  $92^{\circ} 10' \cdot 2$ ; top of spire on R.C. church,  $151^{\circ} 35' \cdot 6$ ; smokestack on flour-mill,  $192^{\circ} 41' \cdot 5$ .

*Burns Lake, B.C., 1915.*—The station is on the north side of the G.T.P. railway. It is 116 feet east of the east side of the depot produced and 550 feet north of the middle of the main line of the railway. A stake 3 inches in diameter and projecting 2 inches above the surface marks the point. The following true bearing was determined: pipe on first house on east side of and at end of road leading to the Indian village,  $225^{\circ} 40' \cdot 3$ .



*Burwash, Ont., 1916.*—The station is near the summit of a rocky hill about one-fifth mile northeast of the C.P.R. depot. It is in line with the north side of the main part of the public school building, and is 135 feet east of the northeast corner of that part of the building. The point is marked by a stake 2 by 2 inches and projecting 2 inches above the surface. The following true bearings were determined: southeast corner of the roof of the C.P.R. depot,  $224^{\circ} 27' 1''$ ; east gable of post office building,  $234^{\circ} 42' 0''$ .

*Byng Inlet, A, Ont., 1916.*—The station is on the north side of the Maganatawan river, on the property of the C.P.R., and east of their coaling plant. It is near the middle of a depression about 150 feet wide in the rocky shore line along the river, and is almost directly across the river from the Bigwood Co.'s saw-mill, 465 feet east of the east end of the wharf, which is part of the coaling plant, and 163 feet north of the high-water mark along the river. The point is marked by a stake 3 inches in diameter and projecting 1 inch above the surface. The following true bearings were determined: north gable of saw-mill,  $170^{\circ} 12' 9''$ ; pole on east end of Presbyterian church,  $194^{\circ} 31' 7''$ ; pole on west end of Presbyterian church,  $195^{\circ} 45' 0''$ ; spire of English church,  $203^{\circ} 54' 7''$ .

*Byng Inlet, B, Ont., 1920.*—As the station of 1916 could not be reoccupied a new location was selected. It is about 300 feet north of the C.P.R. bunk-houses, which are on the site of station A, near the north end of a meadow nearly surrounded by rocks. It is 38.7 feet from the rocks forming the northern limit of the field and 28.5 feet east of a wire fence. The position is marked by a stake 2 inches in diameter driven flush with the ground. The magnetometer was placed 17 feet behind the transit and in line with the spire of the English church. The following true bearings were determined from the transit station: spire on English church,  $198^{\circ} 33' 6''$ ; pole on water-tank beside Maganatawan hotel,  $189^{\circ} 19' 1''$ ; north gable of Bigwood Co.'s saw-mill,  $177^{\circ} 18' 8''$ .

*Caipha, (Laforest), Ont., 1916.*—The station is on a partially cleared space on the west side of the C.N.R. tracks. It is 650 feet north of the south end of the railway siding and 270 feet west of the middle of the main line of the railway. The station is marked by a stake 2 inches in diameter and projecting 6 inches above the ground. A temporary reference mark was used.

*Calgary, Alta., 1911.*—The station is a relocation of the M.S. station of 1907. It is in the southwest corner of NW.  $\frac{1}{4}$  sec. 14, tp. 24, rge. 1, W. 5th mer. It is in the grounds of the R.N.W.M.P. on a slight elevation and almost in line with the south side of Seventh avenue, and about 120 feet east of the fence line. It is distant about 108 feet from the southwest corner of lean-to on stores building and about 97 feet northwest from corner of fence enclosing the garden of the commanding officer. The following true bearings were determined: pole on city hall,  $271^{\circ} 02' 1''$ ; pole on school across river,  $359^{\circ} 42' 1''$ ; pole on centre of hospital,  $37^{\circ} 25' 7''$ .

*Calumet, Que., 1912.*—The station is southeast of the town and about 1,000 feet east of the C.P.R. depot. It is on property belonging to Miss Johnston, and is near the westerly edge of a peninsular-shaped bank, which is southwest of the dwelling-house. It is about 215 feet south of the south limit of a row of lots along the south side of the road leading from Calumet to Grenville, 54 feet west of the fence which is almost in line with the east side of Miss Johnston's house, and 112 feet southwest from the southwest corner of a small house over a spring. A stake 2 by 3 inches projecting 2 inches above the surface



marks the point. The following true bearings were determined: spire of Catholic church in Grenville,  $133^{\circ} 49' \cdot 8$ ; top of water-tower in Hawkesbury,  $152^{\circ} 18' \cdot 8$ ; top of smoke-stack on Perley's mill,  $243^{\circ} 05' \cdot 4$ ; west gable of red brick house,  $73^{\circ} 42' \cdot 4$ .

*Cap Colombier, Que., 1909.*—The station is located on the north shore of an inlet which is opposite the north side of Cap Colombier. It is near the eastern end of a clay bank and about 100 feet south of the government telegraph line, which runs along the foot of a high bank. There is a growth of small spruce trees to the north and west of the station. The point is marked by a stake 4 inches in diameter projecting 3 feet above the ground. Magnetic observations were made in a slight depression 22 feet west of the station and in line with gable of house on bank. The following true bearings were determined: first telegraph pole on the bank to the northeast of the station,  $78^{\circ} 28' \cdot 5$ ; west gable of house on the bank,  $83^{\circ} 39' \cdot 9$ ; cross over grave on Cap Colombier,  $191^{\circ} 59' \cdot 5$ .

*Canaan, N.B., 1912.*—The station is northwest of the I.C.R. depot, on property belonging to Mr. Percy Galligher. It is 765 feet west of the west side of the I.C.R. right-of-way, and 60 feet north of a road, which is only slightly used. The west gable of the I.C.R. depot bears  $93^{\circ} 45' \cdot 8$ .

*Caramat, Ont., 1916.*—The station is on the shore of a small lake, about 1,000 feet east of the C.N.R. section-house and about 800 feet south of the railway tracks. It is southeast of a group of log buildings, 33 feet east and 45 feet south of the southeast corner of the largest of the group, and is 12 feet from the water's edge. The point is marked by a stake 3 inches in diameter and projecting 2 feet above the surface. A temporary reference mark was used.

*Carberry, Man., 1910.*—The station is in an open field in the northwestern part of the town, being in block 6, between First and Second avenues on the north and south, and Dufferin and Lisgar streets on the east and west, respectively. It is 88 feet east of Lisgar street, and 172 feet south of First avenue. The point is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: top of short pole on front of public school,  $90^{\circ} 46' \cdot 1$ ; spire on Presbyterian church,  $114^{\circ} 43' \cdot 4$ ; top of pole on bell-tower near town hall,  $127^{\circ} 55' \cdot 2$ ; top of pole on town hall,  $129^{\circ} 05' \cdot 4$ ; spire on English church,  $155^{\circ} 17' \cdot 4$ ; top of pole on elevator,  $167^{\circ} 17' \cdot 8$ .

*Carleton Place, Ont., 1913.*—The station is near the south side of the town in a field used as an athletic field and race-course. The point is 111 feet northerly from the southerly side of the field and 145 feet easterly from the westerly side, and is marked by a stake 2 by 2 inches, projecting 1 inch above ground. The following true bearings were determined: pole on centre of band-stand in grounds,  $8^{\circ} 39' \cdot 5$ ; pole on tower of town hall, seen over band-stand,  $10^{\circ} 44' \cdot 4$ ; south gable of Catholic church,  $56^{\circ} 27' \cdot 3$ ; pole on dome of house across the Mississippi river,  $299^{\circ} 46' \cdot 4$ .

*Carmi, B.C., 1915.*—The station is in a small clearing among a growth of small trees southwest of the K.V.R. depot. It is determined as follows: at a point 189 feet south of the south side of the depot and 321 feet north of the switch at the south end of the siding in the middle of the main line of the railway, turn to the left, from the direction of the railway tangent to the north, the angle  $104^{\circ} 45' \cdot 3$ , and measure along this direction a distance of 470 feet. The station is marked by a stake 3 inches in diameter and projecting 2 inches above the surface. A temporary reference mark was used.

*Cartier, Ont., 1913.*—The station is about 1,700 feet southerly from the C.P.R. depot and about 900 feet westerly from the C.P.R. tracks. It is on the south edge of a clearing, and to the south of a group of buildings belonging to the Moore Lumber Co. The point is in line with the easterly end of the third building from the west and 271 feet from its southeasterly corner; it is also in line with the easterly end of the fourth building from the west and 250 feet from its southeasterly corner. It is marked by a stake 2 by 2 inches and projecting 3 inches above the surface. The following true bearings were determined: pole on C.P.R. water-tank,  $8^{\circ} 53' \cdot 6$ ; west gable of coal-chute,  $22^{\circ} 43' \cdot 2$ ; tip of spire on church,  $34^{\circ} 47' \cdot 4$ ; south gable of red building near C.P.R. tracks,  $50^{\circ} 33' \cdot 6$ .

*Castlegar, B.C., 1915.*—The station is southeast of the C.P.R. depot, being 114 feet east and 46 feet south of the southeast corner of the public school building. It is marked by a stake  $1\frac{1}{2}$  by  $1\frac{1}{2}$  inches and projecting 2 inches above the surface. The following true bearings were determined: short pipe on south side of hotel,  $278^{\circ} 08' \cdot 9$ ; pole on C.P.R. water-tank,  $287^{\circ} 08' \cdot 9$ ; east gable of school,  $298^{\circ} 51' \cdot 3$ .

*Causapsca, Que., 1912.*—The station is northeast of the village in an open field belonging to the fishing club. It is at the top of a slope, about 80 feet west of the Causapsca river, and about 200 feet northwest of the covered bridge over the river; is 83 feet east of the fence on the west side of the field, 83 feet south of the north fence, and 43 feet east and 184 feet north of the northeast corner of a barn, which is near the southwest corner of the field. The point is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: east gable of house on hill in distance,  $223^{\circ} 08' \cdot 1$ ; north gable of school,  $239^{\circ} 52' \cdot 2$ ; spire on Catholic church,  $266^{\circ} 44' \cdot 1$ ; north gable of church,  $276^{\circ} 03' \cdot 0$ .

*Cayuga, Ont., 1910.*—The station is situated in the third field south of the G.T.R. tracks and on the east side of the road leading to the town. A group of elm trees is situated in the southeast part of the field. The field is about 800 feet from the track. The transit was placed 31.5 feet from the northerly boundary fence of said field and 53 feet from the easterly limit of the road leading to the town. The magnetometer was placed 10.3 feet behind the transit and in line with the transit and pole on water-tank. The following true bearings were determined from the transit station: pole on water-tank,  $45^{\circ} 05' \cdot 9$ ; lightning conductor on northwest gable of house across the road,  $278^{\circ} 51' \cdot 7$ .

*Chalk River, A, Ont., 1920.*—The station of 1913 was reoccupied approximately. It is near the south side of a large field covered with small trees and shrubs, belonging to Mr. Godfrey Page. It is about 91 feet northwesterly from the C.I. station of 1906, 56 feet north of the south end of the field, 69 feet east of the east side of Elizabeth street, 14 feet northeasterly from a poplar tree and 42 feet northwesterly from a lone pine tree. The point is marked by a stake  $1\frac{1}{2}$  by  $1\frac{1}{2}$  inches driven flush with the ground. The following true bearings were determined: top of cross on Lutheran church,  $90^{\circ} 06' \cdot 6$ ; bottom of pole on water-tank near depot,  $145^{\circ} 27' \cdot 0$ ; tip of tower of Presbyterian church,  $208^{\circ} 36' \cdot 8$ ; cross on tower of English church,  $212^{\circ} 49' \cdot 9$ .

*Chalk River, B, Ont., 1913.*—The station is in a small field belonging to Mr. Godfrey Page, and is approximately a relocation of the C.I. station of 1906. The field is the most northerly one, which is under cultivation, on the east side of Elizabeth street. The

point is 85 feet east of the east side of Elizabeth street, 33 feet north of the south side of the field, 22 feet south of the north side and 51 feet west of the east side of the field. The following true bearings were determined: bottom of pole on water-tank about one mile westerly from the C.P.R. depot,  $11^{\circ} 07' 5''$ ; cross on Lutheran church,  $83^{\circ} 52' 8''$ ; bottom of pole on water-tank near C.P.R. depot,  $145^{\circ} 27' 0''$ ; cross on Catholic church,  $232^{\circ} 28' 9''$ .

*Chapleau, Ont., 1918.*—The station of 1910 was re-occupied. It is near the river bank on the east side of the town, just at the end of the street lying between the Catholic and Protestant cemeteries. It is 60 feet southeast of the southeast corner of the Protestant cemetery, and 59 feet northeast of the northeast corner of the Catholic cemetery.

The point is marked by a copper nail in the top of a stake  $1\frac{1}{2}$  by  $1\frac{1}{2}$  inches driven flush with the ground. The following true bearings were determined: gable over window on north side of house across river,  $94^{\circ} 20' 5''$ ; pole on centre of town water-tank,  $253^{\circ} 22' 0''$ .

*Chaplin, A, Sask., 1919.*—The station is a relocation of the D.O. station of 1911. It is northwest of the town in the NW.  $\frac{1}{4}$  sec. 29, tp. 17, rge. 5, W. 3rd mer. It is 590 feet north of the north side of the first street north of the C.P.R. tracks, 72 feet east of a row of telephone poles and 30.5 feet west of another row; it is 144 feet north of an east-west row of telephone poles. The following true bearings were determined: pole on C.P.R. water-tank,  $144^{\circ} 03' 0''$ ; pole on C.P.R. depot,  $162^{\circ} 03' 0''$ ; pole on C.P.R. pump-house,  $170^{\circ} 43' 3''$ .

*Chaplin, B, Sask., 1919.*—As the station of 1911 is not at present well located for taking observations on account of its proximity to a roadway, a new station was selected about 235 feet southwest. It is 389 feet north of the north side of the first street north of the railway tracks and is in line with the east side of the Alberta Pacific Elevator Co.'s elevator, is 57 feet south of the produced line of an east-west telephone line, and 58 feet west of another telephone line produced south on the west side of the road allowance. The station is in a depression in a ridge and is marked by a copper nail in the top of a stake 2 by 2 inches set flush with the ground. The following true bearings were determined: north gable of Conger & Co.'s elevator,  $119^{\circ} 06' 6''$ ; short pole on C.P.R. depot,  $148^{\circ} 16' 2''$ ; tip of C.P.R. pump-house,  $154^{\circ} 57' 3''$ ; northwest corner of main part of the Alberta Pacific Elevator Co.'s elevator,  $177^{\circ} 38' 1''$ .

*Charlottetown, P.E.I., 1918.*—The station is a relocation of the C.I. station of 1908. The observations were made over the middle one of three stones marking the true meridian line established by the British Admiralty in Victoria park. The stone is 13 by 14 inches and projects 18 inches above the surface. West of and in line with the stone marking the south end of the meridian are two additional stones. The point of observation was over the east end of a groove about 2 inches long in southwest quarter of the stone. The following true bearings were determined: middle of north meridian stone,  $0^{\circ} 16' 4''$ ; church spire seen between two chimneys,  $49^{\circ} 56' 3''$ ; church spire  $54^{\circ} 50' 6''$ ; tip of ornament on tower of city hospital,  $70^{\circ} 09' 4''$ .

*Chatham, Ont., 1910.*—The station is situated in a field fronting on the north side of the first road south of Queen street and running parallel to it. The field is opposite the agricultural grounds on Queen street and is owned by Mr. Hoff. The transit was placed 46.8 feet from the easterly boundary fence and 137.3 feet from the northerly limit of the above-mentioned road. The magnetometer was placed 10.8 feet behind



the transit and in line with transit and flagpole on main building of the agricultural grounds. The following true bearings were determined from the transit station: flagpole on main building of agricultural grounds,  $30^{\circ} 55' \cdot 6$ ; church spire (only one to be seen),  $346^{\circ} 54' \cdot 6$ ; top of G.T.R. water-tank,  $327^{\circ} 48' \cdot 6$ .

*Cheadle, Alta., 1911.*—The station is near the southeast corner of NE.  $\frac{1}{4}$  sec. 3, tp. 24, rge. 26, W. 4th mer. It is 350 feet north from the north side of the C.P.R. yards and 430 feet west of the fence on the west side of the school yard. The point is marked by a stake 3 by 3 inches and projecting 2 inches above the ground. The following true bearings were determined: pole on north end of school,  $69^{\circ} 26' \cdot 9$ ; pole on south end of school,  $69^{\circ} 58' \cdot 9$ ; pole on Crown Lumber Co.'s office,  $141^{\circ} 01' \cdot 9$ ; pole on Miller's store,  $153^{\circ} 55' \cdot 4$ ; pole on C.P.R. water-tank,  $180^{\circ} 26' \cdot 0$ .

*Chester, N.S., 1912.*—The station is on the east side of Central street, near the southeast corner of a lot belonging to Mr. Wm. Barry, and north of St. Stephen's church and cemetery grounds. It is 84.5 feet east of the east side of Central street, 44.5 feet west of the east side of the lot and 59 feet north of the south side. A stake driven flush with the ground marks the point. The following true bearings were determined: pole on top of school,  $14^{\circ} 47' \cdot 9$ ; chimney on Lutheran church,  $40^{\circ} 56' \cdot 5$ ; top of cross on Catholic church,  $159^{\circ} 44' \cdot 1$ .

*Chicoutimi, A, Que., 1918.*—The station is approximately a relocation of the C.I. station of 1906 and the D.O. station of 1913. It is in a field which formerly belonged to the seminary and was used for athletics, now the property of Mr. Cloutier. It is about 300 feet northerly from the seminary, and is 61.5 feet east of the fence along the east side of the street which is almost opposite the middle of the seminary, 94 feet westerly from a fence which is in line with a row of poplar trees, 27 feet northerly from a row of poplar trees and 88 feet northerly from a fence along the southerly side of the field. The field is at present (1918) under cultivation. The following true bearings were determined: top of rod beside image on hospital,  $46^{\circ} 18' \cdot 2$ ; cross on tower of Normal school,  $252^{\circ} 09' \cdot 7$ ; spire of Ste. Anne church,  $308^{\circ} 27' \cdot 1$ .

*Chicoutimi, B, Que., 1918.*—The station is on a vacant lot which adjoins the north side of the street passing in front of the seminary, also the east side of the street opposite the middle of the seminary. It is northwesterly from a clump of spruce trees, 88.5 feet north of the south side of the lot, 65.8 feet east of the west side of the lot and 167 feet southerly from the station of 1913 (station A). The point is marked by a copper nail in the top of a stake 2 by 2 inches set flush with the ground. The following true bearings were determined: spire on small dome of hospital,  $46^{\circ} 04' \cdot 4$ ; spire on tower of Normal school,  $258^{\circ} 37' \cdot 2$ ; spire of Ste. Anne Catholic church,  $309^{\circ} 25' \cdot 6$ ; west spire of cathedral,  $341^{\circ} 17' \cdot 0$ ; east spire of cathedral,  $345^{\circ} 03' \cdot 6$ .

*Clinton, B.C., 1908.*—The station is in the southeast part of the town, in a field owned by Mr. Smith. It is on a slight elevation about 30 paces to the south of the road leading to the cemetery. It is 143.5 feet northwest of the post which marks the northwest corner of the cemetery, and 144 feet southwest of the south large gate-post. The station is marked by a brass nail in a fir stake 2 by 4 inches driven 18 inches into the ground and projecting 7 inches above the surface. The following true bearings were



determined: top of church tower, Indian reservation,  $250^{\circ} 07' \cdot 3$ ; pole on cottage, rear of Provincial Land Office,  $271^{\circ} 41' \cdot 3$ ; pole on cottage (Dr. Sanson's),  $290^{\circ} 29' \cdot 5$ .

*Coalspur, Alta., 1918.*—The station is about 500 feet west of the G.T.P. railway tracks. It is on the west bank of the river, being on the point of land where the river changes its course from a northerly to a westerly direction. This is the second distinct bend of the river on the west side of the railway bridge. The point is 10 feet south of the edge of the bank on the north, 27 feet west of the bank on the east, and is marked by a stake 3 inches in diameter projecting 3 inches above the surface. The short pole on the centre of the G.T.P. water-tank bears  $194^{\circ} 09' \cdot 9$ .

*Cochrane, Ont., 1918.*—The station is a relocation of the D.O. station occupied in 1913 and 1914. It is on the north shore of Commando lake, about one-fourth mile north of the T. & N.O. Railway tracks. The lake is nearly bisected by two strips of land extending from the north and south to within about 75 feet of each other. The station is slightly to the east of the centre of the northerly one; is 13 feet east of the east side of Eighth avenue extended south, and in line with the north side of Fifth street extended west, about 30 feet from high-water mark on the east and 250 feet from the southerly extremity of the strip. The point is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: pole on centre of C.G.R. water-tank,  $146^{\circ} 40' \cdot 3$ ; pole on dome of depot,  $190^{\circ} 17' \cdot 9$ ; tip of town water-tank,  $244^{\circ} 48' \cdot 3$ ; cross over entrance to Catholic church,  $348^{\circ} 23' \cdot 5$ .

*Cornwall, Ont., 1920.*—The station is situated on the McMartin property about two miles east of Cornwall on the East Front road. It is in the southeast corner of a pasture field, bounded on the east side by a stone wall 3 feet high. The station is 35.4 feet west from the stone fence, 100 feet north from the wire fence forming the southern boundary of the field, 67 feet from a wild plum tree and 62.4 feet from a mountain ash tree, both being beside the stone fence, and in the pasture field. The point is marked by a stake 2 by 4 inches driven flush with the ground. The magnetometer was placed 20.8 feet behind the transit and in line with transit and spire of R.C. church, on the island. The following true bearings were determined from the transit station: top of easterly lighthouse on island,  $129^{\circ} 50' \cdot 5$ ; top of westerly lighthouse on island,  $132^{\circ} 36' \cdot 5$ ; spire of R.C. church on island (about 4 miles distant),  $134^{\circ} 25' \cdot 8$ ; spike on brick silo,  $284^{\circ} 02' \cdot 6$ .

*Cowan, Man., 1911.*—The station is on the easterly side of a clearing on the east side of the C.N.R. tracks. It is 325 feet east and 110 feet north of the northeast corner of the C.N.R. freight-shed. The point is marked by a stake 3 inches in diameter and projecting 3 inches above the ground. The following true bearings were determined: top of first telegraph pole south of the C.N.R. depot,  $234^{\circ} 54' \cdot 7$ ; top of pole over window on east side of C.N.R. depot,  $250^{\circ} 56' \cdot 4$ ; north gable of freight-shed,  $256^{\circ} 25' \cdot 0$ .

*Craighurst, Ont., 1916.*—The station is in an open field belonging to Mr. John Craig, and west of the C.P.R. depot. It is 384 feet west of the fence along the west side of the C.P.R. right-of-way, and 21 feet south of the fence along the north side of the field. The point is marked by a stake 2 inches in diameter and projecting 2 inches above the surface. The following true bearings were determined: gable over window on west side of C.P.R. depot,  $76^{\circ} 22' \cdot 1$ ; east gable of lower part of elevator,  $166^{\circ} 00' \cdot 1$ ; east gable of upper

part of elevator,  $166^{\circ} 27' \cdot 6$ ; west gable of upper part of elevator,  $167^{\circ} 13' \cdot 3$ ; west gable of lower part of elevator,  $167^{\circ} 40' \cdot 9$ .

*Cranbrook, A, B.C., 1919.*—Station A is on waste land near the westerly corner, and outside, of the cemetery, which is about one-fourth mile west of the C.P.R. depot. It is 51.5 feet northwesterly and 61 feet northeasterly from the westerly corner of the cemetery, and is marked by a stake 3 inches in diameter and projecting 2 inches above the surface. The following true bearings were determined: pole on tower of building in exhibition grounds,  $81^{\circ} 12' \cdot 6$ ; pole on C.P.R. water-tank,  $106^{\circ} 23' \cdot 0$ ; tip of tower of St. Mary's school,  $120^{\circ} 49' \cdot 4$ .

*Cranbrook, B, B.C. 1919.*—Station B is 388 feet northwesterly from station A, and was selected because it appeared doubtful if Station A would be available for future observations. It is near the foot of the hill in front of Mr. Mackenzie's house and garden, being about 180 feet from the front fence. It is 440 feet northwesterly and 56.5 feet northeasterly from the westerly corner of the cemetery, and is marked by a stake 2 by 2 inches and projecting 2 inches above the surface. The following true bearings were determined: pole on building in exhibition grounds,  $93^{\circ} 23' \cdot 8$ ; pole on C.P.R. water-tank,  $111^{\circ} 33' \cdot 8$ ; bottom of smokestack at power-plant,  $165^{\circ} 42' \cdot 3$ .

*Crane Lake, Sask., 1911.*—The station is on property belonging to Gordon, Ironsides & Co., in the southwest corner of the SE.  $\frac{1}{4}$  sec. 27, tp 12, rge. 23, W. 3rd mer. It is in a field lying west of and adjoining the one opposite the C.P.R. depot; 240 feet south of the south side of the C.P.R. right-of-way, and 33 feet west of the fence on the east side of the field. A stake projecting 6 inches above the surface marks the point. The following true bearings were determined: pole on small house on Gordon, Ironsides & Co.'s farm,  $15^{\circ} 39' \cdot 6$ ; bottom of pole on foreman's house,  $156^{\circ} 56' \cdot 6$ ; pole on small house,  $164^{\circ} 47' \cdot 7$ .

*Creston, B.C., 1915.*—The station is northeast of the C.P.R. depot, and near the northeast corner of the public school grounds. It is 34 feet west of the fence along the east side, 36 feet south of the fence along the north side of the grounds and 139.5 feet northeast of the northeast corner of the school building. The point is marked by a stake 4 by 4 inches driven flush with the ground. The following true bearings were determined: top of cross on Catholic church,  $141^{\circ} 17' \cdot 2$ ; tip of Presbyterian church spire  $200^{\circ} 37' \cdot 6$ ; east gable of English church,  $240^{\circ} 15' \cdot 8$ .

*Crossfield, Alta., 1911.*—The station is near the north side of NE.  $\frac{1}{4}$  sec. 26, tp. 28, rge. 1, W. 5th mer. It is northwest of the town and near the edge of a piece of ground covered with small trees, about 435 feet west of the east side of Munson street produced, and 175 feet north of a row of telegraph poles on the north side of Osler street. The point is marked by a stake 2 by 2 inches and projecting 2 inches above the surface. The following true bearings were determined: bottom of flagstaff on tower of school,  $32^{\circ} 08' \cdot 3$ ; west gable of elevator No. 45,  $122^{\circ} 52' \cdot 9$ ; top of cross on English church,  $170^{\circ} 65' \cdot 3$ .

*Crowfoot, Alta., 1911.*—The station is near the north side of the NW.  $\frac{1}{4}$  sec. 25, tp. 21, rge. 20, W. 4th mer. It is on the C.P.R. townsite, being 430 feet north of the C.P.R. right-of-way, about 440 feet south of the north side of the section and 15 feet west of the west limit of block "C." A stake 2 by 2 inches, projecting 1 inch above the surface,

marks the point. The following true bearings were determined: west gable of Mr. W. H. Palmer's house,  $106^{\circ} 43' \cdot 5$ ; pole on west end of Mr. Rodbourne's house,  $118^{\circ} 55' \cdot 7$ ; top of west water-tank,  $133^{\circ} 07' \cdot 3$ .

*Dalhousie Junction, N.B., 1912.*—The station is about one-fourth mile west of the I.C.R. depot on property belonging to Mr. George Thompson. It is southeast of the Presbyterian church, being 45 feet south of the south side and 75 feet from the southeast corner, and is 158 feet south of the south side of the road passing in front of the church. The point is marked by a stake 2 inches in diameter driven flush with the ground. The following true bearings were determined: northeast corner of the Presbyterian church,  $303^{\circ} 02' \cdot 2$ ; south gable of school across the bay,  $304^{\circ} 29' \cdot 6$ ; southwest corner of Mr. Thompson's house,  $305^{\circ} 34' \cdot 8$ .

*Dauphin, Man., 1919.*—The station of 1911 was reoccupied. It is southwest of the town near the southeast corner of the agricultural grounds. It is in line with the south side of the horticultural hall extended, and is 191.6 feet west of the southwest corner, 273.6 feet west of the east fence and 114 feet north of the south fence around the grounds. A stake 2 by 2 inches driven flush with the ground marks the point. The flagstaff on the tower of school bears  $42^{\circ} 09' \cdot 7$ .

*Desbarats, Ont., 1916.*—The station is in an open field west of the group of houses comprising the village, and about 600 feet north of the C.P.R. depot. It is in line with the north side of the Presbyterian church, and is 202 feet west of the northwest corner of the same; it is 116 feet south and 150.5 feet west of the southwest corner of the lot around a dwelling-house owned by Miss McNally. The point is marked by a brass screw in the top of a stake  $1\frac{1}{2}$  by 2 inches and projecting 2 inches above the surface. The following true bearings were determined: east gable of C.P.R. depot,  $160^{\circ} 56' \cdot 8$ ; north gable of English church,  $224^{\circ} 19' \cdot 0$ ; chimney on south end of house about one-half mile to the west,  $255^{\circ} 52' \cdot 3$ .

*Dorion, Ont., 1910.*—The station is in an open field, north of the C.P.R. tracks and depot. It is 190 feet north of the fence on the south side of the field which is adjacent to the C.P.R., and 84 feet east of the middle of the road which crosses the field. The following true bearings were determined: south gable of Mr. Kohler's stable,  $327^{\circ} 09' \cdot 3$ ; south gable of house on farm lying to north of Mr. Kohler's,  $331^{\circ} 31' \cdot 2$ ; south gable of Mr. Kohler's house,  $337^{\circ} 08' \cdot 6$ .

*Doucet, Que., 1918.*—The station is an exact relocation of the one occupied in 1914. It is about 800 feet south of the C.G.R. depot and about the same distance from the car shops and roundhouse across an inlet on the northeasterly side of a point. It is 6 feet easterly and 123 feet northerly from the northeasterly corner of the site of the building used during construction days as a hospital; at present there remain only the sills of the building. The station is 32 feet from the water's edge on the north and 50 feet from the water's edge on the east. The vicinity of the station was cleared of all small trees, mostly poplar, which were found growing over the portion of the point formerly cleared. Observations were taken over a stake 3 inches in diameter and projecting 3 inches above the surface. The following true bearings were determined: southeast corner of C.G.R. shops,  $303^{\circ} 02' \cdot 6$ ; east gable of house farthest south and near opposite shore,  $307^{\circ} 34' \cdot 1$ ;



southeast corner, at top, of house for trainmen,  $311^{\circ} 00' \cdot 6$ ; short pole on west end of depot,  $336^{\circ} 03' \cdot 6$ ; short pole on east end of depot,  $339^{\circ} 04' \cdot 1$ .

*Dryden, Ont., 1910.*—The station is about one-fourth of a mile northeast of the town on the east side of the Wabigoon river. It is on an unused portion of the government road which runs from the river into the country in a northeasterly direction and is about midway between the river and the end of Florence street which intersects the road at right angles. The road leading from the town meets the main road where the latter and Florence street intersect. The pole on the C.P.R. water-tank may be seen about midway between the cross on the English church and the pole on the Central hotel. The point is 34 feet from the southerly side of the government road and 290 feet from the northeasterly corner formed by the intersection of Florence street and the government road. The point is marked by a stake 3 by 3 inches and projecting 2 inches above the ground. The following true bearings were determined: north chimney on Mr. Swanson's house,  $99^{\circ} 32' \cdot 3$ ; cross on English church,  $121^{\circ} 51' \cdot 4$ ; pole on C.P.R. water-tank,  $123^{\circ} 00' \cdot 0$ .

*Dunmore, Alta., 1919.*—The station of 1915 was reoccupied. It is near the eastern end of an irregular depression which is north of the C.P.R. depot. The point is in line with the eastern end of the depot and is 562 feet north of the northeast corner of the same. It is 451 feet west of the rural telephone line and is marked by a stake 2 by 2 inches projecting 2 inches above the surface. The following true bearings were determined: short pipe on C.P.R. water-tank,  $145^{\circ} 46' \cdot 4$ ; east gable of C.P.R. depot,  $163^{\circ} 34' \cdot 6$ ; west gable of C.P.R. depot,  $166^{\circ} 49' \cdot 9$ ; north gable of elevator,  $84^{\circ} 39' \cdot 5$ .

*Eagle, Ont., 1910.*—The station is approximately a relocation of the C.I. station of 1906. It is about one-fourth of a mile east of the C.P.R. depot (moved since 1906) and about 500 feet south of the C.P.R. tracks. A line, which is a continuation of the east side of Mr. J. A. Gardiner's house (formerly the Central hotel) in a southerly direction, intersects a line joining the station and pole on the C.P.R. water-tank 177 feet from the southeast corner of the house and 64 feet westerly from the station. The following true bearings were determined: top of pole on C.P.R. water-tank,  $254^{\circ} 33' \cdot 8$ ; east gable of C.P.R. depot,  $257^{\circ} 24' \cdot 5$ ; bottom of pole on "Blue" store,  $285^{\circ} 22' \cdot 6$ ; left edge of chimney of Mrs. Mitchell's house,  $299^{\circ} 04' \cdot 1$ ; east gable of Mrs. Mitchell's house,  $301^{\circ} 32' \cdot 5$ .

*Edmonton, A, Alta., 1911.*—The station is approximately a relocation of the M.S. station of 1907, but owing to the erection of buildings in the vicinity, it was impossible to be certain of the exact point. The station of 1911 is situated in tp. 53, rge. 24, W. 4th mer. It is in the grounds of the R.N.W.M.P., 48 feet southwesterly from the southwest corner of a stable, 57 feet east of the west side of the grounds and 64 feet north of the north side of Major Cuthbert's house. The following true bearings were determined: southwest corner of west chimney on police barracks,  $23^{\circ} 37' \cdot 9$ ; apex of water-tower in Strathcona,  $202^{\circ} 24' \cdot 2$ .

*Edmonton, B, Alta., 1913.*—The station is on the University grounds to the north of the University buildings and about 2,500 feet west of the high-level bridge over the Saskatchewan river. The point is in line with the east side of two large brick buildings used for dormitories and lecture halls, and is 657 feet north of the northeast corner of the northerly one. It is 161 feet south of the edge of the bank along the north side of Saskatchewan drive. The following true bearings were determined: spire on east tower



of large apartment house across river,  $339^{\circ} 21' \cdot 4$ ; cross on dome of General hospital,  $39^{\circ} 46' \cdot 4$ ; tip of dome on front of Provincial Parliament buildings,  $70^{\circ} 38' \cdot 8$ ; bottom of pole on dome of south wing of Provincial Parliament buildings,  $72^{\circ} 06' \cdot 4$ ; flagpole on south tower of Alberta college,  $151^{\circ} 19' \cdot 0$ .

*Edson, Alta., 1919.*—The station is approximately a relocation of the D.O. station of 1913. It is near the southeast corner of the block on which is located the school and part of which is used as an athletic field and park, 43 feet north of the north side of Eighth avenue and 31 feet west of west side of Dominion street. The point is marked by a cross in the top of a brick set flush with the ground. The following true bearings were determined: tip of circular ornament on house (hospital) across ravine,  $114^{\circ} 50' \cdot 8$ ; cross on church on Seventh avenue,  $153^{\circ} 26' \cdot 0$ ; southeast corner, near bottom, of school,  $249^{\circ} 41' \cdot 4$ .

*Edmundston, N.B., 1912.*—The station is a relocation of the C.I. station of 1906. It is near the northwestern corner of the grounds around the school, being 116 feet from the northwest corner of the school building, 13 feet east of the inside of the row of posts on the west side of the grounds and 16 feet south of the row along the north side of the grounds. The point is marked by a stake  $1\frac{1}{2}$  by 3 inches driven flush with the ground. A pole on the ventilator of the stable bears  $119^{\circ} 41' \cdot 8$ .

*Elie, Man., 1911.*—The station is near the northwest corner of sec. 1, tp. 11, rge. 3, W. Principal mer. It is south of the C.N.R. tracks and in line with the fence on the west side of a lumber yard, 28 feet north of the fence along the south limit of the townsite, 200 feet south of the southwest corner of the lumber yard and 275 feet east of the east side of the government road allowance on the west side of the section. The point is marked by a stake 2 by 2 inches and projecting 2 inches above the surface. The following true bearings were determined: top of cross on Catholic church,  $295^{\circ} 39' \cdot 4$ ; pole on C.N.R. water-tank,  $326^{\circ} 59' \cdot 1$ ; pole on ventilator of stable north of livery stable,  $3^{\circ} 20' \cdot 8$ ; south gable of shed in lumber yard,  $20^{\circ} 27' \cdot 5$ .

*Elmsdale, N.S., 1912.*—The station is east of the town and north of the I.C.R. tracks, in a pasture field belonging to Mr. Fraser. It is about 300 feet north of the railway tracks and about 500 feet northeast of the railway bridge over the Nine Mile river. The point is about 20 feet west of the edge of the river and 22 feet southeasterly from two large elm trees, which are on the southeasterly edge of a grove and separated by 12 feet, and is marked by a stake 3 inches in diameter and projecting 2 inches above the surface. The following true bearings were determined: northwest corner of white house (seen under railway bridge),  $199^{\circ} 28' \cdot 9$ ; pole on school,  $216^{\circ} 06' \cdot 9$ ; chimney on white house,  $315^{\circ} 19' \cdot 0$ .

*Emerson, Man., 1914.*—The station is about one-fourth of a mile southwest of the C.N.R. depot. It is near the southeast corner of the agricultural grounds, being 51.5 feet west of the fence along the east side of the grounds and 26.5 feet north of the south fence. The point is marked by a stake  $1\frac{1}{2}$  by  $1\frac{1}{2}$  inches and projecting 1 inch above the surface. The following true bearings were determined: bottom of flagstaff on brick block on north side of street passing the government building,  $10^{\circ} 16' \cdot 5$ ; flagstaff on Russel hotel,  $18^{\circ} 12' \cdot 3$ ; tip of tower on town hall,  $24^{\circ} 48' \cdot 9$ ; south gable of skating rink,  $26^{\circ} 03' \cdot 7$ .

*Endako, B.C., 1919.*—The station of 1915 was reoccupied. It is east of a group of houses comprising the town and near the edge of a bank overlooking a flat, being 30 feet from the bank on the east, 42 feet from the bank on the north and 75 feet northeasterly from the north side of a trail. It is 291 feet west of the west end of the railway trestle over a ravine, 87 feet west of the first switch west of the trestle and 586 feet north of the middle of the main line of the G.T.P. railway. The station is marked by a stake 2 inches in diameter driven flush with the ground. The following true bearings were determined: easterly one of two smokestacks on G.T.P. shops,  $266^{\circ} 59' \cdot 5$ ; tip of G.T.P. water-tank,  $267^{\circ} 28' \cdot 2$ .

*Enderby, B.C., 1915.*—The station is about 1,000 feet northeast of the C.P.R. depot on the west bank of the Shuswap river. It is near the east end of the street passing the north side of the property on which the flour-mill stands, or the second street north of the depot. The point is 40.5 feet north of the south side, 19.5 feet south of the north side of the street and 20 feet from the edge of the bank along the river, and is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: flagstaff on east end of drill-hall,  $208^{\circ} 55' \cdot 8$ ; north gable of flour-mill,  $237^{\circ} 28' \cdot 6$ ; short pole on south end of frame house opposite flour-mill property,  $281^{\circ} 05' \cdot 2$ .

*Englehart, Ont., 1915.*—The station, which is about 800 feet west of the C.I. station of 1906, is near the northeast corner of the grounds around the public school. It is 112.5 feet from the northeast corner of the building, 19.5 feet west of the east side of the grounds and 39.5 feet south of the fence along the north side of a lane which passes through the middle of the block, there being no fence to separate the lane from the school grounds. The point is marked by a stake 2 by 2 inches and driven flush with the ground. The following true bearings were determined: southeast corner of school building,  $234^{\circ} 56' \cdot 4$ ; tip of tower on Presbyterian church,  $259^{\circ} 02' \cdot 3$ ; pole over centre window on south side of T. & N. O. depot,  $12^{\circ} 17' \cdot 3$ .

*Eskimo Point, A, Que., 1920.*—The station of 1909, or station A, was reoccupied. It is now in a field belonging to Mr. Joe Dupuis, and northerly from his dwelling-house. The field is on the westerly side of the street passing in front of the Catholic church; the station is almost in line with the front of the church, and a line joining the station and a large crucifix in the cemetery passes slightly to the north of the centre of the main entrance. The point is 1.3 feet south of the fence along the north side of the field and 11.3 feet west of the fence along the east side (in order to occupy the station, part of the fence was removed), and is marked by a stone about 2 by 2 inches set flush with the ground. The following true bearings were determined: top of large cross in cemetery,  $71^{\circ} 12' \cdot 7$ ; cross on east end of Catholic church,  $185^{\circ} 02' \cdot 7$ ; spire on tower of Catholic church,  $188^{\circ} 38' \cdot 5$ .

*Eskimo Point, B, Que., 1920.*—As the station of 1909 (station A) is not very suitable for future observations, a new station was selected about 420 feet to the northeast. It is on a sandy ridge 60.5 feet north and 106.5 feet west of the northwest corner of the cemetery, and 257 feet from the centre of the main gate on the west side of the cemetery. From the station the lighthouse and another building on a point of land on an island may be seen through an iron arch over the main gate on the west side of the cemetery.

The point is marked by a stake 5 inches in diameter and projecting 3 inches above the surface, observations being taken over the centre of the stake. The following true bearings were determined: tip of bell-tower on school near east end of village,  $79^{\circ} 33' \cdot 1$ ; top of large cross in cemetery,  $126^{\circ} 58' \cdot 1$ ; top of lighthouse,  $141^{\circ} 38' \cdot 1$ ; spire of Catholic church,  $197^{\circ} 23' \cdot 2$ .

*Ethelbert, Man., 1911.*—The station is near the north side of SE.  $\frac{1}{4}$  sec. 31, tp. 29, rge. 21, W. Principal mer. It is 375 feet north of the north side of the post office building, about 230 feet west of the west side of the government road allowance, is north of and almost in line with the east end produced of the municipal building, 31 feet east of the east side of Railway avenue, and 150 feet south and 35 feet east of the southeast corner of the Catholic church. A stake 2 by 2 inches and projecting 1 inch above the surface marks the point. The following true bearings were determined: top of spire on Galician church,  $166^{\circ} 20' \cdot 7$ ; pole on west end of C.N.R. depot,  $356^{\circ} 36' \cdot 9$ ; tip of cross on west end of Catholic church,  $327^{\circ} 41' \cdot 0$ .

*Farnham, Que., 1907.*—The station is located in a field belonging to the McCorguil estate, and is at least 1,000 feet south of the C.P.R. tracks. The spire of the Methodist church bears  $36^{\circ} 22' \cdot 5$ .

*Fauquier, Ont., 1914.*—The station is near the southwestern edge of a clearing on the northwestern corner of the Ontario Government Experimental farm. It is 1,350 feet southerly from a point in the middle of the N.T.R. track, the point being 62 feet west of the west end of the railway bridge over the Groundhog river; the line joining this point and the station makes, with the direction of the railway tangent east, the angle  $94^{\circ} 20' \cdot 0$ . The station is marked by a stake 2 inches in diameter and projecting 4 inches above the surface. The west gable of the first house south of the railway track on the west side of the river bears  $23^{\circ} 57' \cdot 6$ .

*Fernie, B.C., 1915.*—The station is near the northwesterly edge of the town on the east bank of the Elk river. It is near the north end of Wood street and almost opposite the middle of the lane, which is midway between Nicholas avenue and Chipman avenue. The tip of the cross on the Catholic church is seen a little to the left of the chimney on house at 22 Chipman avenue. The point is 21 feet west of the west line of Wood street and 129 feet north of the north line of Chipman avenue. A stake 2 by 2 inches marks the station. The following true bearings were determined: bottom of flagstaff on public school,  $82^{\circ} 07' \cdot 9$ ; cross on front of English church,  $102^{\circ} 49' \cdot 3$ ; tip of cross on Catholic church,  $109^{\circ} 25' \cdot 7$ ; bottom of flagstaff on court-house,  $117^{\circ} 04' \cdot 7$ ; north gable of skating rink,  $147^{\circ} 40' \cdot 5$ .

*Fire River, Ont., 1916.*—The station is on the east side of the C.N.R. tracks, in line with the north side of the section-house and 224 feet east of the northeast corner of the same. A stake 2 inches in diameter and projecting 1 foot above the surface marks the point. A temporary reference mark was used.

*Flesherton, Ont., 1910.*—The station is situated in a field belonging to Mr. Cullinson and is at the northwest corner of the intersection of the first cross-road eastwards from the C.P.R. on the road to Flesherton. The above-mentioned road forms the southerly boundary for about one-half the length of the field. The transit was placed 24.5 feet from the westerly boundary fence and 117 feet from the southerly boundary fence. The



magnetometer was placed 11 feet behind the transit and on line with the transit and belfry on school. The following true bearings were determined from the transit station: church spire, Flesherton,  $49^{\circ} 12' \cdot 5$ ; belfry on school,  $147^{\circ} 30' \cdot 0$ ; north gable of grain elevator,  $198^{\circ} 48' \cdot 3$ .

*Foleyet, Ont., 1916.*—The station is about one-fourth of a mile southeast of the C.N.R. depot, near the north side of a sandy ridge, which is adjacent to the south side of the low, level land lying to the south and east of the C.N.R. roundhouse. It is among a growth of small trees, 1,425 feet southerly and 498 feet easterly from the roundhouse, measurements being made along and at right angles to the main siding leading from the roundhouse to the main line of the railway. The point is marked by a stake 2 inches in diameter and projecting 1 foot above the surface. The following true bearings were determined: southeast corner of C.N.R. section-house,  $252^{\circ} 31' \cdot 8$ ; northeast corner of C.N.R. bunkhouse,  $272^{\circ} 01' \cdot 7$ ; southwest corner of C.N.R. boarding-house,  $272^{\circ} 11' \cdot 7$ .

*Folleigh Lake, N.S., 1912.*—The station is on the summit of a strip of land lying between two depressions in an open field belonging to Mrs. Mattison. It is about 750 feet east of the east side of Folleigh lake and about 540 feet east of the fence, which is almost in line with the west side of a barn, and 80 feet north of the fence along the south side of the farm. The point is marked by a stake driven flush with the ground. The following true bearings were determined: pole in Mr. Irvin's yard,  $235^{\circ} 54' \cdot 9$ ; south gable of Mr. Irvin's house,  $273^{\circ} 06' \cdot 9$ ; south gable of barn on Mrs. Mattison's farm,  $277^{\circ} 12' \cdot 5$ .

*Forest, Ont., 1910.*—The station is situated in the agricultural grounds on Argyle street. The station is 87 feet from the southerly boundary fence of the grounds and 107 feet from the westerly boundary fence. The following true bearings were determined: spire of Roman Catholic church,  $69^{\circ} 15' \cdot 2$ ; spire of Presbyterian church,  $88^{\circ} 48' \cdot 9$ ; tower of high school,  $133^{\circ} 55' \cdot 8$ .

*Fort Frances, Ont., 1914.*—The station is on vacant property belonging to the Hudson's Bay Co., lying between Third street and the Rainy river, and east of the Catholic cemetery. It is near the edge of the bank along the river, being 266 feet south of the south side of Third street and 116.5 feet east of the fence along the east side of the cemetery. The point is marked by a stake  $1\frac{1}{2}$  by  $1\frac{1}{2}$  inches and projecting 2 inches above the surface. The following true bearings were determined: tip of town water-tank,  $100^{\circ} 48' \cdot 1$ ; bottom of flagstaff on tower of court-house,  $111^{\circ} 59' \cdot 9$ ; tip of water-tank near pulp-mill across river,  $169^{\circ} 35' \cdot 7$ ; cross on tower of Catholic church across river,  $201^{\circ} 52' \cdot 7$ .

*Fort George (South), B.C., 1919.*—The station of 1913 and of 1915 was reoccupied. It is about 2 miles southeast of Prince George, in an open space between the road passing along the front of the Provincial Government buildings and the Fraser river. It is in line with the south side of the land-office building, and is 40 feet west of the edge of the bank on the west side of the Fraser river. A copper nail in the top of a stake 2 by 2 inches, marks the point. The following true bearings were determined: tip of pole on east end of land-office building,  $293^{\circ} 04' \cdot 2$ ; pole on centre of water-tank on hill,  $310^{\circ} 01' \cdot 4$ ; tip of pole on east end of jail,  $322^{\circ} 25' \cdot 2$ .



*Fort William, Ont., 1916.*—The D.O. station of 1910 was reoccupied. It is 22 feet west of the west side of Archibald street, 72 feet south of the south side of Bethune street and 96.5 feet north of the fence along the north side of the athletic grounds. A stake 2 by 2 inches driven flush with the ground marks the point. The following true bearings were determined: bottom of flagstaff on school,  $3^{\circ} 40' \cdot 2$ ; bottom of flagstaff on Y.M.C.A. building,  $172^{\circ} 36' \cdot 7$ ; upper angle of cement block at top of wall near west end of Y.M.C.A. building,  $173^{\circ} 47' \cdot 6$ .

*Frank, Alta., 1919.*—The station of 1915 was reoccupied. It is about 800 feet northeast of the Sanatorium hotel, on the easterly slope of a ridge, the southerly extremity of which is about 120 feet from the northwest corner of a long brick building (an abandoned smelter), and near the edge of the Oldman river. The point is 290 feet northwest-erly from the northwest corner of the smelter and 15 feet east of the summit of the ridge, and is marked by a stake 4 by 4 inches and projecting 3 inches above the surface. The following true bearings were determined: cross on Catholic church,  $123^{\circ} 38' \cdot 6$ ; pole on C.P.R. water-tank,  $144^{\circ} 30' \cdot 6$ ; bottom of flagstaff on front of hotel,  $249^{\circ} 48' \cdot 6$ ; north gable of hotel,  $254^{\circ} 58' \cdot 2$ .

*Fraser, Ont., 1910.*—The station is on the east edge of a clearing on a hill to the northeast of the A.C.R. depot and hotel buildings. It is 87 feet north and 142 feet east of the northeast corner of the hotel, and is marked by a copper nail in the top of a stake 2 by 2 inches and projecting 3 inches above the surface. The following true bearings were determined: pipe on A.C.R. pump-house,  $166^{\circ} 26' \cdot 8$ ; southeast corner of roof of engine-house,  $180^{\circ} 30' \cdot 6$ .

*Fredericton, N.B., 1912.*—The station is on a strip of land belonging to the city adjacent to the St. John river and south of the city. It is about 3,500 feet south of the railway bridge over the river and about 1,400 feet south of the transformer station, and is northeast of the angle formed by a small ravine, which extends about 200 feet in a north-south direction and about half the distance between the bend and the shore of the river in an east-west direction. The point is 57 feet east of a row of electric light poles, 73 feet northeast from the first pole on the north side of the ravine and 83 feet southeast from the second pole, and 125 feet west of the road along the river. The tower of a church in Gibson may be seen approximately through centre of second arch from the west end of railway bridge over the river, the tower of another church may be seen slightly to the east of the centre of the fifth arch from the west end, and a red tower of a third church appears over the most easterly arch. A stake 3 inches in diameter driven flush with the ground marks the point. The following true bearings were determined: southeast corner of transformer station,  $3^{\circ} 24' \cdot 5$ ; spire of church seen through second arch from west end of bridge,  $5^{\circ} 47' \cdot 7$ ; spire of church seen over fifth arch,  $17^{\circ} 01' \cdot 6$ ; spire of red tower seen over most easterly arch,  $27^{\circ} 00' \cdot 3$ .

*Fredericton Junction, N.B., 1912.*—The station is southeast of the C.P.R. depot and southwest of the railway bridge over the St. John river, in a field lying between the railway tracks and the river and belonging to Mr. John Tracey. It is near the southwest corner of the field, being 145 feet east of the west fence and 18 feet north of the south fence, and on the southeasterly edge of a grove. The point is marked by a stake 2 inches

in diameter and set flush with the ground. The following true bearings were determined: pole on east end of Baptist church,  $95^{\circ} 42' \cdot 2$ ; pole on west end of Baptist church,  $96^{\circ} 09' \cdot 2$ ; tip of spire on English church,  $104^{\circ} 35' \cdot 6$ .

*Garneau Junction, Que., 1913.*—The station is in an open field about 358 feet west of the C.P.R. tracks, and about 500 feet north of the C.N.R. tracks. It is in the second field north of Mr. J. A. Bordeleau's barn, being 47 feet north of the fence along the south side of the field, and 9 feet west of the edge of the bank along the west side of a ballast pit. The pole on the centre of the C.N.R. water-tank appears slightly to the west of the northeast corner of Mr. Bordeleau's house. The following true bearings were determined: pole on C.N.R. water-tank,  $131^{\circ} 58' \cdot 4$ ; spire on Lac à la Tortue church,  $157^{\circ} 05' \cdot 5$ ; spire of church in Grand Mere,  $233^{\circ} 18' \cdot 7$ .

*Gimli, Man., 1916.*—The station is in a park on the north side of the town. It is 231 feet north and 34.5 feet east of the fence on the south and west sides, respectively, of the park. The point is marked by a copper nail in the top of a stake 2 inches in diameter set flush with the ground. The top of the cross on the tower of the Lutheran church bears  $160^{\circ} 05' \cdot 7$ .

*Gladstone, Man., 1919.*—The station of 1911 was reoccupied. It is southwest of the town and near the northeast corner of the agricultural grounds, being 150 feet west of the east fence, 250 feet south of the north fence and 172 feet southwest of the southwest corner of the horticultural hall. The point is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: spire on tower of Presbyterian church,  $58^{\circ} 06' \cdot 2$ ; southeast corner of elevator,  $69^{\circ} 56' \cdot 8$ ; pole on grand-stand in grounds,  $213^{\circ} 32' \cdot 6$ .

*Gleichen, Alta., 1919.*—The station of 1911 was reoccupied. It is on the agricultural grounds and northeast of the town, being 226 feet east of the fence on the west side of the grounds, 33 feet south of the north fence and 79 feet southeasterly from the southeast corner of a stable. A stake 3 by 3 inches driven flush with the ground marks the point. The following true bearings were determined: cross on tower of Catholic church,  $213^{\circ} 14' \cdot 4$ ; bottom of flagstaff on school,  $224^{\circ} 35' \cdot 8$ ; pole on east ventilator of livery barn,  $229^{\circ} 24' \cdot 6$ .

*Glenella, Man., 1911.*—The station is near the northwest corner of SW.  $\frac{1}{4}$  sec. 22, tp. 18, rge. 13, W. Principal mer. It is east of the town, being 400 feet south of the south side of the street on the north side of Orange hall, 25 feet west of the east limit of the townsite and about 150 feet east of the east side of Herbert street. The point is marked by a stake 2 by 4 inches driven flush with the ground. The following true bearings were determined: east gable of Western Canada Flour Mills Co.'s elevator,  $260^{\circ} 44' \cdot 4$ ; spire of Presbyterian church,  $293^{\circ} 20' \cdot 5$ ; flagstaff on front of school,  $334^{\circ} 28' \cdot 6$ ; pole on middle of school,  $335^{\circ} 49' \cdot 8$ .

*Godbout, A, Que., 1920.*—Station A is a relocation of the station of 1909. It is near the northwest corner of the grounds around Mr. Napoleon Comeau's residence, being 141.5 feet from the northwest corner of the building, 53 feet northeast from the west post of a range, and 59 feet south and 48.5 feet east of the fence on the north and west sides, respectively, of the grounds. A stake 4 inches in diameter set flush with the ground marks the point. The following true bearings were determined: spire of Catholic church

26° 56'·7; tip of east section of range, 103° 06'·3; north gable of house at southeast corner of grounds, 163° 03'·8.

*Godbout, B, Que., 1920.*—Station B is 20 feet east of station A, 139 feet from the northwest corner of Mr. Comeau's residence, 70·3 feet northeast of the post at the west end of a range, and 59·5 feet south and 68·5 feet east of the fence along the north and west sides, respectively, of the grounds. The point is marked by a hole in the top of a cement block 4 by 4 inches set flush with the ground. The following true bearings were determined: spire of Catholic church, 25° 21'·4; tip of east section of range, 102° 22'·3; north gable of house at southeast corner of grounds, 165° 16'·5.

*Goderich, Ont., 1920.*—The station is about 130 feet north of the D.O. station of 1910, and is situated on the commons bordering the G.T.R. tracks, near the saw-mill of the Boechler Lumber Co., at the foot of Anglesea street. It is 656·4 feet from the centre of Anglesea street, 346·8 feet from the centre of Wolfe street, and 232·8 feet from the centre of the road on the eastern side of the commons (this measurement taken at right angles to former two, and parallel to the above-mentioned streets). The magnetometer was placed 19·8 feet behind the transit and in line with the cross on church. The following true bearings were determined from the transit station: tower on station, 162° 55'·0; water-tank (right edge), 171° 02'·8; cross on church, 254° 40'·4.

*Gogama, Ont., 1916.*—The station is on the west side of lake Mississinakawa, and on the north side of the C.N.R. track, about one-half mile east of the C.N.R. depot. The point is determined by turning to the left, at a distance of 11 feet east of the east side of the C.N.R. pump-house and in the middle of the railway track, from the railway tangent east, the angle 91° 07'·0, and measuring along this direction a distance of 365 feet to the station. The point is marked by a stake 3 inches in diameter and projecting 3 inches above the surface. A temporary reference mark was used.

*Golden, B.C., 1908.*—The station (1908) is on the property of Mr. Alexander, in a clearing on the south bank of the Kicking Horse river. It is about 200 feet east of the road-bed of the proposed Kootenay railway, and is midway between the ends of that portion of the bank along which is a breakwater consisting of a layer of small trees. From the station the top of the Columbia hotel is visible above the wooden bridge over the Kicking Horse river, and the front of the Queens hotel is seen to the east of the fire-hall. The point is marked by a round wooden peg 2 inches in diameter and projecting about 1 inch above the ground. It is distant 190·2 feet from the northeast corner of a vacant log house; 261·8 feet northeast from the southeast corner of a lot, one side of which is on Calgary street and the other parallel to the Kootenay railway road-bed, and 234 feet southeast from the northeast corner of a lot adjacent to the first mentioned one. The following true bearings were determined: bottom of pole on C.P.R. water-tank, 323° 08'·9; bottom of flagpole on Columbia hotel, 310° 24'·2; bottom of flagpole on Parson's store, 279° 56'·1.

The magnetic observations were taken 13·2 feet southeast from station and in line with pole on tank.

*Goodwin, Que., 1914.*—The station is on a partially cleared space on the north side of the N.T.R. right-of-way. It is 96 feet west and 390 feet north of the northwest corner of the depot, and is 60 feet east of the east line of the section-house. The following true

bearings were determined: north gable to wing of north side of depot,  $175^{\circ} 34' \cdot 6$ ; middle of short pole over window on west end of depot,  $176^{\circ} 18' \cdot 0$ ; middle of short pole on east end of section-house,  $205^{\circ} 38' \cdot 4$ .

*Grahamdale, Man., 1916.*—The station is about 600 feet north of the south side of the SE.  $\frac{1}{4}$  sec. 15, tp. 28, rge. 8, W. Principal mer. It is on property belonging to the C.N.R., and is northwest of the dwelling-house and stables belonging to Mr. J. Zeillkea. It is in line with the fence along the north end of the railway yard, and 260 feet west of the northwest corner of the yard. The point is marked by a stake 2 by 3 inches set flush with the ground. The west gable of the Moosehorn Supply Co.'s store bears  $136^{\circ} 22' \cdot 0$ .

*Grand Canyon, B.C., 1913.*—The station is about one-half mile above the upper canyon, and is on a cleared space east of the buildings belonging to Foley, Welsh & Stewart. It is 160 feet west of the west side of Canyon creek and 110 feet south of the south side of the Fraser river. A stake 2 by 2 inches and projecting 4 inches above the surface marks the point. The glass insulator on the front of the office building of Foley, Welsh & Stewart bears  $306^{\circ} 23' \cdot 0$ .

*Grand Forks, B.C., 1915.*—The station is about one-fourth mile east of the Kettle river and about the same distance north of the C.P.R. tracks, near the west side of the agricultural grounds. It is in a small enclosure between the west fence of the grounds and the fence around the outside of the race-course; it is in line with the easterly side of the grand-stand, being 177 feet southerly from the southeasterly corner of the same, 59 feet south and 32 feet east of the post at the turnstile entrance to the grounds, 47 feet south of the fence along the north side of the enclosure and 34 feet west of the fence around the race-course. A stake 1 by 1 inch driven flush with the ground marks the point. The following true bearings were determined: bottom of flagstaff on judge's stand inside race-course,  $105^{\circ} 00' \cdot 5$ ; short pole on north end of house across C.P.R. tracks,  $135^{\circ} 51' \cdot 5$ ; tip of stand supporting a windmill,  $195^{\circ} 32' \cdot 9$ ; short pole on north gable of frame house,  $199^{\circ} 19' \cdot 5$ .

*Grant, Ont., 1918.*—The D.O. station of 1914 was reoccupied. It is about 1,200 feet southeast of the C.G.R. depot and about 640 feet south of the railway tracks, on a partially cleared strip of land near the summit of a slope, which is adjacent to a lake. The point is determined by measuring 517 feet westerly along the main line of the railway from the most easterly semaphore at a switch, thence turning to the left at that distance, the angle  $104^{\circ} 56' \cdot 3$  on the bearing  $209^{\circ} 42' \cdot 8$ , and measuring a distance of 662 feet. Further, it is 202 feet north and 100 feet west of the northwest corner of the pump-house. The point is marked by a stake 2 inches in diameter and projecting 4 inches above the surface. The following true bearings were determined: pipe on pump-house,  $199^{\circ} 02' \cdot 5$ ; southeast corner of house for trainmen,  $294^{\circ} 11' \cdot 3$ ; top of C.G.R. water-tank,  $301^{\circ} 22' \cdot 0$ ; short pole on west end of depot,  $309^{\circ} 34' \cdot 7$ ; short pole on east end of depot,  $309^{\circ} 49' \cdot 0$ .

*Grant Brook, B.C., 1913.*—The station is on a small open space north of the G.T.P. tracks. It is 329 feet northeasterly from the northeast corner of the depot and 40 feet southwesterly from a large pine stump about 12 feet high, and almost on the line joining the middle of the stump and the northeast corner of the depot. The point is marked



by a stake  $2\frac{1}{2}$  by  $2\frac{1}{2}$  inches and projecting 6 inches above the surface. The following true bearings were determined: left edge of chimney on north side of G.T.P. depot,  $235^{\circ} 43' 4''$ ; north gable of wing on north side of depot,  $236^{\circ} 23' 2''$ .

*Grasett, Ont., 1910.*—The station is in a small clearing northeast of the C.P.R. depot. It is 366 feet northeast of the northeast corner of the section-house on the south side of the C.P.R. tracks. The line joining the station with the corner of the section-house intersects the track 72 feet from the house. The point is marked by a stake 3 by 3 inches and projecting 2 inches above the surface. The following true bearings were determined: pole on east end of south section-house,  $223^{\circ} 33' 5''$ ; pole on west end of south section-house,  $226^{\circ} 06' 7''$ ; gable of north end of north section-house,  $237^{\circ} 33' 7''$ .

*Gravel, Ont., 1910.*—The station is at the summit of a slope, 224 feet north of the C.P.R. tracks, and is in line with the east side and 182 feet from the northeast corner of the C.P.R. depot. It is 97 feet northwest of the northwest corner of a small red house belonging to Mr. Roy. A stake 2 inches in diameter and projecting 4 inches above the ground marks the point. The following true bearings were determined: east gable of C.P.R. depot,  $214^{\circ} 09' 8''$ ; top of pole on C.P.R. water-tank,  $281^{\circ} 04' 6''$ .

*Griswold, Man., 1910.*—The station is in an open field south of the C.P.R. tracks and in line with the west end of the C.P.R. depot. It is 460 feet south of the tracks and 123 feet south of a well which is about 6 feet east of a line joining the southwest corner of the C.P.R. depot and station. The following true bearings were determined: east pole on hotel,  $2^{\circ} 32' 7''$ ; south gable of Ogilvie's elevator,  $19^{\circ} 43' 4''$ ; south gable of International Elevator Co.'s elevator,  $33^{\circ} 17' 1''$ ; south gable of elevator No. 188,  $338^{\circ} 34' 0''$ ; west pole on C.P.R. depot,  $347^{\circ} 03' 3''$ ; east pole on C.P.R. depot,  $350^{\circ} 32' 3''$ .

*Guelph, Ont., 1910.*—The station is situated in a pasture field in the northern limits of the town. The field fronts on the east side of Lemon street, and is on the south side of the first road north of and parallel to Stewart street. The magnetometer was placed 222 feet east of the easterly limit of Lemon street and 68 feet south of the southerly limit of the above-mentioned road, and is also 508 feet from the northerly limit of Stewart street. The transit was placed 11 feet in front of the magnetometer and on line with magnetometer and flag on General hospital. The following true bearings were determined from the transit station: flagpole on General hospital,  $279^{\circ} 41' 5''$ ; east gable of Macdonald's barn,  $355^{\circ} 26' 7''$ .

*Gull Lake, Sask., 1911.*—The station is on the property of Mr. Thompson and is near the southwest corner of the SW.  $\frac{1}{4}$  sec. 25, tp. 13, rge. 19, W. 3rd mer. It is north of the C.P.R. tracks and slightly east of being in line with the east end of the freight-shed, 400 feet in a northerly direction from the north side of the C.P.R. right-of-way and 140 feet east of the fence on the east side of the field. The point is marked by a stake 2 by 2 inches and projecting 3 inches above the ground, and is near and east of the bed of a creek. The following true bearings were determined: bottom of pole on C.P.R. water-tank east of depot,  $106^{\circ} 32' 0''$ ; tip of pole on C.P.R. depot,  $139^{\circ} 16' 5''$ ; north gable of International Elevator Co.'s elevator,  $196^{\circ} 34' 7''$ ; bottom of pole on tank west of depot,  $217^{\circ} 38' 3''$ .

*Gypsumville, A, Man., 1919.*—Station A is approximately a relocation of the D.O. station of 1916. It is on lot 9, block 7, of the townsite survey, being 4 feet north of the south side of the lot, 114.5 feet west of the west side of Galt avenue, and 127 feet north of the north side extended of the school, which is on lot 7. The point is marked by a copper nail in the top of a stake 3 inches in diameter set flush with the ground. The north gable of the post office bears  $118^{\circ} 01' .8$ .

*Gypsumville, B, Man., 1919.*—Station B is on lot 8, block 7, of the townsite survey, north of and in line with the west end of the school building, being 98 feet distant from the northwest corner of the school building, 25 feet south of the north side of the lot, 98 feet west of the west side of Galt avenue and 34 feet from station A. The point is marked by a copper nail in the top of a stake 3 inches in diameter set flush with the ground. The following true bearings were determined: west gable of elevator near stone quarry,  $4^{\circ} 38' .8$ ; north gable of post office,  $116^{\circ} 30' .5$ ; station A,  $330^{\circ} 28' .5$ .

*Halifax, N.S., 1918.*—The station is approximately a relocation of the C.I. station of 1905. It is in Point Pleasant park, about 2.5 miles south of the city, and is west of the old fort in a small open space between the road and the beach, 65 feet from the road and 119.7 feet from a flagpole socket, in line with the tower of the lighthouse to the southeast. The following true bearings were determined: tower of lighthouse,  $126^{\circ} 28' .3$ ; highest point of land west of and near lighthouse,  $130^{\circ} 42' .7$ ; spire of church across the northwest arm,  $175^{\circ} 06' .3$ .

*Hamilton, Ont., 1910.*—The station is situated in the second field west of the road leading from the Incline Ry., and fronting on the Chedoke road. A grove of trees lies just over the south boundary of this field. The transit was placed 79 feet from the east boundary fence of said field and 99 feet from the south boundary fence. The magnetometer was placed 11 feet behind the transit and on line with transit and flagpole on concert hall on main road. The following true bearings were determined from the transit station: flagpole on tower of a house,  $67^{\circ} 04' .7$ ; tip of tower on school-house,  $87^{\circ} 06' .0$ ; flagpole on concert hall on main road,  $320^{\circ} 32' .4$ .

*Harricanaw, Que., 1914.*—The station is about one-fourth mile northwest of the N.T.R. depot, on the east bank of the Harricanaw river. It is on the sixteenth lot of the second survey of the townsite, numbered from First avenue north, and is opposite the end of the second street north of First avenue, being 13 feet south of the north line of the street and 53 feet north of the south line. It is 45 feet west of the west side of the first street east of the river, and is marked by a stake 3 by 3 inches and projecting 3 inches above the surface. The following true bearings were determined: north gable of Forest hotel,  $119^{\circ} 43' .9$ ; southwest corner of roof of N.T.R. depot,  $144^{\circ} 12' .7$ ; north gable of residence of Crown Lands agent,  $166^{\circ} 24' .1$ ; northwest corner of west abutment of N.T.R. bridge over the Harricanaw river,  $186^{\circ} 53' .5$ .

*Harrington Harbour, Que., 1920.*—Observations were taken over a stake, supposedly the one marking the station of 1909. It is 554 feet northwesterly and 51 feet northeasterly from the northerly corner of the English church, and 81 feet westerly from the government telegraph line, on a low piece of land, the property of the Grenfell Mission, lying to the north of the hospital and doctor's residence. The point was re-marked with a stone about 3 by 4 inches set flush with the ground. The following true bearings

were determined: smoke pipe on house,  $36^{\circ} 42' \cdot 2$ ; cross on tower of English church,  $144^{\circ} 05' \cdot 6$ ; north gable of doctor's residence,  $155^{\circ} 18' \cdot 5$ ; north corner of Grenfell hospital,  $180^{\circ} 34' \cdot 1$ .

*Hawk Junction, Ont., 1916.*—The station is on a partially cleared hillside west of the A.C.R. tracks. To determine the position of the station select two points, designated A and B, in the middle of the main line of the railway, A, over the rod controlling the switch points opposite the semaphore at the north end of the railway siding, and B, at a distance of 341.5 feet southerly from A; at A turn to the right, from the direction of line joining AB, the angle  $44^{\circ} 23' \cdot 0$ , and at B, turn to the left, from the direction of line joining BA, the angle  $88^{\circ} 52' \cdot 7$ . The intersection of the directions obtained by turning the angles gives the location of the station, which is marked by a stake 3 inches in diameter and projecting 1 foot above the surface. The following true bearings were determined: top of pole on A.C.R. water-tank,  $4^{\circ} 49' \cdot 4$ ; south gable of A.C.R. section-house,  $31^{\circ} 42' \cdot 3$ .

*Hawk Lake, Ont., 1910.*—The station is located on a clearing slightly to the east of south from the C.P.R. depot, and about 300 feet south of the C.P.R. tracks. It is 25 feet from the shore of the lake and 100 feet southwesterly from a rocky beach, the exposed part of the rock being about 20 feet in width. The central portion of this part of the beach is in line with the west end of the C.P.R. depot. The point is marked by a stake 2 inches in diameter and projecting 4 inches above the ground. The following true bearings were determined: west gable of C.P.R. depot,  $350^{\circ} 19' \cdot 6$ ; east gable of C.P.R. depot,  $358^{\circ} 32' \cdot 8$ ; first telegraph pole east of the C.P.R. depot,  $6^{\circ} 52' \cdot 2$ .

*Haysport, B.C., 1915.*—The station is on a clearing on the north side of the G.T.P. tracks. It is 112 feet east of the line of the east side produced of a building belonging to the Skeena Fisheries Co. and located on the south side of the railway tracks, and 445 feet north of the tracks. It is south of and in line with the west side of the house occupied by the manager of the company. The point is marked by a stake 2 by 2 inches and projecting 8 inches above the surface. The following true bearings were determined: east gable of building farthest south on wharf,  $163^{\circ} 28' \cdot 4$ ; west gable of house occupied by manager of the company,  $339^{\circ} 42' \cdot 2$ ; north gable of government telegraph office,  $198^{\circ} 58' \cdot 2$ .

*Hearst, Ont., 1918.*—The D.O. station of 1914 was reoccupied. It is about one-fourth of a mile southeast of the C.G.R. depot, is 91 feet south of the south side of Prince street and 42 feet east of the east side of Seventh street. The point is marked by a stake 2 inches in diameter projecting 4 inches above the ground. The following true bearings were determined: bottom of flagstaff on front of a store,  $309^{\circ} 27' \cdot 6$ ; south gable of coal-chute,  $314^{\circ} 36' \cdot 4$ ; top of C.G.R. water-tank,  $336^{\circ} 23' \cdot 8$ .

*Herbert, Sask., 1911.*—The station is near the southwest corner of SE.  $\frac{1}{4}$  sec. 18, tp. 17, rge. 9, W. 3rd mer. It is on the C.P.R. property and near the foot of a slope to the west of the town; about 347 feet north of Herbert avenue, 53 feet south of the south side of Prairie avenue produced and 145 feet west of the east side of Taylor street. A stake 2 by 4 inches projecting 2 inches above the surface marks the point. The following true bearings were determined: west gable of Mr. John Wiebe's house,  $85^{\circ} 56' \cdot 2$ ; north

gable of Mr. A. Wiebe's house,  $115^{\circ} 11' \cdot 7$ ; bottom of spire on tower of Methodist church,  $123^{\circ} 20' \cdot 5$ .

*Heron Bay, Ont., 1910.*—The station is in a field lying to the northwest of the C.P.R. depot. It is about 325 feet north of the C.P.R. tracks, and is in line with, and 40 feet north of, the end of a fence which, if continued in a southerly direction, would pass about 20 feet west of the depot. About 30 feet south of the station is a ridge of rock extending 40 feet in an easterly and westerly direction. The point is marked by a stake 2 by 4 inches and projecting 3 inches above the surface. The following true bearings were determined: north gable of Begg's house and store,  $119^{\circ} 12' \cdot 8$ ; west gable of C.P.R. depot,  $155^{\circ} 00' \cdot 9$ ; north gable of Miller's store,  $172^{\circ} 22' \cdot 1$ .

*Hervey Junction, Que., 1914.*—The station is about 1,000 feet southeast of the intersection of the C.N.R. and N.T.R. tracks, on the property belonging to Mr. Ed. Lecuy. It is near the edge of the west bank of the Tawachiche river and almost opposite the upper end of the rapids. The point is 161 feet southeast of the southeast corner of Mr. Lecuy's stable and 91 feet east of the east side of the building extended southerly, 15 feet from the edge of the river, and about 124 feet northerly from the edge of a rock exposure. A stake 2 inches in diameter and driven flush with the ground marks the precise point. The following true bearings were determined: east gable of Mr. Lecuy's stable,  $279^{\circ} 43' \cdot 2$ ; west gable of Mr. Lecuy's house,  $294^{\circ} 29' \cdot 0$ ; tip of semaphore on C.N.R. right-of-way,  $13^{\circ} 55' \cdot 0$ .

*Hilliard, Alta., 1911.*—The station is in an open field south of the C.N.R. siding, being 660 feet easterly and 100 feet southerly from the southwesterly corner of the railway yards. A stake 4 by 4 inches and projecting 2 inches above the surface marks the point. The top of a white post on the C.N.R. right-of-way bears  $103^{\circ} 50' \cdot 7$ .

*Hillspport, Ont., 1916.*—The station is northerly from the C.N.R. section-house and water-tank, near the north side of a partially cleared space on the east side of the railway tracks. It is 78 feet south of the semaphore at the end of the north leg of the wye and 430 feet east of the middle of the main line of the railway. The point is marked by a stake 3 inches in diameter and projecting 1 foot above the surface. The following true bearings were determined: pipe on C.N.R. water-tank,  $132^{\circ} 21' \cdot 7$ ; southeast corner of section-house,  $134^{\circ} 33' \cdot 1$ ; northwest corner of section-house,  $137^{\circ} 24' \cdot 6$ .

*Hinton, Alta., 1913.*—The station is near the middle of the SE.  $\frac{1}{4}$  sec. 15, tp. 51, rge. 25, W. 5th mer., the east line of the section passing between the hotel and depot. It is on the first small hill to the southwest of the G.T.P. depot and on the north side of a wagon road, and is about 1,000 feet west of the west side of the depot produced and 465 feet south of the railway tracks. The point is marked by a stake 3 by 3 inches, projecting 3 inches above the surface. The following true bearings were determined: top of second telegraph pole west of the one bearing mileage No. 978,  $340^{\circ} 24' \cdot 9$ ; top of pole bearing mileage No. 978,  $13^{\circ} 12' \cdot 3$ ; south gable of south wing of depot,  $43^{\circ} 32' \cdot 3$ .

*Hornepayne, Ont., 1916.*—The station is east of the C.N.R. tracks and in line with the south edge of the roof of the depot produced. It is 470 feet east of the middle of the main line of the railway, and is marked by a stake 2 by 2 inches projecting 6 inches above the surface. The following true bearings were determined: north gable of C.N.R.



coal-chute,  $142^{\circ} 30' \cdot 6$ ; west gable of C.N.R. hotel,  $157^{\circ} 24' \cdot 7$ ; east gable of C.N.R. depot,  $232^{\circ} 51' \cdot 1$ ; chimney on south side of C.N.R. section-house,  $306^{\circ} 28' \cdot 4$ .

*Hudson Bay Junction, Sask., 1919.*—The station of 1911 was reoccupied. It is southwest of the town and near the edge of a muskeg. It is almost on the south line of Second avenue, and is 50 feet west of the west side of Main street. The point is marked by a stake 2 by 2 inches projecting 2 inches above the surface. The following true bearings were determined: pole on C.N.R. water-tank,  $350^{\circ} 27' \cdot 2$ ; tip of cross on Catholic church,  $49^{\circ} 04' \cdot 5$ ; northwest corner of English church,  $77^{\circ} 54' \cdot 9$ ; flagstaff on tower of school,  $157^{\circ} 00' \cdot 6$ .

*Houston, B.C., 1915.*—The station is on the south bank of the Bulkley river and northerly of the G.T.P. depot. It is determined by turning to the left from the direction of the railway tangent east, at a point in the middle of the main line of the railway and in line with the west end of the depot, the angle  $57^{\circ} 10' \cdot 0$ , and measuring along this direction a distance of 602 feet. The station is 90 feet from the river and is marked by a stake 2 by 4 inches and projecting 6 inches above the surface. The following true bearings were determined: smoke pipe on centre of Mr. Brown's house,  $142^{\circ} 00' \cdot 6$ ; northwest corner of G.T.P. depot,  $180^{\circ} 19' \cdot 6$ .

*Humbermouth (Bay of Islands), Newfoundland, 1920.*—The station is approximately a relocation of the C.I. station of 1905 and 1909, designated "Bay of Islands." It is about one-fourth of a mile west of Humbermouth railroad station, and about 300 yards from the wharf of the Reid-Newfoundland Co.; near the base of a small point projecting into the bay. It is 25 feet east of the produced line of a fence on the south side of the railway track, 127.4 feet from the railway track and 85.4 feet from the northerly extremity of the point. Observations were taken over a small hole in the top of a cement block 2.5 by 4.5 inches set flush with the ground. The following true bearings were determined: pole on Mr. Fisher's house,  $81^{\circ} 15' \cdot 1$ ; church spire in Curling,  $265^{\circ} 01' \cdot 5$ .

*Hunt, Ont., 1916.*—The station is on an uncleared elevation northeast of the C.G.R. depot. It is 177 feet east of the east side of the depot and 225 feet north of the row of telegraph poles along the north side of the railway right-of-way. The point is marked by a stake 3 inches in diameter and projecting 6 inches above the surface. The pole on the centre of the water-tank bears  $141^{\circ} 37' \cdot 6$ .

*Ignace, Ont., 1910.*—The station is approximately a relocation of the C.I. station of 1906. It is in an open field about 500 feet south of the C.P.R. tracks and about 600 feet southeast of the C.P.R. roundhouse; it is 208 feet east of the east side of the first street east of the Y.M.C.A. building and 52 feet north of the fence on the south side of the field. The following true bearings were determined: tip of pole on C.P.R. water-tank,  $298^{\circ} 44' \cdot 2$ ; tip of pole on Y.M.C.A. building,  $324^{\circ} 41' \cdot 1$ ; east gable of store,  $333^{\circ} 29' \cdot 9$ .

*Indian Head, Sask., 1910.*—The station is on the Dominion Experimental farm, being about 650 feet southeast of the barns. It is on a low-lying field and about 50 feet northwesterly from a slough, 57 feet east of a row of trees on the east side of a lane which passes to the east of the barns, 42 feet northwesterly from the middle of a road running along the north side of the slough and 190 feet northwesterly from a windmill. A stake

2 by 2 inches and projecting 2 inches above the surface marks the point. The east ventilator of a barn south of the C.P.R. tracks bears  $184^{\circ} 56' \cdot 6$ .

*Innisfree, Alta., 1911.*—The station is near the northeast corner of the NE.  $\frac{1}{4}$  sec. 3, tp. 51, rge. 11, W. 4th mer. It is in line with the fence on the east side of the school grounds and 230 feet south of the southeast corner of the grounds. A stake 2 by 4 inches and projecting 3 inches above the surface marks the point. The following true bearings were determined: pipe on west side of Bank of Commerce building,  $6^{\circ} 16' \cdot 5$ ; pole on front of Montgomery's store,  $14^{\circ} 33' \cdot 9$ ; west gable of British America Elevator Co.'s elevator,  $27^{\circ} 41' \cdot 7$ ; pole on C.P.R. depot,  $32^{\circ} 27' \cdot 5$ .

*Iroquois Falls Junction, Ont., 1913.*—The station is about 525 feet northeast of the T. & N.O. depot, on land cleared for street purposes. It is on Connaught street; near the intersection of Connaught street and Edward street. The point is 18 feet south of the north side of Connaught street and 9 feet west of the west side of Edward street. The following true bearings were determined: east gable of section-house south of T. & N.O. depot,  $194^{\circ} 23' \cdot 7$ ; southeast corner of roof of T. & N.O. depot,  $212^{\circ} 46' \cdot 7$ .

*Jacquet River, N.B., 1912.*—The station is about 1,000 feet southeast of the I.C.R. depot, in a field belonging to Mr. John Purvey. It is on a piece of waste ground, which is adjacent to the north side of the grounds around a small church. The point is 142 feet north and 54 feet east of the northeast corner of the church grounds, and is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: north gable of Mr. Stanley Culligan's house,  $133^{\circ} 48' \cdot 4$ ; northeast corner of church on Mr. Purvey's farm,  $209^{\circ} 45' \cdot 5$ ; spire on Catholic church,  $259^{\circ} 03' \cdot 7$ ; south gable of Dr. Ellis's house,  $337^{\circ} 13' \cdot 7$ .

*Jafray, B.C., 1915.*—The station is about one-fourth of a mile southwest of the C.P.R. depot, near the easterly edge of a broad ridge, the easterly slope of which is very steep. It is about 600 feet southerly from the C.P.R. tracks, 145 feet south of a wire fence and about 12 feet from the upper edge of the slope. A stake 2 inches in diameter and projecting 4 inches above the surface marks the point. The following true bearings were determined: pole on front of old school building,  $44^{\circ} 04' \cdot 3$ ; pole on centre of C.P.R. water-tank,  $49^{\circ} 31' \cdot 5$ ; tip of pipe on C.P.R. water-tank,  $49^{\circ} 44' \cdot 1$ .

*Jasper, Alta., 1919.*—The station, which is a relocation of the station of 1913, is about 800 feet northwesterly from the G.T.P. depot. It is in Pyramid park, being 59.5 feet west of the west side of Patricia street and 34 feet south of the south side of Cedar avenue. The point is marked by a stake  $1\frac{1}{2}$  by 3 inches set flush with the ground. The following true bearings were determined: tip of steel water-tank,  $99^{\circ} 19' \cdot 2$ ; pole on centre of water-tank south of depot,  $148^{\circ} 29' \cdot 7$ ; tip of weather-vane on Administration building,  $174^{\circ} 36' \cdot 2$ .

*Jellicoe, Ont., 1916.*—The station is near the south side of a level, uncleared piece of land south of the C.N.R. tracks and southeast of the C.N.R. depot. It is 137 feet east of the line of the east side of the depot produced, and 496 feet south of the middle of the main line of the railway. The point is marked by a stake  $1\frac{1}{2}$  inches in diameter and projecting 6 inches above the surface. The following true bearings were determined: northeast corner of C.N.R. hotel,  $259^{\circ} 43' \cdot 3$ ; ball on top of C.N.R. water-tank,  $284^{\circ} 52' \cdot 5$ ; south gable of C.N.R. depot,  $312^{\circ} 04' \cdot 4$ .

*Joe Lake, Ont., 1920.*—The station is on the Algonquin Hotel reserve about 300 feet southwest of the hotel. It is 11.5 feet west of a blazed tree which faces a path leading southwesterly from the hotel. The magnetometer was placed 7.3 feet behind the transit and in line with a spike on water-tower. The point is marked by a stake 2 inches in diameter and projecting 2 inches above the surface. The following true bearings were determined from the transit station: flagpole on hotel,  $38^{\circ} 52' .6$ ; spike on water-tower  $42^{\circ} 07' .4$ ; south gable of hotel,  $52^{\circ} 19' .2$ .

*Junkins, Alta., 1913.*—The station is near the northeast corner of the NE.  $\frac{1}{4}$  sec. 27, tp. 53, rge. 9, W. 5th mer. It is about 500 feet north of the C.N.R. tracks, about 150 feet north of a small creek, 267 feet south and 24 feet west of the northeast corner of the section. The point is marked by a stake 2 inches in diameter and projecting 3 inches above the surface. The top of "Railway Crossing" post at intersection of railway and government road allowance along the east side of section bears  $178^{\circ} 41' .0$ .

*Kalmar, Ont., 1910.*—The station is on a level portion of ground near the summit of a slope lying to the east of the western section-house. It is reached by a path, which leaves the C.P.R. tracks at a point about 50 feet east of the section-house. It is about 245 feet north of the tracks and about 300 feet northeast of the northeast corner of the house. The point is marked by a stake 2 inches in diameter and projecting 1 foot above the surface. The east gable of the section-house bears  $237^{\circ} 30' .1$ .

*Kaministiquia, Ont., 1910.*—The station is about 380 feet north of the C.P.R. tracks. It is almost in line with the easterly end, and is 99 feet southerly from the southeasterly corner of a log house on the west side of the road, and further is 109 feet southwesterly from the southwest corner of another log house on the east side of the road. These are the only houses in the immediate vicinity. The point is marked by a stake 2 by 3 inches and projecting 2 inches above the surface. The following true bearings were determined: west gable of C.P.R. freight-shed,  $239^{\circ} 18' .2$ ; northwest corner of C.P.R. depot,  $254^{\circ} 39' .0$ ; top of pole on C.P.R. water-tank,  $295^{\circ} 31' .6$ .

*Kamloops, B.C., 1919.*—The station of 1915 was reoccupied. It is on the grounds of the Agricultural Association and is 330 feet west of the west side of the agricultural hall, 490 feet west of the fence on the east side of the grounds and 71 feet south of the fence along the north side. The point is marked by a cement post 4 by 4 inches, in the top of which is a hole, set flush with the ground. The following true bearings were determined: northwest corner of foundation of exhibit building,  $79^{\circ} 06' .8$ ; pole on south end of grand-stand,  $246^{\circ} 57' .4$ ; north gable of grand-stand,  $255^{\circ} 44' .9$ ; northwest corner of cottage on hill,  $257^{\circ} 32' .0$ ; smokestack on saw-mill,  $282^{\circ} 53' .1$ .

*Kashbaw, Ont., 1916.*—The station is on the east side of the C.N.R. tracks, in a small, partially cleared, pasture field belonging to Mr. Coyne. It is 296 feet north of the north side produced, of the C.N.R. section-house, and 493 feet east of the middle of the main line of the railway; 12 feet west of the fence on the east side of the field and 45 feet south of the north fence. A stake 2 inches in diameter set flush with the ground marks the point. A temporary reference mark was used.

*Kaslo, B.C., 1915.*—The station is on a hill south of the C.P.R. depot. It is near the southeast corner of the athletic field, being 30.5 feet north of the fence along the south side of the field and 42 feet west of the fence along the east side. The point is

marked by a stake 2 inches in diameter driven flush with the ground. The following true bearings were determined: short pipe on west side of school building,  $133^{\circ} 51' \cdot 5$ ; short pole on east gable of house near foot of mountain,  $296^{\circ} 06' \cdot 1$ .

*Kegashka, Que., 1909.*—The station is near the northeastern extremity of Kegashka island, being about 200 feet west from high-water mark on the eastern side and 200 feet south of high-water mark on the northern side. It is slightly to the west of a rocky ridge, which runs parallel to the east shore for about 500 feet. To the west of the station there is a growth of dwarf spruce trees and immediately surrounding it the rock is covered with moss. From the station it is impossible to see the houses situated on the island, but a house with shingle sides located on a rocky prominence to the north of the narrow channel, separating the island from the mainland, may be seen over a small fish building. The point is marked by a stake 3 inches in diameter, held in position by a mound of stones. The following true bearings were determined: beacon on Kegashka point,  $196^{\circ} 50' \cdot 1$ ; chimney on house on hill,  $276^{\circ} 19' \cdot 5$ .

*Kelowna, B.C., 1915.*—The station is about one-half of a mile northeast of the steamer landing and near the southwest corner of the agricultural grounds. It is in line with the west side of an exhibit building and 113 feet north of the north side of the same, and is 220 feet north and 36 feet east of the southwest corner of the grounds. The point is marked by a stake 2 by 4 inches and projecting 3 inches above the surface. The following true bearings were determined: tip of pole on judge's stand,  $99^{\circ} 36' \cdot 9$ ; bottom of flagstaff on front of main building near entrance to grounds,  $120^{\circ} 18' \cdot 9$ ; bottom of flagstaff on front of Tobacco Co.'s building,  $184^{\circ} 23' \cdot 7$ ; bottom of flagstaff on Canning Co.'s building,  $193^{\circ} 47' \cdot 3$ .

*Kenogami River, Ont., 1914.*—The station is on the west bank of the Kenogami river, and north of a group of houses comprising the Residency. It is determined by turning to the left, from the railway tangent to the east at a distance of 12 feet from the west end of the bridge over the Kenogami river, the angle  $85^{\circ} 23' \cdot 0$ , thence measuring along this direction a distance of 593 feet and then turning to the left the angle  $122^{\circ} 07' \cdot 0$  from the preceding direction and measuring a distance of 190 feet to the station. A stake 4 inches in diameter and projecting 9 inches above the surface marks the point. A temporary reference mark was used.

*Kenora, Ont., 1910.*—The station is on the west slope of a rocky knoll almost one-fourth of a mile east of the Central school. It is approximately a relocation of the C.I. station of 1906. The point is west of and slightly to the north of being in line with the front of Mr. Wilson's house. It is 58 feet west of the fence along the west side of Mr. Wilson's lot and 16 feet north of the north side of Park street (East Third street). The following true bearings were determined: spire of Knox church,  $247^{\circ} 24' \cdot 0$ ; pole on Central school,  $275^{\circ} 16' \cdot 6$ ; spire of Episcopal church,  $281^{\circ} 52' \cdot 9$ ; spire of Catholic church,  $285^{\circ} 21' \cdot 4$ .

*Kent Junction, N.B., 1912.*—The station is about 1,000 feet southwest of the I.C.R. depot, on property belonging so Mr. John Welsh. It is 362 feet west of the fence along the front of the property, which is adjacent to the I.C.R. right-of-way, 30 feet north of the south limit of the property and 45 feet northwest of the northwest corner of the Catholic cemetery. The following true bearings were determined: northwest corner of



north chimney on Mr. Welsh's house,  $18^{\circ} 29' \cdot 3$ ; west gable of I.C.R. depot,  $21^{\circ} 32' \cdot 4$ ; top of cross on Catholic church,  $78^{\circ} 17' \cdot 9$ .

*Kincardine, Ont., 1910.*—The station is situated in a field across the road from the high school in a southerly direction and bordering the Penetang gore on the west side. The field is owned by Miss McCaskey. The transit was placed 170.5 feet from the southerly limit of the road and 38 feet from the easterly boundary fence. The magnetometer was placed 13 feet behind the transit and in line with transit and ornament on western gable of Methodist church. The following true bearings were determined from the transit station: ornament on western gable of Methodist church,  $253^{\circ} 24' \cdot 1$ ; flagpole on post office,  $269^{\circ} 54' \cdot 6$ ; spire of Presbyterian church,  $312^{\circ} 13' \cdot 1$ .

*Kingston Barracks, Ont., 1907.*—The station is probably within 10 feet of Captain Lefroy's station of 1849. The point is within 100 feet of the old barracks (now used as a store), within 80 feet of the stables, and the armoury of the Kingston regiments is within 300 feet. The Kingston Electric Railway runs to the southeast within 200 feet and to the northwest within 600 feet.

*Kingston Junction, Ont., 1907.*—The station, which is an approximate relocation of the C.I. station of 1906, is located in a field belonging to Mr. Elliott. The C.I. station is described as being 400 feet north from the railroad track. The cross on St. Mary's church bears  $182^{\circ} 26' \cdot 8$ .

*Kingston, R.M.C., Ont., 1907.*—The station is located in the playing field of the R.M.C. The college is 625 feet distant. The spire of Brock street Methodist church bears  $259^{\circ} 18' \cdot 4$ .

*Kingsville, Ont., 1920.*—The station is approximately a relocation of the station of 1910. It is situated in a field on the west side of a private lane belonging to Mrs. Colin MacDonald about one mile west of the village. The field is the second field from the road (Main street produced). The station is 207.7 feet from the northerly boundary fence and 154.9 feet from the west fence. The magnetometer was placed 11.8 feet behind the transit and in line with the spire of the English church. The following true bearings were determined from the transit station: spire of English church,  $108^{\circ} 34' \cdot 7$ ; spire on school,  $96^{\circ} 35' \cdot 7$ ; lightning rod, north end of barn,  $156^{\circ} 48' \cdot 2$ .

*Kinistino, Sask., 1911.*—The station is about 1,000 feet south of the north side of the SW.  $\frac{1}{4}$  sec. 28, tp. 45, rge. 21, W. 2nd mer., and 155 feet east of the east side of the government road allowance between sec. 28 and sec. 29. It is northeast of the town and is on the centre line of Second street produced, 145 feet west of the fence on the west side of the agricultural grounds, 215 feet south of the fence, which is a continuation of the fence on the north of the agricultural grounds and about 245 feet northeasterly from the intersection of Second street and the government road allowance. The point is marked by a stake 2 inches in diameter and projecting 4 inches above the surface. The following true bearings were determined: tip of bell-tower on yellow frame house,  $230^{\circ} 16' \cdot 4$ ; top of pole on ventilator of livery stable,  $232^{\circ} 30' \cdot 6$ ; bottom of flagstaff on Kinistino hotel,  $247^{\circ} 54' \cdot 1$ ; tip of tower on Presbyterian church,  $255^{\circ} 39' \cdot 3$ .

*Kinmount, A, Ont., 1910<sup>1</sup>.*—The station is in a field, belonging to Mr. Craige, which is on the north side of the road in front of Mr. Craige's house and is also about 500 feet east of said house. The station is on the south side of a rocky hill, and transit was placed 266 feet from the easterly side of the only gate on the south side of the road and 239 feet from the intersection of the road fences at the fork of the roads. An abandoned iron mine is on the northerly slope of the hill. The magnetometer was placed 8.5 feet behind the transit and in line with the transit and pole on public school belfry. The following true bearings were determined from the transit station: flagpole on grand stand,  $41^{\circ} 42' \cdot 2$ ; south side of chimney on house at foot of road,  $71^{\circ} 15' \cdot 1$ ; cross on Catholic church,  $197^{\circ} 33' \cdot 3$ ; pole on public school belfry,  $235^{\circ} 54' \cdot 7$ .

*Kinmount, B, Ont., 1920<sup>1</sup>.*—The station is in a field now belonging to Mr. Fred Dettman, which is on the north side of the road in front of Mr. Dettman's house, and is also about 500 feet east of same. It is on the south side of a rocky hill, being 239 feet from the intersection of the road fences at the fork of the roads, and 266 feet from the easterly side of the only gate on the north side of the road. The point is marked by a stake 2 by 4 inches and projecting 2 inches above the surface. The magnetometer was placed 8.4 feet behind the transit and in line with the transit and the pole on the second belfry. The following true bearings were determined from the transit station: south edge of chimney,  $78^{\circ} 41' \cdot 0$ ; cross on Catholic church,  $197^{\circ} 26' \cdot 3$ ; spire on Presbyterian church,  $217^{\circ} 52' \cdot 3$ ; pole on public school belfry,  $232^{\circ} 47' \cdot 3$ .

*Kinmount, C, Ont., 1920.*—Station C is in a pasture field belonging to Mr. Wilson. To reach the station, which is about one mile northwest of the G.T.R. depot, proceed about 700 yards westward along road in front of Simpson's hotel, turn northward along road which runs into an east-west road at a distance of about 800 yards. The field is the second from this corner on the right hand side of the north-south road. The station is 103 feet east of the wire fence forming the western boundary, 115.9 feet west of the wire fence forming the eastern boundary and 42.8 feet south of wire fence forming the northern boundary, and is marked by a stake 2 by 4 inches driven flush with the ground. The magnetometer was placed 15.5 feet behind the transit and in line with transit and gable of McIntyre's house. The following true bearings were determined from the transit station: middle of iron chimney on factory,  $12^{\circ} 30' \cdot 0$ ; south gable of house,  $48^{\circ} 46' \cdot 6$ ; north gable of McIntyre's house,  $169^{\circ} 30' \cdot 0$ .

*Kirkella, Sask., 1919.*—The station is approximately a relocation of the C.I. station of 1906. It is southeast of the group of houses comprising the village. It is in line with the west end and 112 feet south of the southwest corner of the main part of the Episcopal church, 109 feet east of the east boundary of the school yard and 42 feet west of the west side of the street which passes to the rear of the church. A copper nail in the top of a stake 2 by 2 inches set flush with the ground marks the point. The following true bearings were determined: east gable of church,  $288^{\circ} 04' \cdot 0$ ; left edge of west chimney on depot,  $15^{\circ} 01' \cdot 8$ ; space between two bricks on top of west chimney of depot,  $15^{\circ} 08' \cdot 3$ ; left edge of east chimney of depot,  $17^{\circ} 58' \cdot 3$ .

*Kiskisink, Que., 1913.*—The station is on the grounds of the Matabetchouan club. It is about 300 feet east of the club house and slightly north of the line of the south end

<sup>1</sup> Stations A and B very closely identical; values of magnetic elements indicate local attraction.

of the building; it is in line with the south end and 156 feet east of the southeast corner of a small cow-stable. The point is marked by a stake 2 by 3 inches and projecting 2 inches above the surface. The following true bearings were determined: tip of pole on centre of C.N.R. water-tank,  $232^{\circ} 29' \cdot 5$ ; gable over door on east side of boat-house,  $241^{\circ} 58' \cdot 5$ ; east gable of club house seen through branches of poplar tree,  $270^{\circ} 47' \cdot 5$ .

*Kitchener (Berlin), Ont., 1920.*—The station, which is a relocation of the station of 1910, is in a field belonging to Mr. J. Shafer, about  $1\frac{1}{2}$  miles west of the town on the north side of the Petersburg road. The field is directly in front of Mr. Shafer's house. The station is 309.5 feet from the westerly boundary fence and 125.4 feet from the southerly boundary fence. The magnetometer was placed 15 feet behind transit and in line with transit and lightning-rod on Shafer's barn. The following true bearings were determined from the transit station: water-tank (left edge),  $15^{\circ} 33' \cdot 9$ ; church spire in Kitchener,  $59^{\circ} 28' \cdot 0$ ; bottom of lightning-rod on Shafer's barn,  $115^{\circ} 46' \cdot 2$ .

*Kitkanga, B.C., 1915.*—The station is on vacant property about 600 feet southwest of the G.T.P. depot. It is 57 feet west and 111 feet south of the southeast corner of the lot on which the Provincial Government buildings stand, and 64 feet north of the bank along the Skeena river. The point is marked by a stake 2 inches in diameter projecting 6 inches above the surface. The following true bearings were determined: south gable of dwelling-house belonging to the Provincial Government,  $17^{\circ} 43' \cdot 9$ ; tip of pole on centre of G.T.P. water-tank,  $34^{\circ} 05' \cdot 9$ .

*Lac Chat, Que., 1914.*—The station is near the west side of a small bay, which is at the southwest corner of the northerly expansion of Lac Chat. The point is 1,350 feet north and 330 feet east of the N.T.R. depot, and 55 feet from the water's edge. The following true bearings were determined: east gable of Mr. Julien's house,  $291^{\circ} 10' \cdot 6$ ; short pipe on middle of Mr. Julien's mill,  $306^{\circ} 14' \cdot 4$ ; east gable of mill,  $308^{\circ} 10' \cdot 6$ ; south gable of club house on island,  $320^{\circ} 12' \cdot 0$ .

*Lachute, Que., 1912.*—The station is southeast of the town in an open field belonging to Mr. Fraser, and is about 600 feet southwesterly from the farm buildings. It is in line with the north side of Grace street, which passes the front of the Catholic church and terminates on the west side of the field. The point is 182 feet east from the west side of the field and is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: tip of spire on Catholic church,  $237^{\circ} 17' \cdot 8$ ; pole on east end of house in Catholic church grounds,  $248^{\circ} 02' \cdot 7$ ; pole on west end of house in Catholic church grounds,  $248^{\circ} 34' \cdot 5$ ; top of pole on post office,  $326^{\circ} 02' \cdot 3$ .

*Lacombe, A, Alta., 1919.*—The station of 1911 was reoccupied. It is on the agricultural grounds to the southwest of the town, is 138 feet north of the south fence, 460 feet west of the fence along the east side of the grounds, 160 feet east of the southeast corner of an exhibit building and 240 feet south of the southeast corner of the grand-stand. It is in line with the east end of grand-stand and also in line with the south end of the exhibit building. A stake 1 by 1 inch set flush with the ground marks the point. The following true bearings were determined: flagstaff on school,  $38^{\circ} 49' \cdot 8$ ; tip of spire on St. Andrew's church,  $45^{\circ} 20' \cdot 7$ ; pole on Merchants bank,  $58^{\circ} 48' \cdot 3$ .

*Lacombe, B, Alta., 1919.*—Station B is approximately a relocation of the C.I. station of 1908. It is in line with the north side of Mr. A. M. Campbell's warehouse and 277

feet east of the northeast corner. The following true bearings were determined: pole on C.P.R. water-tank,  $23^{\circ} 50' \cdot 8$ ; ornament on north end of creamery,  $58^{\circ} 30' \cdot 3$ ; ornament on south end of creamery,  $61^{\circ} 22' \cdot 1$ .

*Lake Bouchette, Que., 1913.*—The station is about 600 feet south of the C.N.R. depot, in a field belonging to Mr. L. E. Jaebert. It is on a small semi-circular clearing in the edge of the woods, which are along the south side of the field, and is slightly south of the summit of a rocky slope, the precise point being 26 feet south of the exposed portion of rock. The chimney on a red-roofed house on the island may be seen between two small poplar trees. A stake 2 inches in diameter and projecting 2 inches above the surface marks the point. The following true bearings were determined: pole on centre of club house across the lake,  $299^{\circ} 18' \cdot 4$ ; top of tower on northerly end of club house,  $299^{\circ} 39' \cdot 2$ ; chimney on northerly end of red-roofed house on island,  $330^{\circ} 09' \cdot 1$ ; pole on north end of C.N.R. depot,  $358^{\circ} 20' \cdot 7$ .

*Lake Edward, Que., 1913.*—The station is about 400 feet southeasterly from the C.N.R. depot, near the C.I. station of 1906, which could not be definitely relocated. It is in the grounds around the Catholic church, and is in line with the northerly end of the stable, which is at the rear of the church, being 74 feet easterly from the northeasterly corner of the stable. It is 31 feet southerly and 52 feet easterly from the southeasterly corner of the fence around the garden, which is on the easterly side of the church. The point is 101 feet southerly from a point in line with the southerly end of the church extended in an easterly direction, and is marked by a stake 2 by 2 inches, driven flush with the ground. The following true bearings were determined: top of cross on Catholic church,  $274^{\circ} 29' \cdot 3$ ; northeast edge of Catholic church,  $280^{\circ} 10' \cdot 9$ ; pole on middle of water-tank near a group of cottages,  $292^{\circ} 28' \cdot 8$ ; south gable of Laurentide hotel,  $340^{\circ} 10' \cdot 7$ .

*Lake St. Joseph, Que., 1913.*—The station is on property belonging to the H. Kennedy Lumber Co., being north of the river and east of the C.N.R. tracks. It is on a cleared space about 400 feet northwest of the saw-mill, and is in line with the south side of the house occupied by the manager of the company. The precise point is 120 feet west of the west side of the house and is marked by a stake 2 by 4 inches driven flush with the ground. The following true bearings were determined: north gable of saw-mill,  $142^{\circ} 29' \cdot 7$ ; upper angle of frame around window in north end of saw-mill,  $142^{\circ} 32' \cdot 9$ ; north gable of C.N.R. depot,  $177^{\circ} 53' \cdot 5$ ; top of pipe on middle of C.N.R. water-tank,  $186^{\circ} 47' \cdot 8$ .

*La Perade, Que., 1912.*—The station is on Catholic church property between the main street of the village and the La Perade river. The vacant lot, on which the station is located, is opposite the priest's residence and is the first one south of the creamery. The point is 73 feet north of the south fence around the lot, 59 feet west of the east fence and about 45 feet from the edge of the river. A stake 2 by 2 inches driven flush with the ground marks the point. The following true bearings were determined: tip of small ventilator on north end of Catholic college,  $41^{\circ} 27' \cdot 9$ ; tip of small ventilator on south of Catholic college,  $50^{\circ} 32' \cdot 9$ ; southwest corner of Catholic church,  $100^{\circ} 37' \cdot 8$ ; top of small pole on gable over front of Dr. Bouille's house,  $152^{\circ} 16' \cdot 4$ .



*La Romaine, Que., 1908.*—The station is located on an island lying along the north side of the harbour, and east of the southeastern extremity of the mainland. The island is southeast of and across a bay from the village. The point is almost in the centre of the island, on a level strip of land about 50 feet north of a ridge of rock which runs, for the most part, the entire length of the island, and is about 20 feet south of a large boulder which lies in a small excavation. The point is marked by a stake 4 by 4 inches, tapering at the top and projecting 6 inches above the ground. The following true bearings were determined: chimney on church,  $350^{\circ} 55' \cdot 8$ ; chimney on frame house painted blue,  $326^{\circ} 04' \cdot 9$ ; chimney on telegraph office,  $309^{\circ} 36' \cdot 8$ .

*Lardo, B.C., 1915.*—The station is on the shore of Kootenay lake, about 1,000 feet southeasterly from the C.P.R. depot. It is 68 feet north and 22 feet west of the northwest corner of a small lighthouse, and is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: door of small red building at landing across lake,  $36^{\circ} 39' \cdot 7$ ; west gable of dwelling-house on hillside across lake,  $49^{\circ} 33' \cdot 7$ .

*Lashburn, Sask., 1911.*—The station is about 300 feet west and about 600 feet north of the southeast corner of the SE.  $\frac{1}{4}$  sec. 8, tp. 48, rge. 25, W. 3rd mer. It is southeast of the town in the agricultural grounds, being in line with the north end of an exhibit building and 224 feet east of the northeast corner. It is about 150 feet west of the race-course on the east and about 360 feet south of the race-course on the north, and is marked by a stake 2 by 4 inches and projecting 1 inch above the surface. The following true bearings were determined: tip of pole on C.N.R. water-tank,  $336^{\circ} 27' \cdot 0$ ; tip of pole on C.N.R. depot,  $341^{\circ} 23' \cdot 2$ ; spire on English church,  $353^{\circ} 59' \cdot 5$ ; pole on school,  $14^{\circ} 41' \cdot 1$ .

*La Tuque, A, Que., 1918.*—Station A is a relocation of the D.O. station of 1914. It is on townsite property lying to the northeast of the town and east of the N.T.R. tracks. It is 345 feet north and 106 feet east of the iron post marking the northeast corner of the intersection of the first street north of the one (St. Joseph street) passing in front of the Catholic church and the third street (Joffre street) east of the N.T.R. right-of-way. The point is marked by a stake 3 by 3 inches and projecting 3 inches above the surface. The following true bearings were determined: cross on tower of Catholic church,  $241^{\circ} 18' \cdot 1$ ; flagstaff on south side of convent,  $247^{\circ} 12' \cdot 8$ ; cross on east side of convent,  $248^{\circ} 44' \cdot 3$ ; short pole on centre of C.N.R. water-tank,  $265^{\circ} 14' \cdot 7$ .

*La Tuque, B, Que., 1918.*—Station B is approximately 560 feet north of station A. It is 250 feet north and 106 feet east of the northeast corner of the intersection of the second street north of St. Joseph street and Joffre street. It is in line with the fence which terminates St. Benoit street at its north end. The point is marked by a copper nail in the top of a stake 3 by 3 inches and projecting 3 inches above the surface. The following true bearings were determined: Station A,  $179^{\circ} 51' \cdot 5$ ; flagstaff on town hall,  $217^{\circ} 54' \cdot 7$ ; top of spire on Catholic church,  $227^{\circ} 37' \cdot 0$ ; pipe on C.N.R. water-tank,  $252^{\circ} 57' \cdot 0$ .

*La Tuque Junction, Que., 1913.*—The station is about 600 feet west of the C.N.R. depot. It is 54 feet south of the south side of the road-bed which was formerly used as a wye, is near the west end of it, and is 50 feet east of the edge of a steep embankment. The point is marked by a stake 2 by 2 inches and projecting 3 inches above the surface.

The following true bearings were determined: pipe on water-tank,  $57^{\circ} 46' \cdot 8$ ; short pole on centre of water-tank,  $58^{\circ} 18' \cdot 8$ ; gable over centre window on railway depot,  $92^{\circ} 31' \cdot 4$ .

*Laurier, Man., 1911.*—The station is near the northeast corner of the NE.  $\frac{1}{4}$  sec. 12, tp. 12, rge. 16, W. Principal mer., and about 50 feet west of the east side of a clearing, which is southeast of the town. It is almost in line with the south side of Mr. Radford's house, which is the farthest south in the town facing Burrows road. The point is 675 feet east of Burrows road, 270 feet south of the south side of Mamie street, and is marked by a stake 2 inches in diameter and projecting 3 inches above the surface. The following true bearings were determined: pole on east end of C.N.R. depot,  $240^{\circ} 26' \cdot 2$ ; pole on west end of depot,  $240^{\circ} 49' \cdot 2$ ; chimney on south end of Mr. Radford's house,  $256^{\circ} 52' \cdot 1$ ; tip of spire of Catholic church,  $292^{\circ} 05' \cdot 8$ .

*Leduc, Alta., 1911.*—The station is near the south side of the SE.  $\frac{1}{4}$  sec. 35, tp. 49, rge. 25, W. 4th mer. It is northwest of the town, being 300 feet north of Main street, which is part of the road allowance between sec. 26 and sec. 35, and is 130 feet west of the middle of the street passing the west side of the English church. A stake 3 inches in diameter and projecting 3 inches above the surface marks the point. The following true bearings were determined: pole on hardware store,  $109^{\circ} 25' \cdot 6$ ; pole on Waldorf hotel,  $109^{\circ} 58' \cdot 4$ ; west gable of English church,  $147^{\circ} 03' \cdot 4$ .

*Les Eboulements, Que., 1908.*—The station is on the east side of the road about three-eighths of a mile from the wharf, being in the southwest corner of the second field to the south of Mr. Cimon's house. The point is 14 feet north from a stake 2 inches in diameter and 4 inches above ground close to the south fence and 33.5 feet east from a stake 2 inches in diameter and 4 inches above ground close to the west fence along the east limit of the public road. The following true bearings were determined: flagpole on Mr. Cimon's house,  $348^{\circ} 56' \cdot 0$ ; tower of church in village,  $53^{\circ} 27' \cdot 2$ .

*Les Escoumains, Que., 1908.*—The station is located to the southwest of the wharf near a sandy beach. On three sides of the beach, including a small strip of grazing land, is a fence. The point is in a small clearing adjacent to the southeasterly corner of this enclosure, and is marked by a stake 4 by 4 inches and projecting 6 inches above the ground, which is 7 feet from the fence and 27 feet from the edge of a large rock at the end of the fence. The chimney on a small house about 1,200 feet distant bears  $238^{\circ} 38' \cdot 0$ .

*Lethbridge, Alta., 1915.*—The station is southeast of the city on the agricultural grounds. It is near the north side of the grounds, being 610 feet west of the northeast corner, 524 feet east of the northwest corner and 139.5 feet south of the fence along the north side. A stake 2 by 2 inches driven flush with the ground marks the point. The following true bearings were determined: pole on west end of stock barn farthest south on east side of grounds,  $126^{\circ} 18' \cdot 8$ ; bottom of flagstaff on central dome of main exhibition building,  $139^{\circ} 56' \cdot 8$ ; bottom of central pole over gate at entrance to grounds,  $282^{\circ} 05' \cdot 2$ ; tip of water-tank seen over fence slightly to south of northeast corner of grounds,  $77^{\circ} 55' \cdot 0$ .

*Lindsay, Ont., 1910.*—The station is situated in the same field as the water works pump-house; the pump-house being on the southerly limits of the town and on the west bank of the river flowing through the town. The remaining part of the field belongs to the Roman Catholic parish. The transit was placed 154 feet from the south side of the road alongside the pump-house and 22 feet from the fence on the westerly boundary of

said field and is also 8 feet to the west of easterly side of street running into the field. The magnetometer was placed 12.4 feet behind the transit and in line with the transit and cross on church. The following true bearings were determined from the transit station: middle of iron smokestack,  $29^{\circ} 07' .9$ ; east corner of pump-house chimney,  $60^{\circ} 30' .7$ ; cross on Roman Catholic church,  $350^{\circ} 09' .0$ .

*L'Islet, Que., 1912.*—The station is northeast of the I.C.R. depot about one-sixth of a mile, on property belonging to Mr. Napoleon Beaulieu. It is on the northerly side of a small creek, which runs along the north side of the village, and is near the south-westerly corner of the third field easterly from the road leading from the depot to L'Islet village, which is on the St. Lawrence river. The point is 28 feet from the fence along the westerly side of the field, 27 feet northerly from the creek, and is marked by a stake 4 by 4 inches driven flush with the ground. The following true bearings were determined: bottom of pole on Lord's store,  $170^{\circ} 42' .5$ ; bottom of pole on furniture store,  $172^{\circ} 06' .9$ ; pole on ventilator of Mr. Alphonse Gemache's stable,  $211^{\circ} 20' .1$ .

*Liskeard, A, Ont., 1918.*—Station A is a relocation of the D.O. station of 1913. It is in the grounds around the public school building, 165 feet east of the northeast corner and in line with the north end of the building extended, and 15 feet west of the fence along the east side of the grounds. The point is marked by a drill hole in the end of a brick set flush with the ground. The following true bearings were determined: short pole on Mr. Hartman's summer-house,  $100^{\circ} 37' .9$ ; spire on Presbyterian church,  $139^{\circ} 21' .9$ ; chimney on east side of hospital,  $245^{\circ} 44' .0$ .

*Liskeard, B, Ont., 1918.*—Station B is a relocation of the C.I. station of 1909. It is in the grounds around the public school, almost in line with the west side of the building and 179 feet north of the north side of the same. Observations were taken over a brick set flush with the ground. The following true bearings were determined: flagstaff on Canada hotel,  $113^{\circ} 46' .5$ ; spire of Presbyterian church,  $137^{\circ} 06' .1$ ; pole on T. & N.O. water-tank,  $247^{\circ} 08' .5$ ; short pole on Mr. Hartman's summer-house,  $108^{\circ} 07' .1$ .

*Liverpool, N.S., 1912.*—The station is near the northeast corner of a field used for athletics. It is about 25 feet from the edge of a race-course, 296 feet northeast of the northeast corner of the grand-stand, 59 feet west of the fence on the east side of the field and 139 feet south of the fence on the north side of the road, which passes the field, there being no fence on the north side of the field. The tip of the railway depot bears  $157^{\circ} 46' .0$ .

*Lloydminster, A, Sask., 1919.*—The station of 1911, designated A, was reoccupied approximately. It is near the northwest corner of the agricultural grounds, about 400 feet south of the north side and about 350 feet east of the west side; it is 44 feet south of a fence for tying horses, 87.5 feet east of the easterly one of two fences also for tying horses, 128 feet north and 125 feet west of the northwest corner of the most northerly of three stock barns. The point is marked by a stake 2 by 4 inches set flush with the ground. The following true bearings were determined: north gable of exhibit building,  $164^{\circ} 16' .7$ ; north gable of Pioneer elevator,  $171^{\circ} 30' .5$ ; spire of Baptist church,  $173^{\circ} 37' .8$ ; north gable of Saskatchewan Co-operative elevator,  $183^{\circ} 15' .1$ .

*Lloydminster, B, Sask., 1919.*—Station B is near the C.I. station of 1908. It is 183 feet west and 197 feet south of the pier marking the Dominion Observatory latitude and longitude station, 59 feet south of the south line of the first street south of the rail-



way depot, and 38 feet west of the west line of the first street west of the depot. The following true bearings were determined: pole on centre of C.N.R. depot,  $64^{\circ} 38' \cdot 1$ ; pole on tower of post office,  $108^{\circ} 10' \cdot 9$ ; spire of Presbyterian church,  $212^{\circ} 54' \cdot 5$ ; pole on tower of school,  $242^{\circ} 28' \cdot 4$ .

*London, Ont., 1910.*—The station is situated in a field belonging to Mr. D. Barclay and is on the north side of the road leading westerly from the G.T.R. depot. This field adjoins on the east side the field in which Mr. T. Lewis's house is situated. The magnetometer was placed 49 feet from the westerly boundary fence and 26 feet from the northerly limit of the road. The following true bearings were determined from the transit station, which was 81 feet in a northeasterly direction from the magnetometer station: middle one of three lightning rods on red barn north of tracks,  $24^{\circ} 43' \cdot 4$ ; south gable of barn,  $46^{\circ} 30' \cdot 4$ .

*Longuelac, Ont., 1916.*—The station is near the southeast corner of the clearing around the buildings belonging to Revillion Bros., being on the east side of Long lake and about one-fourth of a mile south of the C.N.R. tracks. It is 54 feet south and 194 feet east of the southeast corner of the house occupied by the manager of the post. A stake, 2 inches in diameter and projecting 1 foot above the surface, marks the point. The bottom of a flagstaff at the Hudson's Bay Co.'s post across the lake bears  $272^{\circ} 28' \cdot 2$ .

*Louiseville, Que., 1912.*—The station is in the eastern part of the town, about 400 feet north of the street passing in front of the Catholic church, and in a field belonging to Mr. Joe Lescarde. The field is opposite Mr. Lescarde's house, and is situated between the street and the river. The point is 33 feet east of the top of the bank of the river, 124 feet south of the fence on the north side of the field and 54 feet north of the fence on the south side, and is marked by a stake 3 by 3 inches driven flush with the ground. The following true bearings were determined: south gable of large white house (the second north of Mr. Lescarde's),  $28^{\circ} 26' \cdot 0$ ; north gable of American Hay Co.'s barn,  $187^{\circ} 04' \cdot 3$ ; tip of cross on school for girls,  $228^{\circ} 55' \cdot 4$ ; tip of spire on school north of church,  $279^{\circ} 33' \cdot 1$ .

*Lovering, Ont., 1916.*—The station is about one-fourth of a mile northeast of the C.P.R. depot, on property belonging to Mr. Wallace Borrow. It is east of and within 10 feet of the rail fence along the west side of the southerly part of the first large field east of the farm buildings. The point is 304 feet easterly and 72 feet southerly of the southeast corner of Mr. Borrow's house, and is marked by a stake 2 inches in diameter and projecting 2 inches above the surface. The following true bearings were determined: chimney on east wing of Mr. George Prince's house,  $160^{\circ} 35' \cdot 3$ ; north gable of C.P.R. section-house,  $215^{\circ} 52' \cdot 4$ ; northwest corner of C.P.R. depot,  $231^{\circ} 13' \cdot 9$ ; northeast corner of Mr. Borrow's house,  $255^{\circ} 14' \cdot 3$ .

*Low Bush, Ont., 1914.*—The station is on the east bank of the Circle river, and about 1,000 feet north of the N.T.R. tracks. It is south of a group of houses comprising the Residency, and is in line with the west end of the most southerly one of the group. The point is 102 feet from the southwest corner of this house, and is marked by a stake  $1\frac{1}{2}$  by 3 inches and projecting 6 inches above the surface. The northwest corner of the upper portion of the west abutment of the railway bridge over the Circle river bears  $158^{\circ} 14' \cdot 8$ .



*Lucan, Ont., 1910.*—The station is situated in a field west of the G.T.R. depot and south of the tracks. The field, which belongs to Mr. J. Babb, adjoins on the west side the field in which Mr. Babb's house is placed. The transit was placed 43 feet north of the southerly boundary fence and 363 feet west of the easterly boundary fence. The magnetometer was placed 10 feet behind the transit and in line with transit and tower on high school. The following true bearings were determined from the transit station: north side of chimney on grist mill,  $51^{\circ} 53' \cdot 1$ ; windmill,  $67^{\circ} 10' \cdot 4$ ; tower on high school,  $356^{\circ} 20' \cdot 9$ .

*Lunenburg, N.S., 1912.*—The station is on government property to the east of the town. It is in line with the east side of the jail, and is 110.5 feet south of the south side of the jail property, 197 feet east of the fence on the west side of York street and 69.5 feet northwest of the storm-signal pole. The point is marked by a stake 3 inches in diameter set flush with the ground. The following true bearings were determined: spire of Methodist church,  $255^{\circ} 17' \cdot 4$ ; spire of Lutheran church,  $277^{\circ} 14' \cdot 8$ ; spire on north tower of academy,  $285^{\circ} 08' \cdot 3$ ; spire on south tower of academy,  $285^{\circ} 16' \cdot 7$ .

*Macdowall, Sask., 1911.*—The station is southwest of the town, in the grounds around the English church. It is in line with the west side of the church and 75 feet south of the southwest corner, and about 600 feet westerly from the Dominion Observatory astronomical station of 1909. A stake 2 inches in diameter and projecting 2 inches above the surface marks the point. The following true bearings were determined: pole on middle of C.N.R. tank,  $58^{\circ} 26' \cdot 5$ ; southeast corner of Ellis's store,  $66^{\circ} 39' \cdot 1$ ; southwest corner of cement pier marking the astronomical station,  $86^{\circ} 45' \cdot 2$ .

*Mack, Ont., 1916.*—The station is west of the C.G.R. tracks and in line with the north end of the depot produced, being 457 feet west of the northwest corner of the main part of the building. The point is marked by a stake 2 by  $3\frac{1}{2}$  inches and projecting 3 inches above the surface. The following true bearings were determined: gable over window on north end of depot,  $58^{\circ} 20' \cdot 9$ ; gable over window on south end of depot,  $60^{\circ} 25' \cdot 9$ .

*Mackenzie, Ont., 1910.*—The station is on a small clearing northwest of the C.P.R. depot. It is 263 feet north of the tracks, and is in line with the west end of the section-house, being 228 feet from the northwest corner of the main part of the building. True bearings of the following points were determined: west gable of C.P.R. depot,  $125^{\circ} 59' \cdot 3$ ; east pole on section-house,  $155^{\circ} 30' \cdot 0$ ; west pole on section-house,  $161^{\circ} 02' \cdot 8$ ; tip of pipe on C.P.R. water-tank,  $176^{\circ} 56' \cdot 8$ .

*Macleod, Alta., 1919.*—The station is approximately a relocation of the Carnegie Institution of 1908. It is near the southeast corner of the R.N.W.M.P. grounds, west of the town and north of the railway tracks. It is southwesterly and distant 107 feet from the main gate on the east side of the grounds, 103.5 feet west of the fence along the east side of the grounds and 272 feet north of the fence along the south side. The point is marked by a stake  $1\frac{1}{2}$  by  $1\frac{1}{2}$  inches set flush with the ground. The following true bearings were determined: pole on C.P.R. water-tank,  $241^{\circ} 01' \cdot 1$ ; cross on tower of Catholic church,  $34^{\circ} 13' \cdot 1$ ; cross on English church,  $57^{\circ} 31' \cdot 5$ ; flagstaff on west end of exhibit building farthest north in fair grounds,  $301^{\circ} 59' \cdot 2$ .

*MacTier, Ont., 1916.*—The station is about one-eighth of a mile east of the C.P.R. depot on the shore of a lake. It is 367 feet northeast of the northeast corner of the C.P.R.

boarding-house, and 16 feet west of the edge of the bank along the lake. The point is marked by a stake 3 by 3 inches projecting 2 inches above the surface. The following true bearings were determined: southeast corner, at top, of C.P.R. engine-house,  $162^{\circ} 59' \cdot 0$ ; small pipe near west side of roof of engine-house,  $173^{\circ} 11' \cdot 9$ ; pole on centre of C.P.R. water-tank,  $182^{\circ} 46' \cdot 0$ ; southeast corner of C.P.R. boarding-house,  $208^{\circ} 52' \cdot 0$ .

*Mafeking, Man., 1911.*—The station is near the west side of a clearing on the saw-mill property, which is adjacent to the C.N.R. tracks on the west side. It is in line with the south side of the C.N.R. depot and is 330 feet west of the west side of the railway siding. The point is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: southwest corner of chimney on C.N.R. depot,  $72^{\circ} 22' \cdot 2$ ; south chimney on store,  $103^{\circ} 26' \cdot 8$ .

*Malachi, Ont., 1914.*—The station is about one-fourth of a mile southwest of the N.T.R. depot, on property belonging to Mr. John Simpson, Sr. It is about 500 feet west of the railway tracks, in line with the west end of Mr. Simpson's house and 420 feet north of the north side. The point is marked by a 2-inch stake projecting 2 inches above the surface. The following true bearings were determined: south gable of house belonging to Mr. John Simpson, Jr.,  $139^{\circ} 14' \cdot 1$ ; west gable of house belonging to Mr. John Simpson, Sr.,  $220^{\circ} 33' \cdot 7$ .

*Maniwaki, Que., 1918.*—The station is southwesterly from the C.P.R. depot and the Laurentian hotel. It is on vacant property south of the first street south of the hotel, being 35 feet from the street line; it is 446 feet southerly from the southerly side of the C.P.R. depot and 341 feet westerly from the westerly side of the railway right-of-way. It is 116·5 feet south of and 203 feet east of the southwest corner of the intersection of the first street west of the station and the street passing along the south side of Dr. Muligan's residence. The spire of the Catholic church and the northwest corner of a verandah post on the northwest corner of the hotel are seen in line from the station. The point is marked by a 2-inch stake projecting 6 inches above the surface. The spire of the Catholic church bears  $38^{\circ} 32' \cdot 5$ .

*Manuan, Que., 1914.*—The station is on the north side of the St. Maurice river, on property belonging to the Hudson's Bay Co. It is northeast of the store, and is in line with the northeast corner of the store and the southeast corner of a small store-house, being 217 feet from the former and 106 from the latter. A stake 2 inches in diameter and projecting 2 inches above the surface marks the point. The following true bearings were determined: tip of pole on powder magazine to the southeast of the store,  $142^{\circ} 59' \cdot 0$ ; north gable of dwelling occupied by the H. B. Co's factor,  $178^{\circ} 08' \cdot 5$ ; tip of spire on Catholic church,  $259^{\circ} 52' \cdot 5$ .

*Manikuan, Que., 1909.*—The station is in a small field and about 300 feet southwest of the last house, overlooking the beach, in the southwestern part of the village. There is a deep ravine on the easterly and westerly sides of the field. The point is 18 feet southwest of the ravine on the easterly side, 45 feet northwest of the bank adjacent to the beach measured parallel to the easterly fence, and is marked by a stake 4 by 4 inches driven flush with the ground. The magnetic observations were made 12 feet southwest of the station and in line with the cross on the Catholic church porch. The following true bearings were determined: cross on porch of Catholic church,  $57^{\circ} 01' \cdot 1$ ; west gable

of house north of and close to saw-mill,  $109^{\circ} 27' \cdot 7$ ; west gable of saw-mill,  $120^{\circ} 13' \cdot 3$ ; gable on house near mouth of the river and on southerly side,  $131^{\circ} 09' \cdot 8$ .

*Maple Creek, Sask., 1919.*—The station is a relocation of the station of 1911, which is approximately on the centre line between the NE. and SE.  $\frac{1}{4}$  sec. 16, tp. 11, rge. 26, W. 3rd mer., and about 750 feet west of the east side of the section, being on property belonging to Mr. John Dixon. It is situated near the centre of a loop formed by Maple creek, in the field lying south of the C.P.R. tracks and adjoining the west side of the road on the east side of the section. From the station the central portion of the town may be seen through an opening in the trees, which skirt the edge of the stream almost continuously. The point is 57 feet west, 100 feet east and 175 feet north of the stream on the east, west and south, respectively, and is marked by the intersection of two grooves in the end of a brick set flush with the ground. The following true bearings were determined: southeast corner of western abutment of C.P.R. bridge,  $32^{\circ} 26' \cdot 8$ ; cross on belfry of church,  $122^{\circ} 50' \cdot 7$ ; semaphore on railway right-of-way,  $353^{\circ} 58' \cdot 3$ .

*Markstay, Ont., 1913.*—The station is about one-fourth of a mile northwesterly from the C.P.R. depot, in an open field belonging to Mr. M. Lefebvre. It is in line with the stakes marking the north limit of the second row of lots north of Front street, and is 116 feet north and 35.5 feet west of the northwest corner of the lot around Mr. Chamberlin's house. The point is marked by a stake 2 by 2 inches and projecting 2 inches above the ground. The following true bearings were determined: pole on centre of Markstay hotel,  $134^{\circ} 27' \cdot 1$ ; pole on top of C.P.R. water-tank,  $154^{\circ} 26' \cdot 0$ .

*Marquette, Man., 1910.*—The station is about 300 feet southwesterly from Mr. Smith's store, and about 500 feet south of the C.P.R. tracks. It is 76 feet east of the middle of a north-south road, 161 feet north of an east-west road, and 169 feet southwest of the southwest corner of a red barn. Mr. Smith's store appears midway between the west end of the C.P.R. depot and the east end of the C.P.R. section-house. A stake 2 inches in diameter and 3 inches above the ground marks the point. True bearings of the following points were determined: west gable of C.P.R. freight-shed,  $45^{\circ} 57' \cdot 9$ ; west gable of C.P.R. depot,  $49^{\circ} 15' \cdot 5$ ; east gable of section-house,  $64^{\circ} 04' \cdot 7$ ; pole on west end of Mr. Brown's stable,  $121^{\circ} 37' \cdot 2$ .

*Martin, Ont., 1910.*—The station is near the northeasterly corner of a field surrounding the section-house, being 17 feet from the fence on the northerly side and 24 feet from the fence on the easterly side of the field. It is 226 feet in a northerly direction from the C.P.R. tracks, and 206 feet northeasterly from the northeast corner of the section-house. A stake 2 inches in diameter and projecting 3 inches above the ground marks the point. The east gable of the section-house bears  $256^{\circ} 18' \cdot 2$ .

*Massey, Ont., 1916.*—The station is on the north side of the town about one-fourth of a mile north of the C.P.R. depot, being near the north side of a clearing used for athletics. It is 550 feet north of the north side of the street passing in front of Mr. Fryer's residence, and 34 feet west of the west line of the first street west of the C.P.R. depot. The point is marked by a brass screw in the top of a stake 2 inches in diameter and projecting 2 inches above the surface. The following true bearings were determined: short pole on front of main part of Clifton hotel,  $174^{\circ} 36' \cdot 3$ ; top of cross on



Catholic church  $221^{\circ} 04'.0$ ; top of cross on Catholic school,  $224^{\circ} 25'.4$ ; smokestack on Wilson's mill,  $139^{\circ} 20'.9$ .

*Matapedia, Que., 1920.*—The station is a relocation of the station occupied first in 1907. It is on the north bank of the Restigouche river on property belonging to the Fishing club; it is 497 feet south and 9 feet east of the southeast corner of the Restigouche hotel and 39.5 easterly from the base of a large elm tree. A line joining the station and the cross on the tower of the Catholic church passes about  $1\frac{1}{2}$  feet south of this tree. The point is marked by a cement block 5 by 5 inches set flush with the ground. The following true bearings were determined: north gable of house on west bank of Restigouche river,  $195^{\circ} 41'.3$ ; tip of cross on tower of Catholic church,  $281^{\circ} 16'.5$ ; southeast corner of Restigouche hotel,  $343^{\circ} 49'.1$ ; northeast corner of Restigouche hotel,  $353^{\circ} 13'.1$ .

*Matheson, Ont., 1913.*—The station is southeast of the town on a clearing used for athletics. It is 875 feet south of the south side of the T. & N.O. right-of-way, 130 feet east of the government road, which passes about 300 feet east of the railway depot. A stake 3 inches in diameter driven flush with the ground marks the point. The following true bearings were determined: east gable of railway depot,  $330^{\circ} 59'.8$ ; spire on tower of church,  $348^{\circ} 58'.2$ ; bottom of short pole on west end of school,  $2^{\circ} 11'.7$ ; bottom of short pole on east end of school,  $3^{\circ} 19'.7$ .

*Mattawa, Ont., 1918 and 1920.*—Station A, which was occupied in 1918, is approximately a relocation of the station of 1907. It is on the west bank of the Mattawa river near its junction with the Ottawa, in the Hudson's Bay Co.'s reserve. The station may be found by following Pembroke street westerly 722 feet from the northwest corner of the intersection of Pembroke and Water streets, then following a line northwards making an angle of  $102^{\circ} 09'$  with the first line a distance of 311 feet; it is almost in line with the westerly side of a dwelling house and is 93 feet northerly from the northwesterly corner of the same. The point is marked by a copper nail in the top of a stake 3 inches in diameter set flush with the ground. The following true bearings were determined: pole on town hall,  $117^{\circ} 34'.8$ ; flagstaff on store in front of post office,  $133^{\circ} 48'.1$ ; flagstaff on tower of public school,  $138^{\circ} 20'.6$ ; top of cross on right hand tower of Catholic church,  $209^{\circ} 22'.3$ ; cross on tower of Catholic school,  $229^{\circ} 20'.9$ .

Station B, occupied in 1920, is a relocation of the station of 1913. It is northeast of the town, on a strip of land at the confluence of the Ottawa and Mattawa rivers, on the Hudson's Bay Co.'s reserve and about 400 feet northeasterly from station A; it is 106 feet southeast of the southeast corner of an old storehouse, 89 feet south of the south side of the storehouse extended, and 62 feet westerly from the northwesterly corner of an old cribwork. The point is marked by a stake 2 inches in diameter set flush with the ground. The following true bearings were determined: bottom of flagstaff on tower of public school,  $148^{\circ} 22'.2$ ; bottom of flagstaff on store in front of post office,  $151^{\circ} 20'.4$ ; cross on north tower of Catholic church,  $211^{\circ} 34'.4$ ; cross on tower of Catholic school,  $225^{\circ} 36'.2$ .

*Mattice, Ont., 1914.*—The station is 950 feet westerly from the N.T.R. depot, 600 feet westerly from the water-tank, and 651 feet northerly from the railway tracks. It is about 100 feet from the east side of the Missinaibi river, and is marked by a stake  $1\frac{1}{2}$  by



1½ inches driven flush with the ground. A short pole on the middle of the railway water-tank bears 165° 58' 4.

*McBride, B.C., 1919.*—The station is approximately a relocation of the station of 1913. It is about 1,500 feet northwest of the G.T.P. depot, near the west side of the townsite; it is in line with the south side of the lane at the rear of the row of lots fronting on the north side of the second street north of the railway tracks, and is 72 feet west of the east side of the street along the west side of the townsite. The point is marked by a stake 2 by 2 inches set flush with the ground. The following true bearings were determined: easterly one of two smokestacks on railway shops, 191° 13' 2; pipe on railway water-tank, 215° 13' 2.

*McGregor, Man., 1910.*—The station is near the northwest corner of a small field belonging to Mr. F. E. Lewin. The field is adjacent to the south side of the school grounds and the east side of the street which passes to the west of the school. The point is 26 feet south of the fence on the south side of the school grounds. 38 feet east of the street fence, and is marked by a stake 2 by 4 inches projecting 2 inches above the ground. The following true bearings were determined: tip of pole on C.P.R. water-tank, 163° 34' 8; bottom of spire on Methodist church, 136° 22' 4; tip of pole on public school, 62° 06' 9.

*Medicine Hat, Alta., 1915.*—The station is about one-fourth of a mile north of the Meteorological Service station of 1907. It is in the baseball park and near the southeast corner, being 61.7 feet from the fence along the easterly side, 69.7 feet from the fence along the southerly side and 75.7 feet from the southeast corner of the grounds. The point is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: bottom of flagstaff on armoury, 160° 35' 8; top of cross on west tower of Catholic church, 252° 44' 4; top of cross on east tower of Catholic church, 253° 14' 4; tip of tower of centre of convent, 289° 00' 0.

*Medicine Lodge, Alta., 1913.*—The station is about 1,000 feet northeast of the G.T.P. depot, and about 1,000 feet northwest of the G.T.P. water-tank, near the middle of the first cleared space east of the depot and extending from the G.T.P. to the C.N.R. tracks. It is on the eastern slope of a rocky knoll, 440 feet north of the G.T.P. tracks, 27 feet east and 36 feet north of the northeast corner of the easterly one of two log barns. A stake 2 by 2 inches projecting 2 inches above the surface marks the point. The following true bearings were determined: tip of pole on centre of G.T.P. water-tank, 96° 37' 8; left edge of chimney on depot, 202° 52' 0; right edge of chimney on depot, 202° 57' 6.

*Megantic, Que., 1907.*—The station is in the village of Agnes across the Chaudière river in the southeast corner of a field, which is across the street from Agnes Hall. The point is 48 feet north and 13.5 feet west of the southeast corner of field. The flagstaff on school-house in Megantic bears 329° 02' 0.

*Melfort, Sask., 1919.*—The station is approximately a relocation of the D.O. station of 1911 and about 500 feet southerly from the C.I. station of 1908, which is no longer available. It is 300 feet from the fence along the east side of the agricultural grounds, 195 feet from south fence, 8 feet west and 69 feet north of the northeast corner of the most easterly of three stock barns. The point is marked by a stake 1 by 2 inches set flush with the ground. The following true bearings were determined: pole on judge's stand inside

race-track,  $272^{\circ} 21' \cdot 6$ ; chimney on south end of house,  $321^{\circ} 48' \cdot 3$ ; pole on centre of exhibit building,  $24^{\circ} 11' \cdot 9$ ; pole on north end of power-house,  $26^{\circ} 40' \cdot 2$ .

*Memramcook, N.B., 1912.*—The station is on the public school grounds, about one-fourth of a mile northeast of the I.C.R. depot. It is 132·5 feet from the southwest corner of the school building, 57 feet from the fence on the west side of the grounds and 23 feet north of the south fence. The point is marked by a stake 2 by 3 inches driven flush with the ground. The following true bearings were determined: chimney on north end of church on hill,  $79^{\circ} 24' \cdot 6$ ; spire on church on hill,  $79^{\circ} 54' \cdot 9$ ; top of water-tank near Catholic college,  $200^{\circ} 27' \cdot 1$ .

*Michel, B.C., 1915.*—The station is about 100 feet south of the line of the south side produced of the most southerly of two small houses which are at the extreme south end of the town. The houses are on a narrow strip of land lying between the road leading south from the town and Michel creek. The station is on the west side of the road and at an elevation of approximately 15 feet above the tops of the houses in the main part of the town. From the station the bridge over Michel creek may be seen about one-half mile to the south. The station is about 27 feet east of the middle of a lumber road and 24 feet west of the edge of the terrace on which it is located. From the edge of the terrace the bank slopes without interruption to the level of the main road, but about 30 feet north the slope is broken by an oval-shaped terrace about half-way to the road level. A stake 2 by 2 inches and projecting 3 inches above the surface marks the point. The following true bearings were determined: smokestack on power-plant,  $334^{\circ} 01' \cdot 4$ ; pole on C.P.R. water-tank,  $337^{\circ} 09' \cdot 4$ ; tip of centre of bridge over Michel creek,  $136^{\circ} 37' \cdot 2$ .

*Middleton, N.S., 1912.*—The station is on the grounds of the Middleton Racing Association, near the east end of the enclosure, which is inside the race-track. It is 254 feet southeasterly from the east side of the gate at the main entrance to the grounds, and 85 feet north from the inner fence around the track on the south end of the field. A stake 2 inches in diameter and projecting 6 inches above the surface marks the point. The following true bearings were determined: spire of Baptist church,  $234^{\circ} 35' \cdot 0$ ; spire on railway depot,  $254^{\circ} 03' \cdot 1$ ; pole on front of armoury,  $256^{\circ} 46' \cdot 5$ ; south gable of Allen's planing-mill,  $281^{\circ} 43' \cdot 6$ .

*Middleton, Ont., 1910.*—The station is about 450 feet south of the C.P.R. tracks, and 75 feet north of a gravel beach on lake Superior. It is 35 feet west of a rocky bluff and 12 feet north of an excavation. To the west, about 12 feet and beyond, the soil consists, for the most part, of stones and coarse gravel. The point is marked by a stake 3 inches in diameter and projecting 1 inch above the ground. The following true bearings were determined: top of second telegraph pole west of depot,  $2^{\circ} 26' \cdot 1$ ; west gable of depot,  $34^{\circ} 23' \cdot 1$ ; east gable of depot,  $38^{\circ} 09' \cdot 1$ .

*Midway, B.C., 1919.*—The station, which is a relocation of the station of 1915, is about 2,500 feet southeast of the C.P.R. depot and near the edge of the bank along the Kettle river. It is 40·5 feet northwesterly from the centre one of three pine trees, 47 feet from the edge of the bank along the river and 197 feet east of a lone pine tree, which is 55 feet from the edge of the bank along the river. The point is almost in line with the west end of a grand-stand on the south side of the street passing in front of the Spokane

hotel, and is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: short pole on centre of C.P.R. water-tank,  $331^{\circ} 47' \cdot 6$ ; tip of tower of Presbyterian church,  $40^{\circ} 35' \cdot 6$ ; flagstaff on front of Spokane hotel,  $49^{\circ} 10' \cdot 8$ ; gable over window on east side of house across river,  $259^{\circ} 24' \cdot 1$ ; south gable of school,  $302^{\circ} 01' \cdot 8$ .

*Mile 142 (G.T.P.), 1913.*—The station is on a cleared space, 620 feet east of the G.T.P. tracks and 265 feet south of the south side of the Fraser river. The following true bearings were determined: northwest edge of first vertical post from north end of bridge over Fraser river,  $272^{\circ} 00' \cdot 9$ ; northwest edge of second vertical post from north end of bridge,  $271^{\circ} 18' \cdot 9$ ; northwest edge of middle vertical post in north span of bridge,  $269^{\circ} 00' \cdot 9$ .

*Mispec, N.B., 1907.*—The station is about 320 feet westerly from the pulp-mill. The tower on the pulp-mill bears  $114^{\circ} 12' \cdot 5$ .

*Missinaibi, Ont., 1910.*—The station is approximately a relocation of the Carnegie Institution of 1906. It is about one-fourth of a mile west of the old Hudson's Bay Co.'s post and about 400 feet south of the railroad. From the station the C.P.R. pump-house and tank may be seen slightly to the west of the centre of the top of the Hudson's Bay Co.'s new store. The point is 56 feet from the southeasterly corner and 49.5 feet from the southwesterly corner of the Episcopal church. The following true bearings were determined: chimney on C.P.R. water-tank,  $335^{\circ} 30' \cdot 1$ ; pole on school,  $357^{\circ} 23' \cdot 8$ ; southeasterly corner of Hudson's Bay Co.'s store,  $340^{\circ} 51' \cdot 5$ .

*Moisie River, Que., 1909.*—The station is on a slight elevation to the north of the village, being in the northeast corner of a field belonging to Mr. Charles Fournier. It is about 200 feet west of the storm-signal station, which is in the field adjacent. The spire of the Catholic church may be seen over the middle of the first house to the north and east of the station. The point is 34 feet westerly from the easterly fence, 16 feet southerly from the northerly fence around the field, and is marked by a stake 2 inches in diameter projecting 2 inches above the ground. The following true bearings were determined: west gable of house on opposite side of river,  $1^{\circ} 46' \cdot 3$ ; west gable of small house near storm-signal post,  $90^{\circ} 25' \cdot 9$ ; spire of Catholic church,  $129^{\circ} 33' \cdot 1$ ; chimney on post office building,  $146^{\circ} 02' \cdot 6$ .

*Moncton, N.B., 1920.*—The station of 1907 was reoccupied. It is in an open field on the east side of Westmorland street and adjacent to the north side of the Petitcodiac river; 74 feet east of the east side of Westmorland street and 155 feet from a point determined by the intersection of the east line of the street produced and the middle of the footpath along the top of the dyke. The station is marked by a cement block set flush with the ground. The following true bearings were determined: spire of church seen over Paul Lea's mill,  $303^{\circ} 26' \cdot 4$ ; spire of English church,  $330^{\circ} 14' \cdot 7$ ; spire on tower of post office,  $17^{\circ} 00' \cdot 1$ ; tip of lighthouse across river,  $93^{\circ} 17' \cdot 2$ .

*Montizambert, Ont., 1910.*—The station is on a clearing southwest of the C.P.R. depot, being 540 feet southerly from the depot, 165 feet westerly of the railway tracks, and 90 feet easterly of the White river. The east end of the section-house on the south side of the tracks may be seen to the east of a log building, which is distant 51 feet from the



station. The following true bearings were determined: west gable of depot,  $52^{\circ} 07' \cdot 9$ ; east gable of section-house,  $133^{\circ} 55' \cdot 1$ .

*Montreal, Que., 1912.*—The station is approximately a relocation of the U.S. Coast and Geodetic Survey station of 1908. It is on the cricket and football field of McGill University, 148 feet from the southeast corner of the grand-stand, 178·8 feet from the northeast corner, and about 130 feet from the middle of the road. The following true bearings were determined: flagpole on tower of Arts building,  $316^{\circ} 55' \cdot 7$ ; tip of tower of Presbyterian church,  $273^{\circ} 31' \cdot 1$ ; north gable of lodge near entrance to grounds,  $105^{\circ} 31' \cdot 1$ ; southwest corner (at ground) of Monson building,  $301^{\circ} 37' \cdot 0$ .

*Moose Jaw, Sask., 1910.*—The station is in the northern part of the city, near the southeast corner of the agricultural grounds. It is 108 feet north of the south fence, 122 feet west of the east fence of the grounds, and 73 feet southeast of the fence around the race-course. The point is marked by a 2 by 4 inch stake, which projects 3 inches above the ground. The following true bearings were determined: spire on English church at corner of East High street and 10th avenue,  $190^{\circ} 33' \cdot 2$ ; pole on collegiate institute,  $233^{\circ} 50' \cdot 4$ ; spire on dome of house over reservoir,  $265^{\circ} 07' \cdot 4$ ; spire on dome west of grand-stand,  $272^{\circ} 09' \cdot 0$ .

*Morley, Alta., 1919.*—The station, which is a relocation of the station of 1911, is in an open field north of the C.P.R. tracks. It is about 525 feet west and 450 feet north of the northwest corner of the section-house, 25 feet from the ledge of a bank and near two large fir trees, which are separated by about 15 feet. A stake 2 by 3 inches projecting 2 inches above the ground marks the point. The following true bearings were determined: northwest corner of white house on hill across river,  $7^{\circ} 41' \cdot 2$ ; pole on south end of depot,  $110^{\circ} 34' \cdot 6$ ; pole on railway water-tank,  $123^{\circ} 12' \cdot 0$ .

*Mortlach, Sask., 1911.*—The station is in the eastern part of the town, 540 feet easterly from the pier marking the Dominion Observatory latitude and longitude station, and 305 feet northerly from the fence along the C.P.R. right-of-way. It is 27 feet northerly from the north side of the second street north of the railway tracks, 174 feet northeasterly from the northeast corner of Mr. Simmins' house, and 270 feet southeasterly from the southeast corner of the Imperial Elevator Co.'s lumber yard. The following true bearings were determined: north gable of Imperial Elevator Co.'s elevator,  $226^{\circ} 18' \cdot 9$ ; north gable of Anglo-Canadian Elevator Co.'s elevator,  $219^{\circ} 12' \cdot 3$ ; north gable of hardware store,  $213^{\circ} 08' \cdot 5$ .

*Mount Forest, Ont., 1910.*—The station is in a small field belonging to Mr. Duke, about one-fourth of a mile west of the G.T.R. tracks on the main road. A short road runs into the main road at this point at an angle, making the field triangular in shape. The field adjoins the one in which Mr. Duke's house is placed. The transit was placed 178 feet from the easterly boundary fence and 65 feet at right angles from the easterly limit of the short road. The magnetometer was placed 11·4 feet behind the transit and on line with transit and spire of Methodist church. The following true bearings were determined: spire of Methodist church (left-hand spire),  $75^{\circ} 01' \cdot 1$ ; church spire, Mount Forest,  $82^{\circ} 42' \cdot 4$ ; top of depot tower,  $87^{\circ} 21' \cdot 1$ .

*Moyie, B.C., 1915.*—The station is about one-fourth of a mile northeast of the C.P.R. depot, on an uncleared block of townsite property, being 78 feet west of the west side of



the fourth street east of the C.P.R. tracks and 215 feet north of the north side of the second street north of the depot. The following true bearings were determined: tip of cross on Catholic church,  $197^{\circ} 53' \cdot 2$ ; bottom of flagstaff on tower of Central hotel,  $250^{\circ} 14' \cdot 6$ .

*Mulgrave, N.S.*, —Station A, 1907, is located on a clear spot about 1,000 feet east of the I.C.R. depot and at an elevation of about 110 feet. The spire of the Methodist church bears  $71^{\circ} 21' \cdot 6$ .

Station B, 1912, is southwest of the town, in a field belonging to Mr. Cocale. It is 525 feet southerly from the street passing the south side of the Sea Side hotel and about 435 feet westerly from the upper I.C.R. track, which is about 278 feet west of the Sea Side hotel. The easterly side of the field is adjacent to the westerly side of the second block of lots to the west of the upper I.C.R. track. The point is 47.5 feet east of the west side of the field and 45 feet north of the south side, and is marked by a stake 3 inches in diameter set flush with the ground. The following true bearings were determined: spire of Methodist church,  $18^{\circ} 13' \cdot 1$ ; spire of Presbyterian church,  $35^{\circ} 25' \cdot 3$ ; spire of church in Hawkesbury,  $50^{\circ} 03' \cdot 9$ ; spire of English church,  $79^{\circ} 32' \cdot 8$ ; spire of Catholic church,  $359^{\circ} 11' \cdot 2$ .

Station C, 1912, is probably within 50 feet of the station of 1907 (station A), and about 400 feet northwesterly from station B. It is about 840 feet southwest from the Sea Side hotel, and 180 feet south of the south side of the street passing the hotel. It is almost in line with the ridge of the roof of the Methodist church and is at a slightly greater elevation, and is 60 feet west of the fence on the east side of the field in which it is located and 18 feet south of the north fence. The following true bearings were determined: spire of Catholic church,  $5^{\circ} 04' \cdot 0$ ; spire of Methodist church,  $58^{\circ} 30' \cdot 5$ ; spire of English church,  $99^{\circ} 17' \cdot 3$ .

*Mulvihill, Man.*, 1916.—The station is near the southeast corner of the grounds around the public school. It is 25 feet west of the fence along the east side of the grounds, 41 feet north of the south fence and 168 feet southeast of the southeast corner of the school building. The point is marked by a stake 3 inches in diameter set flush with the ground. The following true bearings were determined: north gable of Mr. A. Lundal's boarding-house,  $170^{\circ} 52' \cdot 2$ ; tip of smoke-pipe on C.N.R. depot,  $185^{\circ} 57' \cdot 7$ ; southwest corner of school building,  $304^{\circ} 07' \cdot 3$ .

*Mutton Bay, Que.*, 1920.—The station is approximately a relocation of the station of 1909. It is near the northwest extremity of the harbour and about 1,000 feet north of the last house on the west side; and about 300 feet south and west of the narrowest part of the channel between the harbour and the bay lying beyond. There is a large boulder 15 feet south and west from the station. None of the houses on the west side of the harbour are visible from the station and only a few south of the English church on the east side can be seen. The precise point is marked by a stake 4 inches in diameter set flush with the ground. The following true bearings were determined: north gable of small house across the harbour,  $59^{\circ} 34' \cdot 4$ ; tip of tower of school,  $107^{\circ} 01' \cdot 3$ ; cross on tower of English church,  $109^{\circ} 10' \cdot 2$ .

*Murray Bay (Pointe-au-Pic), Que.*, 1909.—The station is near the northwest corner of an irregular enclosure at the back of the Warren hotel. A stake 2 inches in diameter,

driven flush with the ground, marks the point, which is 33.7 feet east of the west fence and 30 feet south of the north fence. It is in line with the east side, and north of a planing-mill. The English church spire may be seen above the fourth house to the north of the hotel. The following true bearings were determined: north gable of planing-mill,  $166^{\circ} 08' \cdot 9$ ; spire on Catholic church,  $159^{\circ} 17' \cdot 2$ ; north gable of Chateau Murray,  $153^{\circ} 22' \cdot 7$ ; spire of English church,  $34^{\circ} 52' \cdot 1$ .

*Nairn, Ont., 1916.*—The station is about one-sixth of a mile northwest of the C.P.R. depot. It is on vacant land northwest of the Catholic cemetery, being 37 feet north and 65 feet west of the northwest corner of the same. The point is marked by a brass screw in the top of a stake 3 inches in diameter driven flush with the ground. The following true bearings were determined: west gable of the New Nelson hotel,  $110^{\circ} 12' \cdot 1$ ; top of cross on tower of Catholic church,  $127^{\circ} 53' \cdot 6$ ; flagstaff on bell-tower of school,  $187^{\circ} 53' \cdot 2$ ; east gable of English church,  $191^{\circ} 30' \cdot 4$ .

*Nanaimo, B.C., 1919.*—The station is near the one occupied in 1908. It is on the southwesterly side of Jesse island, about 480 feet southeasterly from a cliff which is east of the fish sheds at the northwesterly corner of the island, and about 135 feet from the edge of the bank on the south, 67 feet south and 202 feet east of the southeast corner of a cottage. The point is marked by a stake 2 by 4 inches and projecting 6 inches above the surface. The following true bearings were determined: larger of two smokestacks across bay,  $214^{\circ} 31' \cdot 8$ ; smaller of two smokestacks across bay,  $214^{\circ} 39' \cdot 6$ .

*Napanee, Ont., 1910.*—The station is situated on the circus grounds which border on the third street southwest from the G.T.R. depot. The grounds are owned by Sir Richard Cartwright. The transit was placed 162 feet east of the west limit of the street on the west of the grounds and 291 feet north of the north limit of the street bordering the circus grounds on the south. The transit station was also 35.5 feet from the rear lot line of lots facing on the west side of the next street to the east and 55 feet from the intersection of this rear lot line with the street bounding the grounds on the north. The magnetometer was placed 10.3 feet behind the transit and in line with transit and the spire of Catholic church. The following true bearings were determined from the transit station: spire of Western Methodist church,  $139^{\circ} 15' \cdot 4$ ; spire of Roman Catholic church,  $151^{\circ} 05' \cdot 1$ ; flagpole on high school,  $201^{\circ} 33' \cdot 9$ .

*Natashkwan, Que., 1920.*—The station of 1909 was reoccupied. It is about 100 feet from the high-water mark near the northwestern extremity of Wood island, being opposite a small peninsula on the west side of which is the western harbour. It is about 1,150 feet northeast of the lighthouse, which is also on Wood island, and 125 feet north of east from a granite monument lettered "C.R.C. 1886". This monument is not visible from the station owing to the presence of a rocky ridge. In the vicinity of the station there is barely enough soil on the rock to make it possible to pitch a tent. The station is not marked. The following true bearings were determined: spire of Catholic church,  $81^{\circ} 40' \cdot 4$ ; tip of lighthouse on Wood island,  $220^{\circ} 32' \cdot 2$ ; tip of cross on beacon islet,  $299^{\circ} 16' \cdot 6$ ; east gable of shed at west end of wharf,  $349^{\circ} 16' \cdot 0$ ; south gable of shed seen over middle of shed at east end of wharf,  $0^{\circ} 00' \cdot 2$ .

*Nelson, B.C., 1919.*—The station of 1915 was reoccupied. It is near the edge of a high and rocky bluff on the west side of the City park reserve and the east side of the city.

It is slightly to the south of the centre line of Baker street, the easterly end of which terminates about 400 feet to the west of the station. The point is marked by a stake  $1\frac{1}{2}$  inches in diameter driven to within 2 inches of the surface in a small depression about 1 foot in diameter. It is 6 feet east of the edge of a portion of exposed rock about 5 feet square, and 9 feet east of a footpath. The following true bearings were determined: pole on C.P.R. water-tank,  $245^{\circ} 10' \cdot 3$ ; bottom of flagstaff on Hume hotel,  $247^{\circ} 50' \cdot 1$ ; bottom of flagstaff on tower on corner of court-house,  $251^{\circ} 12' \cdot 1$ ; bottom of flagstaff on tower of town hall,  $260^{\circ} 58' \cdot 3$ .

*Newcastle, A, N.B., 1907.*—The station is in an open field about 1,000 feet easterly from I.C.R. depot. It is 434.5 feet west of west side of King street, and 134.5 feet north of north side of Jane street. The spire of Presbyterian church bears  $21^{\circ} 46' \cdot 0$ .

*Newcastle, B, N.B., 1912.*—The station is about 400 feet southwesterly of the station of 1907. It is in an open field on the south side of Jane street, and west of a row of houses facing Kings' highway. The point is south of and in line with the west side of Mr. Price's lot, west of and in line with the north side of Mr. Clark's house, and is 185 feet from the southwest corner of Mr. Price's lot and 325 feet west of west side of Mr. Clark's lot. A stake 2 by 2 inches, driven flush with the ground, marks the point. The following true bearings were determined: spire of Catholic church,  $7^{\circ} 16' \cdot 9$ ; spire on Presbyterian church,  $28^{\circ} 03' \cdot 0$ ; top of highest tower on convent,  $32^{\circ} 24' \cdot 4$ ; spire on Methodist church,  $45^{\circ} 17' \cdot 5$ .

*Newcastle, A, Ont., 1910.*—The station is situated in a field north of the G.T.R. tracks and in the second block west of the street running under the tracks. The field is owned by Mr. Montague. A creek, dry at times, runs lengthwise of the lot. The transit was placed 144 feet west of the westerly limit of the first street west of the above-mentioned street and 58.5 feet from the fence on the northerly boundary. It is also 83 feet and 64 feet respectively from the farthest easterly and westerly of five small trees along the north side of the creek. The magnetometer was placed 10.4 feet behind the transit and in line with transit and spire on Methodist church. The following true bearings were determined from the transit station: spire of English church,  $2^{\circ} 51' \cdot 7$ ; pole on school belfry,  $50^{\circ} 21' \cdot 7$ ; spire on Methodist church,  $354^{\circ} 39' \cdot 4$ .

*Newcastle, B, Ont., 1920.*—Station B was selected owing to A being at present close to a power line. It is situated in a pasture field belonging to Mr. C. Smith, whose farm is 3 miles from the village. Proceed east along the Kingston road a distance of 2 miles from the village passing under concrete bridge of C.P.R., turn north along road, going a distance of 1 mile to the next cross road, passing school on left hand side of road. The station is in the pasture field in the northwest corner of the cross-roads, being 120.5 feet south of the fence on the north side of the field and 46.5 feet east of the west fence. A stake 2 inches in diameter driven flush with the ground marks the point. The magnetometer was placed 27.2 feet behind the transit and in line with transit and west gable of Ruddell's barn. The following true bearings were determined from the transit station: west gable of Ruddell's barn,  $354^{\circ} 20' \cdot 9$ ; west gable of barn,  $96^{\circ} 57' \cdot 5$ ; west gable of house,  $128^{\circ} 23' \cdot 8$ .

*New Germany, N.S., 1912.*—The station is about one-half mile southwest of the railway depot, on a waste piece of ground near the southwest corner of Mr. Rupert



Varner's farm. It is 205 feet east of the east side of the public school building, 104 feet north of the north side of the English church cemetery and 107 feet northeast of the northeast corner of a cattle pen. A stake 2 by 2 inches set flush with the ground marks the point. The following true bearings were determined: north gable of Mr. Varner's house,  $96^{\circ} 29' \cdot 2$ ; north gable of Mr. Findel's house,  $104^{\circ} 00' \cdot 7$ ; pole on I. B. deLong's store,  $122^{\circ} 50' \cdot 3$ ; northeast corner of English church,  $147^{\circ} 22' \cdot 9$ .

*New Hazelton, B.C., 1915.*—The station is about one-half mile southwest of the G.T.P. depot on partially cleared land near the intersection of Ninth avenue and McLeod street. It is 100 feet south of the south side of Ninth avenue and 120 feet east of the east side of McLeod street. The point is marked by a stake 2 by 2 inches and projecting 2 inches above the surface. The following true bearings were determined: tip of pole on centre of G.T.P. water-tank,  $40^{\circ} 14' \cdot 3$ ; northwest corner of Northern hotel,  $63^{\circ} 39' \cdot 1$ ; tip of white post on south side of G.T.P. right-of way near west end of siding,  $311^{\circ} 16' \cdot 3$ .

*Niagara Falls, Ont., 1910.*—The station is situated in a large open field belonging to Mr. Emmett on the south side of the road leading westwards at the fork of the main road at Stamford Green. The station is about one-fourth of a mile westerly along this road and is on a clear patch between a grapery and a raspberry patch. The transit was placed 55 feet from the west side of the berry patch and 116 feet from the east side of the grapery and 63 feet from the southerly side of the road allowance. The Niagara St. Catharines and Toronto Electric Railway is distant about  $1\frac{1}{2}$  miles in a southerly direction. The magnetometer was placed 11.2 feet behind the transit and in line with the transit and pole on school-house tower. The following true bearings were determined from the transit station: north gable of house on main road,  $104^{\circ} 06' \cdot 5$ ; pole on school-house tower,  $145^{\circ} 36' \cdot 9$ ; windmill on Mr. Emmett's barn,  $193^{\circ} 01' \cdot 1$ .

*Niblock, Ont., 1910.*—The station is on a small clearing southwest of the C.P.R. depot, being on the summit of a small ridge which runs in an easterly and westerly direction. It is 270 feet southwesterly from the southwest corner of the main part of the depot. The point is marked by a stake 2 inches in diameter and projecting 3 inches above the ground. The following true bearings were determined: south gable of small car-house west of depot,  $7^{\circ} 21' \cdot 1$ ; southwest corner of main part of C.P.R. depot,  $62^{\circ} 07' \cdot 8$ .

*Nicola, B.C., 1908.*—The station is opposite the C.P.R. depot, in a field owned by Mr. House. It is about 165 paces southwest of the end of the "Y," 62 feet east of a small irrigation ditch and 22 feet north of a line joining the bottom of the north row of stakes in the fence along the south boundary of the field. The point is marked by a brass nail in a fir post 2 by 4 inches and projecting 7 inches above the surface. The following true bearings were determined: gable end of C.P.R. depot,  $33^{\circ} 36' \cdot 7$ ; gable end of C.P.R. engine-shed,  $49^{\circ} 54' \cdot 4$ ; vertical edge of large boulder on mountain-side,  $86^{\circ} 03' \cdot 0$ ; chimney on south wing of house (this wing painted red),  $182^{\circ} 55' \cdot 8$ ; gable of large red barn, about one mile distant,  $214^{\circ} 30' \cdot 5$ .

The magnetic observations were taken 12 feet northeast from the station and in line with chimney on house.



*Nipigon, Ont., 1910.*—The station is approximately 11.5 feet south and 5 feet west of the C.I. station of 1906. It is in the northeastern part of the town, about 400 feet east of the C.P.R. tracks, 11.5 feet south of the fence along the north side of the street running from the C.P.R. water-tank eastward to the river and 17 feet from the bank of the river. The following true bearings were determined: spire on Presbyterian church,  $217^{\circ} 19' .9$ ; top of pole on Hudson's Bay Co.'s store,  $241^{\circ} 07' .9$ ; spire on C.P.R. water-tank,  $271^{\circ} 24' .8$ .

*Niton, Alta., 1913.*—The station is near the middle of the south side of the SE.  $\frac{1}{4}$  sec. 18, tp. 54, rge. 12, W. 5th mer. It is in a small clearing north of the G.T.P. depot, and is about 20 feet east of the prolongation of the line northward of the east side of the depot. The point is about 8 feet south of a line cut through the woods, this being apparently a preliminary survey line of the G.T.P., and is 300 feet from the northeast corner of the north wing of the depot. A stake 2 inches in diameter and projecting 3 inches above the surface marks the point. The north gable of north wing of the depot bears  $186^{\circ} 55' .2$ .

*Norquay, Man., 1910.*—The station is in an open field belonging to Mr. Black. It is 360 feet south of the south limit of the C.P.R. right-of-way, and 140 feet east of the west limit of the government road allowance. A squatter's house is about 100 feet north-westerly from the station. The following true bearings were determined: east gable of section-house,  $333^{\circ} 34' .0$ ; west gable of C.P.R. depot,  $4^{\circ} 01' .6$ .

*North Bay, A, Ont., 1907.*—Station A is on waste ground at east extension of Sherbrooke street. It is 537 feet east of the east side of First avenue and in line with the north side of Sherbrooke street. The spire of the English church (on Sherbrooke street) bears  $235^{\circ} 50' .4$ .

*North Bay, B, Ont., 1920.*—As station A was no longer available in 1913, a new station, B, was selected and reoccupied in 1920. It is about three-quarters of a mile northeasterly from the C.P.R. depot in Wallace park, which is used as an athletic field. It is near the northeast corner of the field, being 36.5 feet from the fence on the east side and 49 feet south of the fence on the north side of the field. The point is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: spire on tower of English church,  $214^{\circ} 45' .7$ ; spire on tower of public school,  $232^{\circ} 21' .9$ ; bottom of flagstaff on tower of town hall,  $237^{\circ} 44' .5$ ; bottom of flagstaff on tower of Normal school,  $249^{\circ} 44' .2$ ; cross on tower of Catholic church,  $271^{\circ} 16' .4$ .

*North Bend, A, B.C., 1920.*—Station A is a relocation of the station of 1908. It is in an L-shaped field, now under cultivation, belonging to Mr. Phinister; the greater part of the field lies adjacent to the south side of a lane passing north of the post office which is in Richardson's store. It is about 1,000 feet west of the C.P.R. tracks, is 53.7 feet southwest of the post which is at the bend of the lane and 46 feet south of the produced line of the south side of the lane. The following true bearings were determined: pole on C.P.R. water-tank,  $25^{\circ} 46' .3$ ; pole on south end of Mountain hotel,  $46^{\circ} 26' .8$ ; pole on west end of C.P.R. hotel,  $58^{\circ} 18' .8$ ; cross on Catholic church,  $88^{\circ} 19' .6$ .

*North Bend, B, B.C., 1920.*—Station B was selected on account of A being rather unsuitably located, about 1,700 feet east of station A. It is on C.P.R. property about 700 feet east of the railway tracks and not far from the top of the slope along the Fraser

river. It is 132 feet northwest of a post which is at the easterly extremity of a V-shaped enclosure owned by Mr. Phinister and which is between the C.P.R. property on the north and the Indian reserve on the south; it is 118 feet north of the fence along the south side of the field. The observations were taken over a copper nail in the top of a stake 2 inches in diameter and projecting 3 inches above the surface. The following true bearings were determined: cross on church on Indian reserve,  $215^{\circ} 59' \cdot 9$ ; east gable of Richardson's store,  $274^{\circ} 20' \cdot 0$ ; flagstaff seen over north chimney of house,  $279^{\circ} 25' \cdot 3$ ; east gable of main part of Catholic church,  $283^{\circ} 22' \cdot 2$ ; pole on C.P.R. water-tank,  $323^{\circ} 35' \cdot 2$ .

*Norton, N.B., 1912.*—The station is about 500 feet southerly from the Catholic church. It is on a strip of land lying between the cemetery and the baseball field; it is 75 feet easterly from the fence on the westerly side of the field, 90.5 feet north of the fence along the north side of the cemetery and 135 feet from the southwesterly corner of the field. The point is marked by a stake 2 inches in diameter driven flush with the ground. The following true bearings were determined: spire of Presbyterian church,  $340^{\circ} 09' \cdot 4$ ; spire of Baptist church,  $345^{\circ} 41' \cdot 8$ ; tip of cross on tower of Catholic church,  $355^{\circ} 45' \cdot 3$ ; tip of cross on front of Catholic church,  $356^{\circ} 41' \cdot 3$ .

*Oak Point, Man., 1919.*—The station is an approximate relocation of the C.I. station of 1908 and an exact relocation of the 1916 station. It is in a meadow between the village and the lake shore, 61.5 feet southeasterly from the southwest corner of wire fence around Mr. A. Pritchard's yard, and 75 feet southwesterly from the southeast corner. The point is marked by a stake 2 by 2 inches set flush with the ground. The following true bearings were determined: south gable of stable east of Mr. Pritchard's yard,  $57^{\circ} 21' \cdot 6$ ; gable of small house near lake shore,  $290^{\circ} 06' \cdot 2$ ; chimney on house near lake shore,  $310^{\circ} 05' \cdot 4$ .

*Oba, Ont., 1916.*—The station is about one-quarter of a mile northwest of the C.N.R. depot, on a clearing west of the railway tracks. It is 265 feet north of the north side extended of the C.N.R. section-house, and 377 feet west of the main line of the C.N.R. A stake  $1\frac{1}{2}$  by  $1\frac{1}{2}$  inches and projecting 6 inches above the surface marks the point. The following true bearings were determined: southeast corner, near roof, of C.N.R. section-house,  $112^{\circ} 26' \cdot 7$ ; top of pole on A.C.R. water-tank,  $138^{\circ} 14' \cdot 8$ ; top of pipe on A.C.R. water-tank,  $138^{\circ} 23' \cdot 2$ ; short pole on corner of C.N.R. depot,  $142^{\circ} 25' \cdot 7$ .

*O'Brien, Que., 1918.*—The station is a relocation of the D.O. station of 1914. It is about 1,300 feet north of the C.G.R. tracks on the shore of Robertson lake. It is 14 feet southerly and 10 feet easterly from the stake marking the northeasterly corner of the most northerly lot on the west side of Fourth street. It is about 15 feet from the shore line on the north and about 15 feet from the shore line on the east and is marked by a stake 2 by 3 inches and projecting 2 inches above the surface. The following true bearings were determined: cross on tower of Catholic church,  $140^{\circ} 11' \cdot 7$ ; short pole on south end of C.G.R. depot,  $222^{\circ} 24' \cdot 3$ ; short pole on north end of C.G.R. depot,  $225^{\circ} 48' \cdot 9$ ; south gable of upper part of coal-chute,  $236^{\circ} 31' \cdot 6$ .

*Ocean Falls, B.C., 1919.*—The station is northeast of the wharf and north of the town near the foot of the mountain. It is 174 feet north of the north side of the plank drive on Fifth street and 26 feet west of the west line produced of the plank drive on A street. The point is marked by the intersection of two grooves in the top of a brick

set flush with the ground. The following true bearings were determined: ornament on west end of school,  $106^{\circ} 10' \cdot 5$ ; short pipe on north side, near east end, of opera house,  $117^{\circ} 48' \cdot 2$ ; tip of tower of fire-hall,  $153^{\circ} 46' \cdot 8$ ; north gable of west wing of hotel,  $161^{\circ} 26' \cdot 8$ .

*Okanagan Landing, B.C., 1919.*—The station of 1915 was reoccupied. It is on vacant property south of the C.P.R. tracks and almost in line with the east side of the stock pens in the railway yard. It is 600 feet south of the south side of the government road, which is parallel to the C.P.R. right-of-way and south of it, 100 feet west and 252 feet north of the southwest corner of a small field enclosed by a wire fence and belonging to Mrs. Finlayson. The short pole on south gable of the Strand hotel is seen almost over the centre of chimney on Mrs. Finlayson's house. The point is marked by the intersection of two grooves in the top of a stake 4 by 4 inches set flush with the ground. The following true bearings were determined: flagstaff on front of red frame building on north side of C.P.R. tracks,  $323^{\circ} 08' \cdot 5$ ; short pole on south gable of Strand hotel,  $359^{\circ} 36' \cdot 6$ ; short pole over window on east side of Strand hotel,  $0^{\circ} 58' \cdot 9$ ; south gable of house on hillside on north side of lake,  $8^{\circ} 25' \cdot 4$ .

*Olds, Alta, 1911.*—The station is near the northeast corner of NW.  $\frac{1}{4}$  sec. 32, tp. 32, rge. 1, W. 5th mer. It is in an open field between Third and Fourth streets, is about 700 feet west of Second avenue, 120 feet south of Third street and 140 feet north of Fourth street. A stake 2 inches in diameter and projecting 3 inches above the surface marks the point. The following true bearings were determined: pole on tower of school,  $73^{\circ} 48' \cdot 0$ ; pole on tower of fire-hall,  $96^{\circ} 19' \cdot 1$ ; pole on ventilator of Pacific livery stable,  $118^{\circ} 15' \cdot 0$ .

*Ombabika, Ont., 1914.*—The station is near the summit of the hill to the southeast of the N.T.R. bridge over the Ombabika river. It is determined by measuring 235 feet easterly along the railway tracks from the easterly edge of the cement abutment at the easterly end of the bridge, thence turning to the left from this direction, the angle  $104^{\circ} 43' \cdot 3$  and measuring a distance of 685 feet. The point is marked by a stake 3 inches in diameter and projecting 6 inches above the surface. A temporary mark was used.

*Orangeville, Ont., 1910.*—The station is situated in the third field east from the C.P.R. tracks and fronting on the south side of Chisholm street. Mr. Augustine, who owns the field, lives just east of it. The transit was placed 181 feet from the southerly limit of Chisholm street and 64.5 feet from the westerly boundary of the said field. The magnetometer was placed 10.8 feet behind the transit and in line with transit and spire of church in Orangeville. The following true bearings were determined from the transit station: top of windmill on hill,  $60^{\circ} 46' \cdot 8$ ; west side of chimney on cement mills,  $215^{\circ} 29' \cdot 3$ ; spire on church in Orangeville,  $310^{\circ} 50' \cdot 1$ .

*Orient Bay, Ont., 1916.*—The station is about one-quarter of a mile southwesterly from the C.N.R. section-house. It is on a small clearing on the bank of the Nipigon river, 625 feet westerly from the C.N.R. main line, measured along the river bank, and 6 feet from the edge of the bank. A stake 2 inches in diameter and projecting 3 inches above the surface marks the point. The following true bearings were determined: mile-board post south of the C.N.R. depot,  $163^{\circ} 19' \cdot 1$ ; north gable of Hudson's Bay Co.'s warehouse about two miles distant,  $171^{\circ} 36' \cdot 1$ .

*Orillia, Ont., 1910.*—The station is situated in a large marshy field at the end of the first street south of Watson's brickyards, which street runs westerly from the street crossing the G.T.R. tracks west of the station. The clay pits of the brickyard are in this field. The transit was placed 89.5 feet from the westerly boundary of the last lot facing on the first street mentioned above, and 104 feet from the intersection of this lot line with southerly street line and was also 69 feet from the end of the southerly street fence. A small sand pit is about 150 feet to the southwest. The magnetometer was placed 14.2 feet behind the transit and in line with transit and spire on English church. The following true bearings were determined from the transit station: easterly tower on Orillia asylum,  $202^{\circ} 22' .5$ ; southerly tower on town hall,  $304^{\circ} 01' .7$ ; spire on English church,  $320^{\circ} 41' .5$ .

*Oskelaneo, Que., 1914.*—The station is on a point of land on the east side of Oskelaneo lake, about 800 feet south of the N.T.R. tracks. It is northwest of a group of buildings known as Midlige camp. The station is 72 feet from the northwesterly corner of a log house and 66 feet from the northwesterly corner of a building formerly used as a store, being 24 feet northerly from the north line of the former and 40 feet northerly from the north line of the latter. It is about 30 feet from the water's edge, and is marked by a stake 3 inches in diameter and projecting 3 inches above the surface. The following true bearings were determined: south gable of Midlige & Edwardson's store,  $313^{\circ} 53' .3$ ; southeast corner of abutment at west end of bridge over Oskelaneo river,  $327^{\circ} 53' .5$ ; southwest corner of abutment at east end of bridge over Oskelaneo river,  $334^{\circ} 05' .5$ .

*Ottawa, Ont., 1908-1920.*—Observations were taken in the magnetic hut which is in the Observatory grounds.

*Oxford Junction, N.S., 1912.*—The station is on an uncultivated piece of land lying north of the Presbyterian church, being about one-quarter of a mile northwest of the railway depot. It is in line with the west side of the Presbyterian church and is 109 feet north of the northwest corner. The following true bearings were determined: west gable of Mr. Fillmore's house,  $138^{\circ} 10' .8$ ; north gable of railway pump house,  $236^{\circ} 00' .9$ ; cross on English church,  $290^{\circ} 52' .9$ .

*Owen Sound, Ont., 1920.*—The station is practically a relocation of the station of 1910. It is situated in the agricultural grounds on the top of a hill in the eastern section of the town. The transit was placed 201 feet from the northeast corner of the north wing, 233.8 feet from the southeast corner of the south wing of the main building and 99 feet from the northwest corner of the grand-stand. The magnetometer was placed 14.8 feet behind the transit and in line with transit and the spire of the Roman Catholic church. The following true bearings were determined from the transit station: spire on Roman Catholic church,  $12^{\circ} 25' .8$ ; flagpole on Strathcona school,  $278^{\circ} 45' .1$ ; north gable of red brick house,  $99^{\circ} 51' .8$ .

*Pacific, B.C., 1919.*—The station of 1915 was reoccupied. It is on a clearing between the G.T.P. yards and the Skeena river. It is 135 feet southerly from the southerly side of the G.T.P. pump-house and 13 feet westerly from the edge of the bank along the river. The point is marked by a stake 1 by 3 inches and projecting 3 inches above the ground. The following true bearings were determined: top of white post on G.T.P. right-of-way



on south side of rock cut about one-half mile west,  $193^{\circ} 27' \cdot 9$ ; pole on centre of G.T.P. water-tank in railway yard,  $331^{\circ} 05' \cdot 9$ ; chimney on centre of pump-house,  $59^{\circ} 37' \cdot 9$ .

*Pangis, Ont., 1916.*—The station is about 600 feet east of the A.C.R. tracks, near the foot of the hill on the east side of a creek, and about 400 feet southeast of the Lake Superior Co.'s camp office. It is 290 feet south of the south side of a bridge over the creek, and 129 feet east of the east side of the creek. A copper nail in the top of a stake 3 inches in diameter set flush with the ground marks the point. The chimney on the camp cook-house bears  $286^{\circ} 41' \cdot 6$ .

*Papineauville, Que., 1912.*—The station is in the southwesterly part of the town, on the west side of Washington street, being about 800 feet south of the C.P.R. tracks and near the edge of the bay. It is on Mr. Gravell's property, and is 41 feet west of the fence which is along the rear of the lot on which his dwelling-house stands, and is in line with the fence on the east side of the lot. A stake 2 by 2 inches and projecting 2 inches above the surface marks the point. The following true bearings were determined: pole on C.P.R. depot,  $38^{\circ} 39' \cdot 5$ ; south gable of Mr. Gravell's house,  $57^{\circ} 14' \cdot 6$ ; southwest edge of chimney on south end of most easterly house on south side of Washington street,  $107^{\circ} 54' \cdot 7$ .

*Parent, Que., 1918.*—The station is a relocation of the station of 1914. It is southwest of the town near the river, about 500 feet south of the N.T.R. tracks and about 1,575 feet west of the roundhouse; it is 15 feet west of the east side of a street clearing, 235 feet south of the south side of the first street south of the railway tracks and 110 feet northeasterly from the edge of the river. The middle of the standpipe and the northwest corner of the roundhouse are seen in line from the station, and the flagstaff on the Hudson's Bay Co.'s store is seen over the railway company's ice-house. The point is marked by a stake 3 inches in diameter set flush with the ground. The following true bearings were determined: cross on south gable of church,  $70^{\circ} 48' \cdot 1$ ; bottom of flagstaff on Hudson's Bay Co.'s store,  $76^{\circ} 18' \cdot 1$ ; tip of railway water-tank,  $94^{\circ} 23' \cdot 4$ .

*Parry Sound, Ont., 1920.*—The station of 1916 was reoccupied. It is on the north side of the town near the northwest corner of the agricultural and athletic grounds; 77 feet east of the fence along the west side of the grounds and 83 feet south of the fence along the north side. The point is marked by a stake 2 inches in diameter and projecting 2 inches above the surface. The following true bearings were determined: northwest corner of exhibit building,  $87^{\circ} 39' \cdot 6$ ; bottom of pole on centre of exhibit building,  $91^{\circ} 37' \cdot 7$ ; bottom of pole on southwest corner of exhibit building,  $95^{\circ} 18' \cdot 7$ .

*Pas (The), Man., 1919.*—The C.I. station of 1908 was reoccupied. It is in the yard of the mission residence, on an island about one-eighth of a mile down the Saskatchewan river from the Church of England and 100 feet from the mainland. The observations were taken over a cross filed in the gnomon of the sundial of Sir John Franklin. The sundial is mounted on a piece of oak fixed to the top of a post 9 inches in diameter and projecting 2 feet 4 inches above ground. The following true bearings were determined: pole on tower of hospital,  $113^{\circ} 51' \cdot 6$ ; pole in grounds around Indian office,  $181^{\circ} 13' \cdot 8$ ; tip of roof of round cement structure near power-plant,  $201^{\circ} 14' \cdot 9$ .

*Paulson, B.C., 1915.*—The station is on a partially cleared space on the east side of the C.P.R. tracks, and about 1,000 feet southeast of Paulson's store and hotel. It

is 510 feet southeasterly, measured along a trail, from a point in the middle of the C.P.R. tracks which is 660 feet southerly from the south side of the hotel and store building. It is 55 feet east and 30 feet north of the northeast corner of a log cabin, about 90 feet north of a small creek and about 300 feet east of the railway tracks. A stake 3 inches in diameter driven flush with the ground marks the point. The southeast corner of Paulson's store bears  $330^{\circ} 25' 0''$ .

*Paynton, Sask., 1911.*—The station is about midway between the north and south sides of NE.  $\frac{1}{4}$  sec. 35, tp. 46, rge. 21, W. 3rd mer. It is west of the town, being almost in line with the north side of First avenue produced and about 600 feet west of the west side of Main street. A stake 2 inches in diameter driven flush with the ground marks the point. The following true bearings were determined: pole on English church,  $89^{\circ} 38' 5''$ ; tip of spire on Presbyterian church,  $109^{\circ} 25' 9''$ ; tip of pole on middle of C.N.R. depot,  $133^{\circ} 13' 1''$ ; north gable of British America Elevator Co.'s elevator,  $140^{\circ} 55' 9''$ .

*Peachland, B.C., 1915.*—The station is at the extreme east end of the town in an open field used as a baseball and recreation grounds. It is 83 feet east and 67 feet north of a tree, which is at the south side of the gate at the entrance to the grounds and to which are attached the ends of the wires of the fence along the south side of the field. The point is marked by a stake 1 by 1 inch driven flush with the ground. The following true bearings were determined: south gable of Mr. Michael's house,  $216^{\circ} 03' 7''$ ; south gable of Mr. Keating's house,  $226^{\circ} 20' 9''$ .

*Pembroke, Ont., 1913.*—The station, which is an approximate relocation of the D.O. station of 1907, is in the southeastern part of the town in an open field belonging to Mr. Peter White, Jr. It is 6 feet north of the south line of Dickson street extended in an easterly direction, 230 feet east of the west side of the field and 460 feet east of the east side of Commercial street. The point is marked by a stake 2 inches in diameter driven flush with the ground. The following true bearings were determined: cross on centre of Catholic hospital,  $193^{\circ} 07' 8''$ ; spire on tower of Presbyterian church,  $288^{\circ} 53' 6''$ .

*Penetanguishene, Ont., 1920.*—This station is in the vicinity of the D.O. station of 1910, and is situated in a field belonging to Mr. Desrocher, whose house and lot are on the fourth parallel street east from the G.T.R. depot. The field is immediately behind Mrs. Gallacher's lot, which faces on Brock street, the first street from the depot running eastward off Main street. The station is 195.8 feet from the fence on the west side of the lot, 139.1 feet from the northwest corner of Gallacher's barn, and 106.4 feet from the northeast corner post of Desrocher's lot. The magnetometer was placed 15.5 feet behind the transit and in line with transit and cross on Roman Catholic church. The following true bearings were determined from the transit station: cross on Roman Catholic church,  $210^{\circ} 29' 0''$ ; northeast gable of red brick house across the bay,  $257^{\circ} 28' 4''$ ; east gable of white frame house across the bay,  $290^{\circ} 15' 3''$ .

*Pense, Sask., 1919.*—The station of 1910 was reoccupied. It is in an open field south of the C.P.R. tracks in line with the east side of the main part of elevator No. 78, 477 feet south of south side of shed adjoining elevator and 418 feet south of fence along south side of C.P.R. yards. The west chimney of the C.P.R. depot appears slightly to the right of the elevator and the spire of the English church appears midway between the chimney and the north end of "Hardware" store. The following true bearings were

determined: southwest corner of Springrice's elevator,  $325^{\circ} 46' \cdot 7$ ; spire of English church,  $338^{\circ} 04' \cdot 1$ ; south gable of elevator No. 78,  $348^{\circ} 49' \cdot 9$ ; flagstaff on bell-tower of school,  $355^{\circ} 59' \cdot 7$ ; south gable of Winnipeg Elevator Co.'s elevator,  $11^{\circ} 01' \cdot 7$ .

*Pentecôte river, Que., 1909.*—The station is about 12 feet east of the bank of the Pentecôte river, in a small field owned by Mr. Louis Gauthier. The field is opposite and west of the fifth house, which is in a southerly direction from the telegraph office. A narrow strip of land on the west side of the field is covered with a growth of small spruce trees, and the station is on the northeasterly side of a small clearing in this strip. The magnetic observations were made 18 feet in a southerly direction from the station, which is marked by a stake 4 by 4 inches driven so as to project 1 foot above the surface, and in line with the spire of the church. The following true bearings were determined from the transit station: south gable of last house southwest of village,  $354^{\circ} 26' \cdot 4$ ; iron chimney on mill,  $19^{\circ} 24' \cdot 5$ ; spire on church,  $33^{\circ} 04' \cdot 4$ .

*Penticton, B.C., 1919.*—The station is about one-half mile southwest from the C.P.R. depot in a triangular-shaped enclosure, which is just inside the entrance to the agricultural and recreation grounds. It is east of and in line with the south side of the grand-stand, being 136.5 feet east of the southeast corner of the same, 66 feet from the wire fence along the northeasterly side of the enclosure, 117.5 feet from the fence along the south side and 264 feet northwesterly from the main gate at the entrance to the grounds. The point is marked by a stake 1 by 1 inch driven flush with the ground. The following true bearings were determined: flagstaff on west end of saw-mill,  $185^{\circ} 59' \cdot 0$ ; bottom of "Railway Crossing" sign post,  $272^{\circ} 44' \cdot 5$ ; spire of Methodist church,  $86^{\circ} 50' \cdot 3$ .

*Peterborough, Ont., 1910.*—The station is on a plot of ground in rear of a lot owned by Dr. Rogers, a veterinary surgeon. Dr. Rogers's lot is on the south side of Charlotte street, about one mile west of the G.T.R. tracks. The lot on which the station is placed faces on a private lane running south from Charlotte street. The transit was 123 feet west from the west side of this lane and 52 feet north of the line fence bounding this lot on the south. It was also 91 feet and 91.5 feet, respectively, from the southwest and southeast corners of Dr. Rogers's carriage shed. The magnetometer was placed 11.2 feet behind the transit and in line with transit and top of belfry on top of city hall. The following true bearings were determined from the transit station: pole on stone tower,  $65^{\circ} 34' \cdot 7$ ; top of belfry on city hall,  $74^{\circ} 59' \cdot 7$ ; top of Rogers's house,  $326^{\circ} 13' \cdot 0$ .

*Petitcodiac, N.B., 1912.*—The station is about one-quarter of a mile northeast of the I.C.R. depot. It is in an open field belonging to Mr. Jacob Jones, and is about 500 feet north of the railway running to Hargrave. It is in line with the easterly side of the Baptist cemetery, is 190 feet northerly from the northeasterly corner, and 15 feet from the edge of the bank on the easterly side of the Petitcodiac river. The following true bearings were determined: southeast spire of tower on Methodist church,  $154^{\circ} 23' \cdot 4$ ; flagstaff on school,  $165^{\circ} 40' \cdot 7$ ; southeast spire of tower of Baptist church,  $188^{\circ} 16' \cdot 4$ ; spire of old Baptist church,  $196^{\circ} 12' \cdot 8$ .

*Petry, Ont., 1916.*—The station is on partially cleared land south of the C.G.R. tracks. It is 304 feet east of the semaphore at the west end of the siding and 469 feet south of the middle of the main line of the railway. The point is marked by a stake 2 by 2 inches and projecting 3 inches above the surface. The following true bearings were



determined: east gable of small car-house,  $7^{\circ} 31' \cdot 3$ ; northwest corner of roof of C.G.R. depot,  $46^{\circ} 59' \cdot 6$ ; southeast corner of roof of C.G.R. depot,  $53^{\circ} 32' \cdot 1$ .

*Piashti Bay, Que., 1909.*—The station is on the northeastern side of the bay, being 16 feet west of a rocky cliff 10 feet high, which runs for some distance in a northerly and southerly direction. It is about 125 feet north of the high-water mark and 150 feet east of the high-water mark. The church may be seen to the east of a small log house, the southeast corner of which is 74 feet in a northwesterly direction from the station. The station is marked by a stake 3 inches in diameter and 2 feet high, held in position by a mound of stones. The following true bearings were determined: pole on point on western side of entrance to bay,  $210^{\circ} 49' \cdot 9$ ; east chimney of red house on rocky peninsula east of river,  $301^{\circ} 03' \cdot 8$ ; east gable of telegraph office,  $334^{\circ} 58' \cdot 6$ ; chimney on church,  $358^{\circ} 55' \cdot 8$ .

*Pickering, Ont., 1910.*—The station is situated in the second field north of the G.T.R. tracks, and on the west side of the road leading to the grist-mill. This field is used as a pasture, but the southeast corner of the field is fenced off and cultivated. The cemetery is just across the road from the cultivated portion. The transit was placed 128 feet from the westerly side of above-mentioned road and 34 feet from the northerly boundary of cultivated portion. It is also 130 feet in a southerly direction from a large elm tree. The magnetometer was placed 11.4 feet behind the transit and in line with transit and cross on Roman Catholic church. The following true bearings were determined from the transit station: ornament on town hall tower,  $22^{\circ} 23' \cdot 1$ ; cross on Roman Catholic church,  $39^{\circ} 21' \cdot 8$ ; flagpole on grist-mill,  $346^{\circ} 29' \cdot 3$ .

*Pictou, N.S., 1907.*—The station is located on the C.A.E. tennis court grounds which are on top of the somewhat rapid slope to the bay. It is 36 feet south of the south side of Louisa street and 85.6 feet west of the west side of Palmerston street. The spire of St. Andrew's church bears  $180^{\circ} 01' \cdot 6$ .

*Pigou, Que., 1909.*—The station is at the extreme eastern end of a cleared piece of land adjacent to the beach, and is about 1,000 feet east of Mr. Peter Wright's house. To the south and east there is a mass of granite rock which extends along the shore. The point is marked by a stake 3 by 3 inches and projecting 8 inches above the surface. The east gable of Mr. Peter Wright's house bears  $289^{\circ} 50' \cdot 3$ .

*Pincher, Alta., 1915.*—The station is about 600 feet northeast of the C.P.R. depot, and about 600 feet north and 607 feet east of the pier marking the D.O. astronomical station. It is 322 feet east of the fence along the east side of a garden which was formerly a lumber yard, at the rear of the Alexandra hotel, and 70 feet south of the south side of the street passing the north side of the hotel. The point is marked by a stake 1 by 1 inch and projecting 1 inch above the surface. The following true bearings were determined: chimney on frame house about two miles distant,  $125^{\circ} 05' \cdot 7$ ; spire of Catholic church in Pincher Creek,  $185^{\circ} 08' \cdot 7$ ; east gable of public school in Pincher,  $307^{\circ} 49' \cdot 7$ ; north gable of Pacific Alberta Co.'s elevator,  $269^{\circ} 49' \cdot 7$ .

*Pocahontas, Alta., 1913.*—The station is on an open piece of ground south of the G.T.P. tracks and north of the Mining Co.'s buildings, in line with the east side and 266 feet north of the northeast corner of the Co.'s store. A stake 2 by 4 inches and projecting 2 inches above the surface marks the point. The following true bearings



were determined: southeast corner of chimney on middle of G.T.P. depot,  $334^{\circ} 29' \cdot 4$ ; top of metal pipe on chimney of cottage,  $55^{\circ} 48' \cdot 4$ ; northwest corner of Mining Co.'s store,  $157^{\circ} 36' \cdot 3$ .

*Pont Rouge, Que., 1912.*—The station is near the westerly edge of a cleared space in an open field belonging to Mr. Kaich. It is about one-quarter of a mile southwesterly from the C.P.R. depot and approximately 610 feet southerly from the C.P.R. right-of-way; it is 310 feet southerly from the southwesterly corner of a small field, which is adjacent to the south side of the railway right-of-way and the westerly end of the yards, and 272 feet westerly from the fence along the easterly side of the large field in which the station is located. The point is marked by a stake 2 by 2 inches set flush with the ground. The following true bearings were determined: pole on west end of C.P.R. depot,  $36^{\circ} 33' \cdot 7$ ; spire of Catholic church,  $71^{\circ} 26' \cdot 5$ ; tip of C.P.R. water-tank,  $76^{\circ} 49' \cdot 7$ .

*Portage la Prairie, Man., 1911.*—The station is a relocation of the D.O. station of 1910. It is in the grounds of the agricultural association, near the east end of the enclosure which is inside the race-track. It is 132 feet west of the easterly extremity of the fence, 190 feet north of the fence on the south side and 200 feet south of the fence on the north side of the enclosure. The point is marked by a stake 2 by 2 inches and driven flush with the ground. The following true bearings were determined: bottom of pole on judge's stand near barns,  $282^{\circ} 15' \cdot 2$ ; tip of pole on small circular stand in front of grand-stand,  $296^{\circ} 27' \cdot 1$ ; west pole of grand-stand,  $296^{\circ} 28' \cdot 1$ ; east pole on grand-stand,  $305^{\circ} 57' \cdot 1$ ; bottom of pole on pavilion,  $313^{\circ} 27' \cdot 6$ .

*Port Burwell, Ont., 1910.*—The station is situated in a field on the north side of Pitt street and adjoining the English church on the east side. A creek runs across the easterly part of the field. The station was 49 feet from the westerly boundary fence and 135 feet from the northerly limit of Pitt street. The following true bearings were determined: southeast corner of Baptist church tower,  $54^{\circ} 23' \cdot 2$ ; tower on English church,  $253^{\circ} 48' \cdot 3$ ; belfry on school-house,  $349^{\circ} 28' \cdot 6$ .

*Port Colborne, Ont., 1910.*—The station is situated in a field on the south side of the G.T.R. tracks. The field is on the east side of the fourth street from the station running in a southerly direction. The station was about 1,000 feet from the tracks. The transit was placed 52 feet from the easterly limit of the street and 37 feet from the northerly limit of the third street south of the tracks. It was also 355 feet from the southerly limit of the second street south of the tracks. An oil well is situated in the next block to the west. The following true bearings were determined: round iron smokestack,  $208^{\circ} 51' \cdot 8$ ; top of lighthouse tower,  $223^{\circ} 00' \cdot 0$ ; storm-signal post,  $268^{\circ} 42' \cdot 3$ .

*Port Lambton, Ont., 1910.*—The station is situated in rear of a large cultivated field east of the Pere Marquette railway. This field is owned by Mr. McDonald and adjoins, on the south side, his large pasture field. The field is also about 1,000 feet north of the road leading east from the railway depot. The transit was placed 87.5 feet from the easterly boundary fence and 72.5 feet from the southerly boundary fence. The magnetometer was 10 feet behind the transit and in line with transit and flagpole on the "Ohio" cottage. The following true bearings were determined from the transit station: south end of only barn to be seen in this direction,  $35^{\circ} 47' \cdot 0$ ; north end of red barn,  $228^{\circ} 11' \cdot 3$ ; flagpole on the "Ohio" cottage,  $311^{\circ} 51' \cdot 1$ .

*Portneuf, Que., 1909.*—The station is on the western side of the harbour, and about 740 feet south of the government wharf. It is in a small enclosure, being 10 feet west from the fence on the east side and about 20 feet east of the foot of a steep bank. The point is marked by a stake 2 by 3 inches and projecting 3 inches above the surface. The following true bearings were determined from the transit station: top of lighthouse on east side of harbour,  $115^{\circ} 20' 8''$ ; smokestack on mill near wharf,  $41^{\circ} 18' 6''$ ; smokestack on mill in northern part of town,  $14^{\circ} 44' 6''$ .

*Port Rowan, Ont., 1910.*—The station is situated in the southerly part of the field south of the brick-yards at the G.T.R. tracks. The transit was placed 234 feet from the east side of street bordering this field on the west, and 17 feet north from the north street line produced, of the street which runs westward from the Free Methodist church. The magnetometer was placed 11.3 feet behind the transit and in line with transit and windmill on barn. The following true bearings were determined from the transit station: tower on Free Methodist church,  $228^{\circ} 01' 9''$ ; windmill on barn,  $311^{\circ} 10' 2''$ .

*Port Stanley, Ont., 1910.*—The station is situated in a small pasture field on the road leading westerly from the town about one-half mile, which field belongs to Mr. Mitchell. This field is between Fraser Heights and the road and is the second field west of the second road leading up to Fraser Heights. There is a line of apple trees along boundary fence at road. The transit was placed 121.5 feet from the westerly boundary fence and 103 feet from the southerly limit of the road. The magnetometer was placed 8.4 feet behind the transit and in line with transit and small church spire. The following true bearings were determined from the transit station: small church spire, pyramid in form,  $55^{\circ} 52' 7''$ ; flagpole on hotel on Fraser Heights,  $132^{\circ} 41' 7''$ ; south gable of red brick house,  $354^{\circ} 33' 6''$ .

*Prairie River, Sask., 1911.*—The station is on the property of Shaw Bros., east of the saw-mill buildings and about 400 feet north of the C.N.R. tracks. It is in line with the south side of the bunk-house and 410 feet east of the southeast corner. A stake 2 by 4 inches and projecting 3 inches above the surface marks the point. The following true bearings were determined: east gable of saw-mill,  $255^{\circ} 58' 8''$ ; east gable of cook-house,  $266^{\circ} 41' 5''$ ; east gable of bunk-house,  $274^{\circ} 19' 7''$ ; east gable of round-house,  $309^{\circ} 37' 9''$ .

*Prince Albert, Sask., 1919.*—The station of 1911 was reoccupied. It is near the west side of the R.N.W.M.P. grounds and north of two small fields near the southwest corner of the property.

It is 117 feet east of the fence on the west side of the grounds, 73 feet north of the north side of a small field, 107 feet southwest from the southwest corner of stores building, and about 172 feet west from the northwest corner of a shed adjoining one of the barns. The observations were taken over the intersection of two grooves in the top of a cement block 2 by 4 inches set flush with the ground. The top of the standpipe in South Prince Albert bears  $88^{\circ} 24' 9''$ .

*Prince Rupert, B.C., 1919.*—The station is a relocation of the station of 1915. It is about one-half mile south of the wharf, near the agricultural hall and the athletic field. It is 120 feet southerly from the southeasterly corner of the reservoir, 77 feet southerly and 350 feet westerly from the southwesterly corner of the agricultural hall, and 56 feet

northerly and 127 feet westerly from the northeasterly corner of the athletic field. The point is marked by a copper nail in the top of a stake 1 by 3 inches and projecting 2 inches above the surface. The following true bearings were determined: pole on north tower of agricultural hall,  $25^{\circ} 26' \cdot 0$ ; pole on south tower of agricultural hall,  $30^{\circ} 25' \cdot 8$ ; top of cement chimney near dry dock,  $37^{\circ} 00' \cdot 8$ ; pole on tower on centre of school,  $47^{\circ} 50' \cdot 6$ .

*Proctor, B.C., 1919.*—The station is a relocation of the station of 1915. It is about 750 feet south of the steamer landing. It is 265 feet south of the south side of the first street south of the C.P.R. right-of-way and 66 feet east of the east side of the first street east of the C.P.R. depot; it is 30 feet south and 40 feet east of the southeast corner of the cement pier marking the D.O. astronomical station and is marked by a copper nail in the top of a stake 3 inches in diameter driven flush with the ground. The following true bearings were determined: flagstaff on tower of Balfour hotel,  $322^{\circ} 19' \cdot 4$ ; pole on C.P.R. water-tank,  $306^{\circ} 24' \cdot 9$ .

*Pugwash, N.S., 1907.*—The station is in a field belonging to Dr. Clay near the mouth of the Pugwash river and about 15 feet above water level. It is 114.5 feet west of northwest corner of a stable and 167.5 feet northwest of the northeast corner of Dr. Clay's house. The peak of lighthouse roof bears  $334^{\circ} 35' \cdot 0$ .

*Quebec, Que., 1920.*—The station of 1918, which was first occupied in 1906 by the Carnegie Institution, was reoccupied. It is on the Plains of Abraham, west of the jail and in line with the rear wall, inside the main drive and also the cinder course. It is 163 feet northwesterly from the top of a stone which was formerly at the intersection of two fences, and 89 feet from the third lamp post from Wolfe's monument on the westerly side of the drive. A line joining the station with the southwesterly corner of the jail passes 12 feet south of the base of the second lamp post from Wolfe's monument on the east side of the drive. The point is marked by a copper nail in the top of a stake 2 by 2 inches set flush with the ground. The following true bearings were determined: tip of steel tank near the Ross rifle factory,  $59^{\circ} 01' \cdot 4$ ; spire of church south of river,  $141^{\circ} 27' \cdot 9$ ; spire of church south of river,  $190^{\circ} 56' \cdot 0$ ; spire of church north of river,  $207^{\circ} 52' \cdot 6$ .

*Quesnel, B.C., 1908.*—The station is on government property, north of the town. It is about 318 paces from the ferry cable; is 15 feet from the bank of the Fraser river, and 76.7 feet northwest from the corner post of the fence around a small field which is adjacent to the post office property. There are three clumps of spruce trees about 75 feet south, and are so situated that the Catholic church and post office may be seen between the easterly pair, the pole on Reid's store between the westerly pair, and the grist-mill to the right of the westernmost one. The station is marked by a brass tack in a fir post 2 by 4 inches driven so as to project 8 inches above ground. The following true bearings were determined: bottom of cross on church,  $151^{\circ} 49' \cdot 3$ ; gable of wing of post office,  $157^{\circ} 05' \cdot 6$ ; pole on Reid's store,  $165^{\circ} 12' \cdot 6$ ; gable of ventilator on grist-mill,  $177^{\circ} 53' \cdot 1$ .

The magnetic observations were taken 8 feet northwest from the station and in line with pole on Reid's store.

*Quibell, Ont., 1914.*—The station is about 1,000 feet northeast of the C.G.R. depot, in a partially cleared field. It is 345 feet west and 360 feet north of the northeast corner of the railway yards. The point is marked by a stake  $1\frac{1}{2}$  by  $1\frac{1}{2}$  inches and projecting 6 inches above the surface. The following true bearings were determined: short pole on east end of C.G.R. depot,  $236^{\circ} 51' \cdot 1$ ; east gable of blue house north of depot,  $243^{\circ} 30' \cdot 7$ .

*Rainy River, A, Ont., 1914.*—The station is about 900 feet east and about 1,200 feet south of the pier marking the Dominion Observatory astronomical station, and is near the southwest corner of the grounds around the Alexandra school. It is in line with the west side of the school, and is 285 feet south of the southwest corner of the same, 74 feet east of the east side of the street passing in front of the school and 72.5 feet north of the north side of the street along the south side of the grounds. The following true bearings were determined: tip of water-tank near the Rainy River Lumber Co.'s mill,  $106^{\circ} 52' \cdot 3$ ; tip of water-tank in Beaudette,  $258^{\circ} 54' \cdot 5$ ; tip of spire of Catholic church,  $343^{\circ} 39' \cdot 8$ ; flagstaff on tower of separate school,  $16^{\circ} 40' \cdot 5$ .

*Rainy River, B, Ont., 1918.*—The station is almost one-quarter of a mile west of the D.O. station of 1914, which is no longer available for observations. It is approximately a relocation of the C.I. station of 1908. It is 28.5 feet north of the north side of the second street south of the C.N.R. tracks and 121.5 feet west of the west side of the first street west of McQuarrie & Grimshaw's store, or the third street west of the Presbyterian church. The point is marked by a stake 2 by 2 inches set flush with the ground. The following true bearings were determined: pole on centre of C.N.R. water-tank,  $60^{\circ} 55' \cdot 0$ ; tip of tower on Presbyterian church,  $95^{\circ} 49' \cdot 2$ ; pole on tower of school,  $96^{\circ} 18' \cdot 4$ ; pole on McQuarrie & Grimshaw's store,  $99^{\circ} 30' \cdot 1$ .

*Raith, Ont., 1910.*—The station is 150 feet north of the G.T.P. railway. It is in line with the south side of Mr. Johnson's house and 240 feet east of the southeast corner. The point is marked by a stake 2 by 4 inches and projecting 1 inch above the ground. The following true bearings were determined: east gable of C.P.R. section-house,  $305^{\circ} 04' \cdot 0$  top of pole on G.T.P. water-tank,  $295^{\circ} 22' \cdot 9$ ; east gable of C.P.R. depot,  $284^{\circ} 42' \cdot 6$ ; pole on C.P.R. water-tank,  $258^{\circ} 13' \cdot 6$ .

*Red Deer, Alta., 1911.*—The station is near the northeast corner of the agricultural grounds and southeast of the town. It is 120 feet south of the fence on the north side and 62 feet west of the fence on the east side of the grounds. The point is marked by a stake 2 by 2 inches and projecting 2 inches above the ground. The following true bearings were determined: tip of tower of fire-hall,  $318^{\circ} 39' \cdot 0$ ; pole on public school,  $340^{\circ} 36' \cdot 5$ .

*Redditt, Ont., 1918.*—The station is a relocation of the D.O. station of 1914. It is about 1,600 feet north of the C.G.R. depot on townsite property, on a street allowance, being 47.5 feet north and 85.5 feet west of the southwest corner of the intersection of the fourth street north of the railway tracks, which is the first street north of the public school, with the first street west of the school. It is about 50 feet east of the edge of the bank along the east side of a deep ravine, and is marked by a stake 3 inches in diameter and projecting 3 inches above the surface. The following true bearings were determined: gable over window on north side of depot,  $185^{\circ} 54' \cdot 4$ ; short pole on centre of C.G.R.



water-tank,  $196^{\circ} 32' \cdot 4$ ; chimney on house on hill across valley,  $207^{\circ} 43' \cdot 3$ ; northwest corner of house on hill across valley,  $207^{\circ} 56' \cdot 9$ .

*Regina, Sask., 1910.*—The station is about one-quarter of a mile southwesterly from the C.I. station of 1906. It is on the south side of the city in an open field, which is part of the jail property. It is approximately in the centre of Osler street produced, is 51 feet south of the south side of 16th avenue and 300 feet east of the east side of Broad street. The following true bearings were determined: flagpole in yard south of jail,  $224^{\circ} 49' \cdot 2$ ; top of cross on Catholic church,  $328^{\circ} 43' \cdot 5$ ; top of cross on Roumanian church,  $19^{\circ} 03' \cdot 5$ ; northeast corner of Regina General hospital,  $31^{\circ} 00' \cdot 1$ ; southeast corner of hospital,  $35^{\circ} 22' \cdot 5$ .

*Renfrew, Ont., 1920.*—The station is in the vicinity of the D.O. station of 1913 and about 1,400 feet southeast of the C.I. station of 1906. It is near the northeast corner of the agricultural grounds, which are about one-third of a mile southeast of the C.P.R. depot. The wire fence forming the eastern boundary of the grounds is composed of two segments, which meet in an angle of about  $135^{\circ}$ , 100 yards south of the road, one segment running north-northeasterly and the other south-southeasterly. The station is near the intersection of the segments, being 37.3 feet from that running south-southeasterly, 14.6 feet from the north-northeasterly line produced, and 67.2 feet from the intersection. The magnetometer was placed 17.1 feet behind the transit and in line with transit and cross on Roman Catholic church. The station is marked by a stake 2 inches square driven flush with the ground. The following true bearings were determined from the transit station: right edge of water-tank,  $255^{\circ} 28' \cdot 4$ ; bottom of pole south end of armoury,  $286^{\circ} 54' \cdot 5$ ; spire of Presbyterian church,  $294^{\circ} 37' \cdot 3$ ; cross on Roman Catholic church,  $294^{\circ} 55' \cdot 3$ .

*Rennie, Man., 1910.*—The station is on the property of Mr. Shepherd. It is about 300 feet northeast of the C.P.R. depot, being near the southeast corner of the second enclosure east of the C.P.R. tracks. It is 33 feet north of the fence on the south, and 90 feet west of the fence on the east side of the enclosure. A stake 3 inches in diameter and projecting 6 inches above the surface marks the point. The following true bearings were determined: tip of pole on C.P.R. water-tank,  $123^{\circ} 38' \cdot 9$ ; left edge of east chimney on C.P.R. depot,  $232^{\circ} 38' \cdot 1$ .

*Revelstoke, B.C., 1908.*—The station is located on the athletic grounds in the southwestern part of the town. It is about 45 paces east of the bank of the Columbia river. The top of the Catholic church may be seen a little to the left of the line joining the station with the C.P.R. water-tank. The station is marked by a peg  $1\frac{1}{2}$  by 2 inches driven flush with the ground, and is 71.7 feet from the northeast corner of the grandstand and 68 feet from the southeast corner. The magnetic observations were taken at a point 8.2 feet southwest from the station and in line with the transit and water-tank. The following true bearings were determined from the transit station: bottom of pole on west water-tank on mountain side,  $33^{\circ} 28' \cdot 1$ ; bottom of pole on court-house,  $341^{\circ} 06' \cdot 3$ ; top of belfry on school,  $353^{\circ} 56' \cdot 2$ .

*Richan, Ont., 1914.*—The station is on a clearing on the south side of the N.T.R. tracks and about 50 feet west of the edge of Sunday lake. It is situated at the point determined by measuring along the main line of the railway, from the switch at the east

end of the siding, a distance of 545 feet, thence turning to the right, an angle of  $108^{\circ} 42' \cdot 0$ , and measuring along this course a distance of 423 feet. The point is marked by a stake 2 by 2 inches and projecting 3 inches above the surface. The following true bearings were determined: short pole on west end of section-house,  $30^{\circ} 03' \cdot 6$ ; short pole on east end of section-house,  $33^{\circ} 44' \cdot 4$ ; south gable of saw-mill,  $40^{\circ} 00' \cdot 0$ ; pipe on north side of tool-house,  $60^{\circ} 36' \cdot 4$ .

*Richibucto, N.B., 1907.*—The station is located in the post office grounds about 10 feet above sea-level. It is 25 feet south of a fence and 303 feet west of the west side of Water street. The flagpole of the post office bears  $112^{\circ} 56' \cdot 5$ .

*Rimouski, Que., 1920.*—The station is probably within 100 feet of the M.S. station of 1911, on the first point of land east of the Quai de Rimouski and about three miles east of the town of Rimouski. It is on a sodded strip of land across a cultivated field belonging to Mr. Bouillon, being 7 feet north and 380 feet west of a dwelling-house, and 84 feet east of the fence along the rocky shore. The following true bearings were determined: lighthouse on Father Point,  $33^{\circ} 11' \cdot 3$ ; tip of tower of school,  $197^{\circ} 34' \cdot 8$ ; tower of house,  $199^{\circ} 45' \cdot 5$ ; spire of church,  $208^{\circ} 38' \cdot 8$ .

*Riverton, Man., 1919.*—The station of 1916 was reoccupied. It is about one-quarter of a mile southeast of the C.P.R. depot near the southwest corner of the school grounds. It is 32 feet east of the fence along the west side of the grounds, 43.5 feet north of the fence along the south side, and 91.5 feet southwest of the southwest corner of the school building. The point is marked by a copper nail in the top of a stake 4 by 4 inches set flush with the ground. The following true bearings were determined: east gable of C.P.R. depot,  $295^{\circ} 38' \cdot 4$ ; southwest corner of Lutheran church,  $310^{\circ} 47' \cdot 8$ ; spire of church,  $314^{\circ} 48' \cdot 8$ ; northeast corner of church,  $315^{\circ} 00' \cdot 0$ .

*Rivière à Pierre, Que., 1913.*—The station is in an open field belonging to Mr. Pierre Beaupre. The field is on the south side of the river, on the east side of a small creek and west of the C.N.R. tracks. The point is about 390 feet south of the river, about 720 feet westerly from the pier marking the D.O. astronomical station, and is in line with the south fence of the second small field south of the saw-mill property, being 158 feet west of the west side of this field. The point is 25 feet northerly from an old pine stump, which is on the edge of the bank along the creek, and a line through the centre of this stump and the spire of the Catholic church passes almost over the station. A stake 2 by 2 inches driven flush with the ground marks the point. The following true bearings were determined: spire on Catholic church,  $18^{\circ} 36' \cdot 1$ ; west gable of Mr. Martell's house,  $99^{\circ} 49' \cdot 9$ ; pole on centre of C.N.R. depot,  $136^{\circ} 37' \cdot 9$ ; chimney on house across the river,  $210^{\circ} 42' \cdot 6$ .

*Rivière du Loup, A, Que., 1918.*—Station A, which was occupied in 1906 by the Carnegie Institution and in 1912 by the Dominion Observatory, was again reoccupied in 1918. It is on the point near the steamer wharf, probably about 3 or 4 miles west of the B.E. station. It is on the government grounds at a point in line between the government flag pole and the spire of St. Patrick's church in Rivière du Loup about 3 or 4 miles distant. The third wooden post in the fence to the south, counting from the east corner, is also in line. The flagpole is 178 feet distant to the west-northwest; the east wire fence is 36 feet and the south fence is 107 feet distant. The station is marked by a wooden

post about 2 by 3 inches driven flush with the ground. The following true bearings were determined: spire on St. Patrick's church,  $119^{\circ} 43' \cdot 5$ ; spire of St. Ludger church,  $127^{\circ} 39' \cdot 8$ ; spire of St. Francois Xavier church,  $135^{\circ} 35' \cdot 4$ ; top of lighthouse on wharf,  $244^{\circ} 29' \cdot 2$ .

*Rivière du Loup, B, Que., 1920.*—Station B, which was selected for eclipse observations in June, 1918, was reoccupied. It is 429 feet from station A on a line bearing N  $33^{\circ} 23' \cdot 0$  E. It is near the northerly side of a clearing lying between the main road leading to the wharf and the road along the westerly side of the point. It is almost in line with the southerly end of the garage which is south of the cottage "Villa de Sillery"; is 126 feet easterly from the iron fence in front of the cottage and 148 feet from the board fence along the southerly side of the lot in which the station is located. The point is marked by a copper nail in the top of a stake 2 by 2 inches. The following true bearings were determined: centre of pole on building on end of wharf,  $236^{\circ} 50' \cdot 1$ ; pole on westerly end of building on end of wharf,  $257^{\circ} 38' \cdot 7$ ; short pole on northerly end of greenhouse,  $319^{\circ} 51' \cdot 0$ .

*Rivière St. Jean, Que., 1909.*—The station is in a large field on the westerly side of the river and the easterly side of a small bay which becomes dry at low tide. The property belongs to Mr. Sirois and is leased by Mr. Richardson. There is also in the field a dwelling-house, store and store-house. The Catholic church is northeast of the station in an adjacent field. The point is marked by a stake 2 inches in diameter driven flush with the ground, and is 30 feet in a northeasterly direction from another stake, which projects 8 inches above the surface, set 1 foot from the fence, and which is in line with the station and a large cross on the opposite side of the bay. The following true bearings were determined: cross on church,  $71^{\circ} 36' \cdot 9$ ; west gable of telegraph office,  $90^{\circ} 01' \cdot 5$ ; small pole on belfry of fish-house on westerly side of river,  $213^{\circ} 34' \cdot 7$ ; cross on bank on northwesterly side of river and southwesterly side of bay,  $216^{\circ} 46' \cdot 3$ .

*Roberval, Que., 1913.*—Owing to high water in lake St. John, it was impossible to reoccupy the C.I. station of 1906. The new station is about 800 feet south of the former station, in an open field belonging to Mr. Brassard. It is in line with the west side of a barn and 165 feet from the southwest corner, and is 19 feet east of a point, which is south of and in line with the east end of Mr. Brassard's house. A stake 2 by 2 inches marks the point. The following true bearings were determined: smokestack on mill,  $1^{\circ} 24' \cdot 2$ ; tip of ventilator on barn,  $309^{\circ} 04' \cdot 1$ ; spire on Catholic church,  $342^{\circ} 31' \cdot 9$ ; bottom of flagstaff on Commercial hotel,  $343^{\circ} 20' \cdot 2$ .

*Rocky Bay, Que., 1908.*—The station is located on Mr. John Belbin's property, about 50 feet from high-water mark on the south side of a small cove, which is on the eastern side of Rocky bay and about 300 feet easterly from several frame houses. Surrounding the station for a short distance, the rock is covered with a layer of sand about 1 foot in depth. The point is marked by a stake 2 inches in diameter and projecting 18 inches above the surface. The following true bearings were determined: chimney on Mr. Belbin's house,  $284^{\circ} 33' \cdot 2$ ; pole on vacant frame house,  $296^{\circ} 23' \cdot 4$ .

*Rodney, Ont., 1910.*—The station is situated in a small pasture on the south side of Harper street. This field is owned by Mr. Hugo and is the second field west of the first street intersection on Harper street west of Furnivale street. Mr. Hugo's house



is on the southeast corner of this intersection. The station was 131 feet from the westerly boundary fence and 56 feet from the southerly limit of Harper street. The following true bearings were determined: smokestack on planing-mill,  $2^{\circ} 59' 7''$ ; spire on Presbyterian church,  $43^{\circ} 23' 6''$ ; smokestack on box factory,  $104^{\circ} 46' 9''$ .

*Rosenfeld, Man., 1916.*—The station is about 700 feet east of the C.P.R. depot in an open space east of the Leland hotel and north of the school grounds. It is 154 feet east and 321 feet north of the northwest corner of the fence around the school grounds, and 45 feet west of the wire fence, which is along the west side of farm property. The point is marked by a stake 2 inches in diameter and projecting 2 inches above the surface. The following true bearings were determined: bottom of flagstaff on tower of public school,  $196^{\circ} 55' 9''$ ; top of cross on Lutheran church,  $203^{\circ} 00' 9''$ ; east gable of Imperial Elevator Co.'s elevator,  $209^{\circ} 50' 0''$ ; bottom of flagstaff on Leland hotel,  $260^{\circ} 45' 2''$ .

*Rose Point, Ont., 1907.*—The station selected is on a small island known as "Sloop Island." The pole surmounting the cupola of the northeast side of the Canada Atlantic Railway depot bears  $177^{\circ} 38' 8''$ .

*Rossland, B.C., 1915.*—The station is southeast of the town on the east side of the main road leading to the country to the south and east, on the south side of the road leading to the City park, and on a small clearing among the trees. The point is 192 feet easterly from the intersection of the main country road and the road leading to the park, 48 feet southerly from the middle of the latter road, and is marked by a stake 2 inches in diameter and projecting 2 inches above the surface. The flagstaff on the front of the school in the southwest part of the town bears  $277^{\circ} 56' 0''$ .

*Rosthern, Sask., 1911.*—The station is southeast of the town and near the northwest corner of the agricultural grounds. It is 265 feet south of the north side and 200 feet east of the west side of the grounds, and is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: top of spire on English church,  $348^{\circ} 15' 3''$ ; pole on town hall,  $358^{\circ} 06' 3''$ ; pole on tower of school,  $4^{\circ} 39' 3''$ ; southerly pole on C.N.R. depot,  $16^{\circ} 11' 0''$ .

*Ruddell, Sask., 1911.*—The station is in the N.W.  $\frac{1}{4}$  sec. 7, tp. 42, rge. 14, W. 3rd mer. It is south of the town, being 300 feet south of the south side of Maple avenue and 45 feet west of the west side of Main street. A stake 2 inches in diameter set flush with the ground marks the point. The following true bearings were determined: bottom of pole on school,  $345^{\circ} 55' 1''$ ; south gable of Canadian Elevator Co.'s elevator,  $10^{\circ} 12' 1''$ ; pole on west ventilator of barn,  $124^{\circ} 08' 1''$ .

*Sabinoff, Ont., 1914.*—The station is 202 feet easterly and 485 feet northerly from the end of the N.T.R. bridge over a small creek about 1,000 feet easterly from the railway depot. The following true bearings were determined: short pole on middle of N.T.R. water-tank,  $271^{\circ} 41' 9''$ ; pole over window on east side of depot,  $278^{\circ} 43' 5''$ .

*Ste. Agathe, Man., 1916.*—The station is about one mile east of the C.N.R. tracks, on the east bank of the Red river. It is slightly southeasterly from the first bend in the river to the south of the ferry crossing, and is about 590 feet south of the row of telephone poles along the south side of the road allowance. A trail leads from this road in a southerly direction through a wooded tract to the shore of the river. The point is almost opposite the end of the westerly branch of the trail, and is about 12 feet from the



edge of the woods along the shore. A copper nail in the top of a stake 2 inches in diameter and projecting 2 inches above the surface marks the point. The following true bearings were determined: top of cross on Catholic church,  $333^{\circ} 24' \cdot 9$ ; top of cross on bell-tower of school,  $343^{\circ} 04' \cdot 2$ .

*Ste. Anne, Kam. Co., Que., 1912.*—The station is about one mile north of the I.C.R. tracks, on the Catholic college grounds. It is about 400 feet south of the college, is 100 feet west and 38 feet north of the northwest corner of the stone fence around the cemetery, and about 10 feet easterly from two trees, which are united at the base. The point is marked by a stake 2 by 2 inches driven flush with the ground. The following true bearings were determined: top of pole on tower of agricultural school,  $171^{\circ} 21' \cdot 2$ ; northwest corner of Catholic church,  $347^{\circ} 39' \cdot 5$ ; top of cross on east end of Catholic church,  $9^{\circ} 17' \cdot 9$ ; bottom of cross on convent,  $61^{\circ} 17' \cdot 0$ .

*St. Augustine (Outer Island), Que., 1909.*—The station is near the northeast extremity of Outer island, on a gravel beach adjacent to Scole cove. Dog island may be seen to the east of a small island which is distant about 500 feet. The point is 8 feet from high-water mark, and is on the outer edge of a small ravine, which extends a short distance inland and is covered with dwarf spruce trees. Two frame houses may be seen on Dog island, and a line joining the station and houses passes over a low rocky island on which, at first sight, the houses appear to stand. The point is marked by a stake 2 feet high and 3 inches in diameter surrounded by stones. The west gable of the east house on Dog island bears  $17^{\circ} 30' \cdot 3$ .

*St. Augustine River, Que., 1920.*—The station is on a rocky island in the St. Augustine river about 300 feet from the north shore, and opposite the buildings of the Hudson's Bay Co. It is slightly north of the centre of the island, which at times of high water is submerged; the centre of the island is covered with trees and sand, and to accommodate the observing tent a clearing was made. The point is marked by a stake 4 inches in diameter set flush with the ground. The following true bearings were determined: east gable of main part of the H. B. Co's dwelling-house,  $357^{\circ} 57' \cdot 8$ ; west (left) edge of large boulder on hill,  $358^{\circ} 06' \cdot 0$ ; cross on Catholic church,  $44^{\circ} 53' \cdot 3$ .

*Ste. Flavie, Que., 1912.*—The station is about 500 feet north of the I.C.R. tracks, on the north side of an enclosure, in which is an abandoned ballast pit. It is on a level portion of ground, triangular in shape, which is on the north side of the excavation; is slightly west of the west line of the freight-shed, and the spire of the Catholic church appears slightly to the east of the west chimney on the depot. It is 21 feet southerly from the fence along the north side of the enclosure, and 28 feet west of a short section of fence. The point is marked by a stake 2 inches in diameter driven flush with the ground. The following true bearings were determined: pole on I.C.R. water-tank,  $107^{\circ} 40' \cdot 1$ ; cross on convent bell-tower,  $154^{\circ} 13' \cdot 9$ ; cross on Catholic church spire,  $167^{\circ} 00' \cdot 2$ .

*Ste. Hélène, Que., 1912.*—The station is in the first open field east of the street passing the east side of the I.C.R. depot, the field being the property of Mr. Jos. Tremblay. It is almost opposite and east of the creamery, is 44 feet west of the stone fence on the east side of the field, 79 feet east of the west fence and 161 feet north of the fence along the east half of the south end of the field. The point is marked by a stake 2 by 2 inches

driven flush with the ground. The following true bearings were determined: top of cross on east end of Catholic church,  $113^{\circ} 56' \cdot 6$ ; top of cross on west end of Catholic church,  $122^{\circ} 20' \cdot 7$ ; bottom of pole on school,  $150^{\circ} 54' \cdot 7$ .

*St. Joachim, Que., 1909.*—The station is about one-half mile north of the railway depot in the second field, the property of Mr. Filion, north of a large stone building which is at the southwest corner of the intersection of two roads. The point is 79 feet, in a northerly direction, from a stake driven flush with the ground in the centre of a gateway at the south end of the field. The point, the stake and spire of church are in line. The following true bearings were determined: pole on centre of large red barn,  $84^{\circ} 31' \cdot 1$ ; smokestack on saw mill,  $104^{\circ} 33' \cdot 3$ ; spire on church,  $149^{\circ} 54' \cdot 9$ ; lighthouse on Orleans island,  $163^{\circ} 09' \cdot 9$ .

*St. John, N.B., 1918.*—The station is approximately a relocation of the D.O. station of 1912. It is on Gilbert's property facing Gilbert's lane, about one mile northeast of the railway depot, and about 750 feet northerly from the railway tracks. It is 68.5 feet south of the fence on the north side of the field, 223 feet easterly from the northerly side of the gateway which is at the southeast corner of the horticultural section of Rockwood park, 181 feet from the fence along the westerly side of the field, and 38 feet north of the northerly side of Seely street or the south limit of the park produced. From the station the cathedral spire may be seen over the east chimney of the house farthest east on the north side of Pine street, and the tall brick chimney at Peter's tannery and the one at the cotton mill are seen in line. The point is marked by a stone 5 by  $3\frac{1}{2}$  inches and projecting slightly above the surface. The following true bearings were determined: pole on centre of railway water-tank,  $62^{\circ} 36' \cdot 3$ ; pole on water-tank at Peter's tannery,  $150^{\circ} 18' \cdot 9$ ; spire of Leinster Baptist church,  $179^{\circ} 10' \cdot 9$ ; spire on centre dome of hospital,  $181^{\circ} 59' \cdot 1$ .

*St. Siméon, Que., 1909.*—The station is located on the flat north of the road leading from the wharf, and is in line with the westerly end of the Belly hotel. It is 15 feet west of the road along the beach, 385 feet from the end of the wharf, and is marked by a stake 2 inches in diameter and projecting 2 inches above the surface. The following true bearings were determined: pole on front of Belly hotel,  $179^{\circ} 04' \cdot 8$ ; top of shed on wharf,  $135^{\circ} 30' \cdot 5$ ; lighthouse on point on north shore of St. Lawrence,  $33^{\circ} 21' \cdot 9$ .

*Ste. Thérèse, Que., 1912.*—The station is northwest of the town on property belonging to Mr. Jardin. It is in a small field on the south side of the road, which is practically a continuation of the street, which runs westerly from the Catholic college, and is about 600 feet west of the Mont Laurier branch of the C.P.R. The tower of the college appears slightly to the north of the C.P.R. bridge over a creek. The point is approximately in line with the west side of a small house, which is the first one west of a large stone house, both houses being on the north side of the road. It is 223 feet south of south side of road, 52 feet east of the fence on the west side of the field, and about 110 feet north of a creek, and is marked by a stake 2 inches in diameter. The following true bearings were determined: southwest corner of stone house on north side of road,  $43^{\circ} 14' \cdot 0$ ; top of cross on Catholic college,  $87^{\circ} 58' \cdot 8$ ; top of rod seen to left of chimney and just over railroad,  $88^{\circ} 46' \cdot 8$ ; top of rod seen over left corner of chimney and just over railroad,  $88^{\circ} 50' \cdot 6$ .

*St. Valier, Que., 1912.*—The station is northeast of the I.C.R. depot, about one-fifth of a mile, on property belonging to Mr. Lecomte. It is on the southerly edge of a rocky ridge in the first field north of the railway tracks, and on the east side of the road leading from St. Valier station to St. Valier village; it is 57 feet east of the wire fence on the west side of the field and 257 feet north of the north side of a stable, which is at the rear of the Picard hotel. The Picard hotel property was formerly the southwest corner of the field. The point is marked by a stake 2 by 2 inches and projecting 1 inch above the surface. The following true bearings were determined: east gable of I.C.R. depot,  $194^{\circ} 06' \cdot 3$ ; spire of St. Gabriel parish church,  $231^{\circ} 34' \cdot 1$ .

*Salmon Bay, Que., 1920.*—The station of 1909 was reoccupied. It is near the west side of a depression in an irregular terrace on the east slope of a hill, which is opposite Caribou island and south of Salmon bay, about 200 feet west of and in line with the south end of Mr. Jeremiah Dunn's house, and about 300 feet north of Mr. Edward Dunn's house. The point is marked by a stake 3 inches in diameter set flush with the ground. Sand and moss to the depth of about 1 foot cover the rock. The following true bearings were determined: cairn on hill to east,  $40^{\circ} 42' \cdot 2$ ; south gable of Mr. McAllister's house,  $78^{\circ} 45' \cdot 7$ ; east gable of Catholic church,  $159^{\circ} 17' \cdot 1$ ; cairn on point of land, seen to left of pipe on church,  $160^{\circ} 09' \cdot 2$ ; cross on tower of church,  $161^{\circ} 53' \cdot 0$ .

*Salvus, B.C., 1915.*—The station is on the edge of a trail leading northwesterly through the woods from the G.T.P. depot. It is determined by turning to the left from the direction of the railway tangent east, at a point in the middle of the main line of the railway and distant 18 feet westerly from the line of the westerly side of the depot produced, the angle  $103^{\circ} 30' \cdot 7$ , and measuring along this direction a distance of 358 feet. An insulator about half way between bottom and top of telegraph pole near west end of depot bears  $135^{\circ} 14' \cdot 7$ .

*Sarnia, Ont., 1920.*—The station is approximately a relocation of the D.O. station of 1910. It is situated in a field belonging to Mr. Shannon, the field being north of Telford street, south of Wellington street and east of Russel street. A lot belonging to Geo. Foster, containing his house and orchard is adjacent to this field. The transit was placed 190.5 feet from the southern boundary fence, and 57 feet from the eastern boundary fence. The magnetometer was placed 11.2 feet behind the transit and in line with the transit and the spire of St. Andrew's church. Trolley lines are one-half mile to the west. The following true bearings were determined from the transit station: middle of brick chimney on factory,  $183^{\circ} 59' \cdot 3$ ; tower on Russel street school,  $204^{\circ} 49' \cdot 8$ ; spire on St. Andrew's church,  $305^{\circ} 32' \cdot 5$ .

*Sault Ste. Marie, Ont., 1918.*—The station, which is a relocation of the station of 1916, is about one-half mile northeasterly from the C.P.R. depot on the east side of the Great Northern road which is a continuation of Pym street, and south of MacDonald street which runs east from the Great Northern road to the wireless station. It is 125 feet west of the wire fence on the east side of the second street east of the Great Northern road, and 97 feet south of a row of telephone poles on the south side of MacDonald street. The point is marked by a brass screw in the top of a stake 1 inch square set flush with the ground. The following true bearings were determined: top of steel tower across



river,  $224^{\circ} 31' \cdot 2$ ; bottom of flagstaff on high school,  $268^{\circ} 53' \cdot 2$ ; bottom of flagstaff on public school,  $312^{\circ} 43' \cdot 4$ .

*Savanne, Ont., 1910.*—The station is approximately a relocation of the C.I. station of 1906. It is near the Savanne river, about one-quarter of a mile south of the C.P.R. tracks. It is about 54 feet north of the bank of the river in a path which leads south from the railroad, leaving the railroad at a point 800 feet east of the depot. There is a telegraph pole about 20 feet west of the continuation of a line joining the station and the pole on the Hudson's Bay Co.'s store (now vacated). The point is marked by a stake 3 inches in diameter and projecting 3 inches above the surface. The following true bearing was determined: pole on Hudson's Bay Co.'s store,  $24^{\circ} 30' \cdot 1$ .

*Sayabec, Que., 1912.*—The station is near the east end of the town, and about 700 feet north of the I.C.R. tracks. It is in an open field belonging to John Fessenden & Co., the field being on the east side of a private road and just north of the barns. The point is 17 feet south of the fence along the north side of the field, 82 feet west of the east fence and about 36 feet east of the middle of the road, and is marked by a stake 3 by 3 inches driven flush with the ground. The following true bearings were determined: top of cross on English church,  $257^{\circ} 50' \cdot 9$ ; spire on Catholic church,  $327^{\circ} 49' \cdot 3$ ; chimney on middle of cottage-roofed house near lake,  $51^{\circ} 43' \cdot 1$ ; west gable of house farthest east in village,  $132^{\circ} 34' \cdot 9$ .

*Schreiber, Ont., 1918.*—The station is a relocation of the C.I. station of 1906, and the D.O. station of 1910. It is in an open field about one-third of a mile east of the town near the cemetery, being 100 feet from the southwest corner and directly in line with the picket fence on the south side. The point is marked by a stake 2 inches in diameter set flush with the ground. The following true bearings were determined: tip of ventilator on C.P.R. shops,  $192^{\circ} 51' \cdot 1$ ; pole on centre of C.P.R. water-tank,  $208^{\circ} 58' \cdot 1$ ; spire of Presbyterian church,  $257^{\circ} 58' \cdot 5$ ; spire of English church,  $261^{\circ} 53' \cdot 4$ ; short pipe on C.P.R. water-tank,  $209^{\circ} 06' \cdot 9$ .

*Searchmont, Ont., 1916.*—The station is about 600 feet southeast of the A.C.R. depot, and about 480 feet east of the east side of the Searchmont hotel, being near the northwest corner of an enclosure lying to the east of the first small field east of the hotel. It is 64 feet northwest of the northwest corner of a root-cellar, 14 feet south and 19.5 feet east of a post, which is at the south side of the gateway on the west side of the enclosure. The point is marked by a brass screw in the top of a stake 2 inches in diameter and projecting 2 inches above the surface. The following true bearings were determined: east gable of school building,  $224^{\circ} 01' \cdot 1$ ; northeast corner of main part of A.C.R. depot,  $302^{\circ} 35' \cdot 1$ .

*Selkirk, Man., 1916.*—The station is about one-quarter of a mile east of the C.P.R. tracks. It is near the northwesterly corner of the agricultural and athletic grounds, being 52.6 feet northerly from the fence along the southerly side of the grounds and 54 feet easterly from the fence along the westerly side. The point is marked by a copper nail in the top of a stake 2 by 4 inches driven flush with the ground. The following true bearings were determined: spire of Lutheran church,  $93^{\circ} 03' \cdot 0$ ; spire of Presbyterian church  $130^{\circ} 04' \cdot 0$ ; spire on English church,  $132^{\circ} 39' \cdot 6$ ; pipe on top of C.P.R. water-tank,  $316^{\circ} 15' \cdot 2$ .



*Seven Islands, Que., 1920.*—The station of 1909 was reoccupied. It is on property belonging to Mr. Francis Gallienne, Sr., in the second field north of his dwelling-house, being 28 feet north of the fence along the south side of the field and 63 feet west of the east fence. The point is marked by a stake set flush with the ground. The following true bearings were determined: lower section of flagstaff in front of Catholic church,  $157^{\circ} 33' \cdot 2$ ; west gable of Dr. MacDougal's house,  $197^{\circ} 39' \cdot 1$ ; upper end of lower section of flagstaff in grounds around post office,  $275^{\circ} 18' \cdot 6$ .

*Seven Islands (Pointe aux Basques), Que., 1920.*—The station is located on Pointe aux Basques and about 2 miles south of the station in the village of Seven Islands. It is in line with the westerly extremities of Basque island and Manowin island, and a line joining the station and a prominence on the peninsula across the harbour passes over a low rock, which is a short distance west from Basque island. It is about 275 feet south-east from a house with shingle sides and 116 feet northerly from a fence (partially removed) measured in the direction of the westerly extremity of Basque island. The observations were taken over the intersection of two grooves in the top of a stake 5 inches in diameter and projecting 6 inches above the surface. The following true bearings were determined: cairn on highest point of Boule island,  $114^{\circ} 43' \cdot 6$ ; gable over window of log house,  $335^{\circ} 18' \cdot 9$ ; east gable of house with shingle sides,  $357^{\circ} 33' \cdot 5$ .

*Seven Persons, Alta., 1915.*—The station is northeast of the town, and east of the grounds of the public school. It is 64.5 feet northeast of the post at the southeast corner and 98 feet southeast of the post at the northeast corner of the grounds. The point is marked by a stake 2 by  $1\frac{1}{2}$  inches driven flush with the ground. The following true bearings were determined: short pipe on C.P.R. water-tank,  $191^{\circ} 05' \cdot 1$ ; north gable of Ogilvie's elevator,  $198^{\circ} 53' \cdot 5$ ; flagstaff on front of hotel,  $211^{\circ} 11' \cdot 5$ ; flagstaff on east section of school,  $235^{\circ} 42' \cdot 7$ .

*Shallop, Que., 1909.*—The station is about 25 feet from the beach at the northeast corner of a small bay at the mouth of the Shallop river and 10 feet south of a fence which is on the south side of a field enclosing a church, a red house, a yellow house, a small log house and several barns. The sandy beach extends up to this fence about 50 feet to the west of the station. The point is marked by a post 3 inches in diameter and projecting 6 inches above the ground. The following true bearings were determined: chimney on the first house to the northwest of a large frame house on the west side of the river,  $280^{\circ} 19' \cdot 6$ ; chimney on the first log house east of the river on the same elevation as the church,  $298^{\circ} 14' \cdot 5$ ; bottom of cross on church tower,  $324^{\circ} 49' \cdot 1$ .

*Sharbot Lake, Ont., 1920.*—The station is on a knoll about 200 yards north of the railway depot between the Kingston and Pembroke tracks and an arm of the lake. It is about 55 feet above the level of the lake and about 50 feet above the railway tracks, the nearest point of which is 500 feet away. A road runs on either side of the knoll, the station being 103.2 feet from the road between the station and the tracks and 56.3 feet from the other road, both being taken in the direction determined by a line joining station and water-tank. It is 115.5 feet west from a telegraph pole and 117.8 feet northwest from a similar pole. The magnetometer was placed 23.8 feet behind the transit and in line with transit and pole on water-tank. The following true bearings

were determined from the transit station: pole on water-tank,  $124^{\circ} 44' \cdot 5$ ; north gable of yellow house near depot,  $171^{\circ} 19' \cdot 8$ ; north gable of red barn,  $205^{\circ} 43' \cdot 0$ .

*Shediac, N.B., 1907.*—The station is in a field behind the Weldon house. It is 53 feet westerly from a fence on the west side of a road and 28 feet southerly from another fence. The spire of the Presbyterian church bears  $231^{\circ} 33' \cdot 4$ .

*Shelburne, N.S., 1912.*—The station is in a small field belonging to Mr. C. Cox, northeast of the government wharf and west of a small inlet. It is 92 feet east of the fence on the west side of the field, 40 feet west of the east fence and 137 feet from the northeast corner of the field. It is in line with two poplar trees and is 27·5 feet east of the most easterly one. A stake 2 by 2 inches set flush with the ground marks the point. The following true bearings were determined: spire of Methodist church,  $334^{\circ} 29' \cdot 6$ ; spire of Baptist church,  $341^{\circ} 32' \cdot 1$ ; cross on tower of Episcopal church,  $359^{\circ} 00' \cdot 1$ .

*Sherbrooke, A, Que., 1907.*—Station A was occupied in 1907. It is on the public highway, at the intersection of Pembroke avenue and Victoria street, being 35·5 feet southeast of the fence corner on the west side of Pembroke street and 51·3 feet southwest of the fence corner on the east side of Pembroke street. The spire of the Catholic church bears  $92^{\circ} 56' \cdot 4$ .

*Sherbrooke, B, Que., 1920.*—As the station of 1907 was not suitable, a new station, B, was selected about one mile east of the city. To reach the station proceed along the Rue Conseil passing the large Catholic church on right, also two shirt factories, and turn north along road in front of the second of these factories. Six hundred yards from Rue Conseil the road turns east leading up a slope to a farm house. The station is situated at this corner of the level field in front of the shirt factories, being 24 feet west of the road running north and 94·3 feet south from the wire fence along the north side of the field. The point is marked by a stake 2 by 2 inches driven flush with the ground. The magnetometer was placed 20·3 feet behind transit and in line with transit and cross on Catholic church. The following true bearings were determined from the transit station: left edge of chimney on house,  $75^{\circ} 18' \cdot 9$ ; cross on Catholic church,  $232^{\circ} 29' \cdot 9$ ; bottom of pole on exhibition building,  $282^{\circ} 59' \cdot 9$ ; pole on club-house,  $327^{\circ} 41' \cdot 2$ .

*Sicamous, A, B.C., 1915.*—The station is approximately a relocation of the station of 1908. It is reached by turning to the right, at a point in the middle of the main line of the railway 30 feet east of the east end of the railway bridge over the narrows, from the direction of the railway tangent east, the angle  $74^{\circ} 56' \cdot 0$ , and measuring along this direction, from the wire fence along the south side of the railway right-of-way, a distance of 138 feet. It is 22 feet southeast of a large poplar tree, and is marked by a stake 2 by 2 inches and projecting 1 inch above the surface. The following true bearings were determined: southeast corner of Bellevue hotel,  $214^{\circ} 15' \cdot 2$ ; northwest corner of Finlayson's store,  $238^{\circ} 59' \cdot 8$ ; tip of "Stop" signal post,  $254^{\circ} 13' \cdot 4$ ; tip of semaphore,  $254^{\circ} 37' \cdot 2$ .

*Sicamous, B, B.C., 1919.*—Station B is a relocation of the B station of 1915. It is on the east shore of Shuswap lake and on the north side of the C.P.R. tracks. The C.P.R. hotel is seen to the right of two lone clumps of willow, which are about 78 feet southwest of the station. The station is reached by turning to the left, at a point in the middle of the railway main line and 30 feet from the east end of the railway bridge over the narrows, from the direction of the railway tangent to the east, the angle  $73^{\circ} 59' \cdot 0$ , and

measuring along this direction, from the wire fence along the north side of the railway right-of-way, a distance of 374 feet. The station is marked by a cement post 4 by 4 inches set flush with the ground. The following true bearings were determined: south-east corner of Bellevue hotel,  $182^{\circ} 40' \cdot 1$ ; northwest corner of Bellevue hotel,  $188^{\circ} 36' \cdot 1$ ; top of semaphore on west side of railway bridge,  $206^{\circ} 00' \cdot 6$ ; east gable of east wing of C.P.R. hotel,  $228^{\circ} 33' \cdot 4$ .

*Simcoe, Ont., 1910.*—The station is situated in a field fronting on the south side of the first street running east and west, north of the grist-mill on Norfolk street, the first street mentioned ending at the easterly boundary fence of the field. The field contains some sand pits, which are on the east side of Norfolk street. The station is 25.8 feet from the boundary fence on the east and 40 feet from the south limit of Norfolk street, and is on a hill above the sand pits. The following true bearings were determined: ornament on grist-mill,  $237^{\circ} 09' \cdot 4$ ; ornament on station tower,  $310^{\circ} 26' \cdot 7$ ; pole on barn just visible over a clump of trees,  $345^{\circ} 10' \cdot 6$ .

*Sioux Lookout, A, Ont., 1916.*—The station is a relocation of the D.O. station of 1914. It is about one-quarter of a mile southwesterly from the C.G.R. depot, and is near the bottom of the southerly slope of the hill on which the C.G.R. water-tank stands, also near the bottom of the westerly slope of another hill. It is 597 feet southerly from the water-tank, 168 feet east of the edge of Pelican lake and 194 feet north of the wire fence along the south side of the property. The following true bearings were determined: white post on railway right-of-way,  $293^{\circ} 16' \cdot 1$ ; top of pipe of water-tank,  $15^{\circ} 32' \cdot 5$ ; top of pole on water-tank,  $15^{\circ} 50' \cdot 7$ .

*Sioux Lookout, B, Ont., 1918.*—The station is about 250 feet easterly from the station of 1914, which is no longer available for observations. It is slightly west of the summit of a rocky hill, which is the first one southerly from that on which the C.G.R. water-tank stands; it is 26 feet north and 237 feet east of the northeast corner of the second from the south end of a row of five houses in course of construction for railway employees. The point is marked by a copper nail in the top of a stake 2 by 4 inches and projecting 6 inches above the surface. The following true bearings were determined: observing tower on hill across lake,  $259^{\circ} 45' \cdot 9$ ; east end of railway bridge over narrows,  $281^{\circ} 30' \cdot 3$ ; cross on tower of Catholic church,  $329^{\circ} 24' \cdot 8$ ; short pole on top of C.G.R. water-tank,  $348^{\circ} 18' \cdot 7$ ; flagstaff on school,  $2^{\circ} 07' \cdot 8$ ; chimney on southwesterly corner of depot,  $31^{\circ} 08' \cdot 8$ .

*Smithers, B.C., 1919.*—The station of 1915 not being available, a new station was selected about 101 feet west of the former. It is in block 140 of the G.T.P. townsite, near the north side of the block and west of the tennis courts, 117 feet east of the east side of Tenth avenue and 38.5 feet south of the south side of Queen street. The point is marked by a copper nail in the top of a stake 4 inches in diameter set flush with the ground. The following true bearings were determined: tip of G.T.P. water-tank,  $230^{\circ} 00' \cdot 9$ ; flagstaff on building used as a pool room,  $240^{\circ} 05' \cdot 9$ .

*Southesk, Alta., 1911.*—The station is in an open field south of the C.P.R. tracks. It is in line with the easterly end of the freight-shed, is 310 feet southerly from the south side of the C.P.R. right-of-way and 750 feet westerly from the section-house. The following



true bearings were determined: west gable of C.P.R. section-house,  $116^{\circ} 27' 3''$ ; west gable of small car-house,  $133^{\circ} 51' 6''$ .

*Spence's Bridge, B.C., 1908.*—The station is slightly less than one-half mile west of the railway depot in a field belonging to Mr. Clemes. It is 61.4 feet from north corner of cemetery and almost in line with the diagonally opposite corner, and is 110.6 feet from east corner and 115 feet from the west corner. The point is marked by a fir post 4 by 4 inches and projecting 12 inches above the surface. The following true bearings were determined: pole on C.P.R. water tank,  $64^{\circ} 31' 6''$ ; bottom of post marked "Yard Limit" on C.P.R. right of way,  $207^{\circ} 47' 6''$ . Magnetic observations were taken at a point 25 feet westerly from station and in line with station and pole on water tank.

*Sprague, Man., 1914.*—The station is in an open field about one-quarter of a mile northwest of the C.N.R. depot. It is about 540 feet west and 540 feet north of the pier marking the D.O. astronomical station and is 478 feet north of the railway tracks. It is 26 feet east of the fence along the east side of the government road allowance, 288 feet north of the fence along the north side of the C.N.R. right-of-way and 23 feet south of fence along the south side of Mr. Batchelor's lot. A stake 2 inches in diameter and projecting 3 inches above the surface marks the point. The following true bearings were determined: short pole on middle of C.N.R. depot,  $117^{\circ} 42' 2''$ ; tip of pole on centre of C.N.R. water-tank,  $122^{\circ} 46' 4''$ .

*Stonecliffe, Ont., 1913.*—The station is near the southwest corner of the field around Mr. Patrick Reilley's hotel. It is about 300 feet southwesterly from the hotel, is 44 feet north of the fence on the south side of the field and 38 feet east of the west fence. The south gable of the hotel bears  $43^{\circ} 28' 9''$ .

*Stratford, Ont., 1910.*—The station is situated in Queen's park near the Avon river. The station is 230 feet east of the east side of the Normal school and 580 feet north of the north side of the school. It is also 198 feet from the westerly tree of a clump of three trees on the river bank and 171 feet from the easterly tree. The following true bearings were determined: flagpole on Normal school  $203^{\circ} 02' 4''$ ; spire Knox Presbyterian church,  $247^{\circ} 05' 4''$ ; top of house with peculiar mushroom top,  $295^{\circ} 36' 9''$ .

*Sturgeon Falls, Ont., 1913.*—The station is in the northeast part of the town, on vacant property on the southeast corner of the intersection of Market street and Parker street. It is 44 feet east of the east side of Parker street and 105 feet south of the fence along the north side of Market street. A stake 2 by 2 inches driven to within 2 inches of the surface marks the point. The following true bearings were determined: cross on convent,  $198^{\circ} 43' 9''$ ; cross on bell-tower of Catholic church,  $228^{\circ} 59' 2''$ ; spire on tower of public school,  $246^{\circ} 18' 5''$ ; ball on tower of town water-tank,  $270^{\circ} 51' 7''$ .

*Sudbury, A, Ont., 1907.*—Station A is on waste ground, east of and across a creek from the C.P.R. tracks. It is 715 feet east of the east side of Minto street and 6 feet south of the south side of Larch street produced. A small pole on top of water-tower bears  $13^{\circ} 58' 6''$ .

*Sudbury, B, Ont., 1916.*—Station B is a relocation of the station of 1913. It is in the grounds around the High school and is about 230 feet southeast of the southeast corner of the building; it is 132 feet east of the east line of the school building and 167 feet south of the south line of the cement wall along the south side of the school. It is 78 feet



north and 83 feet west of the northeast corner of the grand-stand, which is near the southeast corner of the grounds. The station is not marked, as the grounds on which it is located are now used for athletics, thus making it unsuitable for observing. The following true bearings were determined: tip of cross on Catholic church,  $126^{\circ} 12' 7''$ ; southwest corner of St. Joseph's hospital,  $128^{\circ} 39' 8''$ ; flagstaff on Nickel Range hotel,  $162^{\circ} 51' 7''$ ; flagstaff on public school,  $242^{\circ} 40' 9''$ ; southwest corner of High school,  $314^{\circ} 23' 7''$ .

*Sudbury, C, Ont., 1919.*—Station C was selected in 1916, and reoccupied in 1919, as there seemed to be doubt about the suitability of station B for future observations. It is in the first large field north of St. Joseph's hospital, and about 300 feet from the north side of the building. It is 292 feet east and 38 feet north of the northeast corner of the Catholic school, and is 84 feet east and 62.5 feet north of the southwest corner of the field. It is about 500 feet northeast of the station occupied in 1916, or station A. The point is marked by a copper nail in the top of a stake 2 inches in diameter and projecting 2 inches above the surface. The following true bearings were determined: top of cross on Catholic church,  $158^{\circ} 59' 1''$ ; flagstaff on town hall, seen over hospital,  $183^{\circ} 28' 0''$ ; flagstaff on front of court-house,  $223^{\circ} 37' 3''$ ; bottom of flagstaff on front of High school,  $267^{\circ} 52' 7''$ .

*Suffield, Alta., 1911.*—The station is in the eastern half of sec. 33, tp. 14, rge. 9, W. 4th mer. It is north of the C.P.R. tracks on the C.P.R. townsite property, and is 135 feet northerly from the north side of Alberta avenue and 15 feet easterly from the easterly side of Taylor street. A stake 2 by 2 inches and projecting 1 inch above the surface marks the point. The following true bearings were determined: pole on tank near livery stable,  $66^{\circ} 23' 0''$ ; bottom of pole on Alma hotel,  $101^{\circ} 34' 4''$ ; pole on C.P.R. water-tank,  $133^{\circ} 56' 7''$ .

*Swan River, A, Man., 1919.*—Station A is a relocation of the D.O. station of 1911. It is east of the town near the southeast corner of the agricultural grounds. It is south of and approximately in line with the west side of the horticultural hall, 235 feet west of the fence on the east side of the grounds and 118 feet north of the fence on the south side; 25 feet east and 23.8 feet north of the northwest corner of the stock stable. The point is marked by a stake 2 by 2 inches and projecting 2 inches above the surface. The following true bearings were determined: spire of Presbyterian church,  $251^{\circ} 44' 8''$ ; flagstaff on tower of school,  $284^{\circ} 26' 3''$ ; flagstaff on exhibit building,  $345^{\circ} 50' 0''$ .

*Swan River, B, Man., 1919.*—Station B is approximately a relocation of the C.I. station of 1908. It is just southwest of the main entrance to the fair grounds, and about 420 feet northwesterly from station A; 102 feet south of the south line of street opposite main entrance to grounds, 66 feet east of the west fence along the west side of the grounds and 24 feet east of the fence along the inside of race-track. The point is marked by a stake 2 inches in diameter set flush with the ground. The following true bearings were determined: pole on exhibit building,  $52^{\circ} 12' 9''$ ; pole on tower of school (built in 1912),  $277^{\circ} 02' 2''$ .

*Swastika, Ont., 1913.*—The station is about 400 feet northeast of the T. & N. O. depot. It is 110 feet east and 95 feet north of the northeast corner of the wooden bridge over the Blanche river, and 80 feet north of the north side of a street clearing. The following true bearings were determined: pole on T. & N. O. water-tank,  $151^{\circ} 32' 4''$ ;

northeast corner of stone abutment of T. & N. O. bridge, near top,  $173^{\circ} 22' \cdot 4$ ; pole on store,  $184^{\circ} 02' \cdot 2$ ; northwest corner of Swastika hotel,  $203^{\circ} 46' \cdot 7$ .

*Swift Current, Sask., 1919.*—The station is a relocation of the M.S. station of 1907. It is situated in the SW.  $\frac{1}{4}$  sec. 24, tp. 15, rge. 14, W. 3rd mer., on land belonging to Mr. Vaudreuil, and about 310 feet south of the north side and about 600 feet west of the east side of the property, which is southwest of the town and about one-half mile south of the C.P.R. tracks. The point is marked by a stake which projects about 6 inches above the surface. The following true bearings were determined: south gable of Lake of the Woods Elevator Co.'s elevator,  $354^{\circ} 02' \cdot 7$ ; spire on English church,  $31^{\circ} 29' \cdot 1$ ; bottom of pole on C.P.R. water-tank,  $45^{\circ} 43' \cdot 5$ ; south side of chimney on house to east,  $90^{\circ} 19' \cdot 1$ .

*Sydney, A., N.S., 1907.*—Station A is near the entrance to Victoria park, being 206 feet westerly from the fence on the easterly side of the park and 30 feet northerly from the southerly side of the park. The spire of Falmouth Street Presbyterian church bears  $150^{\circ} 02' \cdot 2$ .

*Sydney, B, N.S., 1920.*—Station B is a relocation of the station of 1918 and is about 100 feet northwest of the C.I. station of 1909 which could not be conveniently reoccupied, due to the removal of all surface earth in the vicinity of the station. Test revealed little, if any, effect due to local attraction. The station is northwest of the town in Victoria park, near the foot of the slope on the northwestern side of the highest point of ground in the western portion of the park. It is near the inner edge of a race-course, is 220 feet easterly from an electric light post on which is a reflector, 278 feet southerly from the iron house near the signal mast and 131 feet southeasterly from a row of willow trees along the northerly side of the race-track. The point is marked by a drill hole in the top of a granite post 4 by 4 inches set flush with the ground. The following true bearings were determined: tip of pole near iron works,  $69^{\circ} 36' \cdot 3$ ; spire of Catholic church,  $126^{\circ} 33' \cdot 7$ ; spire of old stone church on esplanade  $147^{\circ} 26' \cdot 4$ .

*Taber, Alta., 1915.*—The station is in the ball park, being 80 feet north and 80 feet west of the southeast corner. It is 41.5 feet west and 39 feet north of a temporary wire fence extending along the east and south sides of the grounds, the space between the inner (temporary) and outer fences being used as a driveway. A stake 1 by 1½ inches driven flush with the ground marks the point. The following true bearings were determined: bottom of pole on town water-tank,  $321^{\circ} 49' \cdot 5$ ; pole on west end of building at northwest corner of grounds,  $325^{\circ} 19' \cdot 3$ ; pole on east end of building at northeast corner of grounds,  $332^{\circ} 35' \cdot 5$ ; flagstaff on Central school,  $275^{\circ} 13' \cdot 3$ .

*Taché, Ont., 1910.*—The station is east of the river and 260 feet south of the C.P.R. tracks. It is about 12 feet east of a point which is in line with the east end of the railway bridge over the river, 18 feet from the edge of a small ravine on the west, and 15 feet from the edge of one on the south. The point is marked by a stake 2 inches in diameter and projecting 3 inches above the surface. The following true bearings were determined: east gable of C.P.R. depot,  $343^{\circ} 35' \cdot 1$ ; top of pipe on chimney of C.P.R. depot,  $343^{\circ} 53' \cdot 8$ ; tip of pole on C.P.R. water-tank,  $6^{\circ} 25' \cdot 8$ ; south gable of car-house,  $61^{\circ} 22' \cdot 7$ .

*Tadoussac, Que., 1920.*—The station of 1909 was reoccupied. It is near the summit of a rocky slope on the westerly side of the road leading from the wharf to the village; about 390 feet northerly from the freight shed at the wharf, 48 feet southerly from a wire fence, 146 feet westerly from a house and about 30 feet easterly from the base of a rocky cliff. The point is marked by a brass screw in the top of a stake 2 by 4 inches set flush with the ground. The following true bearings were determined: pole on middle of house,  $40^{\circ} 51' 3''$ ; top of outer lighthouse on westerly side of Saguenay river,  $159^{\circ} 25' 1''$ ; top of inner lighthouse on westerly side of Saguenay river,  $171^{\circ} 44' 4''$ ; pole on freight shed at wharf,  $178^{\circ} 15' 9''$ .

*Tannin, Ont., 1916.*—The station is on a partial clearing east of the C.G.R. tracks, being in line with the south side of the depot extended, and 310 feet east of the southeast corner. The point is marked by a stake 2 inches in diameter and projecting 1 foot above the surface. The gable over the south window on east side of depot bears  $235^{\circ} 42' 1''$ .

*Tatnall, Ont., 1916.*—The station is on the shore of lake Oba, on a point of land opposite, and north of the A.C.R. section-house and about 500 feet distant from it, and west of an abandoned camp. It is 19 feet from the water's edge on the south, 18 feet from the edge of the bank on the west and 20 feet from the water's edge on the north. The point is marked by a copper nail in the top of a stake 2 inches in diameter and projecting 3 inches above the surface. The following true bearings were determined: north gable of section-house,  $202^{\circ} 52' 5''$ ; top of pole on A.C.R. water-tank,  $227^{\circ} 17' 8''$ .

*Timagami, Ont., 1913.*—The station, which is approximately a relocation of the C.I. station of 1906, is on the first hill about one-third of a mile west of the railway depot in the middle of a clearing made for a street, which extends west from the depot. The point is marked by a stake 2 inches in diameter set flush with the ground. The following true bearings were determined: west gable of T. & N.O. restaurant,  $89^{\circ} 25' 6''$ ; pole over west gable of depot,  $97^{\circ} 41' 8''$ ; pole on T. & N.O. water-tank,  $111^{\circ} 36' 4''$ ; north gable of hotel,  $131^{\circ} 21' 6''$ .

*Terrace, B.C., 1915.*—The station is north of the town on land reserved for a park. It is near the edge of a bluff overlooking the athletic field, and is in line with a row of telephone poles on the east side of Kalum street. The point is 58 feet southeast of the band-stand, and is marked by a stake 4 by 4 inches driven flush with the ground. The following true bearings were determined: north gable of Terrace hotel,  $179^{\circ} 33' 9''$ ; top of "Railway Crossing" sign post,  $181^{\circ} 42' 7''$ ; top of cross on front of Catholic church,  $252^{\circ} 18' 7''$ .

*Terrebonne, Que., 1918.*—The station is on an island belonging to the Masson estate and about 630 feet northwesterly from a saw-mill. It is 69.8 feet southeasterly from the D.O. station of 1912, which is near the southeasterly corner of a recently-formed small field and at present under cultivation, and is in line with the station of 1912 and the spire on the tower of the Catholic seminary. It is 10 feet south of the fence, produced, along the south side of the field, and 55.6 feet from the post at the southeast corner of the field, the post being 60 feet easterly from a large elm tree which is at the edge of the bank along the Rivière des Milles Isles. The point is marked by a copper nail in the top of a stake 2 by 2 inches and projecting 2 inches above the surface. The following true bearings were determined: northwesterly corner of Sevigny hotel,  $110^{\circ} 58' 0''$ ; spire on tower of



Catholic seminary,  $119^{\circ} 43' \cdot 2$ ; pole on ventilator of a small stone building westerly from the saw-mill,  $142^{\circ} 46' \cdot 9$ .

*Tête Jaune, B.C., 1913.*—The station is about 1,000 feet northeast of the G.T.P. depot, and about 600 feet north of the main line of the G.T.P. railway and about 500 feet east of the end of the wye. It is on a small island on the south side of the main channel of the Fraser river, in a small clearing in the rather dense growth of small trees on the south side of the island. It is 20 feet from the sandy edge of the channel and about 265 feet east of the westerly end of the island. A stake  $1\frac{1}{2}$  by 3 inches and projecting 4 inches above the surface marks the point. The smoke pipe on the G.T.P. water-tank bears,  $249^{\circ} 29' \cdot 0$ .

*Thessalon, Ont., 1916.*—The station is on the north side of the town in the agricultural grounds. It is 51 feet south of the fence along the north side of the grounds and 66 feet west of the east fence. The point is marked by a brass screw in the top of a stake 2 inches in diameter set flush with the ground. The following true bearings were determined: top of cross on Catholic church,  $120^{\circ} 13' \cdot 9$ ; top of spire of Baptist church,  $139^{\circ} 24' \cdot 2$ ; bottom of flagstaff on public school,  $150^{\circ} 43' \cdot 2$ .

*Three Rivers, Que., 1918.*—The station is approximately a relocation of the C.I. station of 1906 and the D.O. station of 1912. It is in the cemetery, which is south of the convent of "Precious Saints," and is southwesterly from the entrance, 85.5 feet northwesterly from the southeast corner and 52.6 feet west of the iron fence along the east side of the cemetery. The following true bearings were determined: cross on spire of church,  $45^{\circ} 14' \cdot 0$ ; cross on spire of cathedral,  $90^{\circ} 05' \cdot 4$ ; top of easterly spire of church,  $150^{\circ} 05' \cdot 2$ ; top of westerly spire of church,  $151^{\circ} 10' \cdot 9$ .

*Thunder River, Que., 1909.*—The station is northwest of the harbour, in a small field belonging to Le Boutellier Bros., which is the second north from the St. Lawrence. It is about 200 feet west of a small barn and about 1,000 feet east of the telegraph office. The point is marked by a stake 3 inches in diameter and projecting 8 inches above the surface, and is 115.5 feet west of the east fence and 127.5 feet north of the south fence. There is a rock exposure about 20 feet to the northeast. The following true bearings were determined: top of belfry on Le Boutellier Bros. storehouse,  $97^{\circ} 29' \cdot 5$ ; spire on Catholic church,  $101^{\circ} 52' \cdot 7$ ; west gable of landing stage on west side of harbour,  $115^{\circ} 06' \cdot 2$ ; east gable of telegraph office,  $260^{\circ} 42' \cdot 8$ ; north gable of storm-signal house,  $301^{\circ} 22' \cdot 7$ .

*Tilley, Alta., 1919.*—The station is near the west side of the townsite just at the end of the street which is the second north of the C.P.R. tracks. It is 27 feet east of the fence along the west limit of the townsite and 17.5 feet south of the produced line of the north side of the second street north of the railway tracks. The following true bearings were determined: pole on C.P.R. water-tank,  $130^{\circ} 29' \cdot 7$ ; north gable of elevator,  $137^{\circ} 21' \cdot 8$ ; west gable of C.P.R. depot,  $147^{\circ} 06' \cdot 3$ ; west gable of C.P.R. land-office building,  $170^{\circ} 35' \cdot 8$ .

*Timmins, Ont., 1913.*—The station is on the athletic field, about 1,000 feet southwest of the T. & N.O. depot. It is near the inner edge of a cleared space, which is intended for a race-course. The point is south of and in line with a row of electric light poles on the east side of Balsam street, 225 feet south of the south side of Second avenue, and is



marked by a stake 3 inches in diameter driven flush with the ground. The following true bearings were determined: south gable of Goldfields hotel,  $29^{\circ} 14' \cdot 6$ ; bottom of pole on T. & N.O. water-tank,  $68^{\circ} 52' \cdot 8$ ; tip of tank on hill south of the Hollinger Mine Co.'s building,  $94^{\circ} 18' \cdot 4$ ; chimney on south end of house near water-tank on hill,  $95^{\circ} 48' \cdot 2$ .

*Tionaga, Ont., 1916.*—The station is about one-quarter of a mile northwest of the C.N.R. section-house, on a partially cleared space on the north side of a contracted portion of a small lake, and southwest of an abandoned camp. It is 20 feet south and 93 feet west of the southwest corner of the largest log building, 240 feet from the water's edge on the east and 51 feet from the water's edge on the south. The point is marked by a stake 3 inches in diameter and projecting 3 inches above the surface. The top of the pole on the C.N.R. water-tank bears  $54^{\circ} 48' \cdot 1$ .

*Tisdale, Sask., 1911.*—The station is near the northwest corner of the SE.  $\frac{1}{4}$  sec. 1, tp. 45, rge. 15, W. 2nd mer. It is southwest of the town and north of the race-course, in line with the south side and 600 feet east of the southeast corner of the English church, 330 feet southeast from the southeast corner of a school and 35 feet north of the north side of the race-track. A stake 2 by 2 inches and projecting 2 inches above the surface marks the point. The following true bearings were determined: east gable of Methodist church,  $268^{\circ} 37' \cdot 0$ ; east gable of English church,  $271^{\circ} 38' \cdot 6$ ; east gable of school,  $290^{\circ} 53' \cdot 8$ ; tip of C.N.R. depot,  $297^{\circ} 47' \cdot 0$ ; tip of spire on Presbyterian church,  $311^{\circ} 54' \cdot 9$ .

*Tring Junction, Que., 1907.*—The station is located about 250 yards west of the Q.C. tracks, in a field. It is 34 feet east of the old roadbed of the Q.C., and 139 feet south of the northerly fence of the field. The spire of the Roman Catholic church at St. Frederick, two miles distant, bears  $29^{\circ} 58' \cdot 3$ .

*Trois Pistoles, Que., 1912.*—The station is about one-half mile north of the I.C.R. tracks and near the government wharf. It is on the west side of the bay on property of Mr. Joseph Rioux, in the second field south of the road which passes a row of cottages along the St. Lawrence river. It is 278 feet south of the fence along the south side of the above-mentioned road, 16 feet south of the fence on the north side of the field, 46 feet east of the west fence and 66 feet west of the fence on the east side. The east side of the field is adjacent to the road leading from the village to the wharf. The point is marked by a stake  $1\frac{1}{2}$  by  $1\frac{1}{2}$  inches driven flush with the ground. The following true bearings were determined: tip of water-tank,  $107^{\circ} 15' \cdot 8$ ; top of spire on east end of Catholic church,  $127^{\circ} 55' \cdot 2$ ; top of spire on middle of Catholic church,  $129^{\circ} 26' \cdot 7$ ; top of statue on west end of Catholic church,  $130^{\circ} 52' \cdot 6$ .

*Truro, N.S., 1920.*—The station of 1912 and 1918 was reoccupied. It is near the entrance to Victoria park, and is about 200 feet east and 615 feet south of the southeast corner of the intersection of Brunswick street and Outram street. There are three electric light poles in line across the front of the park and almost in line with the middle of the bridge over the creek which flows through the park. The station is 192 feet southwesterly from the most easterly one of these poles, 135 feet southerly from the middle one, and 87.5 feet easterly from the row of small trees on the east side of the driveway which is along the west side of the park. The point is marked by a stake 2 by 3 inches set flush with the ground. The following true bearings were determined: pole on C.G.R.

depot,  $325^{\circ} 10' \cdot 2$ ; pole on tower of Learmont hotel,  $336^{\circ} 16' \cdot 3$ ; chimney on middle of house on hill,  $194^{\circ} 55' \cdot 4$ .

*Twin City Junction, Ont., 1918.*—The D.O. station of 1916 was reoccupied. It is in the City of Fort William park, the west limit of which is about 1,600 feet east of the C.N.R. depot, and the south limit is adjacent to the north side of the government road allowance which is along the north side of the C.N.R. right-of-way; it is 472 feet north of the fence along the north side of the C.N.R. right-of-way and 299 feet east of the wire fence along the west side of the road which passes the west side of the park. The point is marked by a stake 3 inches in diameter and projecting 2 inches above the surface. The first white post east of the depot on the south side of the railway tracks bears  $245^{\circ} 17' \cdot 9$ .

*Vancouver, B.C., 1915.*—The station is a relocation of the station of 1908. It is on the government lighthouse reserve, on which is also the Dominion Observatory astronomical station, which is used as a reference station for longitudes in British Columbia. It is 43 feet southerly from the southwest corner of the observatory building (office part), and 8 feet due west from the produced line of the west of the building. The following true bearings were determined: north spire of church across harbour,  $50^{\circ} 18' \cdot 2$ ; south spire of church across harbour,  $50^{\circ} 26' \cdot 4$ ; bottom of flagstaff across harbour,  $51^{\circ} 00' \cdot 2$ .

*Vanderhoof, B.C., 1915.*—The station is about one-quarter of a mile southeast of the G.T.P. depot. It is near the southeast corner of the intersection of Ryley avenue and Fourth street. The point is 31 feet south of the south side of Fourth street and 45 feet east of the east side of Ryley avenue, and is marked by a stake 2 by 3 inches driven to within 4 inches of the surface. The following true bearings were determined: east gable of Egan block,  $286^{\circ} 22' \cdot 1$ ; southwest corner of Vanderhoof hotel,  $317^{\circ} 47' \cdot 3$ ; pipe near centre of G.T.P. water-tank,  $325^{\circ} 15' \cdot 3$ .

*Vegreville, Alta., 1919.*—Reoccupied the station of 1911. It is in an open field northeast of the town, about 2,000 feet northeast of the C.N.R. depot, about 1,600 feet northwest of the Catholic church buildings, and about 1,900 feet north of the C.N.R. water-tank which is at the intersection of the railway right-of-way and the government road allowance. The field is adjacent to the north side of a row of lots on the north side of the first street north of the one in front of the Catholic church. The observations were taken over a copper nail in the top of a stake 2 by 2 inches set flush with the ground, the point being 45.5 feet east of the fence along the east side of the government road and 176 feet north of the south side of the field. The following true bearings were determined: cross on tower of convent,  $109^{\circ} 52' \cdot 9$ ; cross on Catholic church,  $114^{\circ} 32' \cdot 9$ ; pole on C.N.R. water-tank,  $181^{\circ} 10' \cdot 1$ ; tip of town water-tank,  $221^{\circ} 21' \cdot 0$ ; flagstaff on school,  $223^{\circ} 28' \cdot 1$ .

*Vermilion, Alta., 1911.*—The station is near the middle of SE.  $\frac{1}{4}$  sec. 31, tp. 50, rge. 6, W. 4th mer. and west of the town. It is about 10 feet north of the north side of the continuation of the street passing along the south side of the English church, about 1,350 feet west of the English church and about 460 feet north of the north side of the C.N.R. right-of-way. There is a ravine a short distance west of the station. The point is marked by a stake 2 inches in diameter and projecting 3 inches above the surface. The following true bearings were determined: spire of Methodist church,  $83^{\circ} 59' \cdot 8$ ; tip

of cross on English church,  $88^{\circ} 12' \cdot 1$ ; pole on front of Vermilion hotel,  $97^{\circ} 47' \cdot 3$ ; north gable of flour-mill,  $114^{\circ} 01' \cdot 9$ ; pole on C.N.R. water-tank,  $116^{\circ} 39' \cdot 7$ .

*Vermilion Bay, Ont., 1910.*—The station is about 400 feet north of the C.P.R. tracks; is 6 feet west of being in line with the west side of the Grand Trunk House, and 158 feet north of the northwest corner of the main part of the building. It is 30 feet west of the produced line of the west side of the depot, and is 288 feet north of the fence along the north side of the C.P.R. yard. A stake 2 by 2 inches, and 2 inches above the ground, marks the point. The following true bearings were determined: east gable of freight-shed,  $214^{\circ} 52' \cdot 5$ ; top of pole on railway water-tank,  $204^{\circ} 43' \cdot 3$ ; east gable of depot,  $165^{\circ} 59' \cdot 1$ .

*Victoria, B.C., 1919.*—The station is approximately a relocation of the C.I. station of 1907. It is on an open strip of land between Dallas road and the seashore, and between Dallas avenue and Government street extended, 12 feet from the edge of the bluff and 42 feet east of the line, produced, of a row of poles which are on the east side of Government street and seen over the shrubbery on the south side of Dallas road. The point is marked by a copper nail in the top of a stake 2 by 2 inches set flush with the ground. The following true bearings were determined: flagstaff in Dr. Milne's yard,  $64^{\circ} 50' \cdot 5$ ; Race Rocks lighthouse,  $223^{\circ} 14' \cdot 6$ ; top of buoy on Brocthy ledge,  $252^{\circ} 19' \cdot 2$ ; top of lighthouse on outer wharf,  $288^{\circ} 12' \cdot 9$ .

*Virden, Man., 1910.*—The station is located near the northeast corner of the agricultural grounds. It is about 70 feet outside of the race-track, 57 feet west of the fence on the east side and 63 feet south of the fence on the north side of the grounds. The top of the C.P.R. depot may be seen a little to the left of the pole on the Alexandra hotel. The point is marked by a stake 2 by 2 inches which projects 1 inch above the ground. The following true bearings were determined: bottom of pole on C.P.R. water-tank,  $248^{\circ} 27' \cdot 0$ ; bottom of pole on Alexandra hotel,  $269^{\circ} 32' \cdot 9$ ; east gable of Ogilvie's elevator,  $276^{\circ} 57' \cdot 6$ ; east gable of Imperial Elevator Co.'s elevator,  $290^{\circ} 30' \cdot 3$ .

*Vivian, Man., 1914.*—The station is about 650 feet northwest of the N.T.R. depot. It is in the middle of a street clearing which extends from the north limit of the railway yards to the government road about one-fourth of a mile distant. The point is 243 feet west of the west side of the depot and 440 feet north of the north limit of the railway yards, and is marked by a stake 2 inches in diameter and projecting 3 inches above the surface. The following true bearings were determined: top of pipe on pump house,  $136^{\circ} 40' \cdot 5$ ; tip of pole on centre of water tank,  $138^{\circ} 29' \cdot 1$ .

*Wabamun, Alta., 1919.*—The station of 1913 was reoccupied. It is approximately on the centre line of Main street produced north across Third avenue, being 135 feet north and 34 feet west of the southeast corner of the intersection of Main street and Third avenue, and 62 feet south and 13 feet west of the southeast corner of a dancing pavilion. The point is marked by a stake 2 inches in diameter set flush with the ground. The following true bearings were determined: circular chimney on telephone building,  $172^{\circ} 53' \cdot 1$ ; east gable of Wabamun Trading Co.'s store,  $180^{\circ} 42' \cdot 5$ ; east gable of drug store,  $180^{\circ} 50' \cdot 5$ ; lightning rod on east end of drug store,  $180^{\circ} 52' \cdot 7$ .

*Wabigoon, Ont., 1910.*—The station is 34 feet south of the foot of a ridge of rock which terminates Stanlev avenue at its northerly end, and is in line with the fence on the



easterly side of the street. The point is marked by a stake 2 by 3 inches and projecting 3 inches above the ground. The following true bearings were determined: top of cross on English church,  $135^{\circ} 08' \cdot 3$ ; pole on Imperial hotel,  $151^{\circ} 05' \cdot 1$ ; gable of house on southerly side of bay,  $196^{\circ} 44' \cdot 5$ .

*Walsh, Alta., 1911.*—The station is south of the C.P.R. tracks and east of the town, being almost in line with the west end of the freight-shed. A line joining the station with the west end of the freight-shed passes about 21 feet west of the Dominion Observatory astronomic station of 1910. The point is 268 feet south of the south limit of the railway yards, and is marked by a stake 2 by 2 inches projecting 3 inches above the surface. The following true bearings were determined: east chimney of farm house,  $173^{\circ} 00' \cdot 6$ ; east gable of school,  $258^{\circ} 01' \cdot 6$ ; northeast corner of hotel,  $279^{\circ} 17' \cdot 0$ ; west gable of freight-shed,  $00^{\circ} 03' \cdot 6$ .

*Wapella, Sask., 1910.*—The station is northeast of the town near the northwest corner of the agricultural grounds. It is 51 feet south of the north fence and 156 feet east of the west fence. The point is marked by a stake 4 by 4 inches and projecting 4 inches above the ground. The following true bearings were determined: north gable of elevator No. 158,  $137^{\circ} 10' \cdot 9$ ; top of pole on C.P.R. water-tank,  $259^{\circ} 58' \cdot 9$ ; bottom of spire on English church,  $272^{\circ} 54' \cdot 7$ ; tip of belfry on school,  $287^{\circ} 39' \cdot 1$ .

*Wapitagan, Que., 1909.*—The station is on the southeastern part of Wapitagan island, being on that part of the island which lies adjacent to the south side of Wapitagan harbour. There is a small island to the east, on which is a range for service to boats entering the harbour by the eastern passage. Both sections of the range may be seen over the southeastern part of the island on the south side of the harbour, the southerly one being slightly to the left of a mass of rock which is 45 feet southeast of the station. On the westerly side, and about 10 feet distant from the point, is a rocky cliff which rises gradually to a height of about 40 feet. The westerly extremity of a small islet is about 25 feet northeast of the station, which is marked by a stake 4 inches in diameter and projects 2 feet above the surface. The following true bearings were determined: bottom of north section of range,  $79^{\circ} 30' \cdot 8$ ; bottom of south section of range,  $93^{\circ} 45' \cdot 6$ .

*Warman, Sask., 1919.*—The station of 1911 was reoccupied. It is near the south side of sec. 5, tp. 39, rge. 3, W. 3rd mer. in line with the north side of school, 450 feet west of the west fence around the school grounds, about 20 feet west of the edge of a slough and 450 feet north of the telephone line, which is on the road allowance between tp. 38 and tp. 39. The point is marked by a stake 2 by 2 inches and projecting 2 inches above the surface. The following true bearings were determined: pole on tower of school,  $92^{\circ} 46' \cdot 1$ ; pole on C.N.R. depot,  $142^{\circ} 02' \cdot 5$ ; pole on elevator,  $204^{\circ} 05' \cdot 0$ .

*Warren, Man., 1916.*—The station is on C.N.R. property, which is diagonally opposite the grounds of the Warren consolidated school and about one-quarter of a mile west of the depot. It is 127 feet east of a wire fence along the east side of the road allowance, which is along the west side of the property, and 83 feet north of the fence along the road allowance on the south. The point is marked by a stake 2 by 2 inches projecting 2 inches above the surface. The following true bearings were determined: top of spire on tower of Methodist church,  $101^{\circ} 49' \cdot 2$ ; chimney on east end of white house about a mile distant,



179° 44'·9; southeast corner of school building, 229° 54'·7; northwest corner of school building, 237° 45'·8.

*Wayland, Ont., 1910.*—The station is 244 feet southwesterly from the southwesterly corner of the C.P.R. depot. From the station all of the depot except the southerly end is hidden from view by a large boulder, which is about 94 feet distant in a northeasterly direction. The following true bearings were determined: chimney on C.P.R. water-tank, 19° 14'·2; south gable of C.P.R. depot, 41° 57'·8.

*Wetaskiwin, Alta., 1911.*—The station is near the northeast corner of the agricultural grounds, being 105 feet south of the north fence and 70 feet west of the fence on the east side of the grounds; in line with east end and 160 feet north of the northeast corner of the stock-barn. A stake 2 by 4 inches projecting 4 inches above the ground marks the point. The following true bearings were determined: pole on King Edward school, 223° 57'·4; pole on court-house, 246° 13'·9; pole on Alexandra school, 255° 47'·9; tip of water-tank, 274° 21'·0.

*Weymouth, N.S., 1912.*—The station is on property belonging to Mr. James Dunbar, about 600 feet northeast of the Episcopal church, and in line with the north side of a lane which is on the south side of Mr. Harry Hoyt's lot. The point is 42·5 feet east of the rear of Mr. Hoyt's lot, and is marked by a stake 2 inches in diameter driven flush with the ground. The following true bearings were determined: top of north ventilator on school, 156° 08'·0; top of south ventilator on school, 159° 31'·1; cross on spire of Catholic church, 187° 46'·7; top of spire of Episcopal church, 221° 31'·6.

*Whitemouth, Man., 1910.*—The station is northeast of the C.P.R. depot, and about 600 feet north of the railway tracks, being on property belonging to Mr. McKinley. It is at the summit of a slope adjacent to the river, and is 15 feet north of a fence which marks the north limit of the first enclosure north of the main street of the village. It is 75 feet west of a gate which is on the west side of the lane running from the main street to the river; 140 feet northeast of a church, and about 225 feet west of the C.P.R. pump-house. A stake 2 inches in diameter and projecting 4 inches above ground marks the point. The following true bearings were determined: top of pole on C.P.R. water-tank, 215° 34'·0; pole on east end of C.P.R. depot, 233° 41'·4.

*White River, A. Ont., 1910.*—The station is probably within 20 feet of the C.I. station of 1906. It is 110·5 feet east of the Y.M.C.A. building and slightly to the north of a line extending from, and at right angles to, the middle of the eastern side of the building. It is 152·5 feet southeasterly from the southeast corner of the Methodist church. The following true bearings were determined: tip of ventilator on roundhouse, 296° 54'·6; tip of pole on C.P.R. water-tank, 307° 45'·6; chimney on English church, 337° 55'·5; spire of Catholic church, 342° 31'·6.

*White River, B, Ont., 1918.*—The station of 1910 being no longer available, a new station was selected about one-quarter of a mile north of the original station, and a short distance southeast of the Catholic church. It is 60·5 feet southerly and 151 feet easterly of the southeast corner of the church, and is marked by a copper nail in the top of a stake 3 inches in diameter and projecting 1 inch above the surface. The following true bearings were determined: spire of Presbyterian church, 170° 02'·9; tip of ventilator on C.P.R.

shops,  $203^{\circ} 37'.6$ ; pole on centre of C.P.R. water-tank,  $209^{\circ} 14'.0$ ; southwest corner of Catholic church,  $264^{\circ} 15'.0$ .

*White Shore Lake, Que., 1914.*—The station is on the shore of White Shore lake and north of a group of buildings known as the Residency, which are about one-quarter of a mile north of the N.T.R. tracks. It is on a semi-circular strip of land projecting slightly into the lake, the edge of the strip being lined with boulders. The point is 45 feet west of the easterly edge, 45 feet east of the westerly edge and 18 feet south of the northerly edge of the strip. Marked point with a stake projecting 2 inches above the surface. The following true bearings were determined: north gable of building used as an office,  $187^{\circ} 02'.9$ ; iron peg in rock in lake about 200 feet from shore,  $341^{\circ} 15'.9$ .

*Williams Lake, B.C., 1908.*—The station is southwest of the town on property belonging to the Cariboo Trading Co. It is about 132 paces west of the government road, and a line joining it with the centre of the school passes over the entire length of a fairly large irrigation ditch. A telegraph pole obscures the lower part of the pole on the top of the school. The station is 87 feet from the point where the ditch branches into two, one taking a northwest direction and the other a southwest one. The point is marked by a brass nail in a fir post 4 by 4 inches and projecting 7 inches above the surface. The magnetic observations were taken 25 feet northwest from the station and in line with chimney on large frame house. The following true bearings were determined from the transit station: bottom of pole on C.T.Co's barn,  $7^{\circ} 52'.5$ ; top of small pole on school,  $88^{\circ} 20'.5$ ; top of north chimney on large frame house,  $157^{\circ} 48'.0$ ; bottom of pole over bay-window of white house west of hotel,  $353^{\circ} 21'.9$ .

*Windigo, Que., 1914.*—The station is northeast of a group of buildings belonging to the Brown Bros. Pulp Co. on the west bank of the St. Maurice river, and almost opposite the middle of the Windigo river, where it empties into the St. Maurice on its east side. The point is 64 feet west of the edge of the bank along the St. Maurice river, 237 feet north of the north side of a frame building containing office and sleeping apartments, in line with the east side of the building, and is marked by a stake 2 inches in diameter and projecting 2 inches above the surface. The following true bearings were determined: north gable of office building,  $162^{\circ} 43'.7$ ; north gable of cook-house,  $183^{\circ} 37'.6$ ; north gable of store-house near railway,  $188^{\circ} 39'.4$ .

*Windsor, N.S., 1912.*—The station is on government property, and is southwesterly from the site of the old fort, being about 500 feet southwesterly from the block-house, 57 feet east and 77 feet south of the southeast corner of the grounds around the drill-hall, and 55.5 feet east of the east side of a tennis court. The point is marked by a stake 2 by 3 inches driven flush with the ground. The following true bearings were determined: east gable of old house north of block-house,  $2^{\circ} 25'.3$ ; spire of Methodist church,  $149^{\circ} 09'.5$ ; spire of Presbyterian church,  $150^{\circ} 43'.5$ ; northeast corner of drill-hall,  $280^{\circ} 59'.2$ .

*Windsor, Ont., 1920.*—The station of 1920 is about 500 yards east of the D.O. station of 1910, which is no longer available. It is situated in a field belonging to the General Motors Corporation of Canada. The field is the third east of Lincoln road, on the north side of Tecumseh road and immediately west of the Walker cattle barns. The station is 105.8 feet from the southern boundary fence (high red board fence) and 47.2 feet

from the western boundary fence. The magnetometer was placed 13.5 feet behind transit and in line with church spire. The following true bearings were determined from the transit station: ball on water-tank, Maxwell-Chalmers Motor Co.,  $257^{\circ} 34' .1$ ; spire of church (St. Alphonse),  $296^{\circ} 17' .8$ ; spire on tall building in Detroit,  $313^{\circ} 42' .3$ .

*Wingham, Ont., 1910.*—The station is situated on a small field at the northeast corner of the intersection of St. Patrick street and Carling avenue. The transit was placed 78 feet from the northerly limit of St. Patrick street and 62.5 feet from the easterly limit of Carling avenue. The magnetometer was placed 15 feet behind transit and in line with transit and lightning rod on south end of red barn north of tracks. The following true bearings were determined from the transit station: top of G.T.R. semaphore,  $45^{\circ} 41' .3$ ; east side of water-tower,  $204^{\circ} 04' .8$ ; lightning rod on south end of red barn north of tracks,  $348^{\circ} 32' .8$ .

*Winnipeg, Man., 1919.*—The C.I. station of 1906 was again reoccupied. It is in River park, about one-half mile east of the park entrance, in the first cleared space beyond the grove of small trees that surround the entrance. It is about 15 paces from the top of the north bank of the Red river and in line of the fence bounding the buffalo pasture on the side adjacent to the river. It is about 330 feet southwest of the south corner of the pasture. Two grain elevators in the distance, and a small red barn in the pasture are seen nearly in line from the station. A brass peg in the top of a marble post 2 by 2.7 inches set flush with the ground marks the point. The following true bearings were determined: pole on water-tank in distance,  $23^{\circ} 37' .6$ ; smokestack near elevator,  $39^{\circ} 16' .2$ ; flagstaff on tower of red brick building,  $51^{\circ} 37' .2$ .

*Wolseley, A, Sask., 1919.*—Station A is a relocation of the station of 1910. It is north of the town near the north end of the street passing the town hall. It is west of and in line with the south side of a white cottage, about 520 feet north of the street passing along the north side of court-house and 40 feet east of the fence along the west side of the street on which it is located. The following true bearings were determined: spire on dome of court-house,  $170^{\circ} 20' .5$ ; bottom of pole on C.P.R. water-tank,  $179^{\circ} 42' .6$ ; tip of tower on town hall,  $182^{\circ} 29' .2$ ; bottom of flagstaff on bell-tower of town hall,  $183^{\circ} 31' .3$ ; cross on Catholic church,  $243^{\circ} 44' .5$ .

*Wolseley, B, Sask., 1919.*—Station B is about five-eighths of a mile southeasterly from the former station which is at present not very suitably located. It is in the agricultural grounds near the northeast corner, being 110 feet south of the fence on the north and 137 feet west of the fence along the east side of the grounds. The point is marked by the intersection of two grooves in the top of a brick set flush with the ground. The following true bearings were determined: flagstaff on bell-tower of town hall,  $333^{\circ} 20' .0$ ; tip of tower of northeast corner of town hall,  $334^{\circ} 42' .7$ ; spire of church,  $2^{\circ} 12' .2$ .

*Woman River, Ont., 1913.*—The station is about 800 feet northeast of the C.P.R. depot on the summit of the first small hill lying to the north of the C.P.R. section-house. The point is approximately in the middle of a clearing, and the western slope of the hill opposite the station is quite clear of trees, so that the C.P.R. depot and water-tank can be seen clearly. It is about 250 feet north of the section-house, which may be seen, though not plainly, through the trees on the south slope of the hill. A stake  $1\frac{1}{2}$  by  $1\frac{1}{2}$  inches and projecting 2 inches above the surface marks the point. The following true

bearings were determined: northeast edge of chimney on section-house,  $191^{\circ} 30' \cdot 9$ ; top of smoke pipe on C.P.R. water-tank,  $257^{\circ} 49' \cdot 1$ ; east gable of C.P.R. depot,  $269^{\circ} 53' \cdot 1$ .

*Woodstock, N.B., 1918.*—The station is a relocation of the D.O. station of 1912. It is in the northwestern part of the town in an open field used as golf grounds. It is on a slight elevation about 160 feet northeast of the front entrance to the grounds, the entrance being at the north end of Orange street and about 120 feet north of the north side of Elm street. The point is 144 feet north of the north end of Mr. T. A. Lindsay's lot and 25 feet west of the fence which is a continuation of the fence on the east side of the lot. A copper nail in the top of a stake 3 by 3 inches set flush with the ground marks the point. The following true bearings were determined: spire on Baptist church,  $129^{\circ} 10' \cdot 8$ ; spire on Presbyterian church,  $141^{\circ} 17' \cdot 0$ ; south gable of the golf club-house,  $347^{\circ} 01' \cdot 7$ .

*Woodstock, Ont., 1910.*—The station is situated in a small pasture field belonging to Mr. Hart. This field is on the south side of a short street running easterly from the street bounding Woodstock College grounds on the east and adjoins Mr. Hart's house and lot at the intersection of the above-mentioned streets. The transit was placed 51.5 feet from the westerly boundary fence and 75 feet from the southerly limit of the above-mentioned short street. The magnetometer was placed 13.8 feet behind the transit and in line with transit and top of tower of Woodstock college. The following true bearings were determined from the transit station: top of Hydro-Electric tower,  $190^{\circ} 13' \cdot 0$ ; top of tower of Woodstock college,  $257^{\circ} 26' \cdot 3$ ; smokestack on grist-mill,  $318^{\circ} 29' \cdot 1$ .

*Yahk, B.C., 1915.*—The station is about one-quarter of a mile east of the C.P.R. depot. It is on the north side of a road leading to a saw-mill, and on the west side of the main channel of the Moyie river, 150 feet north of the north side of the bridge over the main channel of the river and 7 feet west of the edge of the bank along the river. A stake 3 inches in diameter and projecting 3 inches above the surface marks the point. The following true bearings were determined: whistle on saw-mill,  $50^{\circ} 29' \cdot 9$ ; south gable of saw-mill,  $50^{\circ} 37' \cdot 5$ .

*Yarmouth, N.S., 1912.*—The station is in the athletic field, being 52.5 feet south of the north side of the field and 133 feet west of the east side. The following true bearings were determined: spire on Baptist church,  $199^{\circ} 44' \cdot 5$ ; spire on Methodist church,  $239^{\circ} 31' \cdot 3$ ; spire on Jewish synagogue,  $279^{\circ} 46' \cdot 7$ ; spire of Trinity church,  $344^{\circ} 17' \cdot 9$ .





