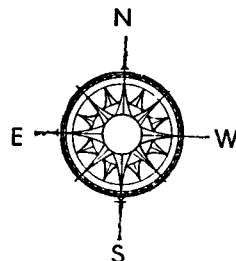


The Nova Scotian Surveyor

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ELIMINATING THE FURTHER USE OF MAGNETIC BEARINGS

The original layouts of townships and land grants in Nova Scotia were based on Magnetic Bearings. Until very recently nearly all descriptions for property conveyances were made in the same manner, and unfortunately quite a number still are.

This Association has taken the lead in the change over to the use of Astronomic Bearings, in property surveys and descriptions. Our efforts have met with considerable success, but there is still much to be done, and we should not rest until the use of Magnetic Bearings in surveys and conveyances has been entirely eliminated.

One obstacle to overcome is to clear up the impression that True Bearings for all surveys and descriptions would mean an enormous increase in costs. Quite the reverse is true, the fact being that the ultimate result would mean cheaper and of course far better surveys and descriptions. Inaccurate and unreliable Magnetic Bearings on boundary surveys are the source of perpetual property line disputes, increasing in direct ratio with the increase in land values.

Land ownership here is based on the location of ground monuments. The bearings and distances recorded in grants or other property conveyances are for the purpose of defining, locating, or relocating these monuments, therefore the need for standard survey monuments, set by the surveyor at the time of survey, is obvious.

Let us now consider what standard of accuracy we should set when Astronomic Bearings are applied to property boundary surveys. In this connection I should like to call your attention to the excellent paper read by Mr. L. C. Higbee, President of W. and L. E. Gurley Co. In his paper, read at the last annual meeting of The Canadian Institute of Surveying and Photogrammetry, Mr. Higbee quoted the opinion of The American Congress of Surveying and Mapping, expressed in their publication "The Technical Standards For Property Surveys" was that a minimum of 1:10,000 should be maintained. Continuing, Mr. Higbee then gave the opinion of Mr. S. E. Huey, an eminent surveyor of wide experience, from Monroe, Louisiana. In Mr. Huey's opinion inflexible standards were not the answer to the problem. He believed the surveyor's judgment was a very important factor, when considering the required standards of accuracy for any survey.

There is little doubt that a standard of 1:10,000 here is for the time being at least, somewhat high. I believe however that a standard should be set, and submit for your careful consideration that the limit of error for Astronomic Bearings on property boundary lines should be confined to one minute or less.

The actual method of taking the observation is not important, so long as the desired standard is maintained. Solar observations are quite adequate if properly taken, and a number of surveyors prefer them. I do not. My preference is Polaris in the late afternoon or early evening, which for ease, speed, and simplicity, cannot, in my humble opinion, be equalled. A description of this method will appear, in this issue, if space allows, or if not, in the next issue of the quarterly.

J. E. R. March

TABLE NO. 1 A

CORRECTION FOR TIME
At 3 min. 56.6 sec. per day

Number of Days	Correction	
	Minutes	Seconds
1 — —	3	56.6
2 — —	7	53.2
3 — —	11	49.8
4 — —	15	46.4
5 — —	19	43.0
6 — —	23	39.6
7 — —	27	36.2
8 — —	31	32.8
9 — —	35	29.4
10 — —	39	26.0

TABLE NO. 1 B

CORRECTION FOR ACCELERATION OF TIME
At 9.86 Seconds per Hour

Number of Hours	Correction	
	Minutes	Seconds
1/6 (10 min)	0	1.64
1/4 (15 ")	0	1.64 <i>2.46</i>
1/2 (30 ")	0	4.93
1 hour	0	9.86
2 "	0	19.72
3 "	0	29.58
4 "	0	39.44
5 "	0	49.30
6 "	0	59.16
7 "	1	9.02
8 "	1	18.88
9 "	1	28.74
10 "	1	38.60
11 "	1	48.46
12 "	1	58.32
13 "	2	8.18
14 "	2	18.04
15 "	2	27.90
16 "	2	37.76
17 "	2	47.62
18 "	2	57.48
19 "	3	7.34
20 "	3	17.20
21 "	3	27.06
22 "	3	36.92
23 "	3	46.78
24 "	3	56.60

TABLE NO. 2

CORRECTION FOR LONGITUDE
At 4 minutes per degree

No. 2 A
Correction For Each Degree
From
Long. 67 00 (Most W'ly position in Nova Scotia)
To
Long. 59 00 (Most E'ly position in Nova Scotia)

From Long. 75 00 To Longitude	Number of Degrees	Correction Hours	Correction Minutes
67 00	8	0	32
66 00	9	0	36
65 00	10	0	40
64 00	11	0	44
63 00	12	0	48
62 00	13	0	52
61 00	14	0	56
60 00	15	1	00
59 00	16	1	4

NO. 2 B

Correction For Each Minute of Longitude From 1 Min. to 60 Min.

Minutes of Longitude	Corr. Min. Sec.
1	0 4
2	0 8
3	0 12
4	0 16
5	0 20
6	0 24
7	0 28
8	0 32
9	0 36
10	0 40
20	1 20
30	2 00
40	2 40
50	3 20
60	4 00

NO. 2 C

Correction For Each Second of Longitude From 1 Sec. to 60 Sec.

Seconds of Longitude	Corr. Seconds
1	0.06
2	0.13
3	0.20
4	0.26
5	0.33
6	0.40
7	0.46
8	0.53
9	0.60
10	0.66
15	1.00
20	1.33
30	2.00
40	2.66
50	3.33
60	4.00

EXAMPLE

Required the Local Sidereal Time in Longitude 63 35 17, at 8.45 p. m. Atlantic Daylight Saving Time, July 30th, 1955.

(Longitude scaled from new map)

FROM FIELD TABLES SUPPLIED

	Hours	Minutes	Seconds
Sidereal Time at Noon, Eastern Standard Time (75 Long.) July 21st, 1955	7	54	45
Noon July 21st to Noon July 30th	9 days.		
9 days correction for time, TABLE 1 A.,		35	29.4
<hr/>			
Sidereal Time at Noon Eastern Standard Time July 30th	8	30	14.4
8.45 Atlantic Daylight Saving Time is 6.45 Eastern Standard Time,	6	45	
<hr/>			
	15	15	14.4

Acceleration of Time (6 hrs. 45 min.)

TABLE 1 B.

	Min.	Sec.			
6 Hours	0	59.16			
45 Minutes	0	7.39			
<hr/>					
	1	6.55	add
					1 6.5
<hr/>					
					15 16 20.9

Correction for Longitude (63 35 17)

75 00 00
 63 35 17

 11 24 43

	Hrs.	Min.	Sec.			
11 00 00	0	44	00			
24 00	0	1	36			
43	0	0	2.86			
<hr/>						
		45	38.86	add
						45 38.9
<hr/>						
						16 01 59.8

Altitude and Azimuth of Polaris then taken from FIELD TABLES.

Latitude scaled from new map and corrected for Altitude of Polaris taken from FIELD TABLES, should agree with observed altitude minus one minute for refraction.

NOTICE: to all members of the Association

**You are requested to send in materials for the Nova Scotia Surveyor to R. E. Millard
 P. L. S., Editor, Liverpool, N. S. Every item will be carefully read and considered.**

POLARIS AT DUSK

NOTES FROM THE PRESIDENT J. R. MARCH, P. L. S.

Observations on Polaris at any time except at or near elongation have until recently been looked upon with some disfavor by many surveyors here, and for several very good reasons.

Latitude and time could not be obtained with sufficient accuracy unless special observations were made for these quantities, as no reliable maps were available for Latitude, and time unless obtained from direct observations was uncertain. Watch time was not too reliable. The computed local time was dependent on Longitude scaled from maps of very doubtful accuracy. The surveyor found it easier to take the observation at elongation at some unholy hour, or not take it at all.

Let us look at our position now.

Maps

It may come as a pleasant shock to suddenly realize that this Province only a few years ago equipped with maps that left so much to be desired, now has complete coverage with maps from which Latitude and Longitude can be scaled anywhere with confidence, to within a few seconds.

Time

Turn on radio, short wave band, and listen to that beautiful beep-beep-beep, every second, from the Dominion Observatory.

Astronomical Field Tables

Supplied free by the Legal Surveys and Aeronautical Division, Ottawa and distributed by the Dept. of Lands and Forests, Halifax, N. S. If your name is not on the mailing list, write to that department and have it put on. With the foregoing in view, I submit that for the purpose of obtaining the Astronomic Bearings on boundary lines in this Province to an accuracy of one minute or less, no method is comparable for ease, speed, and simplicity, with the method described in the Astronomical Field Tables mentioned. To make this observation even simpler. I have made out a set of tables that appear on another page of this issue.

By using these tables, Local Sidereal Time may be obtained with no calculations whatever, other than a few sums in simple addition, and one in subtraction.

Furthermore, contrary to the belief held by many, Polaris is easily visible with any ordinary good transit, long before dark, and the whole observation can be taken without artificial light. With the use of maps now available, the Latitude being known, it is therefore a simple matter to set the vertical reading so as to bring the horizontal cross-hair on the Star. The Magnetic Declination for any place in the Province is known now with sufficient accuracy to at least bring the star within the field of vision of the telescope, by use of the Magnetic needle.

There only remains the problem of proper focus, and here, I believe, is the reason many surveyors find it difficult to find Polaris before dark, for the **focus must be exact**. The Moon is sometimes available, and with a clouded or smoked eyepiece, the setting Sun may be used. A distant point on the horizon usually is just not good enough. All too often, any or all the above could not be used anyway, because of the observation being required at a place where they are obscured by trees or other objects.

I have on many occasions suggested to various agents and representatives of some of the better known instrument makers that it would improve their instruments greatly if they would place a block on the focusing slide so that it would be impossible to turn the focusing screw beyond the point of greatest clarity for stellar observations. This of course would be of no aid to the owners of the great many excellent instruments now in use.

To overcome the difficulty in obtaining a perfect focus at or near sunset, I have made an attachment, or gadget, consisting of an adjustable arrow and it is amazing what a help and time saver it turned out to be.

Here are some of the results. On July 12th, 1955, a particularly clear day, I used it in my back yard, having of course preset it. Where the transit was set up there was no opportunity to obtain exact focus without the attachment, or gadget, as I was surrounded by trees and buildings. Using the attachment, I was able to see Polaris at 8.35 A.D.S.T., that is 6.35 Eastern Standard Time sometime before sunset. This was with an ordinary Japanese "Sokkisha" transit. I have taken a number of observations recently when the sky was so hazy that without the attachment I would not have been able to find the Star until a light would have been required for the cross-hairs and the reference mark.

This simple attachment could be made to fit any transit, and it is beyond my understanding why it is not on all of them.

SUMMER EXECUTIVE MEETING

TUESDAY, AUGUST 9th, 1955, 310 ROBIE STREET, HALIFAX

The meeting opened at 2:30 P. M., President, J. R. March.

Those present were:—

R. E. Dickie
R. E. Millard
Major J. A. H. Church
Freeman Tupper
Ronald Chisholm
Herbert Martell
Layton Reid
R. M. Schofield

1. The first item on the agenda was the discussion of preparation re the coming Annual General Meeting. The time of the meeting was discussed. It was suggested that the Nova Scotia Meeting be held near the time of the Annual Meeting of the New Brunswick Land Surveyor's Association.

R. E. Dickie moved that the date of the meeting be in November, the exact date to be determined after consultation with the New Brunswick Association.

Seconded by Major J. A. H. Church. Motion carried.

2. President March asked Herbert Martell to give an account of the branch meeting in Cape Breton. Mr. Martell said that the chief subject discussed was the minimum fee to be adopted by Nova Scotia Surveyors. He said more meetings would have to be held.

Copies of the minimum fee charged by Ontario Surveyors were passed around to those present, and a discussion on same followed.

3. President March read a letter from Pope & Adams, Land Surveyors of Sydney, re persons unqualified as Land Surveyors. A discussion re the above followed. R. E. Millard moved that the above letter be forwarded to Mr. Martell for investigation and report to the Association. Seconded by R. E. Dickie. Motion carried.

4. The subject of the journal "The Nova Scotia Surveyor" was discussed. A request for material for the journal was urged by Mr. March and the Editor-in-Chief, R. E. Millard from among members of the Association.

5. The subject of examinations for Provincial Land Surveyor's Certificates was discussed. A meeting of the Committee is scheduled for the evening of August 9th at the Provincial Building.

6. Ronald Chisholm moved that the next meeting of the Executive be held sometime in October, the exact date to be set by President March. Seconded by Freeman Tupper. Motion carried.

7. A plea for membership was expressed by R. E. Dickie. He felt that all Provincial Land Surveyors should be personally contacted.

8. Herbert Martell brought up the subject of Deed being approved by a Provincial Land Surveyor before being recorded. A discussion followed. President March suggested having the matter discussed at the Annual General Meeting.

The meeting adjourned at 5.45 P. M.

DO YOU USE THE GRADIENTER?

(From "Surveyors Note Book" published by W. & L. E. Gurley, Troy, N. Y.)

"Very few field men realize the value of the grader," says Henry M. Stanley, Construction Engineer for The Virginian Railway Company. "But, in rough terrain, the addition of a grader screw to a transit can save many a headache.

"When neither tape nor ordinary stadia can do the job, the grader will give you a reading in a few minutes. This method was a real life saver for me when I was with the Forestry Service out through North Carolina, western Virginia and eastern Tennessee.

"Here is how it worked near Roan Mountain, Tennessee. I placed plywood targets, 12 inches in diameter, at the 1-foot and 25 foot marks of the stadia rod on the other side of a ravine. Setting the middle crosshair on the bottom target, I found the grader was at 18. I then brought the middle wire to the top target, using the grader screw, and read 50.5 on the grader. The difference in reading was 32.5 units.

"The angle representing 1 to 100 equals $0^{\circ} 34' 22.5793''$ or $2062.5793''$. A unit on the grader is 1/100 of this or $20.625793''$.

"Using logarithms, I made the following calculations: $20.625793''$ times 32.5 units equals $670.338''$. The subtended interval in the rod was 24'. Therefore, 24 divided by tangent $670.338''$ equals the distance to the rod, $7384.8'$. The vertical angle was $7^{\circ} 10' 20'$. Distance to the rod times cosine $7^{\circ} 10' 20'$ equals $7327.0'$ — the horizontal distance.

"I have done many types of surveying in my day. Each kind requires a good instrument. On my present railroad job, my chief has just turned a new Gurley over to me. I don't believe I've ever had anything better to use.

NEW COMPASS

ON THE MARKET

Box No. 337
Amherst, N. S.
27 June, 1955

R. E. Millard, P. L. S.
Liverpool, N. S.

Dear Mr. Millard:

I have recently received the May Issue of "The Nova Scotia Surveyor" and must congratulate you on the excellent issue. The material contained is of real help to every surveyor and I sincerely hope that this periodical will be of increasing interest and assistance.

The tables of magnetic declinations are of real help and as reports come in and are published giving other localities it will eventually be of great value. I also enjoyed the article by Reg. Dickie which is worth the annual dues at any time.

As you know it has been nearly impossible to get surveyor's compasses. One could get a compass but it would not be in accordance with the Regulations. Either the needle was too short or the plate would only be graduated to single degrees.

Last winter I asked an instrument company if they would make a compass that filled the N. S. requirements and this past week to my surprise I received the first such instrument.

It is divided in quadrants, and graduated to ½ degrees. Has a beautiful 4" needle also variation plate to set off declination. Folding slot and close hair sights. Is suited for either Jacob Staff or tripod mounting and is furnished with or without extension tripod. The instrument comes in a leather sling case and is most reasonable, far cheaper than I had hoped.

Instrument only in case	\$50.00
Extension tripod to fit	15.00
	<hr/>
	\$65.00

delivered COD or cash with order. I can get some for early October delivery if order places soon. This item might be of help to those who are trying to secure a compass and it is the biggest value I have seen. This may be worth placing in your next edition and if I had the list of members of the Association would otherwise send them notice. If you do not wish to mention in the "Surveyor" would you send this on to the Secretary who might furnish me with a list of our Members.

Yours very truly,

F. C. Wightman, P. L. S.

NEW MEMBERS

SINCE MAY ISSUE OF N. S. SURVEYOR

- 181 — Oran E. Monplaisir
Virgie, St. Lucia, B. W. I.
- 182 — Allan C. Crandall
Dorchester, N. B.
- 183 — David W. Crandall
469 Broadway Ave.,
Winnipeg, Manitoba.
- 185 — Evans G. Drysdale
Cartries, St. Lucia, B. W. I.
- 136 — Frederick W. Newberry
63 Albert St., Halifax, N. S.

LET YOUR TRANSIT DO THE PAPER WORK

(From "Surveyors Note Book" published by W. & L. E. Gurley, Troy, N. Y.)

"It can be determined in the field, without calculation, whether or not a survey closes," says John Goggin, C. E. of Marathon, Florida

"Down here on the Florida Keys, land is scarce and credible monuments are few. In the absence of the usual landmarks, accuracy (I prefer the word precision) is paramount. We are, therefore, forced to use USC&GS monuments. Compass is set to read True Bearing of the line. Instrumentman then traverses by azimuth to the point of beginning of the survey. At each change in alignment, a backsight is taken with telescope plunged or inverted—after making certain forward azimuth on the back line is still properly set. The compass is released, telescope erected and sighted on next forward point. The line is measured and azimuth recorded. Compass reading is also recorded as a check.

"Now the upper motion is unclamped and a backsight is taken with telescope erect and back azimuth read. With the upper motion unclamped, a foresight is again taken. This should check the original azimuth of the forward line.

"This operation is repeated at each change in alignment back to point of beginning, where the forward azimuth should read the same as the calculated value. Thus, back azimuths are read each time and forward azimuths are double checked. In addition, constant reference to compass readings is made and all observable points-in-survey or known coordinated points are sighted.

"Only an instrument of reputable precision capable of standing hard knocks and rough usage, could be depended upon in performing this work. From long experience, we have decided upon the Gurley."

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

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REMEDY FOR "FROZEN" TRIPODS

(From "Surveyors Note Book" published by W. & L. E. Gurley, Troy, N. Y.)

Did you ever have an instrument "freeze" to the tripod out in the field? Chances are that nothing you tried would budga it.

The next time it happens, take a tip from a cadastral engineer: spread the tripod legs apart until the instrument is a foot above the ground. The instrument will then come off easily. This engineer first tried the trick 40 years ago; says it's never failed since in any temperature or climate.

REMEDY FOR SLIPPING TRIPODS

(From "Surveyors Note Book" published by W. & L. E. Gurley, Troy, N. Y.)

"Here's a good trick for keeping the tripod from slipping. Three blocks of wood, with holes in them to accomodate the points of the tripod legs are connected with light chains which will stretch out and become taut when the tripod is set up. I carry the blocks and chain in my case. The rig is excellent also for use on the pavement or when the tripod is used on any hard surface.

"Of course, the instrument on the tripod is a Gurley. Everyone in this neck of the woods swears by Gurley instruments, for they can really take it. I have a level which has been in use for more than 60 years. It's still in fine working condition."