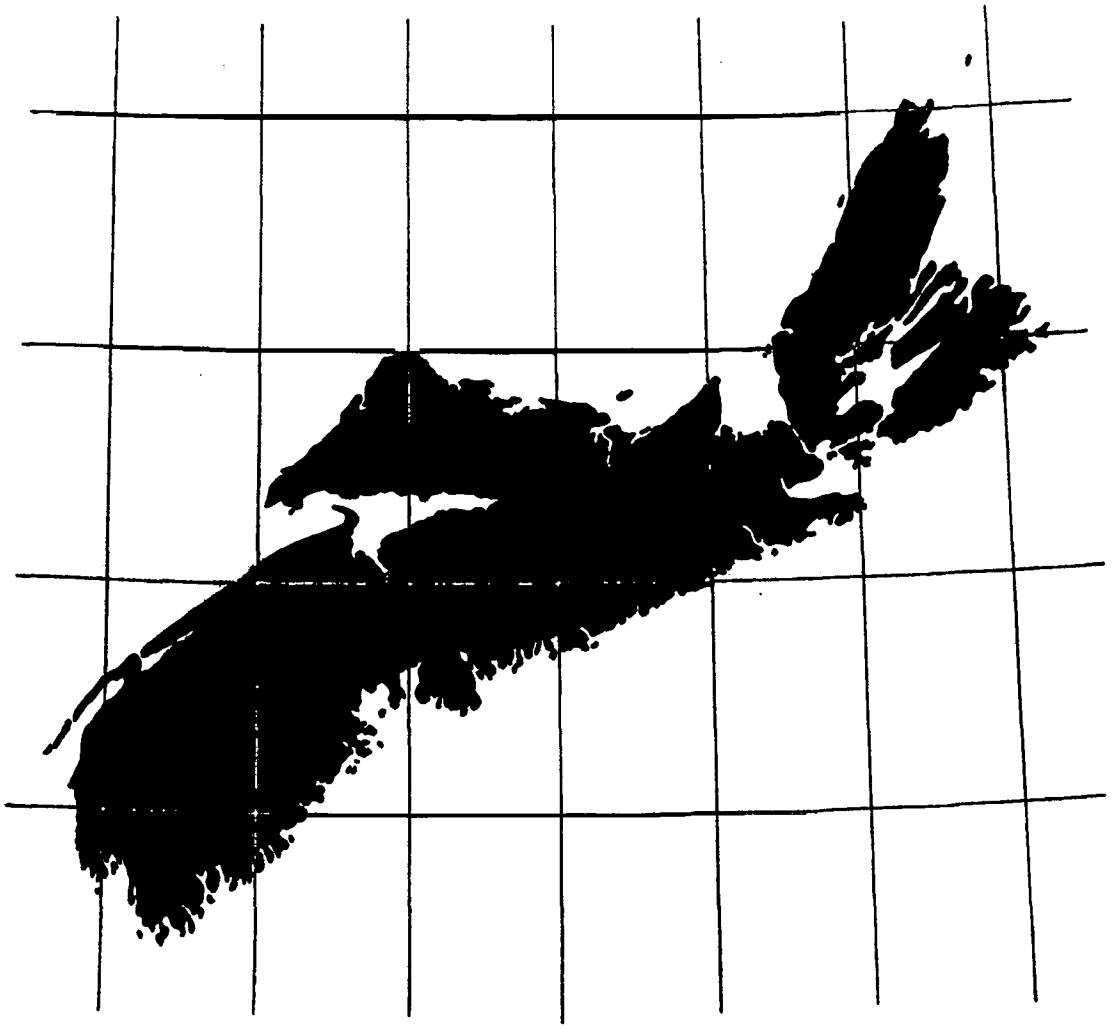
The NOVA SCOTIAN SURVEYOR



Published by
The Association of Provincial Land Surveyors of Nova Scotia

Founded 1951 | R. E. Millard, P.L.S. | Incorporated 1955
Volume 16 | MARCH, 1964 | Number 39

Association of
Provincial Land Surveyors of
Nova Scotia

14th ANNUAL MEETING

Date: NOVEMBER 6th and 7th, 1964

LOCATION — THE CITADEL INN.

BRUNSWICK STREET, HALIFAX, NOVA SCOTIA

PLAN NOW SURVEYORS AND BRING YOUR SURVEYORETTE.

Relax and Enjoy Life for 2 Days at the new Motel Hotel.

The NOVA SCOTIAN SURVEYOR

Published four times a year by
The Association of Provincial Land Surveyors of Nova Scotia Incorporated

J. F. ARCHIBALD
President

EDWARD P. RICE
Secretary-Treasurer

R. E. MILLARD
Editor

Volume 16

Number 39

Address all communications to P. O. Box 1541, Halifax, Nova Scotia

Paper Presented At The Annual Meeting

of the Association of New Brunswick Land Surveyors January 21-22, 1964
By LLEWELLYN SCHOFIELD, Massachusetts Land Surveyor and Civil Engineer

Mr. President, Members and Distinguished Guests of the
Association of New Brunswick Land Surveyors:

It is a pleasure to meet with you again, and be honored by being asked to present a paper. The subject of my paper "Automation in Surveying Practice" was suggested by Archie McLaughlin. It reflects for the most part the development of work simplification, a better work than automation, as observed by the writer in thirty-five years of private practice in land surveying.

Poets and playwrights are years ahead of scientists and surveyors in predicting the shape of things to come. In 1921 a play by Karl Capek called "R.U.R. (Rossums Universal Robots)" was produced in Prague, Czechoslovakia, and told the story of how an army of mechanical men rebelled and destroyed their creators. It was not a sensational hit, largely because most people thought that the idea of mechanical men was so farfetched as to be laughable. The robots in the play had human form, intelligence, strength and memory, but were devoid of feeling. If this play was produced today, few people would laugh. The idea of machines doing the work of human beings hits too close to home for millions of workers. The word for it is "automation" and it is a fighting word; it spreads fear. A few years ago, workers in several midwest industrial cities were asked to list the things they feared most. Russia came first and automation second, but it is an even money bet that if a poll were taken today the order would be reversed.

To argue against automation is to argue against progress. Progress demands that scientists have complete freedom of action in developing whatever their ingenuity can devise. It is just as illogical to demand a halt to automation as it is to tell medical researchers they must stop their search for a cure for cancer.

Whenever there is a new upsurge in technological efficiency, there is an immediate outcry that this will mean less employment and reduced earnings. On the contrary, more rapid and cheaper methods of doing work mean more jobs in the long run.

It would be foolish to deny that there are serious immediate difficulties posed by automation. Retraining, replacement, and other programs are necessary to cushion the initial impact. Management, union, municipal, provincial and federal authorities well recognize the temporary confusion that must be alleviated. For one thing, there is more need for workers of high skills; less for those with no training.

But how, you may ask, is the surveyor affected by automation. Here I am reminded of a story of the surveyor appearing in court as an expert witness who was being belittled by the opposing attorney. The attorney asked if, in fact, a pickaxe and shovel were not among the tools of his, the witness' profession. The surveyor replied that they were but, in addition, there was one other. When the lawyer pressed him for the other tool he doubted that the lawyer would understand the use of this tool, and when the lawyer continued his demand for the name of the other tool, the witness replied, "brains." This is a little rough on any of you who may be lawyers as well as surveyors. Surveyors all recognize that brainpower is our principal asset and with it we adapt ourselves to the use of the best mechanical devices to accomplish the task before us.

In our field work, automation has been adopted as the most logical means of measuring the earth and in the case of the private surveyor, a surer way of making a profit. Thirty years ago, extreme care had to be exercised to attain closures of 1 in 10,000 using the equipment then available. Today with increasing land values, it is imperative to attain such precision on most surveys and it is done more readily with the new optical reading transits and theodolites and measuring devices. Accurate angles could only be measured through repetition, a time consuming process, where we can attain the same result, provided we use a modern optical reading transit with one turning of an angle and completion of the horizon measurement for a check.

While in Amsterdam, following the F.I.G. meeting in Vienna in 1962, our attention was called to a survey being made with an extremely small instrument. It was a double pentagonal prism, particularly adaptable for taking right angle offsets and 180 degrees extension of lines. Many of my American surveyor friends had never seen such an instrument, and yet it is a piece of equipment in everyday use with our survey parties.

In a matter of lineal measurements, it was most unusual twenty-five years ago to find a surveyor using a tape or a chain of over 100 feet in length. Today it is common everyday practice to use chrome clad 200 foot tapes, and it has been found advantageous to use 300 foot chains in the right kind of topography. This is the area where we can look for development of electronic and light measuring devices to meet the needs of the private surveyor. You have demonstrated here in New Brunswick with your Geodetic Control System what can be done through automation in your government surveys, utilizing the Tellurometer and the Geodimeter. Competition between the makers of the Tellurometer,, Geodimeter, Electro-Tape and Wild Dis-to-mat, is constantly working to our advantage. The difficulty of overcoming error constants for short distances has been overcome and more attention is being given to the development of shorter distance measurements. We can also look forward to the utilization of lasers to produce a simple machine capable of both short and long distance measurements at a cost that the surveyor in private practice can afford.

Since World War II we have been able to acquire prism levels and automatic levels that have accelerated our vertical control work through simultaneously observing the rod and the level bubble. These instruments are capable of extending third order level controls without getting involved in special adjustments.

Most large area topography is being done through photogrammetry. We find that there still is plenty of topography that can best be obtained by ground methods. The telescopic alidade and plane table showed little improvement for half a century. Considerable development has gone on since 1950, so that we now have a microptic optical reading alidade with vertical arc and Beaman scales on an enclosed glass circle and read through an eyepiece situated next to the telescope. In addition, we have alidades with pendulum operated self-indexing Beaman arcs and an endless motion tangent screw. The latest developments of European plane table alidades are self-reducing stadia instruments where the intercept on the stadia rod between curved

lines seen in the field of view of the telescope are multiplied by a factor. This product is either the horizontal distance or the difference of elevation, depending upon what pair of curved lines were used. The field of view of the telescope contains two other curves which are used to determine the horizontal distance. The rod intercept between these curves when multiplied by a factor of 100 will provide the horizontal distance. The intercept between the inner curves when multiplied by a factor appropriate for a particular range in slopes gives the difference in elevation. The factor to be used is indicated by very short lines between the elevation curves. The topographer can easily obtain the required elevation and distance through simple arithmetic.

Rods have also shown considerable development. The Lenker rod with a revolving steel tape makes possible direct elevation readings eliminating the need of subtracting the rod reading from the height of instruments. Rods divided into yards have been developed for three wire leveling. Stadia rods with special markings to facilitate easier reading are now available.

Over the year we have watched the retirement of Vega and Bruhns log books and their replacement with natural "Trigonometric Functions" and desk calculators. Thirty years ago most of these computers were hand operated. Today most private offices have 10 place semi automatic electric calculators with an angle adder here and there. Many of us have utilized electronic computers through a mail order service, particularly for subdivisions of 20 lots and larger. In the past year we have witnessed the advent of the computer small enough to fit in a small office and simple enough to operate that needs only two or three days' instruction to acquaint the surveyor in the solving of most of his mathematical problems. This particular machine utilizes an I.B.M. typewriter to enter the problem and prints out the solution. A number of small surveyors' offices in California, New Jersey and Massachusetts are leasing or purchasing these machines.

It has been said that the average man uses only about 10 percent of his brain-power, and that this has caused many frightening predictions that someday he will build a machine so smart that it will overwhelm the human race. Rest easy — we still have a big bulge over the mechanical devices we are creating. Computers can do marvelous things, but they cannot think. They are helpless unless a human being feeds into them accurate information. Once they get the information, they will come up with the answer at a speed which the human brain cannot match. Thus the computers are the glamour boys of automation because they seem to come closer than anything else to the process of thinking. The solution appears to be that we should utilize the computer to take the drudgery out of our work and leave us more time for the more pleasant tasks in our chosen work. There are literally hundreds of computers being developed, and it will only be a question of time before electronic computers will be as commonplace in our offices as the electric desk calculators are today.

Drafting machines and lettering devices are valuable aids perhaps only dreamed about a couple of decades ago and are now taken for granted. The development of Mylar as a mapping base has all but made obsolete the vellums, tracing papers and tracing cloth, so indispensable only a few years ago. Photographic processes are commonplace not only for record-keeping but also for duplication and reproduction of old and valuable maps.

Communication has always been a problem between members of a survey party. The development of the transistor radio plus assignment of broadcasting channels has solved this problem for many of us. Master stations can be set up in the main office with mobile receivers and transmitters in the vehicles affording contact at all times at a reasonable cost for a reasonable range. In addition, Walkie Talkie units small enough that they can be carried easily in a jacket or pants pocket and operated

on the same channel as your master station completes a chain of communication from the owner of a business in his office to his lowliest rodman in the field. This ease of communication that could only be dreamed about has now become a reality.

The tape recorder, the dictaphone, and the camera are all aids involving automation aiding us materially in our everyday office procedure. The printing machines for reproduction of our maps have become commonplace in even the smallest offices. The automobile, which is probably the most common object of automation, has provided us with a means of expanding our operations many miles from our home office. Many private surveyors have found it most practical to equip both two-wheel and four-wheel drive vehicles with all the tools they might be expected to utilize in their work. Even the axe, machete and bush hook are being replaced with brush and chain saws. Even the lowly shovel can be replaced at times with an earth power-driven augur.

The surveying profession has gained immeasurably from automation without appreciable loss of labor, and has made possible tremendous gains in material things at a lesser cost for the public good. It is exciting to anticipate new developments in surveying techniques for the future as they are sure to come.

From BEDFORD INSTITUTE OF OCEANOGRAPHY CRUISE REPORT NO. 3
C.C.G.S. JOHN A. MacDONALD
July 26th to October 12th, 1962 by J. J. BUTTERS

JOHN A. MACDONALD A-1-62
CANADIAN REFERENCE NUMBER 00359

This report deals with the second cruise of the C.C.G.S. "John A. MacDonald" in the high latitude regions of the Canadian Archipelago.

The purpose of the cruise was to carry out Oceanographic observations and obtain a general picture of the bathymetry of the area as proposed in B.I.O. memorandum Arctic Survey (July 23, 1962). Observations of temperature, salinity, and oxygen were made at the Oceanographic Stations. Bathythermograph casts were made at each station.

Personnel:

Mr. J. J. Butters — (Oceanographic Research) Officer in Charge;
Mr. B. Kelly — (Oceanographic Research);
Dr. Wm. L. Ford — (Department of National Defence, R.C.N. (from August 18th to August 27th.)
Mr. T. Jones — (Hydrographic Service) i/c Soundings.

Time:

G.M.T. was used for all scientific data. Time kept onboard between August 6th and October 4th. Zone + 5.

Oceanographic Station Procedure:

(1) Serial observations were made at intervals of 0, 10, 20, 30, 50, 75, 100, 150, 200, 250, 300, 400, 500, 600 metres, depending on depth of water.

(2) Samples were obtained from Knudson reversing water samplers.

(3) Temperatures were measured by using two protected deep-sea reversing thermometers on each Knudson bottle.

(4) Salinity Samples were drawn into 8 — oz. citrate bottles, and were returned to Bedford Institute for analysis.

(5) Surface samples for oxygen and salinity analyses were obtained with a one-gallon metal bucket.

(6) Plankton hauls were made at positions pre-selected by the Arctic Unit, F.R.B.

(7) Bottom grabs for Benthos and Geological samples were obtained from a random scatter over the whole area.

Methods of Analyses:

The dissolved oxygen analyses were done by a modified Winkler method (Strickland and Parsons, 1960).

Bathythermograph Observations:

A BT Cast to maximum depth was made before each Oceanographic Station, and occasionally between stations. Surface temperature measurements were made by Mr. J. Lewis, ice observer, D.O.T.

Plankton Collections:

Vertical Zone Plankton hauls were made from 150-m to the surface using a No. 6 Mesh Hensen Net. Microplankton collections were drawn from the O, 10, 20, 30 and 50 metre water samples.

Benthos Collections:

Bottom grabs were made using a La Fond Dietz Snapper-type sediment sampler. 50% of the samples were placed in a plastic bag and preserved in a fluid made up of 5 parts formalin and 95 parts water.

Geological Samples:

50% of each bottom grab samples were placed in air seal Mason jars and returned to the Bedford Institute for analysis.

Equipment:

(1) Winch-Bergen Nautik Slit ring M type, worked well at shallow depths, but gave constant trouble on the deep hauls. It required the unfailing attention of the engineering staff in between stations to keep the unit operational.

(2) Wire — 3 x 19 5/32" galvanised. 100-M cut, remainder in excellent condition. 16,000 feet left on drum.

(3) Sampling Bottles — Knudson, new type, functioned well.

(4) Thermometers — Deep-sea reversing. German (Richter & Wiese) and Japanese (Yoshino Keiki Co.) manufacture. The R. & W. were troublesome.

(5) Meter Block — Bergen block with remote dial, performed well.

(6) Bathythermograph — 140-M. — 275-M. satisfactory.

(7) Oxygen Kit — Satisfactory.

Weather Observations:

All weather observations used in the Oceanographic data were made by Mr. J. Lewis, ice observer, D.O.T.

Soundings:

Shallow water soundings in the unexplored Fiords, and Sounds, were obtained from a Kelvin Hughes (Marine) Ltd., M.S. 21 navigation installation fitted in C.H.L. "Fulmar". The "Fulmar" Messrs. Jones and Butters onboard, sounded Sherwood Beach approaches, Glacier Fiord, a Channel to the west of Stor Island, Eureka Sound, Slidre Fiord, and Tanquary Fiord. Soundings in all other areas were taken from the ship. This phase of the operation will be the subject of a separate report to be published by Mr. T. Jones of the Canadian Hydrographic Service.

Liaison:

The ship was made available through the courtesy of the Marine Branch of the Department of Transport. Commanding Officer, Capt. J. Cuthbert; Chief Officer, Mr. M. Lever; Chief Engineer, Mr. D. Taylor.

These officers, their Juniors, and Ship's company co-operated to the fullest extent. Personnel were readily available to assist as required. Problems were dealt with as they arose and were ironed out in committee in the best interests of all.

Appendix 1

Log of Cruise		**Can. Ref. 00359**
July 26th	Ship departed Montreal	Shed 51
July 27th	Ship departed Quebec	D.O.T. Wharf
August 5th	Lancaster Sound, occupied 3 Oceanographic Stations.	
August 6th	Prince Regent Inlet and Barrow Strait, occupied 9 Oceanographic Stations.	
August 7th	Resolute Bay for mail pick up, proceeded to Griffith Island area, 6/10 ice. Occupied 5 Oceanographic Stations.	
August 8th	Peel Sound, Lowther Island, and McDougall Sound, occupied 7 Oceanographic Stations.	
August 9th	At anchor off Cape Riddle, Erebus Bay, Devon Island. Visited Sir John Franklins camp site. Working party renovated monument.	
August 10th	Resolute Bay, at anchor discharging cargo.	
August 11th	Resolute Bay, loading cargo from CCGS N. B. McLean.	
August 12th	Resolute Bay, loading fuel drums from SS "Federal Pioneer".	
August 13th	Proceeding to Jones Sound.	
August 14th	Grise Fiord, mail drop, proceeded to Cape Sparbo. Went ashore by helicopter and made contact with Mr. Spencer Appilloni of the Arctic Institute of North America. New line of soundings from Bear Bay to Baad Fiord, occupied 5 Oceanographic Stations.	
August 15th	Through Hells Gate to Norwegian Bay and anchored off Sherwood Head. 3/10 ice. United States Weather Bureau party ashore to service atomic powered weather station. Occupied 2 Oceanographic Stations.	
August 16th	Sherwood Beach.	
August 17th	Completed maintenance of weather station and proceeded into Eureka Sound. Embarked in CHL "Fulmar" with hydrograher Mr. T. Jones and sounded channel to the West of Stor Island.	
August 18th	Slidre Fiord, at anchor off Eureka. Embarked in CHL "Fulmar" with hydrographer Mr. T. Jones and completed sounding of Slidre Fiord started last season by Mr. H. Blandford.	
August 19th	Eureka. Dr. W. Ford, D.R.B. arrived from Ottawa. Visited Geological Survey camp. Discharging cargo.	
August 20th	Eureka. Discharging cargo.	

August 21st	Eureka. Discharging cargo.
August 22nd	Greely Fiord. New line of soundings from Iceberg Point to Tanquary Fiord.
August 23rd	Tanquary Fiord. Furthest North any Canadian Ship. Embarked in CHL "Fulmar" with hydrographer Mr. T. Jones and sounded point to point down Tanquary Fiord. Rendezvous with John A. MacDonald at Station No. 32. Occupied 3 Oceanographic Stations.
August 24th	Nansen Sound. Heavy winter ice, big floe at the mouth of Flat Sound. Probe to the West halted at 81 degrees 13' N 91 degrees 10' W by Polar Ice, occupied 5 Oceanographic Stations.
August 25th	Eureka Sound, and Norwegian Bay. Bergs, Bergy Bits, Winter/Polar ice. Ship stopped in Belcher Channel for four hours in fog. Occupied 3 Oceanographic Stations.
August 26th	Penny Strait, Queens Channel, Wellington Channel. Polar/Winter ice. Occupied 5 Oceanographic Stations.
August 27th	Resolute Bay at anchor. C.H.S. "Baffin" alongside for fuel. Dr. W. Ford, Miss Moira Dunbar and Lieut/Cdr. J. Croal returning to Ottawa. Discussed programme with Mr. N. Gray, Dominion Hydrographer, and Admiral Storrs, Chief of Ships Service Division. Proceeded West to Austin Channel. Polar ice in Byam Channel.
August 28th	Viscount Melville Sound. Thick winter ice in belts.
August 29th	Viscount Melville Sound. Polar/Winter ice hummocked. Vast floe to the West.
August 30th	McClure Strait. New line of soundings across Strait 121 degrees W. Winter/Polar ice in belts. Occupied 5 Oceanographic Stations. Obtained Pre-Cambrian rock specimens from ice island off Cape Russell.
August 31st	Viscount Melville Sound. Occupied 4 Oceanographic Stations.
September 1st	Viscount Melville Sound off Byam Martin Island. Winter/Polar Ice Rind. Occupied 2 Oceanographic Stations.
September 2nd	Barrow Strait. Mail pick up from Resolute Bay. Rendezvous with CHS "Baffin".
September 3rd	Peel Sound. Open water. New line of soundings. Occupied 3 Oceanographic Stations.
September 4th	Franklin Strait. Winter/Polar ice to the South. New line of soundings from Weld Harbour to Cape Swinburne. Ship stopped for ten hours in fog.
September 5th	M'Clintock Channel. Open water. New line of soundings. Occupied 3 Oceanographic Stations.
September 6th	M'Clintock Channel. New line of soundings. Ship anchored for nine hours to establish control, occupied 2 Oceanographic Stations. Proceeded by helicopter to Stefansson Island, landed on a convenient ice pan offshore and lowered a 275m. B.T. No bottom at this depth.
September 7th	Peel Sound, proceeding to Bellot Strait, completed circumnavigation of Prince of Wales Island.

September 8th	Bellot Strait. Open Water. Visited Fort Ross at the eastern entrance of the strait. Occupied 3 Oceanographic Stations.
September 9th	Gulf of Boothia. Open water. Occupied 4 Oceanographic Stations.
September 10th	Gulf of Boothia. Winter/Polar, Hummocked. Rendezvous with CHS "Baffin", Hydrographer Mr. T. Jones transferred to Baffin. Time under way 18 hours, distance 36 miles.
September 11th	Gulf of Boothia, Fury and Hecla Strait, escorting CHS "Baffin". Damaged both wing propellers, proceeding on centre shaft. Occupied 1 Oceanographic Station.
September 12th	Hall Beach at anchor. R.C.N. salvage team inspected under water damage. Decided that ship could complete cruise using centre shaft only. Proceeded to Hudson Strait. Occupied 1 Oceanographic Station.
September 13th	Foxe Basin. Open water. Occupied 2 Oceanographic Stations.
September 14th	Foxe Channel. 9/10 Winter ice to the West. Occupied 3 Oceanographic Stations.
September 15th	Evans Strait. Occupied 6 Oceanographic Stations.
September 16th	Hudson Bay. Occupied 3 Oceanographic Stations.
September 17th	Hudson Bay. Occupied 4 Oceanographic Stations.
September 18th	Hudson Bay. Occupied 3 Oceanographic Stations. Mail pick up at Churchill.
September 19th	Hudson Bay. Occupied 4 Oceanographic Stations.
September 20th	Hudson Bay. Occupied 5 Oceanographic Stations.
September 21st	Hudson Bay. Off Port Harrison. Occupied 6 Oceanographic Stations.
September 22nd	Hudson Bay. Occupied 5 Oceanographic Stations.
September 23rd	Hudson Bay. Occupied 3 Oceanographic Stations.
September 24th	Hudson Bay. Occupied 4 Oceanographic Stations.
September 25th	Hudson Bay. Occupied 5 Oceanographic Stations.
September 26th	Hudson Bay. Occupied 8 Oceanographic Stations.
September 27th	Hudson Strait. Occupied 6 Oceanographic Stations.
September 28th	Hudson Strait. Hove to Storm gusts to 77 knots.
September 29th	Hudson Strait. Proceeding in gale. Occupied 3 Oceanographic Stations.
September 30th	Hudson Strait. Occupied 5 Oceanographic Stations.
October 1st	Hudson Strait. Occupied 6 Oceanographic Stations.
October 2nd	Hudson Strait, Ungava Bay. Occupied 6 Oceanographic Stations .
October 3rd	Ungava Bay. Occupied 4 Oceanographic Stations.
October 4th	Ungava Bay. Anchored at Port Burwell. Picked up Northern Affairs Officer, proceeded to Davis Strait. Occupied 4 Oceanographic Stations.

APPENDIX 2

Oceanographic Station Co-ordinates **Can. Ref. 00359**

Station	Number	Latitude North	Longitude West
	28	76 - 01	96 - 28
	29	75 - 39	81 - 23
	30	75 - 52	87 - 00
	31	76 - 05	87 - 00
B T	33	76 - 18	87 - 00
B T	34	76 - 23	87 - 00
B T	35	77 - 05	89 - 22
B T	36	80 - 25	89 - 38
B T	37	80 - 31.5	85 - 00
	32	80 - 26	83 - 50
	33	80 - 37	82 - 00
	34	80 - 33	81 - 14
	35	81 - 22	80 - 18
	36	81 - 00	77 - 25
	37	80 - 41.5	79 - 00
	38	81 - 13	80 - 00
	39	81 - 10	91 - 15
	40	81 - 06	90 - 37
	41	80 - 36	91 - 30
	42	80 - 10	88 - 50
	43	79 - 17	87 - 03
	44	78 - 09	84 - 40
	45	77 - 40	88 - 08
	46	77 - 15	92 - 10
	47	76 - 57	97 - 14
	48	76 - 53	97 - 44
	1	76 - 48	98 - 24
	2	75 - 25	99 - 00
	3	75 - 23	92 - 46
	4	75 - 06	93 - 26
	5	74°- 26'	101 - 07
	6	74 - 15	87°-00'
	7	74 - 04	87 - 00
	8	73 - 53	87 - 00
	9	73 - 01	87 - 00
	10	73 - 10.5	89 - 38
	11	73 - 18	90 - 08
	12	74 - 07	90 - 46
	13	74 - 23	92 - 00
	14	74 - 40	92 - 00
	15	74 - 40	92 - 00
	16	74 - 40	92 - 43
	17	74 - 37	93 - 21
	18	74 - 22	95 - 00
	19	74 - 07	95 - 00
B T	20	74 - 00	95 - 00
	20	74 - 02	95 - 34
	21	74 - 04	96 - 35
	22	74 - 12	97 - 30
	23	74 - 25	98 - 00
	24	74 - 42	98 - 02
	25	74 - 57	98 - 00
	26	74 - 57	98 - 00
	27	74 - 55	97 - 12

49	75 - 04	102 - 15
50	75 - 03	103 - 27
51	75 - 39	121 - 00
52	75 - 17	121 - 00
53	74 - 55	121 - 00
54	74 - 36	121 - 00
B T 61	74 - 50	120 - 11
B T 62	75 - 05	119 - 15
55	75 - 22	118 - 05
B T 64	75 - 01	117 - 50
56	74 - 16	117 - 21
57	74 - 28	115 - 58
58	74 - 39	114 - 36
B T 68	74 - 02	114 - 45
59	73 - 27	114 - 53
60	74 - 56	105 - 50
B T 71	74 - 51	103 - 26
61	74 - 43	102 - 05
62	71 - 56	96 - 06
63	71 - 56	95 - 32
64	71 - 20	97 - 00
B T 76	71 - 11	98 - 14
B T 77	71 - 06	97 - 48
B T 78	71 - 01	97 - 18
B T 79	70 - 56	96 - 52
B T 80	71 - 05	98 - 26
65	71 - 04	99 - 00
66	71 - 04	100 - 00
67	71 - 04	100 - 52
B T 84	71 - 40	100 - 51
68	71 - 43	100 - 51
B T 86	71 - 52	100 - 56
B T 87	71 - 51	102 - 00
B T 88	72 - 02	101 - 31
B T 89	72 - 31	103 - 00
69	72 - 58	102 - 54
B T 91	73 - 02	104 - 45
B T 92	73 - 25	101 - 58
70	72 - 00	93 - 40
71	71 - 47	93 - 25
B T 95	71 - 49	93 - 00
B T 96	71 - 50	92 - 21
72	71 - 51	91 - 49
73	71 - 55	90 - 36
B T 99	71 - 37	91 - 43
B T 100	71 - 21	92 - 40
B T 101	71 - 21	91 - 25
B T 102	71 - 20	90 - 08
B T 103	70 - 59	91 - 08
B T 104	70 - 44	91 - 48
74	70 - 20	91 - 21
75	70 - 19	90 - 00
76	70 - 18	88 - 32
B T 108	69 - 50	88 - 05
77	69 - 37	81 - 22
B T 110	69 - 21	80 - 38
B T 111	69 - 08	80 - 18
78	68 - 53	80 - 05

B T 113	68 - 04	80 - 47
79	66 - 51	80 - 29
B T 115	65 - 52	80 - 20
80	65 - 33	80 - 53
81	65 - 00	79 - 37
82	64 - 12	78 - 12
B T 119	63 - 50	77 - 27
83	64 - 00	76 - 44
84	63 - 39	78 - 08
B T 122	63 - 32	78 - 44
85	63 - 19	79 - 10
B T 124	63 - 19	79 - 53
86	63 - 20	80 - 36
87	62 - 58	81 - 48
88	62 - 48	81 - 20
89	62 - 38	80 - 46
90	62 - 20	80 - 06
91	61 - 50	81 - 58
92	61 - 51	84 - 47
93	61 - 45	87 - 28
94	61 - 45	90 - 02
95	61 - 28	92 - 40
96	61 - 00	92 - 12
97	60 - 33	92 - 32
98	59 - 57	92 - 46
99	59 - 20	93 - 30
100	59 - 00	92 - 40
101	59 - 19	91 - 10
102	59 - 49	90 - 10
B T 142	59 - 23	89 - 07
103	58 - 56	88 - 00
B T 144	58 - 49	86 - 21
104	58 - 41	84 - 45
105	58 - 40	82 - 35
106	58 - 28	81 - 04
107	58 - 39	79 - 26
108	58 - 05	79 - 39
109	58 - 20	78 - 33
110	58 - 37	78 - 52
111	59 - 03	79 - 18
112	59 - 33	79 - 02
113	60 - 00	79 - 02
114	60 - 43	78 - 47
115	60 - 43	79 - 24
116	60 - 00	82 - 00
117	60 - 00	84 - 00
118	60 - 00	86 - 00
119	60 - 00	88 - 00
120	60 - 00	89 - 36
121	60 - 26	89 - 36
122	60 - 30	91 - 30
123	61 - 00	90 - 00
124	61 - 00	88 - 00
125	61 - 00	86 - 00
126	61 - 00	84 - 00
127	61 - 00	82 - 00
128	61 - 26	80 - 47
129	60 - 58	80 - 00

130	61 - 31	79 - 30
131	61 - 25	78 - 10
132	62 - 00	78 - 18
133	62 - 00	78 - 40
134	62 - 00	79 - 02
135	62 - 00	79 - 15
136	62 - 16	79 - 02
137	62 - 38	79 - 36
138	63 - 04	80 - 00
139	63 - 04	78 - 00
140	62 - 58	78 - 00
141	62 - 46	78 - 00
142	62 - 37	78 - 00
143	62 - 28	76 - 00
144	63 - 06	75 - 52
145	63 - 40	75 - 47
146	64 - 08	75 - 42
147	63 - 48	73 - 38
148	63 - 14	73 - 44
149	62 - 44	73 - 50
150	62 - 50	72 - 34
151	62 - 30	70 - 43
152	62 - 19	71 - 06
153	62 - 08	71 - 30
154	61 - 56	71 - 55
155	61 - 43	69 - 05
156	62 - 01	67 - 42
157	61 - 44	68 - 18
158	61 - 25	68 - 55
159	61 - 08	69 - 34
160	61 - 09	67 - 09
161	60 - 38	67 - 36
B T 203	60 - 10	67 - 40
162	59 - 42	67 - 46
163	59 - 15	67 - 50
164	59 - 15	66 - 55
B T 207	59 - 35	66 - 33
165	59 - 58	66 - 08
166	60 - 23	65 - 40
B T 210	60 - 30	66 - 40
167	61 - 33	66 - 47
B T 212	61 - 47	66 - 07
168	61 - 15	64 - 52
169	60 - 42	65 - 00
170	60 - 57	65 - 03
B T 216	60 - 24	64 - 51

The Land Surveyor
His Right and Privileges

A Free Translation of an Article in the December 1963 Issue of The Canadian Surveyor

Extract from a report of the Board of Direction of the Corporation of Quebec Land Surveyors, presented by Michel Sice at the annual meeting of the Corporation, held at the Cardy Alpine Inn, Ste. Marguerite, P.Q., May 19 to 21, 1963.

We are members of one of the oldest corporations of the Province — and one of the most important, for we deal with the very basis of the capitalistic system, the right to hold estate. Who talks about property talks about boundaries, and this is where we find our place. The human society is a jealous guardian of its rights and privileges, a society whose members do not hesitate to do battle in defense of its property rights. That same society, incapable of establishing its properties by itself, has not hesitated to appeal to the competence of certain of its members to whom it has given great powers and privileges in the conduct of its affairs. We, the land surveyors, are these men. The law has given us immense powers, such as you will not find in any other corporate body.

We as land surveyors — sworn surveyors — have the right to enter upon any property whatsoever in the exercise of our duties. We have the power and the duty to hear and swear whomsoever we judge it proper to hear and swear and to proceed with a "subpoena duces tecum" if necessary.

We are the only ones who, when called as experts by the Court in the exercise of our functions, have the privilege of proceeding solely on the basis of our oath of office. Just this year Judge Salvas has reaffirmed this privilege.

It would take too long to complete this enumeration, and this is not the place to do so. However, we would remind you that the law has given us exclusive powers that are not confined to the marking of boundaries, as certain other organizations would have it, or even some of our own members, who would reduce us to the status of mere planters of monuments. These exclusive powers also cover the preparation of plans and the surveys of lakes and rivers, which includes photogrammetry, a field in which we have suffered considerable losses that we must repair; in land subdivision, where some architects, engineers, and town planners are making heavy encroachments, in cadastral surveys, compilations, and copies of plans, where we find appraisers and engineers; and, finally, in geodesy, to which we have the full rights.

However, the powers of the surveyor are not found only in our own Act; they are also found throughout our whole civil legislation. The surveyor is met with in the Civil Code; in the Cities and Towns Act; in the Expropriation Act; in the Railway Act of the Province of Quebec, which recognizes his competence as an appraiser; in the Lands and Forests Act, and so forth. He should be everywhere, since he is at the root of property.

But where is the surveyor found in reality? Is he in possession of all the fields to which he can claim the right?

Here is a challenge, gentlemen, a challenge that we must face, that we have already faced. We must defend our rights outside the Corporation, and it is our duty to demand respect for our laws and regulations within the Corporation — among our own members. These two obligations belong to our directors and their associates, and you may rest assured that they are not neglectful of their obligations. We sincerely hope that our members will of themselves maintain respect for our laws and regulations, which the membership has itself established by majority vote. What will happen to us if a

minority refuses to recognize the decisions reached by vote of the majority? This would be a ridiculous act, inconceivable among professionals.

Outside our Corporation we continue the struggle to recover our rights. This is a difficult task and one that will demand financial sacrifices by our members. Recourse to the courts is expensive, but it is often the only means at our disposal. In some cases, people who have ignored our laws have not taken our warnings seriously, and we have been forced to action.

All actions taken to court or contested by the Board of Directors have been on a business basis. We are a corporate body, and there is no room for sentiment in our decisions. These court actions, whether won or lost, will serve as guides in future decisions of the Board, and if in the course of actions we discover any weaknesses in our charter, you will be asked to approve the necessary amendments before they are submitted to legislation. Discussion among our members on our basic law, no matter how wise, can never have the force of a court judgement, for in our social system only the courts are competent to interpret and explain the law. This is normal procedure for any corporation.

Finally, gentlemen, do not forget that the trustees are above all your colleagues, and they have agreed to look after your interests. Their devotion is measured not only by the time they give, but also by the damage they themselves suffer. Take note that these men standing there in the court are your colleagues, surveyors like yourselves. who have consented to stand there solely to defend your rights, so that you, like them, may be proud to be called land surveyors and may enjoy all the privileges that go with that title.

From December 1963 Supplement Canadian Surveyor

Supplement to September Issue 1963 Canadian Surveyor

In response to the article published in the last issue, we received further data concerning the survey of the Town of Hawkesbury. The survey contract was awarded to the firm of W. N. Wildman, Land Surveyors, who provided the following information.

The extent of the contract was to survey and have confirmed under the Boundaries Act all properties within the town limits. The land will, therefore, be transferred from the Registry Act to the Land Titles Act system. The survey has been carried out under the direction of the Office of the Director of Titles. To date 800 properties east of Hamilton Street have been successfully surveyed according to the estimated schedule.

The 25% Provincial Grant was approved by the Treasury Board in October and is apparently equivalent to the 25% normally contributed by the Inspector of Legal Offices towards Judges Plans under the Registry Act.

The value of such a survey in the prevailing circumstances was recognized by a progressive and public-minded council, and the result will be that from the time the plans are registered, all properties will be unalterably defined upon the ground, all properties will be designated by lot and plan number and then all title to properties will be guaranteed by the Land Titles Act. This should completely solve all problems relating to extent and validity of title to land within the municipality, and will enable lawyers and surveyors to carry out their functions with regard to land transactions, safe in the knowledge that the basis of their determinations is irrefutable. This also ensures that further decay is impossible because it will be necessary thereafter that all divisions of land be effected with the benefit of a precise monumented and examined survey.

At a meeting of the Association of Provincial Land Surveyors of Nova Scotia a few years ago, a delegate from the Republic of Cape Breton Island was heard to remark that the beautiful isle was not sufficiently represented on the Association Council, and that unless representation was increased, the members from that area might secede and form their own association. This particular delegate had plenty of drive and determination. We have often wondered what eventually happened? They were not permitted to breach the Causeway.

An Ontario Land Surveyor, after witnessing on several occasions the destructive work of road building machinery placidly ripping out survey posts and markers, wrote to the Department of Highways — "The well preserved monuments put in with public funds have apparently been destroyed with public funds and Lands and Forests are doing their best to get public funds for vital survey retracement programs; it doesn't make sense". It was pleasing to hear that the Department of Highways took immediate action to curb this unintended destruction.

T. S. Nash, M.E.I.C., D.L.S.

In the English law of conveyancing a monument is an object fixed in the soil, whether natural or artificial and referred to in a document and used as evidence of the delineation of boundaries or the situation of a particular plot of land.

The first requisites of the monument are that it shall be of such form that it can be identified, and that it shall be permanent in character. These characteristics were recognized in earliest times. The Romans who made offerings to Terminus, their god of landmarks, recognized these requisites, for we read of the censors who had charge of their drainage system erecting in B.C. 54 a series of boundary stones (cippi) along both banks of the river to prevent encroachment by private persons.

The ancient Roman customs probably gave rise to the old English practice of "beating the bounds." On Ascension Day or during Rogation week, sometimes called Gang week, the priest of the parish, together with parochial officials headed a crowd of boys, who, armed with green boughs, beat the parish border stones. Sometimes the boys were themselves whipped or violently bumped upon the border stones to make them remember. The object in taking boys was obviously to insure that witnesses to the boundary marks should always survive. This perambulation of the parish boundary was made popular by the holding of a parish-ale or feast at its termination.

While the practice may now seem crude, the principle of it might well be pondered by many Canadians who are too preoccupied to take an interest in preserving the boundary marks that determine the limits of their lands.

Electronic Surveying Improves B. C. Basic Control Network

By STAFF WRITER

Tellurometer speeds work, reduces cost for province

An ambitious programme to expand and strengthen the basic survey control network of the Province is under way in British Columbia. The long-range programme will take several years, but it is expected to produce substantial savings in future surveying work, both for private and public agencies.

"The pressure increases yearly for more and better basic controls here," Surveyor General G. S. Andrews reports. "Public works engineers want to extend water lines, highway engineers want to locate new highways and private companies want to expand their industrial plants. They all have to start from accurate monuments.

Some of those monuments are more scattered than we'd like, or not accurate enough for present-day standards. We're trying to correct this situation throughout the province.

The agency chief would like to see new monuments established, from 25 to the square mile in cities, to one per mile in rural areas. An average of only three per mile throughout the Province would call for more than one million control points. This is 30 times the number now in place.

Two years ago the B C Legislature approved funds for a start on the accelerated survey programme. Colonel Andrews immediately put a party to work in the congested Southwestern part of the Province where the most rapid urban development is taking place.

Here, the agency is employing modern survey methods, both in the field and in the laboratory. Much of the field operations is built around electronic equipment like the Tellurometer. Surveyors use this device, which employs micro-waves to measure distances, instead of taping or computing distances by triangulation.

About 600 points must be set in this particular area before it is photographed from the air for contour plotting. The Tellurometer and theodolites are being used to run a precise basic network into the area from high-order survey points nearby. To do this, one member of the survey party will occupy a high point with one of the units. His team mates will occupy one of the other points to be monumented.

A series of high-speed impulses is transmitted from one to the other, and the time it take for the micro-waves to make the round trip is converted into miles and feet and 10ths of feet. Thus, a measurement which might take several hours by taping or triangulation is made in a few minutes.

In the Northern reaches of the Province, weather, and, until quite recently, transportation, were the chief limiting factors in survey productivity. However, the B. C. Agency's operations now include the use of float planes and helicopters. Even though inclement weather can still be a serious problem, speedy air travel in the field does ensure a greatly increased utilization of the available good weather.

The Babine-Takla Lake project is typical of those on which B C surveyors are utilizing modern surveying methods. Here a party established a pattern of ground control, using highly accurate theodolites for turning angles and a Tellurometer for distance measurement.

The survey plan was the classic one of designing the field work to control cross-flights of precise air photography, the flight lines of which were 100-150 miles long and 12 miles apart; these flights were, in turn, processed by WILD Autograph to control the block air photo coverage for secondary bridging and plotting by the Multiplex system.

Each of the 9 x 9 inch photographs taken from 20,000 feet covered 32 square miles. Elevations were carried between ground stations in the laboratory, using a precision "bridging" plotter. Finally, adjustments were made in an IMB electronic computer. The field and laboratory work required to thus establish basic control grid throughout this 16,000-square-mile territory took three seasons.

Working seasons are short and field parties have to move quickly in the mountainous terrain to accomplish much before snow falls. The modern equipment described above, however, is boosting productivity significantly during the summer months.

"We used to send out six parties of seven to 10 men each, on foot, plus one helicopter party of 25 men. The parties on foot would produce little more than one map sheet a season. The helicopter party would do 10 (in both cases, including manual compilation). Now a nine-man helicopter party will complete up to 25 map sheets in a season, depending mainly upon flying conditions encountered," E. R. McMinn, Supervising Surveyor, reported.

By such measures, the Provincial Government hopes to accomplish its long-range mapping programme economically and precisely.

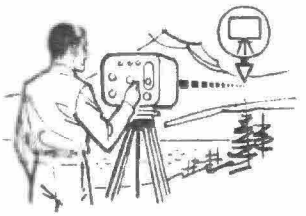
From Volume 12 — No. 1 March 1964 Issue Public Works in Canada

the NEW MRA3

MICRO-DISTANCER

an all new completely transistorized compact microwave system for precise distance measurement— with built-in battery and direct readout in centimetres

The new MRA3 Micro-Distancer is the latest development of Dr. T. L. Wadley, and the laborotories which created the original "Tellurameter". The MRA3 is complete in one package — no extra power supplies, batteries or other excess equipment to carry around. The MRA3 provides improved accuracy (within 2 centimetres at short distance), either phase resolver (digital) display or an improved cathode ray display to customer's choice; also readout either directly in centimetres or in millimicroseconds is available.



FEATURES:

- Accuracy 2 centimetres: 3 parts per million.
- Measures 100 metres or less to over 60 kilometres day or night.
- Weighs only 34 lbs. with built-in rechargeable nickle-cadmium battery.
- Only 3 main operating controls.
- Plug-in circuit cards and modular construction throughout.
- World-wide after sales service.

TELLUROMETER CANADA LTD.

1396 Merivale Road, Ottawa

Reprinted from The Engineering Journal. February 1964 issue