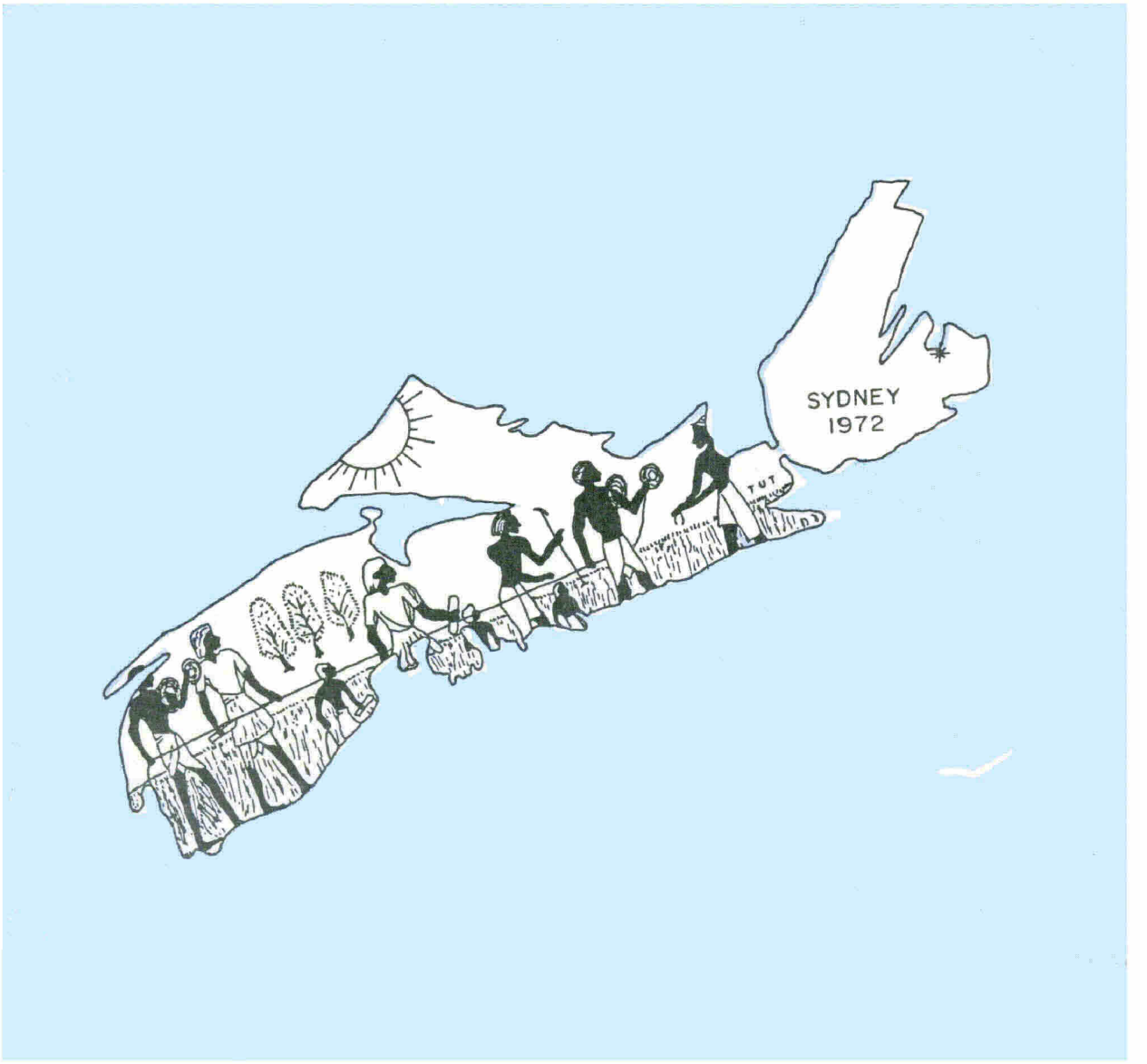
The NOVA SCOTIAN SURVEYOR



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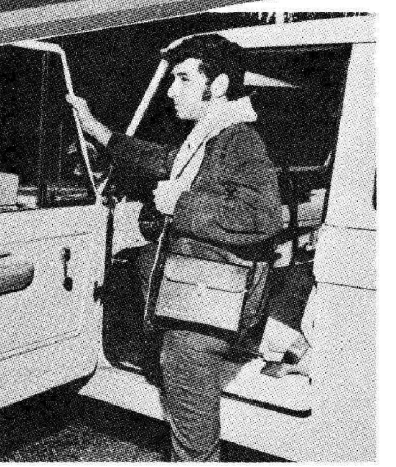

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The NOVA SCOTIAN SURVEYOR

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Views, expressed in articles appearing in this publication are those of the authors, and not necessarily those of the Association.

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- AN ADDRESS TO THE GRADUATION CLASS -

N.S.L.S.I., May 19, 1972

Angus C. Hamilton
Chairman
Department of Surveying Engineering
University of New Brunswick

We here today are all concerned with one task - that of measuring and delineating the features of our physical environment for the benefit of society. This is surveying. Some of you have specialized in field methods of making measurements; some of you have specialized in photogrammetric methods of making measurements and some of you have specialized in the methods of presenting these measurements. But we must remember that these are all parts of one task.

Let us look back a generation or two: The National Topographic Maps; now 1:50,000 and 1:250,000 then 1 mile and 4 miles to the inch, were made entirely by field survey. A party would spend the whole summer in the field gathering data for one or two sheets and they'd spend all winter compiling them including the scribing directly on zinc or copper plates. There was a great pride in craftsmanship in those days and in many ways a better quality product was produced. At that time there was no photogrammetry as we know it now and the lines between surveying and cartography were blurred. Was a man compiling a manuscript on a plane table a surveyor or a cartographer? In effect, he was both. Modern photogrammetry dates essentially from World War II, and as with most new developments there was a mystique built up that it should be completely separate. Photogrammetry is an alternative to field survey or, one can say, field survey is an alternative to photogrammetric survey. All are concerned with the problem of gathering data on the position of features of the physical environment and presenting these features in an orderly, structured manner so that the public can use this information intelligently. This is one task, albeit a large one. It is of necessity subdivided into smaller elements but we should not lose sight of the fact that it is just one task.

My use of the word surveying to describe this task rests on good authority. At the National Survey Teacher's Conference held in Cornell in 1968, there was a workshop session and a long debate on the name of our profession. The word Geometronics had been introduced - and used by one group in the U.S. - there were attempts to construct a new term but when the new term began to look like Geocartophotohydrotopometronomics the group realized the absurdness of the situation and settled on "surveying". Their report (p. 173 of the Proceedings) states: It is recommended that the title "Surveying" be the general name used to describe those disciplines involved in the science of measuring the physical features of any surface or space representing them for such purposes as engineering projects, or resource evaluation and development plants.

Graduation or, as it is sometimes called, commencement, is a time to be looking forward. So what does our crystal ball tell us about the future? The one, definite, clear insight that we now have is that there will be change in the future. It's frequently said that change is the only fixed feature of our society today. All the structures that we have in our society are in the process of change. This includes governments, universities, schools, industry. We are in the process of adapting our society to the breakthroughs in technology that have burst upon us in the last couple of decades and that are still coming at an even faster rate. Venerable old institutions are being completely restructured; this applies to the churches, government agencies, to governments themselves, to private enterprise and alters the way we live and even the way we think. Clearly, surveying cannot be an exception to something as pervasive as this in our society.

You are a fortunate group, you have been blessed with the ability to absorb knowledge, training and education and you've been fortunate also to be living in a society that can afford to make this education and training available to you; so now you have a passport to a place in society to fulfil a useful and needed role. This matter of a needed role cannot be stressed too much; if you read the papers you are aware that there is a significant segment of society - the unskilled unemployed - that to all intents and purposes is not needed and this is a fate we would not wish on anyone. Now you are needed, there are many tasks for the talents that you have. To sum up the current state of surveying and mapping Canada and in the world in general the most charitable description is to say that it is inadequate. Rarely does a user get the map information that he heeds in the form he needs it when he needs it. This I know is a damning statement and I mean it just that way. We make maps starting with photography that is not always recent and by the time the manuscript has gone through the compilation and reproduction process it's almost an archive document. We are not providing planners with the up-to-date map information on property, planimetry, topography and - for urban areas - utilities in an integrated readily-useable format; yet all of these are needed for correlation with socio-economic information to give a complete picture of our environment. We have neither the proper techniques, nor the appropriate administrative structure to do this but, as I said earlier, change is the order of the day and perhaps in five years, possibly in ten years this sort of service will be available in the form that it should be. Hence the techniques, the skills that you've learned are a passport to enable you to participate for five or ten years without too much adaptation but during those years you must continue to learn just as you have been doing here. You will not be in a formal learning environment but I would suggest that every four or five years of your working life you should be learning as much as you learned in the two years here.

There is plenty of work to be done, but there will be changes: In land surveying, land owners will always need to know where they are at; methods will change as coordinate systems and photogrammetric methods evolve. In engineering surveying, bulldozer operators will continue to generate work for surveyors by systematically rooting out monuments and knocking down stakes; methods will change, laser alignment instruments are becoming available even though no one has yet suggested we should use lasers powerful enough to stop the bulldozers.

In photogrammetry, the Earth Resources Satellite program will eventually provide a deluge of photography. This must be examined and used. Methods will change, automatic correlation is now possible although no one has yet found an automatic method of distinguishing a road from a railroad on a photograph.

In control surveys tens of thousands of additional points are needed; but methods are changing, in hinterland areas the Doppler satellite method looks very promising (we're conducting tests in the Maritimes starting on May 22nd) in settled areas aereal triangulation will be used extensively.

Cartography or graphics is our most exciting field at the present time. Graphic presentation is still the best - in fact, the only - way we can convert large volumes of data into useful intelligence. You've heard the quotation: "One picture is better than a thousand words". I suggest we extend this to "a picture is better than 10,000 digits". But here we're not speculating when we say there will be change. Automatic drafting machines - and very good ones - are here now. In the Map Compilation and Reproduction Division of Surveys and Mapping Branch in Ottawa, there are men - and women - who have spent years scribing contour lines. That is now being automated. As of April first the automated cartography unit has scheduled to go on production; there may be some delays but there is no doubt that it will succeed. Dynamic cartography is possible now using cathode ray oscilloscopes for the display. There is much to do: more attractive maps are needed for the Tourism Industry; for management and planning maps are needed quickly, in "real time" to use computer jargon.

I know some of you are concerned about your individual careers and about employment in the immediate future; all I can say on this is that if you lived in a communist society you would not have the freedom to search for employment; you would be told where to go whether you liked it or not. We live in an open society, there are opportunities - they may be difficult to find - but most of us believe that it is more challenging and more rewarding where as much as possible is left to the initiative of the individual. Your predecessors have done well, they faced the same problems you face and they've succeeded very, very well. You are on the way, you have an excellent short term passport. The only limitations to your future are those that you impose yourselves. I hope that you accept the challenge of a changing world and that you have full and rewarding lives.

NOVA SCOTIA LAND SURVEY INSTITUTE - GRADUATION EXERCISES

Graduation exercises were held in Lawrencetown May 19,1972, when prizes were presented to the following students: Darryl Roy Spidle received the Norman Wade prize as best student in Second-Year Surveying: Georges Pierre-Yves Boisvert received the Atlantic Air Survey prize for best student in Second-Year Photogrammetry;Odile Boisvert received the Norman Wade prize for best student in cartography; Harry T.Ashcroft received the J.E.R. March prize for best kept Field Book; Daniel B. Burke received the J.A.H. Church prize for making the most progress in First-Year Surveying; Wendell Charles Feener received the prize for best student in First-Year Photogrammetry.

The Valedictory Address was presented by Nathaniel F. Spence, who graduated in Second-Year Surveying.

Col. J.F. Doig, Principal, was Chairman of the exercises and was assisted by Instructors: P.M. Milo, W. E. Chambers, C. Hogg, L. W. Telfer, J. F. Wightman and W. K. Morrison. Also attending the exercises, on behalf of the Department of Education, was W.D. Mills, Director of Applied Arts and Technology and Everett E. Green, Supervisor of Institutes of Applied Arts and Technology; Mr. J.E.R. March, Honorary Member of the Canadian Institute of Surveying;Mr.H.B. Robertson, Director of Surveys, Department of Lands and Forests, Walter E. Servant and S.E. Daykin of the Nova Scotia Land Survey Institute Advisory Committee.

Mr. Angus C. Hamilton, Chairman of the Surveying Engineering Department, University of New Brunswick presented the address to graduates. Those receiving certificates and diplomas were:

SECOND-YEAR SURVEY STUDENTS

Elmer Randall Brittain	Westville, Nova Scotia
Melvin Louis Comeau	Kentville, Nova Scotia
Colin Creighton Cormier	Riverview, New Brunswick
Royce Arnold Deal	Mount Uniacke, Nova Scotia
Joseph Edward Fraelic	Brooklyn, Nova Scotia
Christopher John Geddes	Bridgetown, Nova Scotia
Winston Franklin Gilks	Blissfield, New Brunswick
James Bartlett Gillis	Middleton, Nova Scotia
Bernard Christopher Gunning	Ottawa, Ontario
Dennis Allison Jones	Sydney, Nova Scotia
Harold Stephen Lively	Lantz, Nova Scotia
Victor Douglas MacLeod	Truro, Nova Scotia
Nathaniel Fraser Spence	Paradise, Nova Scotia
Darryl Roy Spidle	Mahone Bay, Nova Scotia
David Stephen Thorne	Granville Ferry, Nova Scotia

SECOND-YEAR PHOTOGRAMMETRY STUDENTS

Georges Pierre-Yves Boisvert	Paradise, Nova Scotia
Lynette Ruth Callicott	Lawrencetown, Nova Scotia
Murray Frederick Dunfield	Sussex, New Brunswick
Gary Brenton MacPherson	Kingston, New Brunswick
David Ronald McAndrew	Lawrencetown, Nova Scotia

FIRST-YEAR SURVEY STUDENTS

Harry Thomas Ashcroft	Halifax, Nova Scotia
Daniel Bernard Burke	Amherst, Nova Scotia
Clinton Curtis Garland	Falmouth, Nova Scotia
Richard Bryce Greene	New Glasgow, Nova Scotia
Michael John Hogan	Renous, New Brunswick
Joseph Emmanuel Larade	Cheticamp, New Brunswick
Michael George Joseph LeBlanc	Comeauville, Nova Scotia
Francis David Lewis	Charlottetown, Prince Edward Island
George William MacKay	Tatamagouche, Nova Scotia
Richard Donald Mehlman	Port Mouton, Nova Scotia
Paul Irving Sinclair	New Glasgow, Nova Scotia
Erwin Robert Turner	Bridgetown, Nova Scotia
Stephen Owen Vaughan	Halifax, Nova Scotia

FIRST-YEAR PHOTOGRAMMETRY STUDENTS

Robert Charles Braham	Jarvis, Ontario
Wendell Charles Feener	Bridgetown, Nova Scotia
David Ernest Himmelman	LaHave, Nova Scotia
Joseph Hortie	Dartmouth, Nova Scotia
David John Laffin	Lingan, Nova Scotia
Brian LeFort	Dartmouth, Nova Scotia
Grant Thompson MacDonald	Oxford, Nova Scotia
John Arthur Moran	Charlottetown, Prince Edward Island
David Robert Gordon Westcott	Chester Basin, Nova Scotia

CARTOGRAPHIC DRAFTING STUDENTS

Odile Boisvert	Paradise, Nova Scotia
Gordon Burpee Cranton	Amherst, Nova Scotia
Margaret Louise Docker	Merigomish, Nova Scotia
Peter Charles Michael Gaudet	Amherst, Nova Scotia
Gordon Richard Harris	Lawrencetown, Nova Scotia
Lewis Henry How	Wolfville, Nova Scotia
Graham Merrill Hyson	Hantsport, Nova Scotia
Gene Quinn Josey	Tangier, Nova Scotia
Dwight Ivan Malally	Truro, Nova Scotia
Michael Russell Owen Minick	Paradise, Nova Scotia
Kirk Thomas Nutter	Truro, Nova Scotia
Shirley Alan Smith	Amherst, Nova Scotia
Paul Stuart Sprague	Liverpool, Nova Scotia
John Gordon Stead	Dartmouth, Nova Scotia
James Donald Sutherland	Brookfield, Nova Scotia

*** NSLS BOARD OF EXAMINERS IMPORTANT NOTICE ***

SURVEYORS-IN-TRAINING - *J. F. Archibald, Secretary Board of Examiners* -

At the last meeting of the Board of Examiners the Board approved a form of Notice that on or after September 1, 1972, all Surveyors-in-Training must register their intention with the Board of Examiners:

REGISTRATION OF SURVEYORS-IN-TRAINING

1) On or after September 1, 1972, the Board will require those persons wishing to become Surveyors-in-Training to register their intention with the Board and to furnish the name and the position of the surveyor under whose supervision they will be working and studying.

2) This stipulation is being made, primarily, in the best interests of the Surveyor-in-Training for the following reasons:

    a) It will establish the fact that a master-student relationship has been arranged between a registered surveyor and the Surveyor-in-Training. (Some cases have recently come before the Board for consideration where it seems doubtful this master-student relationship ever existed during the period for which service is claimed. The Board sees quite a difference between an ordinary employee or associate and one who is a Surveyor-in-Training as well as an employee or associate.)

    b) The Board can offer the Surveyor-in-Training counsel and advice, and keep him informed of policy decisions and changes in the regulations during his period of training.

    c) The Board can inform the Surveyor-in-Training on registration what, if any, previous experience or training time will count towards ultimate certification.

    d) As changes in the regulations occur, the Board will have a means of determining the individuals whom these changes will affect and the individuals who will be exempted new requirements.

ACTUAL PRACTICE IN THE FIELD

1) The Board considers "actual practice in the field" to be work related to property or municipal boundaries.

2) Surveyors-in-Training should note that such projects as highway construction, clearing out rights-of-way, coordinate emplacement and control surveys, for example, are not regarded by the Board as work involving property boundaries. Before undertaking any extensive engagements for work which may be of doubtful value for training credit, a Surveyor-in-Training should seek the advice of the Board.

3) Surveyors-in-Training are reminded that it is incumbent upon them to satisfy the Board as to the suitability of their qualifications.

CHANGE OF EMPLOYMENT

1) When Surveyors-in-Training change employers or supervisors during their training period they should:

    a) So inform the Board.

    b) Obtain from their former employer or supervisor the requisite affidavit to cover the period of training with that employer or supervisor.

SAMPLE - REGISTRATION NOTICE TO

BOARD OF EXAMINERS FOR NOVA SCOTIA LAND SURVEYORS

REGARDING SURVEYOR-IN-TRAINING

I. (To be completed in triplicate by the surveyor-in-training, within 30 days of the beginning of his "in training period", and certified by the registered land surveyor under whom he is training. Original to be forwarded to the Secretary of the Board of Examiners; duplicate copy to be held by the registered land surveyor for completion of paragraph II as detailed below; triplicate copy to be retained by the surveyor-in-training.)

I, ..., DO HEREBY GIVE NOTICE PURSUANT TO THE NOVA SCOTIA LAND SURVEYORS ACT 9(1) (c) (R.S.1967), THAT SINCE ..... I HAVE BEEN IN ACTUAL PRACTICE
date
IN THE FIELD AS A SURVEYOR-IN-TRAINING WITH .....

A NOVA SCOTIA LAND SURVEYOR REGISTERED TO PRACTICE AS SUCH.

....
Date Surveyor-in-Training

Certified Correct:

....
Date Nova Scotia Land Surveyor

II. (This paragraph to be completed on the duplicate copy as soon as the surveyor-in-training finish his period of prescribed practice in the field, or when employment is terminated, whichever comes first, and forwarded to the Secretary of the Board of Examiners.)

I CERTIFY THAT ..... DID ACTUALLY PRACTICE IN THE FIELD UNDER MY DIRECTION AS A SURVEYOR-IN-TRAINING FROM... ..... TO ....., A PERIOD OF .... MONTHS.

....
Date Nova Scotia Land Surveyor

JOINT REGIONAL MEETING - HALIFAX CITY-COUNTY

A joint Regional Meeting of the Halifax City-County area members was held during the evening of May 3, 1972.

The principal topic was the proposed changes of the Nova Scotia Land Surveyors Act.

COUNCIL MEETING - MARCH 11, 1972

Complaints Committee -

1) Following a report of an unlicensed individual practising land surveying, Council advised him of the Provincial Statutes relating to land surveying. Recently, this Committee learned that the individual in question has employed the services of a Nova Scotia Land Surveyor.

2) A problem between a Nova Scotia Land Surveyor and client has been resolved to the satisfaction of the Committee.

3) A complaint against a Nova Scotia Land Surveyor was received. Council suggested that he appear before the Complaints Committee.

4) A complaint was received concerning alleged excessive fees charged. Council found that the fees for services provided were justified.

5) A complaint charging a Nova Scotia Land Surveyor of providing insufficient information with his plan of return of survey. Council suggested that the Nova Scotia Land Surveyor should appear before Committee.

Legislative Committee -

Correspondence and reports were received regarding the proposed changes of the Nova Scotia Land Surveyors Act.

Reports of the Councillors' Meetings with A.P.E.N.S. were discussed, as well as how the proposed changes affect the Nova Scotia Land Surveyor who only belongs to A.P.E.N.S. Council was reluctant to act on the amendments as directed by the November General Meeting, as Council fears the implications of such amendments were not fully realized at the General Meeting. It was moved: That Council re-examine each of the amendments to the Act passed at the 21st Annual Meeting and the matter be referred back to the Legislative Committee for further consideration because Council, on reflection, thinks that the full implications of some of the amendments were not fully considered prior to presentation. That the Association of Nova Scotia Land Surveyors hold a General Meeting on June 10,1972, to consider proposed changes to the Nova Scotia Land Surveyors Act.

Moved - That a report of the Nova Scotia Land Surveyors Act changes be presented to A.P.E.N.S. for their consideration and comments.

The question of the Association seeking Legislature approval to amend its own By-laws was discussed.

Richard Greene was accepted as a Non-practising Member of the Association.

The Secretary submitted the names of 18 members, who are over $60.00 in arrears, thus not in good standing with the Association.

It was moved by Council that Garnet Clarke serve as Secretary-Treasurer for the remainder of E. P. Rice's term.

A new Legislative Committee was appointed, consisting of:

Chairman	-	W. S. Crooker
Vice Chairman	-	J. F. Thompson
		I. P. Macdonald
		L. R. Feetham.

REPORT FROM EASTERN NOVA SCOTIA - *David C. Clark, Councillor*

On February 4, 1972, I had the opportunity of attending the Annual Meeting of the Nova Scotia Forest Products Association as representative of the Association of Nova Scotia Land Surveyors in Truro.

The afternoon session of the one-day meeting was especially interesting and at the closing banquet I had the honour of being a head table guest.

The meeting was well represented by government, having in attendance no less than one M.P., two MLA's, one Deputy Minister and the Mayor of Truro.

The Deputy Minister of Lands and Forests gave a report on the activities of the Department for the last year and among other things, touched on the progress of the Co-ordinate Survey Monumentation program.

A technical session I found to be interesting, was a presentation on safety which included the safe handling of chain saws and demonstrations of personal protective equipment for woods work.

A panel discussion was held with three excellent speakers, on the subject of capital gains tax, corporation tax and succession duties which was of interest to anyone in business.

** NEWS FLASH **

It is reported that Surveyors from all over Nova Scotia will join up with the Cape Breton forces to carry out an invasion of the Isle Royal Hotel in Sydney on November 2, 3 and 4, 1972.

- SCIENCE AND THE SURVEYOR -

By Harold E. Jones

GEODETIC SURVEY OF CANADA
DEPARTMENT OF ENERGY,
MINES AND RESOURCES

Reprinted from SCIENCE AFFAIRS
(March 1969)

In the last two decades many outstanding survey applications of new scientific discoveries have been developed. Surveyors are finding that, in addition to their facility with the conventional tape and transit, they must have at least a working knowledge of such things as lasers, Kerr cells, klystrons, microwaves, light emitting diodes and gyroscopes. The type of surveyor known as a geodesist, who is concerned with the accurate measurement of long distances where the curvature and precise shape of the earth are of major concern, is also concerned with measurements to satellites and with radio astronomy. Meteorology also has become of very much concern to surveyors.

THE BASIC PROBLEM

Basically, a surveyor's job is to measure the size, shape, and location of a piece of land so that it can be marked on a plan or map for a client. His client may be a home owner who wants his land defined on the city plan or a government which wants its country defined on the spheroidal world. To do this he must measure distances ranging from a fraction of a foot to hundreds or thousands of miles.

CLASSICAL METHODS

The classical method of measuring distances, used for centuries and still commonly used to measure distances up to a few hundred feet, is to stretch a graduated tape between the points involved. But if we require a distance of many miles, taping becomes impractical, especially if the terrain is mountainous or involves crossing lakes and rivers. The classical solution to this problem was to use triangulation in which the lengths of a few sides of abutting triangles were measured and the lengths of the other sides were computed using measured angles. This was slow and expensive.

THE VELOCITY OF LIGHT IN A VACUUM

Dr. Erick Bergstrand of the Swedish Geographical Survey Office might be considered the father of the modern electromagnetic distance measuring (E.D.M.) instruments. In the decade 1940-1950 he set out to determine a more accurate value for one of the basic constants of science "c", the velocity of light in a vacuum. In essence he used Fizeau's rotating gear wheel method, reasoning that once a better value of c was known he could use his instrument as a survey instrument to measure distances. He projected a beam of light modulated in intensity, using a Kerr cell shutter, at ten million cycles per second. The beam was reflected by a mirror at a precisely known distance a few miles away and "observed" by a photomultiplier tube. He determined the phase difference between the outgoing and returning light, and from this was able to compute the velocity of travel to very high precision.

INDEX OF REFRACTION OF AIR

Bergstrand measured the speed of light in air. The ratio between the speed in a vacuum and in air is the index of refraction by definition. Fortunately, H. Barrell and J. E. Sears of the National Physical Laboratory in England had just completed a comprehensive study of this index and Bergstrand was able to apply their work. In order to compute the index applicable to the conditions of his experiment the average pressure, temperature and vapor pressure along the light travel path were required.

Bergstrand named his instrument "Geodimeter". The AGA company in Sweden put a commercial model into production and has now produced several successive models incorporating improvements in size, weight, and operating convenience. The recent model in general use weighs about 35 lbs, and sits on a standard surveyor's tripod using a 12 volt storage battery for power. Its accuracy (standard deviation) is a centimeter or so with an additional 1-2 parts per million (ppm) due to meteorological uncertainties which predominate when the line measured is more than 10 Kilometers (6 miles). The range is normally a few miles but if a stronger light source is used (an arc lamp requiring a small motor generator power source) and work is done at night, lines up to 20 miles can be measured. The air must be exceptionally haze-free to measure at this maximum range. Similar instruments are made in Russia and East Germany. Thousands are in use throughout the world.

DISTANCE MEASUREMENT BY MICROWAVE BEAM

In 1957, Dr. T. L. Wadley, of the South African National Telecommunications Research Laboratory, introduced a system in which microwaves were "reflected" by an instrument which received and retransmitted the signal back toward its source. This system had some advantages over the Geodimeter in that it could measure longer distances by day or night, was unaffected by haze, and was smaller and more convenient than early Geodimeters. It was not as accurate for two reasons. First, microwaves cannot be directed into as narrow a beam as light. Therefore, if the line travels above a lake or marsh, which will reflect microwaves, some of the signal arriving at, or returning from, the 'reflector' will have come by an indirect path reflected off the lake rather than the direct path. The error can be largely eliminated by changing the carrier frequency through a small range in steps and measurements at each step. The measured length shows a cyclic variation as the carrier frequency is changed and the average is likely to be close to correct. However, sometimes a full cycle of variations cannot be received or the cycle is of such an erratic shape that it is not clear when a cycle is complete. A second reason for decreased accuracy is in the difficulty of measuring the average water vapor content of the air in the path. The effect of water vapor on velocity is much greater for microwaves than light.

Dr. Wadley called his instrument a Tellurometer and a company was set up to manufacture it. Several successive models have been produced incorporating improvements, the main one being the reduction of the wave length of the carrier to enable the beam width to be narrowed. Several other manufacturers, among them American, Russian, Polish, Swiss and Hungarian, have produced similar instruments. They are the most common type of EDM instruments. Many thousands are in use throughout the world. Accuracy is typically a few centimeters with an additional 3-5 ppm.

DISTANCE MEASUREMENT BY LASER BEAM

Surveyors have been anxious to use lasers in their distance measuring instruments because the very intense beam will increase the range of the Geodimeter-type instrument. However, the increase is not great because even a laser beam, like any other light, is blocked by dense haze. Accuracy is not appreciably increased because the accuracy of measuring the mean refraction index is the same as for conventional light and is the limiting factor. The newest model of the Geodimeter, which is just coming into production, uses a laser light source.

DISTANCE MEASUREMENT BY INFRATED BEAM

Not long ago, gallium arsenede diodes were developed. They have the property of producing infrared light when a voltage is applied to them. This light, which can be manipulated with ordinary lenses and mirrors, is used for new instruments manufactured by Swiss and German firms and possibly others. A small Swiss instrument mounted on top of a standard theodolite. It is designed to measure up to two kilometers with an accuracy of one or two centimeters.

METEOROLOGICAL PROBLEMS

The accuracy of all these methods of measuring distances over a few kilometers has been limited by the meteorological problem of finding the average index of refraction, and thus the average velocity, for the particular carrier frequency over the entire path length. Normally it is feasible to measure temperature, pressure, and relative humidity at the ends of the line only where local ground effects are likely to produce conditions quite different from those on the mid-portion of the line. For the microwave system vapor pressure measurement is very critical. The most feasible method found so far to measure this is by the use of wet and dry thermometers. It is notoriously difficult to take wet and dry bulb temperature readings, accurate to one or two tenths of a degree, unaffected by radiation and effects due to the proximity of the observer. And yet, this is required for the most accurate microwave measurements. In order to average down errors, complete sets of length measurements are made at different times of day and the results averaged.

An entirely different method of getting the true mean value of the index for light, over the entire path, is being tested and investigated by the Institute of Environmental Research in the United States. This method depends on the fact that the value of the index is a function of the frequency (color) of the light. The same length is measured alternately using different color carriers, and from the difference between the measurements the value of the index for the different frequencies can be computed. This method shows great promise.

The previously considered methods are generally for measurements under 50 miles. When hundreds or thousands of miles have to be measured, a traverse or survey network can be used to divide the distance into measureable lengths. But this can only be done if there is land between the points to bridge oceans, other methods have been devised, a few of which are considered in the following chapter.

DISTANCE MEASUREMENT BY SECOR
RANGING ON SATELLITES

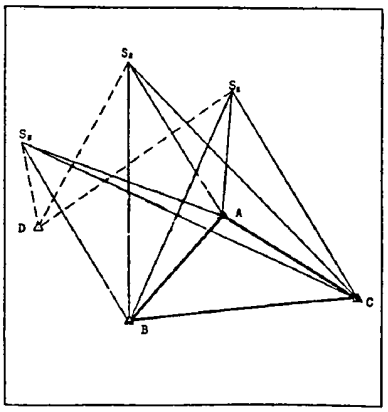


Figure 4 -

Diagram illustrates satellite ranging measurements. A, B, and C are known positions. The lines to S_1, S_2 and S_3 indicate range measurements which determine three satellite positions. The dotted lines from the three satellite stations to D indicate measurements which can fix the position of D.

With this method, distance to a satellite are measured from four ground stations as the spacecraft passes within range. (Figure 4). The distances are measured using a microwave carrier as in the Tellurometer system. The signal is sent out from the ground stations and retransmitted at the satellite. The position of the satellite is computed using the measurements from three stations A, B, and C with known positions. The fourth measurement (dotted) is a range to an unknown position D. Three sets of these ranges are shown in Figure 5, but in practice many sets are taken giving ranges to the unknown station from many directions. It

is thus possible to solve for the unknown position D. We have assumed that each set of four measurements is simultaneous. Actually they are taken in very quick successive (SECOR stands for Sequential Collation of Range) and corrections are made to give an effective simultaneous set.

One of the largest sources of error in the system is the effect of the ionosphere on the velocity of the ray. The effect varies from day to night and with sunspot activity, etc. The method of correcting is a function of the frequency of the carrier. When the modulated radio beam is received at the satellite it is retransmitted with the modulation imposed on two different carrier frequencies. From the difference in the time between the return on the two carriers the correction for each is computed. The ground control electronic equipment is relatively sophisticated and expensive and a special satellite designed for the system is required. The system is currently used by the U.S. Army Map Service.

DISTANCE DETERMINATION BY SATELLITE TRIANGULATION

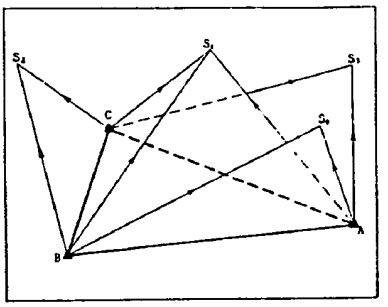


Figure 5 -

Diagram illustrating satellite triangulation methods, A, B, and C are ground stations of which A and B have known positions. The arrows to the satellite stations S_1, S_2, S_3 and S_4 indicate rays defined by photographs taken simultaneously from the ground stations for each of the satellite positions. The rays define planes in space and the intersection of the planes defines the direction and position of lines between ground Stations. The intersection of the lines from A and B to C fixes the position of C.

In this method the satellite is passive but it must be in such a position that it can be photographed against a star background. The sun must be shining on the satellite while the ground stations are in darkness. Also the sky must not be obscured by clouds. There are many satellites that can be used, but clearly there are seasonal and weather restrictions at any particular site. To see how the system works consider three ground stations, A, B, and C, of which B and C have known positions (Figure 5). S_1 is a satellite position at which simultaneous pictures are taken from the three ground stations. The camera shutters are controlled by independent clocks synchronized to thousandths of seconds. Using the precisely known co-ordinates of the stars in the background as a basis, the directions in space of the rays from each station to the satellite can be scaled from the photographic plates. Each pair of rays intersecting at the satellite defines a plane in space. At satellite position S_2 simultaneous photos are taken from B and C. The pair of rays through B and C define the line B, C, in space. Similarly, the lines AC and AB are defined using planes through S_3 and S_4 respectively in combination with the appropriate plane through S_1. If the positions of A and B are known, the measurements make it possible to solve for the position of C using the formulae of solid geometry. It should be noted that this system measures directions only. The scale of the three-dimensional triangulation must be supplied by other types of measurements between the initial stations. This is the main accuracy limitation. The U.S. Coast and Geodetic Survey in cooperation with many other countries has a worldwide net of stations. Other groups of nations in Western Europe and in the communist countries have programs of satellite triangulation.

DISTANCE MEASUREMENT BY RADIO INTERFEROMETER

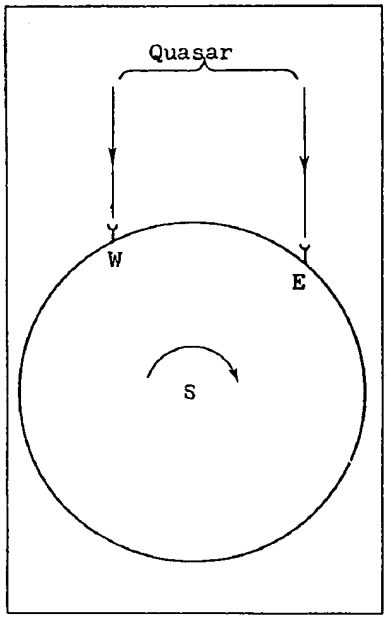


Figure 6

Diagram of a simplified radio interferometer with two radio telescopes on the equator at E and W viewed from the south. A Quasar infinitely distant and on the plane of the equator emits radio wave fronts which do not in general arrive simultaneously at E and W. The delay between arrival times varies as the earth rotates at a known velocity. The rate of change of this delay, which can be accurately measured as a frequency, depends on the distance between E and W. From the measured frequency the distance can be deducted.

A method of accurately measuring the distance between two radio telescopes has been suggested by Dr. J. Locke of the National Research Council of Canada and others, and is currently being tested. The principle behind the system is illustrated in Figure 6, which shows a simplified system in which two radio telescopes at E and W, both on the equator and a thousand or so miles apart, are pointed at a Quasar, a point source of one frequency (monochromatic) radio waves which is in the plane of the equator. The wave fronts approaching the earth from the Quasar are collected by the telescopes. If both telescopes are the same distance from the Quasar or the difference is an integral number of wave lengths, and the signals from the two receivers are added, they will reinforce. If the difference is an odd number of half wave lengths they will cancel. Thus, from the frequency it is possible to compute the distance. In practice the restrictions of a monochromatic signal and the equatorial positioning of the telescopes and the Quasar are not necessary but it is necessary to measure also the actual delay between the times a wavefront reaches the two telescopes. Various indirect methods of measuring this are possible. The accuracy of this delay measurement and of ionospheric refraction corrections are the limitations on the overall accuracy with the present experiments, but from theoretical considerations and with improvements in technique the method promises to provide great accuracy. The operation of an interferometer requires the signals from the two receivers to be added. If the receivers are a thousand miles apart the signals cannot be added by bringing lead wires from the two to a common point because of the large varying and unknown delays which would be introduced in the wires. The method of circumventing this difficulty is to record the signals on magnetic tapes at the receivers along with time signal pulses from very precise clocks. Then the two tapes can be brought together and "played back" using the timing pulses to synchronize them. The stability requirements for the clocks are extreme, being about 1 part in 10^{13}, or better, over the period of observing.

CONCLUSIONS

Surveyors are in the forefront of science. New discoveries in both basic and applied science in its many branches and from many countries find application in the profession. The surveying profession is not a large one, but it is hoped that this article, in which only a few of the developments are mentioned, has indicated why those within the profession find it very stimulating and rewarding.

- DEPARTMENT OF SURVEYING ENGINEERING, U.N.B., AWARDED CONTRACT - TO CARRY OUT A DOPPLER SATELLITE SURVEY IN THE MARITIMES

The Department of Surveying Engineering, University of New Brunswick, Fredericton has just completed the field-work phase of an experiment that will help determine whether first-order geodetic control can be obtained from Doppler satellite observations. The work is being done by U.N.B. under a contract from the Surveys and Mapping Branch of the Department of Energy, Mines and Resources, Ottawa. It is the third of three experiments involving U.N.B.

The first was a joint experiment with the Bedford Institute, Halifax and Shell Canada Limited, Calgary, the results of which are published in the June, 1972 issue of The Canadian Surveyor. The second experiment involved U.N.B., Dabbs Control Surveys Limited, Calgary (now merged with McElhanney of Vancouver) acting on behalf of Mobil Oil Limited, Edmonton, and Bedford Institute and was concerned with the location of points on Sable Island.

The results for the first experiment, which contained several lines of about 1,000 kilometers in length, indicated an average agreement of three metres between the Doppler satellite survey and terrestrial survey. The current experiment is an attempt to confirm these results for shorter lines of 15 to 150 kilometers. In this experiment, stations were occupied at Fredericton, Halifax, and at four stations in between to give lines of varying length. The method of the satellite survey used employed two Doppler receivers located at each end of a line. Simultaneous observations to satellite passes were made for a period of about one week for each of the several lines measured. Ground surveys were eliminated by placing the satellite antennae directly on or about first-order geodetic monuments. Data was collected on punched paper tape which was brought to Fredericton on a routine basis and processed on the IBM 360/50.

Carrying out the above experiment is no one-man job. Working with Dr. Edward J. Krakiwsky, Associate Professor, U.N.B. and director of the project are: Mr. David Wells (on leave from the Bedford Institute) - a Ph.D. candidate as co-director; Mr. Donald Thomson - a Ph.D. candidate as project manager; Mr. Mohammed Nassar - an M.Sc. candidate as computer programmer; Miss Wendlynn Wells as data analyst; Mr. Harold Jones (Geodetic Survey of Canada) as field supervisor; Mr. Ronald Kerslake and Mr. Ronald Wade - senior undergraduate students as crew chiefs; and Messrs. Olayiwola Afolabi, Charles Merry, Robert Craigs, Emmanuel Ezekiel, Allen Sewell, and Robert Wilson - U.N.B. students as observers.

- submitted by Dr. Edward Krakiwsky.

THE ASSOCIATION OF NOVA SCOTIA LAND SURVEYORS

COUNCIL MEETING SUMMARY

JUNE 10, 1972

President James F. Doig called the Council Meeting to order. Each region of the province was represented, two councillors were absent.

The agenda for the Council Meeting listed items of urgent business and items pertaining to the Special General Meeting.

Our Complaints Committee had three main complaints in hand, of which two have been satisfactorily resolved, one is pending a hearing before the Committee. There were four new complaints outlined to Council for which the Committee is waiting for additional information from both parties.

The Legislative Committee presented five Amendments to the Nova Scotia Land Surveyors Act, for final discussion and recommendations, before going to the Special General Meeting to be held the same day. The five Amendments with background information were sent out to every member of the Association.

Council proposed and would recommend to the Special Meeting Amendments 1, 2, 4 and 5. Amendment 3 would be an addition to the Act which would give the Association the right to control the qualifications of the principals of any Incorporated company surveying in Nova Scotia.

Reports from two regional meetings were given. Both reports indicated general approval for Amendments 1, 2, 4 and 5, but would not approve Amendment 3 as it now was worded. Each councillor was polled for his opinion and in summary the Council was unanimous in suggesting the Amendment 3 should be referred back to the Legislative Committee for further detailed study. Council also suggested that this Amendment should not be presented to the Special Meeting as a formal Amendment but only as a topic of discussion. The discussion would provide Council with needed input so a detailed presentation could be made to our solicitor for his recommendations.

Council accepted the following list of qualified applicants into the Association:

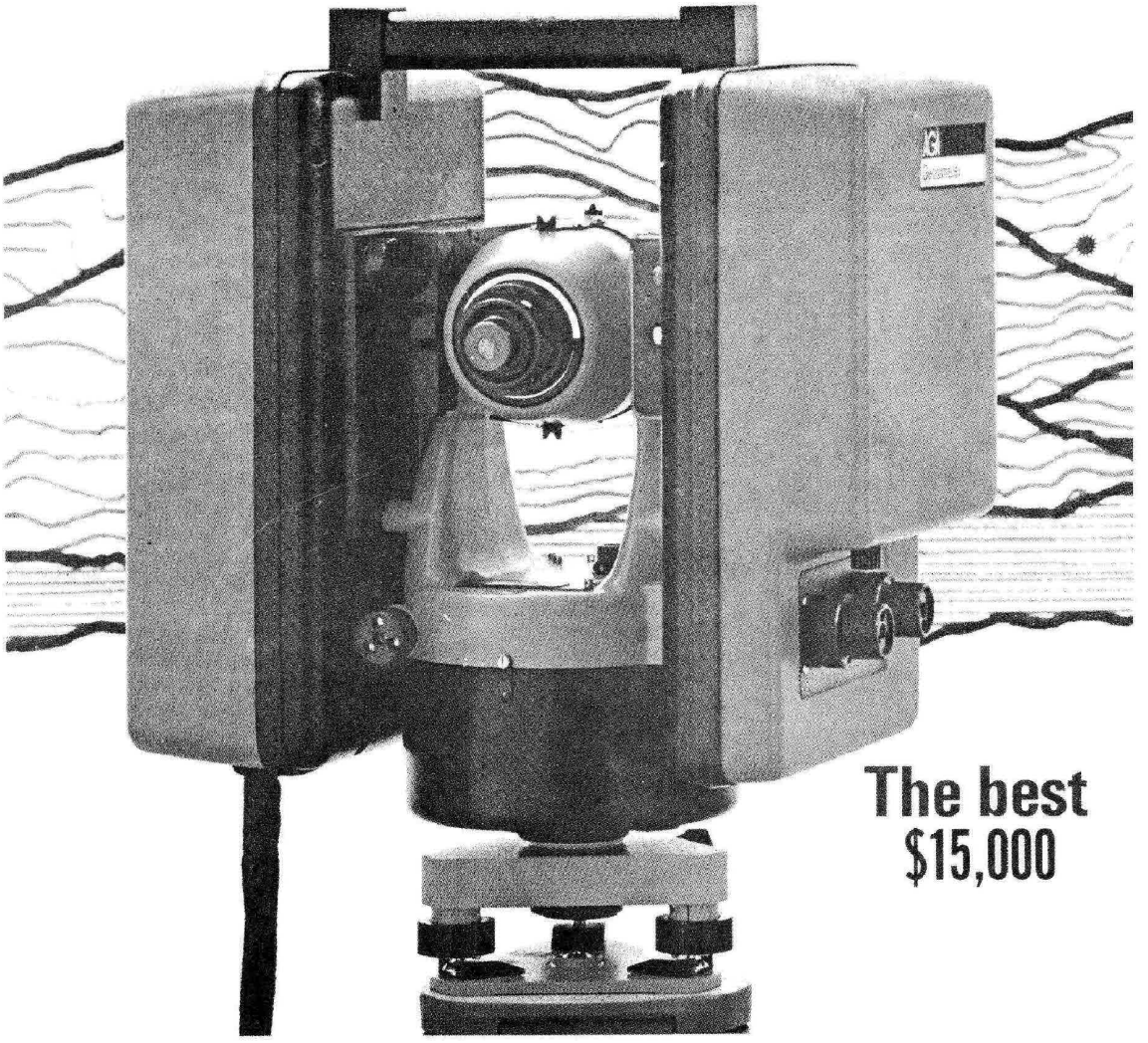
Donald Lee Johnston	- Dartmouth
Michael Joseph Crant	- Halifax
Ray Allister Fulton, P. Eng.	- Truro
Harvey William Doane, P. Eng.	- Halifax
Hugh Daniel Baillie	- R. R. 3, Westville
Arthur H. Abbott, P. Eng.	- Halifax
Gerald A. Pottier	- R. R. 3, Tusket, Yarmouth Co.
Donald T. Gillis	- Middleton
Robert A. Daniels	- Dartmouth.

Mr. F. Lyndon Gray will continue to be the Association's representative on the Voluntary Economic Planning Committee for 1972.

Our President has received a letter from Mr. Angus Hamilton, Chairman of the Survey Engineering Department of University of New Brunswick. Mr. Hamilton would like to have a representative from our Association to the Advisory Committee of his Department. No one was appointed at the Council Meeting.

The meeting closed with a discussion on the streamlining of procedures and methods of our Association. The question, "Do we need to set up an office with full time staff?" was repeated again.

- Associate Editor.



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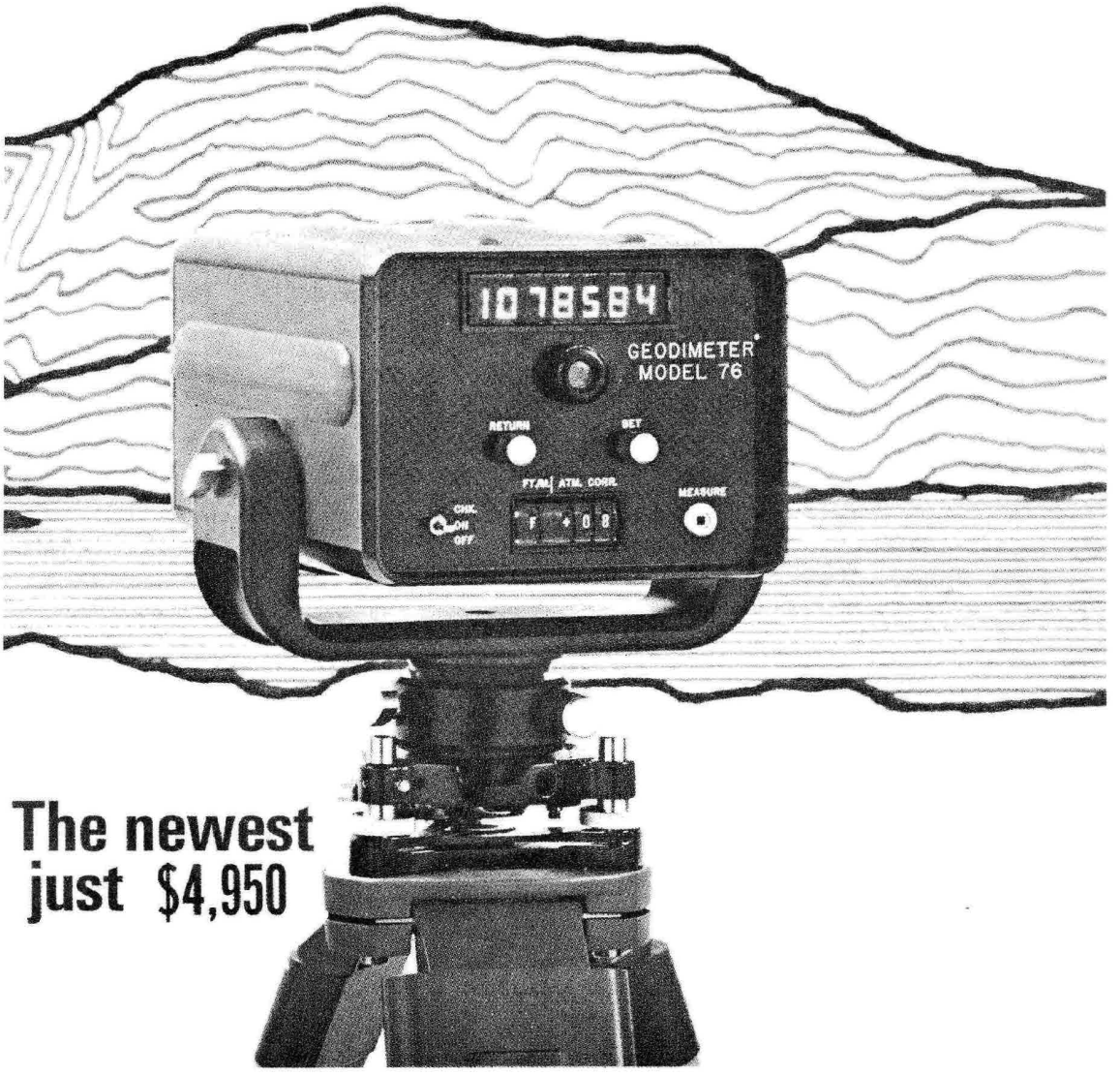

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- SPECIAL GENERAL MEETING -

HELD AT HOTEL NOVA SCOTIAN

SATURDAY, JUNE 10, 1972 AT 2:00 P.M.

The President, Mr. J. F. Doig, called the meeting to order. Mr. Doig referred to the Annual Meeting in November when instructions were given to Council to proceed with Amendments that had been put before the meeting which were to make changes in The Nova Scotia Land Surveyors Act. Your Council and your Legislative Committee have done just this, and the purpose of this meeting is to make you aware of what is going on in the interim and to put before you the results of these deliberations.

Mr. Doig referred to the letter that went out to the membership on the 16th May in which it stated that, in the course of deliberations, we have come to the conclusion in some of the earlier proposals that some of the proposals should not be proceeded with, and that other proposals require modification. I might say now that the proposal that was then decided should not be proceeded with was the one that had the affect of changing the composition of the Board of Examiners. Your representatives of the Council met with the Association of Professional Engineers of Nova Scotia and we jointly examined this problem and Council itself came to the decision in March that no useful purpose would be resolved in pressing for an alteration on the Board of Examiners. The key here from Council's point of view is not who is on the Board of Examiners by reason of the fact, but where does he come from, whether the individuals that make up the Board are knowledgeable, intelligent and industrious. If these conditions can be satisfied then Council thinks that there are other questions that can occupy our time, so Council has withdrawn any amendments having to do with changing the composition of the Board.

Mr. Doig then referred to the Notice of the Meeting in which it pointed out that the only topics for discussion were those involving amendments to the Surveyors Act.

Amendment No. 1 -

Mr. W. S. Crooker moved that Section 16, Subsection (b) be deleted, seconded by Mr. I. P. Macdonald.

You will find that the basic difference in what is put before you today and what appeared before you in November is the requirement that all Professional Engineers who practice land surveying become members of the Association is modified by the grandfather clause which will give exemption at the time of the passing of this amendment to all those who are exempted at present. It became quite clear in the discussions and correspondence we had with the Association of Professional Engineers of Nova Scotia that if we did not make this provision they would not go along with the Legislation.

There is another factor, as well here, that Council considered and that is that if we did not make provision for an exemption for those who are now qualified to survey, we would be putting ourselves as an Association in a position of going before a Legislative Committee, or the House of Assembly, and proposing to take away rights and privileges presently enjoyed by some members. The advice that we received was that if we do this, we would probably fail in our request.

I might say too that our Secretary has been informed verbally that APENS supports, or will support, Amendment No. 1 and Amendment No. 2 in its present form, and written confirmation of this will follow. APENS Council meeting was on June 9, which accounts for the verbal information and APENS interest in these Amendments.

Mr. Servant made comment on Amendment No. 1 - to require that all Nova Scotia Land Surveyors, who are also Professional Engineers and who practice land surveying, to become members of the Association of Nova Scotia Land Surveyors. We

give the impression many times that people are talking about Engineers being entitled to practice.

Mr. Eldridge then asked Mr. Doig - if he said that the Professional Engineers had their meeting June 9, and you have in writing that they will not oppose this? Mr. Eldridge made the comment that until we receive something in writing from APENS that we proceed with a certain amount of caution. The reason I make this statement is that I was around when this Association was attempting to get their first Act through and we have received a lot of this information verbally, but when the crunch was down we found that we were flat on our face as soon as it hit the Law Amendments Committee, even before it got to the floor of the House it was defeated there. I caution this group very much that they get something in writing that could be produced when our presentation is made to the Law Amendments Committee.

Mr. Doig assured the meeting that we would not go before the Law Amendments Committee without being well prepared and documented.

Mr. Eldridge stated that the Engineering Profession holds a much higher status than the Surveyor. Whether we want to accept this or not it is a fact, in the minds of the Legislature at least, because they have a national body behind them and able to lobby much more effectively than the Surveyor. Approval by APENS Council may not mean the total membership agree and we should wait written confirmation.

Mr. I. P. Macdonald pointed out that the briefs supporting Amendment No. 1 and No. 2 were sent to the Engineers and stated that it pointed out just what we meant exactly by deleting the Sections in our Act.

Mr. Ken Robb referred to the statement made by Mr. Servant.

Mr. Doig said the statement made by Mr. Servant improves the wording of the Amendment.

Amendment No. 2 -

Mr. W. S. Crooker moved that a new Section 16A be inserted. Seconded by Mr. I. P. Macdonald, motion carried.

Amendment No. 4 -

Mr. W. S. Crooker moved that Section 9, Subsection (1) (a) be deleted. Seconded by Mr. I. P. Macdonald, motion carried.

Amendment No. 5 -

Mr. W. S. Crooker moved that Section 4 (line one) be amended by deleting the words 'with the approval of the Governor-in-Council'. Seconded by Mr. D. Clark.

Mr. Doig explained (Amendment No. 5) that the Association will be asking the Government of Nova Scotia to give us the authority to amend our own By-laws. This amendment was put before you in November and passed. I thought it best to come back to the meeting this time, not because of any change in the wording, of the original motion, but because there were some thoughts in the brief in support of this amendment that I felt the membership should be aware of. If we are to go to the Legislative Committee of the House to ask permission to alter our own By-laws I think one of the first questions the Legislative Committee would put to us - so if you have this power what do you propose to do? In the brief are three points which will come before Council from time to time. At various Council Meetings it was felt it would be reasonable topics to give our attention to by way of amendments to the By-laws.

Mr. Ken Robb asked how difficult it was to get changes in the By-laws.

Mr. Doig replied that, if we do our homework properly, if we put up our proposed changes clearly to show what is involved it would probably take relatively little time. I believe on the last occasion it took considerable time because of the form we had put our proposals in. It was not made clear what the effect of some of the changes would be.

Mr. Bob Murray asked the question, that if the Association has the right to amend their own By-laws, does it mean that Amendments 1,2,3 and 4 can be amended here today without going to the Legislative Council? Mr. Doig replied that amendments that we are considering are amendments to the Land Surveyors Act, which is the prerogative of the Legislature to change. The By-laws are only rules and regulations which give affect to the basic acts and they can never conflict.

Mr. Sherran of New Brunswick made the comment that they have the authority to amend their own By-laws, but there must be thirty days or ninety days before the Annual Meeting a By-law must come to the Secretary signed by two members, secondly, it must be passed by two-thirds vote of the Association, and I can see no harm being done. That probably should be put in your amendments to your Act.

Mr. Burt Robertson made the comment that Mr.Sherran made a good point and until such time as the actual procedures are laid down of how the By-laws are to be amended he does not support this amendment.

Mr. Sherran then added that maybe they could use the Act that was used in New Brunswick or a section covering that, and it would simplify things if you would do that.

Mr. Burt Robertson suggested that the amendment be brought up again in November after further discussion, and moved it be withdrawn for further information and referred back to Council.

Mr. Crooker withdrew his motion to have approval by the membership of Amendment No. 5. Mr. Dave Clark, the seconder, withdrew also and they agreed to have Council and our Legislative Committee present this amendment with procedural details. The meeting agreed to this action.

Amendment No. 3 -

Mr. Doig made reference to the morning's Council Meeting in which they gave considerable thought to the substance of Amendment No. 3, and it is the view of Council that we cannot recommend to the meeting that Amendment No. 3 be considered as it stands. Council wishes to put the material entitled Amendment No. 3 before this meeting as a basis of discussion. The basic intent of this item was to make arrangements whereby the policy of Companies and Partnerships offering services as land surveyors be made by Nova Scotia Land Surveyors, and secondly that the records, surveyor records, etc. of such companies be continually available. These were the basic intentions. The difficulty comes when you translate the good intent into detailed rules and regulations which govern all of us. I have given considerable thought on this material in the past months and it seems to be that our problems here have arisen from a number of sources. One of them it seems to me, that heretofore we have all in general have looked at ourselves in body and have conceived ourselves of being either surveyors who are employed as civil servants and surveyors who are employed in private practice, and we find that all of those who are in private practice organize their affairs in much the same way. It has become quite apparent in the past few weeks, that there is a great variety of methods by which we organize ourselves as private business and partnerships, and there has been considerable discussion of the mechanics of this event as it affects the variety of ways we do organize.

Another situation that is giving us concern, is the fact that I think all of us as individuals are in unfamiliar territory when it comes to deal with partnerships and companies. We have reasonable confidence, I suppose as a group, to deal with technical matters involving surveying, but we are dealing with partnerships

and Companies. There are things involved here that are not apparent to any one of us and some of these things are being made apparent to members of Council. Council wants to take this opportunity of putting this before the meeting as a basis for discussion to find out, and better to inform ourselves as Council members, the variety of ways we do conduct business and the possible objections many of our members see to some of the proposals outlined here under Partnerships and Companies.

The basic attempt dealing with Partnerships and Companies, is first of all the policies to arrange things in such a way that survey policies determined by Partnerships and Companies are in effect made by surveyors, and secondly, to arrange affairs in such a way that records of such companies be continually available in the province so that we would not find ourselves in a situation as it happened on occasion elsewhere, where the firm does come in and does a piece of work and disappears. These two propositions were basic to this whole idea. Both of these, I believe, are worthwhile propositions but how to achieve this in detail remains a bit of a problem.

Mr. Robb - at present is it possible for a body corporate to be formed without having a Board of Directors?

Mr. Fred Roberts asked if there wasn't any statute on the books now that govern companies.

Mr. Doig replied that the Companies Act provides the Company who performs with a certain number of officers may be registered.

Mr. Sherran stated he has a company formed in New Brunswick and in his Charter it states what they can carry out as land surveyors. The land surveyor is subject to the Land Survey Act, the Engineer is subject to the Engineering Profession Act.

Mr. Hingley stated that a clause should be included in the Surveyors Act whereby companies doing legal surveying should be registered with the Association and their surveyor who is responsible for all work performed by them.

Mr. Streb - these companies are able to advertise that they do land surveying, when, in fact, no one on their staff is a legal land surveyor. Is this the main objection?

Mr. Doig - the main objections seems to be the body to the Act, we will designate as Section 25A and B, there are companies in the province who have on their staff surveyors as your pulp and paper company, some of the objections, some of the difficulties that are seen stem from these sources. They employ registered surveyors but their Board of Directors are not themselves surveyors. This is where they see difficulty. Others see it probably in the pulp and paper company employing their own staff of surveyors as they do now, legitimately according to our rights, but in future being restricted by some of the terms outlined here, it might prohibit them from using their own staff on their own properties. They never advertise their services as surveyors. Its the name you see, pulp and paper company, the surveyors are looking after the company holdings and some companies feel that their rights are enfringed upon.

Mr. Sherran - you can take care of that in your By-laws. That any company who employs a land surveyor will work upon that companies own land but not for hire.

Mr. Bob Murray stated that the land surveyors who are employees of Scott Paper are called upon to carry out land surveying for a subsidiary land development company. This is beyond working on the employer's land.

Mr. Eldridge commended Council for deferring Amendment No. 3 but condemned them for allowing this amendment to go to our November meeting. He did not agree that we were proceeding on the right track.

Mr. Dunbrack - I was just wondering, Mr. Murray has said that they have subsidiary companies that develop land and his surveyors are engaged on surveys of these lands, and I would like to ask Mr. Murray if perhaps these surveyors are working strictly on Scott lands, or if perhaps they are putting themselves out to the public as being land surveyors?

Mr. Murray - Scott's surveyors only survey on Scott lands which may be lands of a subsidiary company of Scott.

Mr. Dunbrack - but you do work strictly on Scott land?

Mr. Murray - this is where the hair splitting comes in to the question.

Mr. Servant - to follow up on a question that arose quite possibly might apply to your company, is that I think most companies when they are incorporated are incorporated to do certain other duties that they would carry out, and generally there is this clause which you refer to the grandfather clause at the end, which says and such other things and matters which make it necessary to carry out the principal purpose of the corporation. What I am thinking of is that I would expect that that clause would cover your surveying, it is of course, one of the main things to carry out the pulp and paper industry which your company is formed to do. Likewise, a company formed for surveying says that this company is formed for the purpose of surveying, mapping and owning such properties and doing such things as necessary.

Mr. Servant - this Act is nothing new, it was put before the meeting, it was almost identical to the Nova Scotia Architects Act which was approved by the Legislature several years ago here in Nova Scotia. It is also very similar pertaining to the same thing in regard to the majority of shareholders in a new Act for land surveyors in Ontario. Up until several years ago in Ontario, the land surveyors were not allowed to practice under any corporation, that is they were not allowed to incorporate a company for the purpose of surveying, certainly they were allowed to survey as part of their business for the power companies or governments. Only several years ago were they allowed to work for survey companies or partnerships or associations or whatever. That was relatively a new Act, they made several amendments to it in 1971, but nothing very much, and the secretaries of the Ontario Association informed me that there were no serious objections from the general membership at all. They operate with it in Ontario and there are no problems.

Mr. Crooker - I have been trying very hard to digest this information this afternoon because as Chairman of the Legislative Committee, it is obvious that I have a lot of work to do. First, I would like to ask you if the Scott Pulp and Paper Company surveyors do work for other pulp and paper companies?

Mr. Murray replied no.

Mr. Crooker asked if those objecting to the amendments would give specific reasons so Council could have as much background information as possible.

Mr. Eldridge - I can't help but feel that whoever brought this to Council have a personal axe to grind. Council themselves didn't bring this up - it was brought to Council by somebody and I ask you who?

Mr. Crooker - Mr. Servant did.

Mr. Eldridge - for eighteen years I was associated with a company in woods land surveying and at different times surveyors on our staff were borrowed. Would this amendment allow this for one thing? I feel that perhaps some of you City surveyors have a problem, maybe in this area, and you are trying to cover your problem by trying to make an issue of the thing to apply to all land surveyors in the province. I have a feeling that a number of our land surveyors are being bulldozed here, and until I see this in a better light, I can't support it in any way

or form, and I think I have a number of supporters. I don't mind the idea of loaning surveyors.

Mr. Hingley - the company I work for is primarily directly affected by this Amendment No. 3, and we feel that we are being possibly held as an example for something. The majority of the Directors don't agree with this, and possibly our work is not being considered, it is just the set up that we cannot bear, and what type of work we do we are being penalized because we do not meet this Partnerships and Companies Section, and perhaps it should be the work that is on display and not actually the set up of your directors. Section 3, Subsection 2 gives the Association a considerable amount of power and there is no assurance here that this will be confidential, that the Secretary and Council would not make this a common knowledge type of thing. The Secretary could from time to time inspect the share registry and registry of directors. If the Association would like this filed we would be more than willing to file this, but it is just that possibly there should be something in there about it being confidential.

Mr. Murray - take into consideration things that have been going on for years. I would like for the Council to consider the possibility of putting in a deadline or grandfather clause and put this amendment into effect for the future. I think that we have to take into consideration that members of this Association who are already in practice, although he does not own his own company.

Mr. Fred Robertson - perhaps I am not knowledgeable about the why of this, and I don't want to fan something which is of not much consequence, but it seems that the area we are falling into is that we are trying to question the people who seem to have some reason by way of legal advice apparently about their companies that this might have been their best interests. I am not too sure myself that I know all the reasons, the why and the wherefores of the amendment, perhaps it might be more helpful if the general meeting at large were told why this is necessary, what is the problem. I don't really know the problem, granted there are probably problems for privately-owned companies. I don't work for a privately-owned company but the legal advice that I have against it, is that it would not be in the interests of the corporation that I work for. I work for a municipality and indications are that from our legal people that they were seriously opposed to this. This is the point I am trying to make, I am willing to tell you if I can, but with regard to the legal advice, I would like to know the particulars of why this is needed as well and if you get these for me, maybe you can convince me of the wisdom of the motion. I gave it to our solicitor and he said that it wasn't in the best interest of our corporation. There are certain reasons he mentioned - some of them is the wording, you are talking about grandfather clauses here, and I am sure that grandfather clauses are the things that make the problems of the law. The judges interpret the law as you said yourself by the letter of the law. He does not know the intent of the surveying Association that passed this motion. The intent may well be a good one, I don't question that, but when it becomes a statute it is up to the courts to rely by the statute; they may not rule as the intent of the original. It might be more in order to tell us why we want it. I am not opposed to you asking why I am against it, but I am not sure in my own mind exactly why it was necessary.

Mr. Servant - it has been mentioned over the years that certain companies have advertised and held themselves out as being capable of making surveys in Nova Scotia. Their principals, we understand, are not land surveyors, their shareholders are not land surveyors. Generally, it couldn't be ascertained that these companies in some cases only had land surveyors on the staff for the time or the period of time that it took to sign the plan. So these advertisements run in the newspapers and other various publications and directories throughout the province and throughout Canada and even to the United States.

Mr. J. Chisholm - I get the feeling that there are some members who do not have legal advice on it and can't point specifically what they are apprehensive about but they worry that in ten years they may retire from public service and they want to set up survey practice and it might affect them directly at that time. I

would really like to know whether or not we are carrying out an exercise in futility trying to put something forth for a worthy cause and at the same time affecting a number of our members.

Mr. Bob Murray read the definition of a land surveyor.

Mr. Phil Milo - separate the two types of people - one is the person hired by Scott Paper Company to do land surveying with Scott Paper. The other is the people who meet on the street and say look let's form a company and hang up our shingle. We are trying to come up with an amendment in our Act which will cover both types of people. Suggest that Sections (a) and (b) of 25 be deleted leaving us with - no body corporate shall practice land surveying for gain in its own name. It has to be under the supervision of a permanent employee. The company policy will not be governed by land surveyors if we take out Section (a) and (b), but I am not altogether sure that it should be. The company policy of Scott Paper certainly shouldn't be governed wholly by land surveyors, but surely they have the right to have land surveyors on staff. I think the other point is maybe we should ask the Architects Association what problems they run into with these subsections because I expect there are companies in Halifax who have architects on permanent staff operating under their Act which reads with these two subsections inserted.

Mr. Burt Robertson - the way I see it a body corporate cannot survey right at the present time, there is no way that a body corporate can survey. The only person that can sign the plan right now is the person that did the survey. The land surveyor is the one responsible for it, regardless of who he is working for.

Mr. Dunbrack - who is responsible. Is the company responsible or is the land surveyor responsible? I wonder, let us say one of our inexperienced land surveyors created an error and has caused a great financial loss to us and a client, I wonder who will swing for it - the land surveyor or the Company?

Mr. Eldridge - depends on how the legal action is taken. Maybe one or both. I don't think you would see a law firm go after one, they would go after the pair of them. If you did a bad survey for me I would take legal action against you and your company - make sure I would get one of you.

Mr. Dunbrack - as I recall several years ago one surveyor who wasn't primarily in the survey business who knew of an error on a plan and who had a deadline to meet, whether it was a council meeting, or a planning board, or some such thing, there was an error in the plan he was forced to sign or lose his job. Now what is this young inexperienced chap going to do - maybe his boss will stand behind him. He speaks to his boss and asks him if he will stand behind him, he tells him to sign the plan he needs it tonight. What happens then - the Association will take action against the land surveyor who signed the plan and if that boss was running a business such as an undertaker or a florist who would be responsible?

Mr. Eldridge - I think that when our group gives this man the right to practice land surveying then he is responsible for his actions.

Mr. Hingley - who owns the reports - possibly the client we are working for, possibly they should be demanding them.

Mr. Doig - who owns the surveyor's plans - the client or the surveyor?

Mr. Milo - one point brought up here today - I am quite familiar with a situation in St. John, where a surveyor has made his livelihood by owning the reports and selling these rights to other land surveyors and so forth. I am concerned over one of the remarks that was made here today in the sense that some firm comes in from outside and hires a land surveyor, gets him to do a job and takes off with the plans. Another point, what if a land survey firm goes bankrupt and the plans disappear. I think somewhere along the line perhaps our Council should be considering the disappearance of survey plans. Maybe they should be vested with the Department of Lands and Forests as custodians or something like this, because they

should not be lost to this province as they are pertaining to the division of lands within the province or the provinces offshore area. I think that this is an important area they should be careful of, and I think that it is a point that our Association should press upon because I can see in the future some of the areas of maps and plans of this province disappearing with companies that could be set up, go bankrupt and disappear and perhaps create hardship to any further work for the future.

Mr. Hingley - agrees with Mr. Milo's summarization of this. I think that possibly Article C of Section 25 is a very good point.

Mr. Doig - I think the only real definition you might stick in there is the point that the company should be organized in such a way that there is an established vacancy for a supervising surveyor.

Mr. Chisholm - when an employee changes companies he doesn't take all the plans. I think the company should be responsible.

Mr. Hingley - our company, in particular, have no plans that are signed in the company records. The prints that go to the client are signed.

Mr. Bates - the only answer to this problem is that copies of all plans should be sent to the government. Plans belong to the people of Nova Scotia.

Mr. Macdonald - on this point of responsibility I, as a Dominion Land Surveyor, am responsible for all the work that I have done for the office of the Surveyor General in Ottawa. He puts his name on the plan as his approval of the format of the plan, but I am the responsible one. When I left the legal surveys I could take all of my field records. The original survey plan is registered in the Canada Land Survey Records and also registered in the Registry Office in the district in which the survey is done as public information. I have the original field books.

Mr. Dunbrack - this is a little different again in as far as Quebec is concerned, the land surveyor in Quebec once signing the plan is the owner of the plan and all the records of the survey. If he changes his position and leaves that employ he takes the plans with him.

Mr. Crooker - safekeeping of plans - say if my office burned down this evening - all the plans that would be available would be the ones that I have filed with the Registry of Deeds.

Mr. Dunbrack - Mr. Hingley has remarked that they only sign the prints that go out, they don't sign the originals. So what happens after you have left the employ of your company and I as a client who asks for another print can't get one?

Mr. Hingley - I am sure that the certification is recognized if you had a signed copy of the plan that was originally given you. Plans do not have to have approval again, they are automatically stamped because there is no change from the original. Plans are the property of the client and not the property of the company.

Mr. Doig - how do they show that their was an original plan signed in the first place?

Mr. Eldridge - you could sign a plan of survey and give me the original, okay you die, is there anything to stop me from making changes in this original?

Mr. Doig - on behalf of Council thank you for the points that you have brought forward this afternoon and to say to you that the Legislative Committee will go over this business again and have these clauses defined, particularly taking into account those recommendations, at least, that we have obtained from other solicitors and our own solicitors.

Fred Robertson moved the meeting be adjourned, seconded by Mr. Bob Murray, motion carried.

- G. F. Clarke,
Secretary-Treasurer.

* * * * R H O D A 'S T E A * * * *

Dot Chisholm *Jeannine Daykin*
Rhoda Feetham *Phyllis Servant*

Madelyn Doig

Bea Schofield
Margaret Hamilton *Helen Bates*

ASSOCIATION of NOVA SCOTIA LAND SURVEYOR'S

1972

ANNUAL MEETING*

*CAPE BRETON STYLE

NOVEMBER 2, 3, AND 4

ISLE ROYALE HOTEL

SYDNEY, N.S.

A FULL PROGRAMME IS PLANNED FOR THE LADIES.

MAKE YOUR RESERVATIONS NOW TO AVOID INCONVENIENCE.

CONTACT.

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BANK OF NOVA SCOTIA BLDG.
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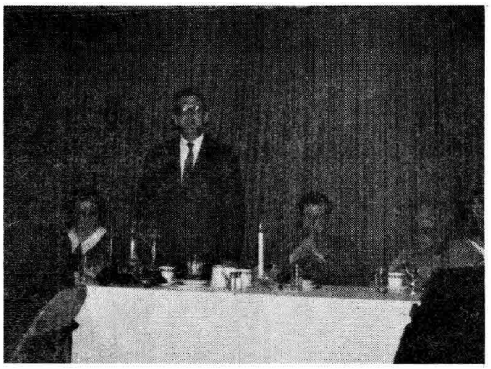
SYDNEY, N.S.

*** ED AND BETTY NIGHT ***

Even the darkest cloud may have a silver lining, and so it was in Halifax June 10th, when some eighty surveyors, wives and friends met at the Armdale Yacht Club to bid a tearful farewell to Betty and Ed Rice - it truly became the gala afair of the year.

After a steak dinner with candlelight and wine, the cupboard doors were torn off to reveal a multitude of gifts for the going away couple. After the bearing of gifts and speech making were over the group enjoyed, until the wee hours of the morning, one of the best dances ever.

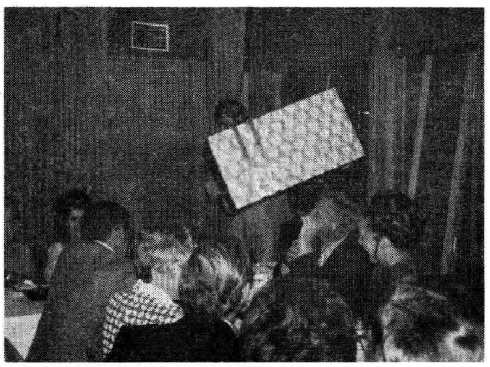
So we say to Betty and Ed - may your days in New Glasgow be happy ones.



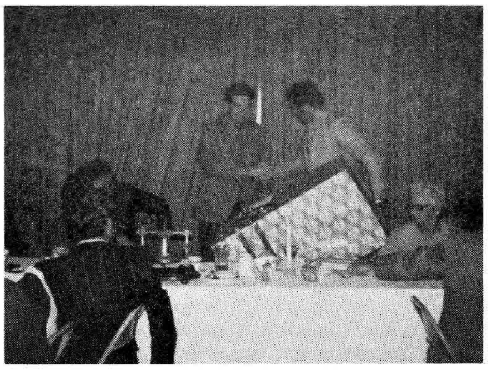
"The purpose of this get-together....."

"..accept this token of our appreciation"

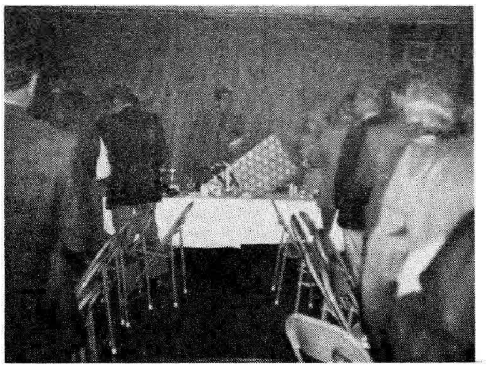
"...it has been a pleasure..."



" W O T I N E L L ???? "



"another token.."



Standing ovation (while Ed catches his breath)

"What more can I say? . . ."

A wire from the Schofield's

"I just had no idea...."

"Now WE can relax a bit, too."

STRETCHING THE TAPE--

At the airport, the boss's wife called his office and delivered the following message to his secretary, "I'm off to Florida for a week. Please tell Mr. Smith I forgot to turn off his side of the electric blanket when I left this morning."

"I will," answered the secretary, "and who's calling please?"

* * *

Two Englishmen and their wives were out for an afternoon of hunting. Spotting what he thought was game, one of the men fired and narrowly missed the other's wife.

"I say, old man, you almost shot my wife."

"Here, take my gun and have a go at mine."

* * *

A Texas millionaire reported to police that his brand-new Cadillac had gone out of control and smashed four Buicks, six Lincolns, and five Oldsmobiles before it could be stopped.

"It's a good thing," he added, "that the accident happened in my own garage."

* * *

PERSONALITIES IN THE NEWS -

Richard Greene, a 1970 graduate of the Survey Institute, and a member of the Association is employed with Shell Canada Limited. Dick reports that he had the opportunity to work in Inuvick, North West Territories. During the past winter the temperature there dropped to 72° below zero with a chill factor of 110°, and we understand Dick has suffered a frost bitten nose. Perhaps a hint to the girlfriend for a knitted nosewarmer might be in order for future winters.

* * *

The appointment of Gerald N. Ewing, to the post of Dominion Hydrographer was recently announced. He has served with the Hydrographic Service since 1961 and has been principally engaged in the study of and the carrying out of offshore geophysical surveys in Eastern Canada. He has written papers on shipborne gravity and magnetic measuring techniques.

In 1969 he was appointed to the post of Assistant Regional Hydrographer. In his new post, he will serve from the Headquarters in Ottawa.

* * *

There has been a happening! An organizational steering committee was formed at the first meeting of instrument men, cartographers, photogrammetrist and commissioned land surveyors who are interested in an Association of Certified Survey Technicians and technologists for Nova Scotia.

This step was taken on July 24, 1972, when twenty keenly interested Halifax-Dartmouth survey-oriented persons met to hear Steve Geneja, P.R. man for the Association of Certified Survey Technicians and Technologists of Ontario, and to plan for the future. Steve outlined the circumstances surrounding the birth of ACSTTO and its success. Those in attendance questioned Steve about many aspects such as: -Does ACSTTO have any union affiliation? No. What courses of study are presented? Many. Do employers recognize certification? Yes.

It is obvious that we are still in the question stages but the steering committee is hard at work.

Gerry H. Bourbonniere, 60 Gaston Road, Dartmouth may be contacted by those who are interested.

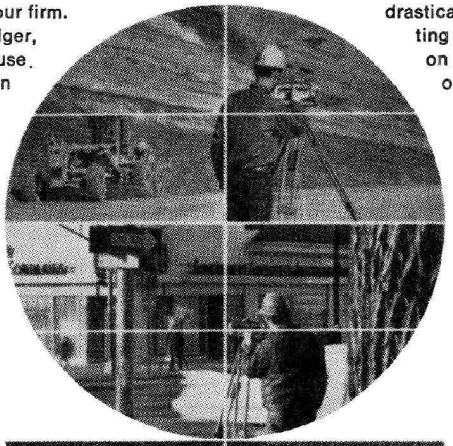
The Available Distance Meter ... *Look Into It!*

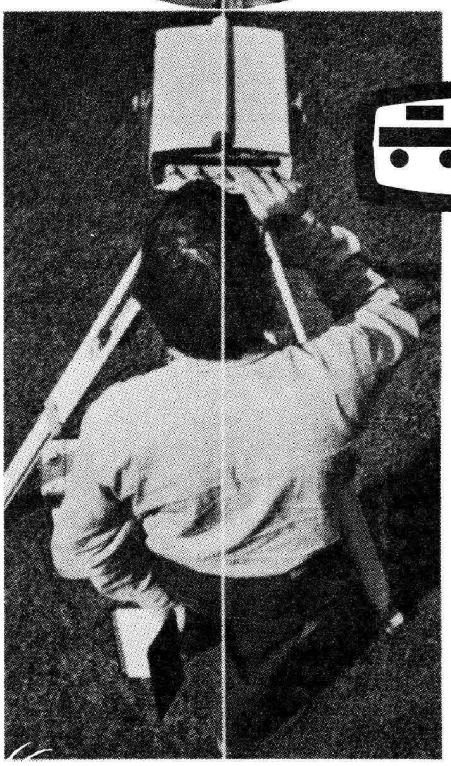
The HP 3800 is the Distance Meter that bears looking into. Since it's **available now**, you won't have to reserve months in advance, for first-hand scrutiny and evaluation.

Whether you view the 3800 with the eyes of a businessman, or the eyes of an operator, you'll quickly discover that it's the optimum solution for distancing problems. Start with the price: for a one-time investment of **just $4,587 (duty included)** you can have the competitive advantages of electronic distance measuring for your firm.

In the field or in your business ledger, you'll appreciate the fast, easy-to-use 3800. Just one quick demonstration and you and your crew are ready to go. Dial in the environmental factors, make the measurement, then *read the result directly in feet* (or meters), up to 10,000 feet. Solid-state electronic circuits make the 3800 ideal for rough field conditions, such as extreme heat, cold, or rough use. It's backed by a one year warranty. And, since the 3800 is compact and truly lightweight (only 30 pounds including power supply), you won't feel like a pack mule when you are working in rough terrain.

Sure, many of these are little things, but when you add them together, they mean you and your crews are going to cover more ground, faster with the HP Distance Meter. To handle the increased work load in your office, you'll be interested in the new Series 9800 Programmable Calculator Systems. These low-cost computing systems can drastically reduce the time you spend computing your field data. For further information on services and products for surveyors, or for a "hands-on" demonstration of the 3800 Distance Meter, write: Survey Systems, Hewlett-Packard (Canada) Ltd., 275 Hymus Boulevard, Pointe Claire, Québec.





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HEWLETT hp PACKARD

DISTANCE METER

VERNIER THEODOLITE WITH GLASS CIRCLES

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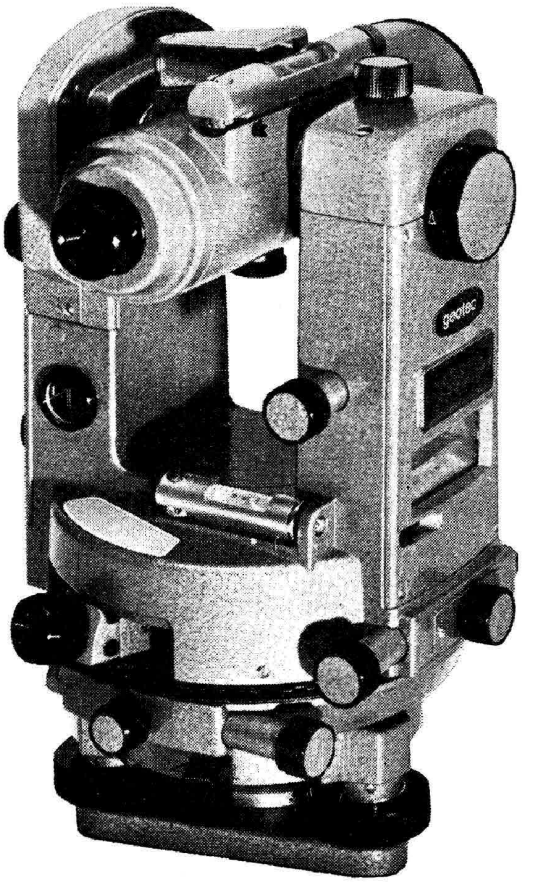

Reads direct to 20 seconds easily

- The combination of shifting mechanism for centering and optical plummet provides the fastest and most accurate means for setting up over a given point.
- Horizontal and vertical glass circles are completely protected against dust. The reading on both circles is made through light green glass covers. No eye fatigue.
- The reversible telescope spirit level type, with reflecting mirror, simplifies observation and adjustment.
- A lighting device is available.

SPECIFICATION

TELESCOPE

Type	Internal focussing; anallactic optics Coated lenses
Image	Erect
Magnification power	27X
Effective aperture	1.67"
Minimum focus	5'11"
Stadia	Ratio 1:100; additional constant, O

SENSITIVITIES OF SPIRIT LEVELS

Telescopic spirit level	40" per 2mm
Plate levels	90" per 2mm

CENTERING TELESCOPE

Image	Erect
Magnification power	2X
Field of view at height of 5'7"	0.59" ø

CENTERING DEVICE

Type	Adjustment by loosening plummet clamp lever
Range of shifting	⅜" ø

COMPASS

Bar type (N-indicating type) Needle, 50mm

HORIZONTAL CIRCLE

Diameter	4¼"
Graduation	20'
Verniers	Read to 20"
Number of verniers	2

VERTICAL CIRCLE

Diameter	2¾"
Graduation	30'
Vernier	Reads to 1'
Number of vernier	1

WEIGHT

Instrument	11 lbs
Case	5 lbs

ACCESSORIES

Plastic case, objective lens cap, adjusting pins, screwdrivers, brush, plummet.

TRIPOD

1⅜ x 13 wide frame extension

Hughes-Owens

BRANCHES ACROSS CANADA

wade

INFORMATION

DRAFTING, DESIGN, REPRODUCTION, SURVEYING, TECHNICAL SCHOOL MATERIALS & EQUIPMENT; LETRASET & ACS TAPES; WADE DI-LINE & DI-LAR, TRANSTEX & TRANSLAR PAPERS & FILMS; DRAWING TABLES.

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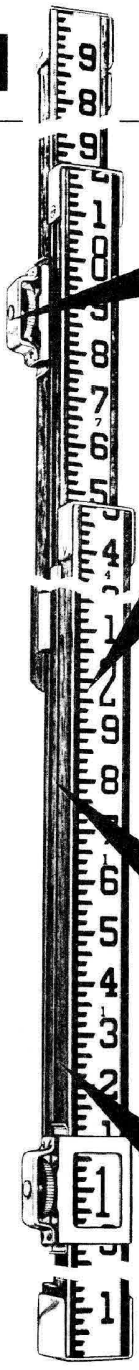
Catalogue No.
12 FOOT — SE 301281
15 FOOT — SE 301381

This top quality, three sectional sliding Frisco level rod has been manufactured of carefully selected materials to afford long lasting performance in the field. The stainless steel metal fittings are attached to the wooden portion of the rod by stainless steel coarse thread screws to assure permanent mounting. A unique system is used on the metal facing, where the brushed satin aluminum printing provides a three-dimensional illusion for ease in recognition of graduations. These rods are available in twelve and fifteen foot lengths, graduated in decimals of a foot.



All metal fittings manufactured of stainless steel

Replaceable metal facing of brushed satin aluminum, printed and anodized in two colours

Rod material manufactured of African Mahogany (aged four years) to retard warpage

Rod is completely coated in plastic for extra protection against moisture intrusion

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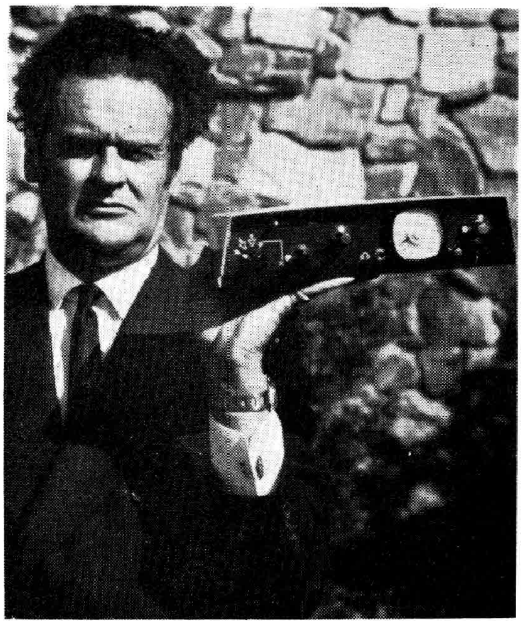

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