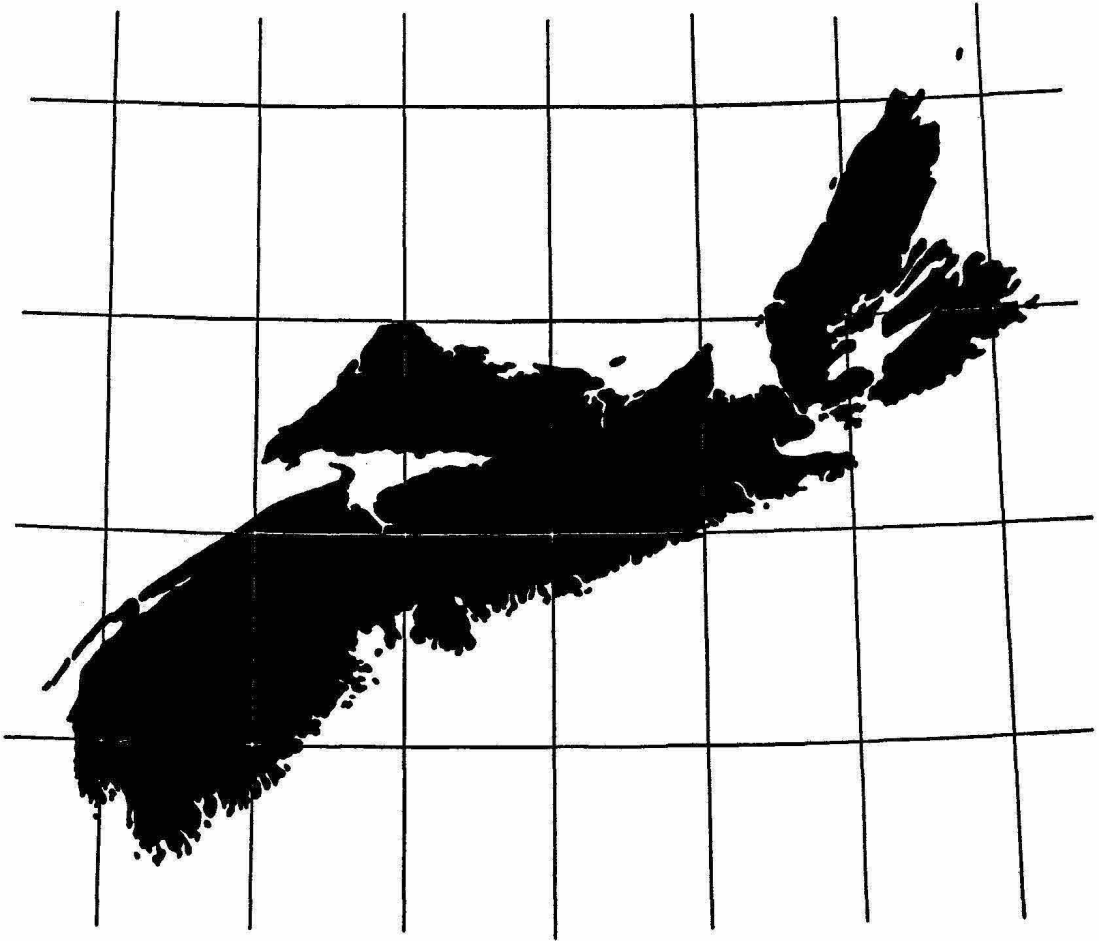


The NOVA SCOTIAN SURVEYOR



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The Association of Provincial Land Surveyors
of Nova Scotia*

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

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ANNUAL REPORT 1965

The NOVA SCOTIAN SURVEYOR

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

H. B. ROBERTSON
President

EDWARD P. RICE
Secretary-Treasurer

R. E. MILLARD
Editor

Volume 18

Number 46

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

President Errol Hebb's Address, presented at 15th Annual Meeting, Nov. 5, 1965.

Gentlemen:

Amid these pleasant surroundings, it is both an honour and a pleasure to welcome you here this morning, and I officially announce the 15th Annual Meeting of the Association of Provincial Land Surveyors of Nova Scotia now in session.

It is pleasing, indeed, to see so many distinguished friends and visitors from other Associations and Institutions here with us, and we hope your stay and our programme will be a most pleasant one for each and every one of you, I will take this opportunity to invite you to feel free to contribute to our discussions at any point throughout our meeting. I shall call on you, in due time, to stand and identify yourselves.

To our new members of the Association, I wish to caution you to look upon this Organization, not as just another obstacle in your quest to becoming a Provincial Land Surveyor, but as a group of fellow practitioners, who are interested in the advancement of Surveying Techniques and practises for the betterment of the profession, as a whole, and it is our wish that you take an active part in the meeting, since you must recognize that you are the backbone of the Association; your ideas and assistance are a requirement now and in the future.

As I have just spoken of the future, I also recall, in the not-too-distant past when a handful of men in this profession had the fortitude, ability, and foresight to organize and put into motion the wheels which have successfully pounded laboriously over the many obstacles to the officially recognized position which we enjoy today. These unselfish men gave of their knowledge in leadership and time in surroundings far removed from what you see about us here, and I can see some of them here with us today, to mention a few: Prof. Temple Piers, Major J. A. Church, Rusty March.

These facts we will remember with significance when our path seems bogged down by seemingly invincible problems. Let us not relax in our efforts to attain a strong and competent association.

Throughout the year, Council Meetings were held, Nov. 7, Jan. 22, March 15 and Sept. 24. All meetings were well attended, much business was transacted and our thanks are hereby extended in appreciation for the time and expense of our Council members throughout the year. A full report on Council Meetings will follow.

A meeting of the Board of Examiners was held on March 26th, 1965, in room 327 of the Sir James Dunn Science Building Dalhousie University, and another on Nov. 4, both presided over by Prof. A. F. Chisholm and a report of the business and accomplishments from the meeting will be heard later on during this meeting. We regret the retirement from the Board of Examiners of Mr. V. P. Harrison, pursuant to a letter from him requesting same. His office as Secretary of the Board was ably filled by Mr. J. A. Archibald. I would like this meeting to go on record as expressing our appreciation for all the work Mr. Harrison has done for the Board.

Due to business commitments and other irregularities, your president was a poor traveler this year and was limited to 2 official appearances, one at the Can. Inst. of Surveying Annual Meeting at Ottawa, the other at the graduation exercises at the Nova Scotia Land Survey Institute in Lawrencetown at which time a prize from the Association was presented to the student making the most progress.

Our immediate past President, Mr. Joe Archibald attended the New Brunswick Land Surveyors Annual meeting and Vice President, Mr. Bert Robertson attended the Mass. Inst. of Engineers and Surveyors. Reports show that we were royally entertained at all these conventions.

During the year we regret the passing of 2 of our members, Mr. Angus MacLeod of Wreck Cove and Mr. George Killam of Yarmouth; and also Prof. H. L. Cameron, Acadia University. Please join rue in a moments silence out of respect in memory of these members.

In closing I wish to thank the retiring members of our council for their efforts during their term of office and assure you it has been a pleasure to have you with us in your official capacity.

ANNUAL REPORT OF THE SECRETARY-TREASURER

Presented at the 15th Annual Meeting, November 5th, 1965

Mr. President, Guests and Members:

Before beginning my report, I also wish to thank all the guests for honoring us with their presence at our meeting. I hope that your stay here will be a pleasant one and that you will take pleasant memories back with you on your return. I also wish to thank the exhibitors, not only for coming but for their promptness in replying.

I wish to thank, at this time the committee members who worked very hard and made sacrifices to bring this annual meeting about. The committee is made up of the following: Mr. Ted Hollingum, our Assistant Secretary, Mr. Roy Dunbrack, Mr. Burt Robertson, Mr. George Bates and working with Mr. Bates, Mr. Al Daykin. A thank you also goes out to Mr. Burt Robertson's staff of the Department of Lands and Forests for printing our programs.

During the past year, the following eleven new members were accepted in the Association.

Mr. G. E. Streb, Mr. G. W. Conrad, Mr. J. H. Ryan, Mr. Ronald C. Dearman, Mr. Roger B. Meister, Mr. Robert B. Lawrence, Mr. Thomas S. Foster, Mr. Donald V. Purchell, Mr. Sheldon C. Patriquin, Mr. Everett B. Hall, Mr. William F. Mason.

This gives us a total membership of 256 of which 157 are fully paid up members. Of the 99 remaining members, I estimate that at least 75 per cent will pay up their 1966 dues. The remaining 25 per cent, I regret to say, will have to be dropped from our nominal roll.

Along with Mr. Archibald, Secretary of the Board of Examiners, I have started a card index system for every person who has received a P. L. S.

These cards will then be separated into three categories:

1. Those who may practise under the Act;
2. Those who may practise under Section 17 (b) of the Act;
3. Those who may not practise at all.

When this is completed, we will then attempt to publish a list of those entitled to practise on the first of April and mail it to the registry offices and planning boards. This will mean that anyone wanting their name on this list will have to pay their dues by March 31st. Engineers qualifying under Section 17 (b) will have to pay their dues to the Association. I regret to announce that this publication will not take place by April, 1966 but I hope it will come about in April, 1967.

The first Council Meeting was held just after closing the Fourteenth Annual Meeting, November 7, Ten of sixteen councillors were present. At this meeting, the new

discipline committee for the year, 1965 was appointed, and Professor A. F. Chisholm and Mr. J. R. Chisholm were reappointed to the Board of Examiners for another year.

The Second Council Meeting was held on January 22, at which time eleven council members were present. The highlights of this council was a report of Mr. Robb with regard to the percolation test being done by Provincial land surveyors and discussions on Mr. Shaw's letter suggesting that the Association join the C. I. S. under bulk membership. The council instructed Mr. Hebb to approach Mr. Shaw at the C. I. S. Annual meeting and obtain further information on bulk membership.

The Third Council Meeting of the year was held on March 15 and twelve council members were present. This was a special meeting at which time we invited Mr. W. Thompson, Director of Regional Planning, Cape Breton Planning Commission, to attend. Mr. Thompson spoke on the by-laws which he was going to have submitted for legislation. He spoke about the Cape Breton Planning Commission being made and he was interested in us supporting him for (1) safeguards of ownership and (2) facilitate re surveys. Mr. Thompson suggested that for each subdivision there should be a plot plan and a survey plan. The survey plan is to be submitted to the commission for the proposed subdivision. This survey plan is also to show the proposed location for the buildings. The Commission has within its organization a board of adjustment, which is to deal with special cases for old properties and special surveys which date back for several years. They will also deal with special cases. Following discussions between the members and Mr. Thompson, the council unanimously approved a motion that this Association support the Director of Regional Planning for the Cape Breton Regional Planning Commission in his effort to have a certified survey as a pre-requisite to the issuance of building permits in the region. The Secretary was also asked to write and thank Mr. Thompson for (1) his advice, (2) discussing the problem with us and (3) listening to our advice.

The Third Council Meeting of the year was held on July 9 at which time nine members were present and among the absent was your Secretary. Highlights of this meeting was a report given by Mr. Rusty March on the bulk membership in the C. I. S. I will not elaborate further on this at this time as I believe a report on the same will be given later.

The Fourth Council Meeting of the year was held on September 24th and thirteen council members were present. Highlights of this meeting being a discussion on the coordinate symposium which is to be held next spring and sponsored jointly by our Association and the Halifax branch of the C. I. S. Again I will not elaborate further on this at this time as we will be discussing this further during our special session. Another highlight of this meeting was the fact that it was pointed out by two members of council that the practice of surveying for gain is being carried on in the province by persons other than those qualified. Both councillors were asked to submit the names in writing to the Secretary. However to date no names have been received. This last item may well be a point of discussion during the special session.

During the year, our Discipline Committee was completely inactive as only one complaint was received against a member and this was solved without going to the Discipline Committee.

During the past year, we have received six letters, four from England, two from the Philipines, from surveyors wishing to emigrant to Canada. Not knowing where these gentlemen could find employment, we wrote them, including copies of the by-laws, Regulations and Act, which would indicate to them what they would need to qualify to survey in Nova Scotia and also the addresses of the National Employment Office, Department of Labour and the C. I. S. The majority of these surveyors were university graduates plus being qualified surveyors in their country.

I intend in future to forward such requests to Mr. Millard for publication in the Nova Scotian Surveyor. I might also add here that if anyone is looking for a qualified surveyor, he may use the Nova Scotian Surveyor as a media for advertising.

This concludes my report for the year 1965.

Respectfully submitted,
E. P. Rice, P. L. S.
Secretary-Treasurer

**THE ASSOCIATION OF PROVINCIAL LAND SURVEYORS OF NOVA SCOTIA
FINANCIAL REPORT
FOR PERIOD SEPTEMBER 30, 1964 TO SEPTEMBER 30, 1965**

Bank Balance October 1, 1964	\$1725.06	
Receipts	4151.46	
Expenditures		\$3695.13
Bank Balance September 30, 1965		2181.39
	\$5876.52	5876.52

DETAIL OF RECEIPTS

Dues:		
Arrears	\$ 340.25	
Current	1323.55	
1966	50.00	
Advertising in the Nova Scotia Surveyor	345.50	
Fourteenth Annual Meeting	988.50	
Examination Fees	887.30	
Certificates	5.00	
Refund on Delegate Advances	67.00	
Subscription to Nova Scotian Surveyor	4.00	
Premium on U.S. Money Order.....	.36	
Gift.....	40.00	
	\$4151.46	\$4151.46

DETAIL OF EXPENDITURES

Fourteenth Annual Meeting.....	\$1223.44	
Examinations.....	815.33	
Stenographic Services and Supplies	145.69	
Council Meeting Expenses.....	110.90	
Postage.....	118.38	
Honorarium to Mr. E. P. Rice.....	250.00	
Honorarium to Mr. E. G. Holligam	75.00	
Printing of the Nova Scotian Surveyor.....	763.79	
Delegates to Conventions	147.00	
Dues for the Nova Scotian Surveyors, Editor to C. I. S.....	20.00	
The Atlantic Advocate.....	3.00	
Prize for Student at School	10.00	
Bank Charges and Exchange on Cheques	12.60	
	\$3695.13	\$3695.13

Respectfully submitted,
(Sgd.) E. P. Rice, P.L.S.
Secretary - Treasurer

Auditors: - (Sgd.) J. F. Archibald (Sgd.) V. P. Harrison

SLATE OF OFFICERS

1966

President.....	H. B. Robertson, P.L.S.	27 Canary Cres. Rockingham, N. S.
Vice President.....	George T. Bates.....	1271 Edward St. Halifax, N. S.
Secretary – Treasurer	E. P. Rice, PL.S.....	39 Edward Laurie Drive, Rockingham, N. S.

COUNCILLORS

Halifax City.....	** Ernest Boehk, P.L.S.	300 Fuller Terrace Halifax, N. S.
Halifax County.....	* K. W. Robb, P.L.S.	10 Caldwell Rd. Dartmouth, N. S.
	** Forbes Thompson, P.L.S.....	6407 Bayers Road Halifax, N. S.
Western Section of Province	* Robert A Miller, P.L.S.	P.O. Box 172 Middleton, N. S.
	** Roger Melanson, P.L.S.	Mill Village, Queens County, N. S.
Eastern Section of Province	* Gordon Nicholson, P.L.S.	105 Alexander Street, New Glasgow, N. S.
	** Melvin Wadden, P.L.S.	R. R. No.1 Riverton, Stellarton, N. S.
Cape Breton Island	* John S. Pope, P.L.S.	257 Charlotte St. Sydney, N. S.
	** Carl MacDonald, P.L.S.	45 Commercial St. Dominion, N. S.

SLATE OF OFFICERS

1966

Members at Large	* J. D. MacKenzie, P.L.S.	Enfield Hants Co., N. S.
	** J. F. Archibald, P.L.S.	2 Faulkner St. Dartmouth, N. S.
Past President	* Errol B. Hebb, P.L.S.	15 Walnut St. Bridgewater, N. S.

* Term ends November, 1966

** Term ends November, 1967

DISCIPLINE COMMITTEE

1966

In compliance with the Laws of the Association made under the authority granted by the Provincial Land Surveyors Act, being Chapter 6 of the Statutes of Nova Scotia, 1959, and approved by the Governor-in-Council March 30, 1961.

Chairman	George T. Bates	1271 Edward St. Halifax, N. S.
Member	J. F. Archibald	2 Faulkner St. Dartmouth, N. S.
Member	Melvin Wadden	R.R. No. 1 Riverton Stellarton, N. S.
Member	K. W. Robb	10 Caldwell Road, Dartmouth, N. S.

Member.....	Ernest Boehk	309 Fuller Terrace, Halifax, N. S.
Member.....	John Pope	257 Charlotte St., Sydney, N. S.
Member.....	Roger Melanson	Mill Village, Queens Co., N. S.

E. P. Rice, P.L.S.
Secretary-Treasurer

**MINUTES OF FIFTEENTH ANNUAL MEETING OF
ASSOCIATION OF PROVINCIAL LAND SURVEYORS OF NOVA SCOTIA**

The meeting was officially opened at 10:05 a. m. by the President, Mr. Errol Hebb. After the ringing of the C. G. S. Baffin's bell to assemble members and the visitors in the meeting room, Mr. Canning, Assistant Manager of the Citadel Inn bid us welcome on behalf of the management and staff of the hotel. The President, Errol Hebb, then read his address to the members assembled, which was a review of the past fifteen years of the Association of Provincial Land Surveyors of Nova Scotia. At the end of the President's address, the President asked the members to stand to observe one minutes silence in memory of two members who passed away during the past year, Mr. George Killam of Yarmouth, Mr. Angus MacLeod of Wreck Cove, Nova Scotia, and he also included Professor H. L. Cameron of Acadia University who had long been associated with the surveying profession in the Dominion of Canada.

Then followed the introduction of exhibitors, who each in their turn expressed their delight in being able to exhibit for us and expressed their desire to return next year and exhibit once again. The exhibitors were as follows: Eastward Industries represented by Mr. Murdock Hattie; Bravour Electronics represented by Mr. Martin Murray; Jena Scientific Instruments represented by Mrs. Fred Steinmetz; Charlie Brunning Company represented by Mr. Stuart Carver; Tellurometer of Canada Ltd. represented by Mr. Mike Mogg; Enamel Heating Products Ltd., represented by Mr. William Hastings; Wild of Canada by Mr. Doug Peoan; Norman Wade represented by Mr. Don Wright and Hughes Owens represented by Mr. Charles Stringer.

Next was the introduction of visitors. Each said a few words and all, expressed their pleasure at being here and expressed best wishes for a successful meeting.

Mr. J. C. Traynor, President of the Canadian Institute of Surveying and also representing the Saskatchewan Land Surveyors Association, stated he was very pleased to represent the Canadian Institute of Surveying and said this while wearing a hat with the official tartan of Nova Scotia. He then put on a hat with the tartan of Saskatchewan while making official representation on behalf of the Saskatchewan Association of Land Surveyors.

Our distinguished visitors included also:

Mr. R. W. Brotherhood, President of the Association of Ontario Land Surveyors.

Mr. Stewart Dobbin, President, New Brunswick Land Surveyors Association.

Mr. F. M. Shortall, Secretary-Treasurer, Newfoundland Land Surveyors Association.

Mr. Lester Higbee, past president of the American Congress of Land Surveying and Mapping.

Mr. R. T. Thistlewaite, Surveyor General of Canada.

Mr. Lewellyn Schofield, Schofield Brothers.

Mr. G. E. Streb, President of Nova Scotia Land Survey Institute.

Mr. E. G. Green, Director of Vocational Education, Province of Nova Scotia.

Mr. Walter Nason, New Brunswick Power Commission.

Mr. Lorne Pelton, Surveys and Mapping, Department of Mines and Technical Surveys, Ottawa.

Mr. Dick Shaw, Past President of C.I.S.

The President asked the Secretary to read the minutes of the Fourteenth Annual

Meeting. Mr. Pine mentioned that the minutes were printed and published in the October, 1965 issue of the Nova Scotian Surveyor and distributed approximately ten days prior to the meeting. The secretary pointed out that during the last session of the Fourteenth Annual Meeting the dictaphone broke down and therefore part of the minutes were not recorded. Mr. Eric Millard moved that the minutes of the Fourteenth Annual Meeting be amended to read that a motion was passed that the council set up a committee for the coordinate system and prepare a brief to be presented to the Minister of Lands and Forests, Province of Nova Scotia. Seconded by Mr. Ronald Chisholm. Motion carried.

Mr. March moved that the minutes of the Fourteenth Annual Meeting be accepted, as printed in the October 1965 issue of the Nova Scotian Surveyor and as amended at the Fifteenth Annual Meeting. Seconded by Mr. Donald Eldridge. Motion carried.

Reports Of Committees

Mr. Roy Dunbrack - Scrutineers

Mr. Dunbrack named those elected to the executive for the year 1965-66.

President - H. B. Robertson

Vice-President - George Bates

Secretary-Treasurer - E. P. Rice

Counsellors:

Halifax City Area - Mr. Ernest Boehk

Halifax County Area - Mr. Forbes Thompson

Western Nova Scotia - Mr. Roger Melanson

Eastern Nova Scotia - Mr. Melvin Wadden

Cape Breton Area - Mr. Carl MacDonald

Counsellor at large - Mr. J. F. Archibald

Mr. Dunbrack further reported that of the 157 ballots mailed out, only 78 were returned which represents approximately 50 per cent of the amount mailed out. This is a very poor figure; however it is the highest we have ever had in the Association.

Mr. Eric Millard - Editor of Nova Scotian Surveyor, "Mr. President:

I herewith submit the following report as Editor of your quarterly publication "The Nova Scotian Surveyor."

Editing this paper is a pleasure and also a challenge. A pleasure when each one is done, a challenge to find material and proof read it on two occasions for each issue usually on a Sunday morning.

To those few who have sent me articles to publish I say in all sincerity 'thank you'. To those who planned to send copy and forgot, I say, "keep planning and stop forgetting," 'surprise me'. It's nice to be surprised.

Each time an issue comes from the printers, I mail out copies and bills to our advertisers, whom we really appreciate and also copies to new prospective advertisers usually 6 to 10 copies, and occasionally I get a new advertiser. We have one subscriber, paid of course, in Hungary, also a request for a free subscription from China.

I scan a large number of magazines and papers that come to my office as Superintendent of Works for the Town of Liverpool. There are many subjects but they would take up half of the paper and therefore have to be rejected.

I like to get a variety of articles of 2 or 3 pages.

Once again I say thank you for the articles you've sent in so far. Respectfully Submitted".

Professor A. F. Chisholm, Chairman of Board of Examiners presented the annual report for the Board of Examiners.

"Board of Examiners Meeting - October 27, March 26, November 4. This year, I was once again elected chairman of the Board and before I go any further, I want to say that without the wonderful efforts of the either members, Bob Fitzner, representing APENS, Dr. G. W. Creighton, Deputy Minister Lands and Forests, Errol Hebb, your president, Ronnie Chisholm, Joe Archibald, the wonderful secretary who did all the work.

There was a good deal of correspondence concerning ways to become full fledged members of the Association. Mainly these were engineers and the usual reply is that they must pass exams as prescribed by the Board (usually consisting of Spherical Trigonometry, Legal and perhaps some others dependent on the results achieved by the candidate while attending his university). In addition he must serve a 12 month apprenticeship period. After hearing of the latter argument most of the applicants are never heard from again. The above of course applies to Civil and Forestry Engineering graduates after 1959; there are other regulations applying to civil graduates prior to 1959.

The following gentlemen having successfully completed the necessary examinations and apprenticeship required under a Provincial Land Surveyor, were issued with their Provincial Land Surveyor's Certificates:

Gerald Wayne Conrod, Yarmouth, Section 10, Clause (e), Feb. 1, 1965.
Ronald Claude Dearman, Dartmouth, Section 10, Clause (e) Jan. 22, 1965
Richard Earl Dunbar, James River Sta., Section 10, Clause (e) Sept. 1, 1965.
Stephen Thomas Foster, Fairview, Section 10, Clause (e) Sept. 1, 1965.
Everett Bevington Hall, Brighton, Section 10, Clause (e) Feb. 26, 1965.
Joseph Edward Hanifen, Erinville, Section 10, Clause (e) Sept. 1, 1965.
Douglas Winston Joudrey, Halifax, Section 10, Clause (e) Sept. 15, 1965.
Reginald Clair Lewis, Plympton, Section 10, Clause (e) Feb. 1, 1965.
William Frederick Mason, Bridgewater, Section 10, Clause (e) July 5, 1965.
Duncan Alexander McGregor, MacLellan's Brook, Section 10, Clause (e) Mar. 5/65.
Sheldon Clair Patriquin, Londonderry, Section 10, Clause (e) July 5, 1965.
Donald Vincent Purcell, Beaverbank, Section 10, Clause (e) July 20, 1965.
Leonard William Telfer, Bridgewater, Section 10, Clause (e) Apr. 20, 1965.

Mr. J. E. R. March, Chairman of Legislative Committee will report on the legislative committee and also on bulk membership in C. I. S.

"The report of the Legislative Committee will be very short. There is only one item that should be discussed here; and that is the change requested a year ago in relation to apprenticeship. I had the necessary preparations made to have it presented to the legislature last year and as you will remember we were late in presenting it. I did not know that such legislation must be in before the first day of December. The Minister of Lands and Forests was very kind in putting the amendment in January which means that it will not go through until this year. I have been trying to get in touch with the Honorable Mr. Haliburton. However, I have been in touch with his secretary and she has informed me that this amendment will, to the best of her knowledge, go through this year. If the Secretary wishes, I will check on this before the first of December so that the proposed amendment will not be delayed another year.

Regarding the bulk membership in the C. I. S. there is not much to report. I understand that the bulk membership is still under discussion by the C. I. S. There may be some changes in that, that I have no knowledge of. Perhaps Mr. Shaw or Mr. Traynor could give us more information. Another subject that should be brought up is the one of surveyors or so-called surveyors practicing without authority. As this will be up for further discussion later, I will not say anything at the present time on that point. I have had no formal notification of any such violations, although we know they are going on. I think our discussions later will cover that. Thank you.

With regard to bulk membership in C. I. S., Mr. Traynor was asked if any firm decision had been made as yet. Mr. Traynor reported that nothing firm had yet been made.

Mr. Bates reported for the Fifteenth Annual Meeting Committee.

"As a member of the program committee, I have been very busy and have not had time to prepare a formal report. As a member of that committee I want to say that it has been a very great pleasure for me personally and I know that I speak for all the members of the committee when I say that it has been a pleasure to plan the

shenanigans that the members are going to participate in at this the Fifteenth Annual Meeting. The committee itself has had many meetings. Some of them attended by the whole committee, others two or three of us. We first made long range plans for the theme of this fifteenth annual meeting. Since that time there have been amendments and revisions. We had planned to hold a symposium on the coordinate system in conjunction with the annual meeting but due to the election on November 8th it was postponed until next spring. We do plan to hold that symposium and in view of the fact that we don't have to plan the two things together, that is the symposium and the annual meeting, we will be able to do a much better job on the symposium and we hope we have done a much better job on the annual meeting. We planned for your technical education, for your general interest and for your social activities. We've looked back, we've looked at the present and we are looking at the future. I should mention here that on our committee there was one member who is not a member of this Association and that is Al Daykin and for those of you who know Al Daykin I don't need to say any more. But for those of you who don't know Al, he's been a tower of strength to the committee and it's our regret that he is not a member of this Association. The program is now in effect and the committee will be working right up until the last minute of this annual meeting. We hope you enjoy the program. Thank you very much.

Mr. Eric Millard asked if all the advertisers had paid up their advertisements. The Treasurer reported they were.

Mr. Pope asked if the secretary had notified the Ministers as requested in the Council meeting held in June and asked for instructions. The Secretary reported that having been absent for that meeting he had not yet been notified that he was to do so.

Mr. Pope moved that a letter be drafted and sent to the Ministers of Highway and Lands and Forests to notify their employees of the provision of the Act. Motion seconded by Mr. March. Motion carried.

Mr. Pope asked how many persons, if any had been prosecuted in Nova Scotia for practising land surveying without being qualified. The Secretary-Treasurer reported none. Mr. Donald Eldridge asked who would pay for such prosecutions if they were made. Mr. March replied that the Association would have to assume the cost.

Mr. Streb pointed out that government men in most cases were using government equipment for their own personal use. The government should prohibit their employees from using government equipment for personal use.

Mr. Dobbin, president of New Brunswick Land Surveyors Association told of a case which the New Brunswick Association prosecuted in New Brunswick. The cost was over the \$600 mark to their Association. One cost that the Association had to pay was the man's keep while he served three months in jail. Following his release, the person went back into practice again. Mr. Rice at this point read part of Section 17 of the Act "No person shall practice land surveying for gain unless he is the holder of a certificate of qualification as a Provincial Land Surveyor", and pointed out the two words "for gain". Mr. Rice reported that it would be very hard to prove in court that a person was practicing for gain. Mr. Crawley asked if anything could be done to stop the registrar of deeds from registering land transactions without a provincial land survey certificate or survey plan.

Mr. Servant pointed out that the Government was not helping much in these cases and he read parts of the Act from the Colchester County Regulations which state that certain subdivisions require plans drawn up by Provincial Land Surveyors. However, if the land or lot to be surveyed is 500 ft. or more from the nearest highway, it does not have to be surveyed or if the area is over five acres, it again does not have to be surveyed.

Mr. Servant pointed out that such legislation was leaving the back door open for unqualified persons and it was a hindrance to the Provincial Land Surveyors.

Mr. Higbee pointed out that land surveyors should be instructed how to gather

information to present or court cases so that when such cases come up it could be done in a fast and proper manner.

Professor Chisholm moved that discussions on illegal surveys in Nova Scotia and certain county acts within the province be investigated by council. Seconded by Mr. Donald Eldridge. Motion carried.

At this point, the meeting was recessed for luncheon at 11:55 a. m. Both Mr. Traynor and Mr. Thistlewaite were presented with bow ties in the tartan of Nova Scotia. After the luncheon, an address was given by Mr. Traynor, President of the Canadian Institute of Surveying, who spoke on the Institute.

Following this, the guest speaker for the luncheon, who was **Rear Admiral H. F. Pullen, (Ret'd R. C. N.)** spoke on Expo '67 and mainly the Atlantic Pavilion which will represent the Atlantic Provinces at the Worlds Fair. The luncheon terminated at 3 p. m. and the meeting progressed with a paper given by Mr. Llewellyn Schofield of Schofield Brothers from Massachusetts. He spoke on the Cape Cod **Natural Seashore Survey Project**. We hope to print this paper in a future issue of the Surveyor.

Following Mr. Schofield's paper, two films on Nova Scotia were shown. This was largely attended and enjoyed by all the members. The evening was left open for persons wishing to attend the Atlantic Winter Fair or just relax from festivities.

NOVEMBER 6, 1965

The meeting started at 9:00 a. m. with the showing of another film on Nova Scotia, "Gloosecap Country", followed by a film introducing photogrammetry, compliments of Wild of Canada. This was followed by **Colonel Streb** who spoke on the Nova Scotia Land Survey Institute. Again a copy of this paper will be presented in a later issue of the **Nova Scotia Surveyor**.

Mr. Walter Nason from the New Brunswick Power Commission presented a paper on the **Mactaquac Survey Project**. Likewise this paper will be printed in the Nova Scotian Surveyor. The last paper for the morning and for our Fifteenth Annual Meeting was presented by **Mr. Lorne Pelton** from the Surveys and Mapping Branch of the Department of Mines and Technical Surveys, Ottawa. His paper follows in the Nova Scotian Surveyor.

The meeting recessed for lunch at 12 noon.

FINAL BUSINESS SESSION OF FIFTEENTH ANNUAL MEETING

The President, Mr. Errol Hebb, opened the meeting at 2 p.m. He turned the chair over to the Secretary-Treasurer who read the following excerpt from the minutes of the council meeting of Sept. 24th, 1965. "It was moved by Mr. J. D. MacKenzie that Mr. J. E. R. March, past president of the Association of Provincial Land Surveyors of Nova Scotia be made an honorary member of the Association for his services rendered. Seconded by Mr. Roy Dunbrack. Motion carried unanimously." As this required a vote of the Association at its annual meeting it was moved by Mr. Rice that Mr. J. E. R. March be made an honorary member of the Association of Provincial Land Surveyors of Nova Scotia. Seconded by Mr. Eric Millard. Motion carried unanimously and enthusiastically.

The meeting was then turned back to the President, Mr. Errol Hebb. At this point, Mr. Hebb thanked the committee and all those who had helped him, especially the councillors, through the past year. He then turned the meeting over to the incoming president, Mr. H. B. Robertson.

The president then read a letter received from Mr. Ivan P. MacDonald from Legal Surveys, Ottawa:

"The Association's 1965 programme looks to me as a very fine effort by the executive. I only regret that I won't be able to attend.

Since I can't attend this year I would like to suggest that each article be written up in the Nova Scotian Surveyor so all the unfortunate members who are not in attendance will benefit too.

Another suggestion I would like to make is that the N. S. Surveyor carry the complete reports of Secretary - Treasurer, Scrutineers and the Committees.

Many times I have been asked questions about the Association of which I could not answer. One question came up just lately; 'What are the committees in the association talking about these days?' and another question was, 'Who makes up the executive this year?' I couldn't answer either of the questions because I could not find out from the N. S. Surveyor.

I am suggesting that a complete annual report in ONE edition of the Surveyor be attempted. I have found that some annual meeting references are made in the third edition of the Surveyor after the annual meeting. It sure is confusing to those of us who are away from Nova Scotia but are keenly interested in the Association. Let's try for a special annual report edition this year.

Enclosed with this letter is a motion that I would like to put before the annual meeting. Your truly."

The president then read the motion which is as follows:

"The members of every provincial association in Canada are called surveyors of that province except Nova Scotia who are called Provincial Land Surveyors. Then the question is asked, of what Province. I think it is time that something be done to change our name to Nova Scotia Land Surveyors.

In these days when there are so many surveyors from Nova Scotia which are employed outside the province, I believe that to be called a Nova Scotia Land Surveyor has much more meaning than being called a P.L.S. I have heard members of our past executives introduced at the Canadian Institute of Surveying annual meetings as Nova Scotia Land Surveyors and I am sure that everyone present understood immediately. To be introduced as a P. L. S., among so many other provincial land surveyors, would be ambiguous.

I now move that the name of our Association be changed to "Association of Nova Scotia Land Surveyors Incorporated". Ivan P. MacDonald 26/10/65."

The president put the motion on the floor and it was seconded by Mr. Eric Millard. The president mentioned that sometime ago the name as requested by Mr. Ivan P. MacDonald was put forward and a committee was formed to have the legislature change it. However, the legal people of Nova Scotia were opposed to such a change due to the fact that it would subsequently cause so many other acts to be changed, approximately 25 in number. At present many acts refer to provincial land surveyors or P.L.S.'s and if our name is changed, such acts would have to be changed also to read Nova Scotia Land Surveyors or N. S. L. S.

Mr. March mentioned that this would have to be put before the Legislature before the first of December.

Mr. Streb made a new motion that the executive take steps to have the name of the Association of Provincial Land Surveyors of Nova Scotia, changed to the Association of Nova Scotia Land Surveyors. Seconded by Mr. Walter Servant. Motion carried.

Mr. Servant then pointed out the manner in which the Department of Highways acquires land. He mentioned that if land was acquired by expropriation; that is, accepted by a bill of sale with the land owner, that only the receipt given for the purchase of land was filed and this was filed with the Department of Highways. This receipt was not registered; therefore a proper search of title cannot be obtained Mr. March asked if Mr. Servant could give an example of one of his cases. Mr. Servant then mentioned that the plans show only the acreage purchased and the centre line, nothing else. Mr. Bates mentioned that the County Planning Board should be notified, that the survey is not legal.

Mr. Traynor said that in Saskatchewan they had the Torrens System for registration and therefore all titles are based on a plan or plans. Therefore this situation did not exist in their province.

Mr. Schofield said that in Massachusetts state highways were taken in fee and that some were taken only as easements. Therefore the people still owned the land subject to the easement. He also stated that all easements were recorded.

Mr. March moved that the council consult with the Department of Highways to find a solution to the problem and also consult the Bar Association. Motion seconded by Mr. Errol Hebb. Carried.

The President spoke on the centennial project for surveyors across Canada. The project is that a monument be set in the capital of every province of the Dominion of Canada and on the plaque is to be the coordinates of the monument and the bearing and distances from the monument in each capital to the monument in the adjacent Capital and to Ottawa. It is also hoped that the ceremony across Canada for the official opening will take place at the same hour. A time capsule is to be put in each monument and to be opened in the year 2067.

Mr. March said that the Association should support the project.

The president spoke on the symposium to be held either the first week of March or the last week of March, 1966. This symposium is being held to instruct not only the land surveyors on how the system works, how it is done and its uses, but also to inform the legal profession and the members of Parliament so as to gain their support. It was intended that this symposium would be held in conjunction with the Fifteenth Annual Meeting. However, with the election due to be held on November 8, just after our annual meeting, it was felt that the members of the legislature would not be available for this symposium. That was the reason for cancelling it at this time. It is hoped to have speakers from provinces where a co-ordinate system is in effect or being established and also from the Department of Mines and Technical Surveys of Ottawa. The president informed the meeting that shortly, literature on this symposium would be going out when dates and other items were finalized. He also expressed the hope that members of the surveying profession in Nova Scotia would support this symposium by their attendance.

Major Church thanked the Association for the flowers which he received while in Camp Hill Hospital. He said that they were very much appreciated.

Mr. Traynor said that he was pleased that he was invited and also that he could come, and he thanked us all for the hospitality he had received on his visit here to our Fifteenth Annual Meeting.

Mr. Brotherhood on behalf of he and his wife, thanked the members of the Association for the opportunity to attend the convention and for the hospitality which he had received. He said that the convention of the Ontario Land Surveyors Association was to be held in Sudbury this coming year, immediately after the Canadian Institute of Surveying meeting in Ottawa.

Mr. Lester Higbee thanked the Association for inviting him and for the hospitality he had received. He mentioned that this was the eleventh meeting which he had attended.

Mr. L. Schofield thanked the members for having invited him to attend and to speak at their meeting and that he wished to return again. He also thanked everyone for the hospitality shown to his son.

Mr. Dobbins thanked the members for having invited him to attend the annual meeting of our Association. He said that the annual meeting of the New Brunswick Association was to be held on the 17th and 18th of January 1966 in St. John.

Mr. Neil Flemming on behalf of himself and the other members of the Department of Lands and Mines of New Brunswick, thanked the Association for having invited them to attend the annual meeting and that they had enjoyed it, and hoped to be able to attend in future.

For the first time since the Association has been formed, one of our exhibitors, Jena Scientific Instruments had a raffle at which they gave away small surveying items. This gesture was very much appreciated. Mr. Fred Steinmetz was given a hand for his gesture following the draw. A hand level won by Mr. Lester Higbee was donated by the Nova Scotia Land Surveying Institute.

The President asked that a hand be given to Mr. Roy Dunbrack and his committee for the fine arrangements which they had made for the Fifteenth Annual Meeting. The applause was most enthusiastic.

At 3.30 p.m., the President, H. B. Robertson, adjourned the Fifteenth Annual Meeting. For the remainder of the day, November 6, 1965, a council meeting was held in the Association rooms, followed by the Annual Dinner and dance which turned out to be a gala affair. The largest number ever attended the Fifteenth Annual dinner, at which time the head table was piped into the dining room. A fine meal was served by the hotel and the staff and the following presentations were made. To the past presidents of the Association a Certificate of Honor was presented, with the exception of **Professor E. O. Temple Piers, first President, who received an exclusive Certificate of Honor which was signed by all succeeding presidents.**

The last presentation of the evening was made to Mr. J. E. R. March at which time he received a Certificate of Honorary Membership into the Association of Provincial Land Surveyors of Nova Scotia.

After the clearing of the tables, the Fifteenth Annual Dance was held and again as all other activities of the meeting, it had the largest attendance ever.

Respectfully submitted,
E. P. Rice, P. L. S.
Secretary – Treasurer

MUNICIPAL COORDINATE CONTROL
By Mr. Lorne Pelfon,
Topographical Survey Division
Department Of Mines & Technical Surveys

Paper to be presented at the annual meeting of the Association of Nova Scotia Land Surveyors to be held in Halifax on November 5th and 6th, 1965.

Mr. Chairman, Mr. _____, fellow surveyors:

I notice that on your program the title of my paper is shown as "The Toronto Metropolitan Control Survey". Mr. Hoganson who is chief of our computations section, and a native Haligonian, suggested to me that names such as Toronto or Upper Canada should never be mentioned at a meeting in Nova Scotia! My paper today should have been titled "Municipal Coordinate Control" and it won't be confined solely to the control survey of Metropolitan Toronto. A few minutes will be devoted to coordinate systems generally and to a brief historical account of municipal control surveys that have been carried out by the Department of Mines and Technical Surveys since 1961.

The main issues will be concerned with the field work and uses of coordinate control.

INTRODUCTION

Coordinate control surveys have been established in many Canada cities during the past four years and it might be of some benefit to describe what a plane coordinate system is. Briefly, a plane coordinate system consists of two axes which intersect each other at right angles at a point called the origin. If two city streets intersect each other at ninety degrees they could be considered as the X and Y axis of a plane coordinate system and all points in the four adjoining blocks, or quadrants, could then be referenced to these axes by an X distance along one street and a Y distance measured perpendicular to the X axis. Most cadastral surveys are carried out on areas which are considered as plane surfaces. The error introduced by neglecting curvature only amounts to about 1 part per million at a distance of ten miles from the origin and therefore a plane rectangular coordinate system is ideal for surveys of areas up to about 25 miles in diameter. However, when an adjoining coordinate area is met the two systems clash. The bug-bear here is of course, that our globe is not a cube and we have to concern ourselves with the spheroidal curvatures of meridians, parallels, geodesic lines and the like. Nevertheless, if we take into account a certain area, its east-west and north south

dimensions and the scale distortions that we can allow it is possible to come up with good projection systems that will give X and Y coordinate references that are related to the geodetic latitudes and longitudes for the points.

It is then possible to give any point in the area an X, Y coordinate value and if greater accuracy is desired, known scale corrections can be applied to give geodetic values for the positions, angles and distances. It would be possible, for instance, to pick a projection system that would give scale errors up to 1 foot in 3000 feet. These projection errors are known and the coordinate system could still be used for highly accurate surveys. With today's precision distance measuring instruments it is relatively easy to obtain traverse closures of 1 foot in 10,000 feet. It would seem advisable therefore, to pick a projection system that would allow plane angles and distances to be used and still attain accuracies of 1 part in 10,000. Small scale corrections would then only be required for a specialized surveys. Since angles are very important in any survey a conformal projection is desirable. This means that there is no differential angular distortion between angles calculated on the projection and corresponding angles measured in the field.

HISTORY

The importance of a system of rectangular coordinates is slowly but surely becoming apparent to most people connected with surveying. The survey date is of benefit to federal, provincial and municipal organizations as well as to private land surveyors and engineers. Officials of the Department of Mines and Technical Surveys feel it is a responsibility of the federal government to encourage and assist municipalities to establish networks of good survey control. The Surveys and Mapping Branch has been able to provide such assistance by establishing first and second order control to which other municipal surveys can be referenced. Trained personnel, precise survey instruments and modern computational equipment and methods have been made available to carry out a limited program of municipal control surveys.

In 1961 discussions were begun between Mr. C. A. Boileau, Superintendent Engineer with the Montreal Department of Public Works, and Mr. S. G. Gamble, Director of the Surveys and Mapping Branch of the Department of Mines and Technical Surveys. This resulted in an agreement to establish first and second order horizontal control to supplement a network of first order levels that had been put in previously by the leveling section of the Geodetic Survey. Inquiries soon followed from officials of the Metropolis during the summer of 1962. Since that time the Surveys and Mapping Branch has assisted twenty-three separate municipalities in establishing an integrated control network for their particular areas. Two of these areas are in British Columbia, four in Alberta, three in Saskatchewan, one in Manitoba, eight in Ontario, two in Quebec, two in Prince Edward Island and one in the Yukon. I understand that Sydney, Halifax and Dartmouth are scheduled for next summer.

FIELD WORK FOR MUNICIPAL CONTROL

The field work connected with municipal control is very interesting to me and I would like to go into this aspect in a little more detail. Reconnaissance is one of the most important steps to a good second order net and if at all possible the party chief should look after this phase of the work in cooperation with the municipal officials. He should try to determine which roads are to be widened in the immediate future and which side is to be widened. All schools, churches, parks, municipal grounds and hydro lines should be located. He should build up a mental picture of prominent landmarks, and ground locations that are intervisible with the first order control stations. The second order points must be accessible and relatively permanent and the network should be dense enough to be practical for a surveyor to use. Whenever possible neat orderly loops should be laid out and redundant lines across numerous loops should be avoided. The method of using temporary stations with side-shots to main coordinate control stations should be avoided as check measurements or future relocations will be difficult to make after the temporary marks have disappeared. Signal mirrors, binoculars and walkie-talkie radios are essential to good reconnaissance.

Underground utilities should be located and utility companies should be advised even if a monument is only to be located near their lines. This is in the area of public relations which I believe is very important. In fact, the utility companies should be urged to tie their lines in with coordinate references once they become available so that the relative positions of the local utilities can be established. It is a good policy to inform the owner of property adjacent to a proposed monument site as to what the monument is there for and how it can be used and ask him if he sees the monument being tampered with to call the local city surveyor or whoever is in charge of the monuments in that area.

One of the most important prerequisites to a second order network is a strong first order framework. The Geodetic Survey established twenty-four first order stations in and around Metro Toronto which covers an area of 240 square miles. This gives a density of one monument for every 10 square miles. This is essential in order to provide the necessary azimuth and positional control for the second order work. According to the Surveys and Mapping Branch control specifications, the maximum number of courses along the most direct route between azimuth control points is 10 and the probable error of astronomic azimuths should be within 0.3 seconds. This is impossible to achieve with a normal star shot on polaris. Small errors will inevitably occur in the second order work but with a strong first order framework and proper adjustment these errors can be distributed to give an overall uniform system.

The main difference between my last summer's operation in the Burlington-Oakville-Toronto Township area and the 1962 to 1964 surveys of Metro Toronto and Hamilton was that distances were measured by day and angles at night. With the early model Geodimeters it was necessary to make most of the measurements at night. To keep the vehicles and equipment working efficiently on a 24-hour basis it was therefore necessary for the angle work to be carried out during the day. With the coming of the mercury arc lamp and the new model 6 Geodimeter it was possible to reverse the scheduling. Last summer using a model 6 Geodimeter with a standard bulb it was possible to measure lines up to 1½ miles in daylight and about 4½ miles at night.

There are many excellent features to the new Model 6 Geodimeter; however I am not here to sell Geodimeter so suffice it to say that we found them very reliable and easy to use. As in previous years communication between stations on both the Geodimeter and angulation parties was by walkie-talkie radios. These were F. M. sets in the V. H. F. Band.

Specifications for second order control as outlined by the Surveys and Mapping Branch state that the maximum anticipated error in measured lengths, after reduction to sea level, should not exceed 1 part in 50,000. The closing error for traverses must be better than 1 part in 20,000. Because of an inherent error of about 1 cm in the Geodimeter an attempt was made to keep the distances between successive monuments to a minimum of 1000 feet and preferably 2000 feet. Although ambiguities are unlikely with the model 6 Geodimeter we again used a 50 cm bar at the reflector end and 2 complete measurements were taken for each line. For the first position the reflector was set 25 cm in front of the plumb point and for the second position it was set 25 cm behind the plumb point. The two measurements were then meaned to give the required distance. The two readings give a good check on your work and little time is required to take the extra measurement as only the prism housing at the reflector and needs to be moved. Seven foot tripods were used for sightings over cars, pedestrians, mailboxes and the like. On one occasion the reflector was placed on a four foot extension bar on top of a 7 foot tripod in order to clear some waving grass that was blocking the line of sight. Distances of less than 800 feet were claimed to maintain accuracy.

A Wild T-2 was used for angle measurements along with the Wild traversing equipment which allows the instrument and target to be interchanged on the tribachs

without moving the tripod. Eight sets of horizontal angles were read for each required angle and a maximum deviation of 5 seconds from the mean was accepted. If large spreads were encountered extra sets were taken until a satisfactory mean was achieved. One set of vertical angles was taken at each station in order to reduce the slope distances to horizontal distances at sea level.

Night work was found to give much better results than daytime and loop closures were generally kept to within $2/N$ where N stands for the number of sides in a closed figure or traverse. The number of sides in any loop was held to a maximum of 16 and preferably around 9, to help isolate angular errors.

Descriptions and horizontal photographs were taken of each monument location for reference purposes. A few stations around the perimeters of the various municipalities were selected as photo reference points and a number of azimuths distances were taken at each of these stations to photo-identifiable points. The purpose of this was to aid in the preparation of photogrammetric plots for large scale maps should the need arise.

Monumentation varies from place to place. In the "Diamond Horseshoe" area of Toronto and Hamilton, frost seldom penetrates deeper than 4 feet. The majority of monuments consisted of a cement cylinder $4\frac{1}{2}$ to 5 feet deep and about 1 foot in diameter. These were brought to ground level. Four reinforcing rods were placed vertically in the cement to avoid breakage of the column. In Metro Toronto all the holes were dug by hand whereas in Hamilton and the various municipalities between Hamilton and Toronto powered augers were used. Many tablets were cemented directly into sidewalks in Metro Toronto. Sidewalks are subject to considerable disturbance due to frost, plows and construction and in 1964-65 most sidewalk monuments were placed independent of the sidewalk. This involved cutting a section out of the sidewalk, digging a 5 foot hole, pouring the monument and finishing with a steel casing to take up any shock between the sidewalk and the monument. In Winnipeg most monument holes were dug to depths of 25 feet to overcome a particularly poor soil condition. Last year, the Ontario Department of Highways in Toronto made tests with numerous types of monuments in different locations and even in Toronto where frost is relatively light they experienced vertical displacements of up to $1/10$ of a foot in one year. Precise leveling must be a demoralizing experience! A design that is now being used in Ottawa consists of 2 concentric pipes with a lubricant between them so that the outer cylinder is free to slide up or down without disturbing the inner pipe, which contains the survey tablet. Certainly a good solid footing below frost level should help a great deal to overcome disturbances due to frost.

The adjustment of the second order municipal control is presently being carried out by a computer program known as GROOM. Groom stands for "Generalized Reduction of Observed Material" and is actually a series of programs that gives an area type of least squares adjustment for the survey data. Groom was originally written for the IBM 650 in 1961. It was written in SPS which stands for "Symbolic Programming Systems" and in the fall of 1963 the program was rewritten for the IBM 1620. Now the 1620 is considered inadequate and our programmers are again rewriting GROOM for a newer computer - the CDC 3100. The latest program will be in Fortran which stands for "Formula Translation" and should be adaptable to still newer and more sophisticated computers as they become available.

In carrying out adjustments it is obvious that slope distances must be reduced to give horizontal distances but the reason for a reduction to sea level may not be as apparent. The Clarke Spheroid that is used in Canada assumes that the earth is an ellipse that has rotated about its minor axis to give what some people call an "oblate spheroid" and others an "ellipsoid of revolution". All geodetic measurements are reduced to this mathematical figure and sea level is used as the scaling reference. For rectangular coordinates though, we could just as easily assume a mean elevation for the area in question and then horizontal ground measurements would more closely approximate the grid values. However this would only hold for relatively flat areas.

The sea level correction amounts to about 1 part in 10,000 at an elevation of 2000 feet. A very interesting paper on "Skew Plane Coordinates" was given by Mr. J. E. Lilly, Dominion Geodesist, at last year's American Congress of Surveying and Mapping held at Kansas City, Missouri. This paper deals with coordinate axes that are not north-south and east-west but have been rotated or "skewed". Mr. Lilly has developed the "Mercator Projection" and a projection which he calls a "Geodesic Strip Projection" and has tested both of these projections for an area similar to the Province of Nova Scotia. The Modified Transverse Mercator with 3 degree zones could easily be used for Nova Scotia. Two zones, with central meridians at longitudes 61 degrees - 30' and 64 degrees - 30', could be used to cover the entire province and would fit into a system that has been proposed for many provinces in Canada. There would seem to be a practical advantage to having the grid north in the general direction of true north rather than having it oriented to the northeast, however these are all considerations that should be thought out before a projection system is selected.

USES OF MUNICIPAL CONTROL

There are four basic mathematical problems that can be solved using rectangular coordinates:

First: if the distance and azimuth between two points and the coordinates of one of them are known, the coordinates of the second point can be calculated.

Second: if the coordinates of two points are known, the distance and azimuth between them can be calculated.

Third: if the coordinate of three vertices of a triangle are known the three angles of the triangle can be calculated.

Fourth: if the coordinate of two points A and B are known along with the angle between AB and AC, where C is any other point, then the azimuth of AC can be calculated. With a coordinate system of X and Y values a surveyor can set up over a coordinated monument and use an adjacent monument as his plane coordinate reference azimuth. He can then traverse along measuring angles and distances until he comes to another coordinated monument. His angle work can be checked against the plane coordinate azimuth at the end point. Coordinate values can be easily computed for all intermediate stations using his measured lengths along with sine and cosine values. The coordinate and azimuth errors at the end point if within a permissible limit, can be adjusted into the intermediate stations which will then be coordinated with the entire control survey. I have listed seven broad uses for municipal control which may be of interest. These are taken from a list that was prepared by our office last year:

1. A control survey provides an integrated system of monuments which can be used for the orderly development of maps and plans and as a reference for surveys executed in a city.

2. A first and second order control network gives a means of standardizing and checking the accuracies of future surveys. The control is based on a uniform system of observations, computations and adjustments and once filed in the local city surveyor's office (or city engineer's office) the survey information should be readily available to the public.

3. It provides control for the production of base maps from aerial photography. Such maps are of value to planning boards interested in parks and recreational areas, urban renewal and zoning and assessment commissions. Route maps for transportation systems can be tied to the control

4. Street and highway plans developed by a city should be tied to a reference system. Much money is invested in surveys for such projects which usually become of no future value because the survey has left no retraceable evidence on the ground or has not been tied to a reference system.

5. Utilities, such as sewage and water works, telephone communications, both overhead and sub-surface, and power commissions require accurate plans for the

development of their interests. Duplication of survey efforts could be avoided if all surveys were tied to a reference system.

6. Property surveys tied to a reference system could be much more readily relocated on the ground and evidence collected with greater certainty. Rectangular coordinates give the possibility of interconnecting points even though they may not be intervisible and may be miles apart.

7. A reference system can cut costs and aid planning. The majority of maps and plans become nothing more than expensive sketches because of the inability to correlate the portrayed material to evidence found on the ground. By the complete integration of surveys bound to a common reference system much money and man power would be available for other investment.

Metropolitan Toronto is actually using city control and to give a more detailed idea of how a control survey system can be used I would like to quote a section from the Metropolitan Toronto Department of Roads Biennial Report for 1963-64.

This report lists thirteen uses as follows:

- (1) Provides control for construction projects.
- (2) Relates various projects.
- (3) Relates property surveys to engineering surveys.
- (4) Provides ground control for aerial surveys.
- (5) Co-ordinates Department work with private developers and other Departments.
- (6) Relates all engineering data.
- (7) Eliminates the need to run closing loops.
- (8) Reduces the possibility of survey errors.
- (9) Standardizes all measurements.
- (10) Provides an easy method of calculating and indexing.
- (11) Provides a permanent record.
- (12) Provides an easy method of survey maintenance.
- (13) Eliminates the need to take astronomic observations.

Many other uses of the co-ordinate network will be made as time goes on. A number of these uses depend upon the Municipality undertaking other projects for which the co-ordinates were a prerequisite.

With the co-ordinate systems now established it is possible for the Municipality to proceed with the following projects: -

The modernizing of the land registration system.

The transferring of all land in the Metropolitan Area into the Land Titles Office (this would include the relating of each parcel of land to the co-ordinate network, the confirming of the boundaries thereof and the confirming of the ownership thereof).

The modernizing of the land survey and land subdivision system in the area.

The integrating of engineering records.

The compiling of basic city maps for the area (topographic, cadastral and utility).

The establishment of a Municipal Data Bank containing all types of information related to a geographic location. (The bank will contain the information from the above projects plus information from many other sources, e. g., Assessment, Planning, Welfare, Housing, Industrial Commissioners, etc.).

When these projects are undertaken then the full potential of the co-ordinate survey system will begin to be realized.

While in Toronto I discussed this idea of a Municipal Data Bank with Mr. R. A. Smith, Supervisor of Surveys for the Metro Toronto Department of Roads. Although still in the future the possibilities of a computerized city leaves a person somewhat awed. In Philadelphia, a municipal data bank has already been set up. This is a large capacity computer that stores statistics such as population, information on electoral districts, births, deaths and traffic accidents which are broken down by street and dates. Any desired information is obtained merely by pushing the right buttons.

What is required for a data bank is an accurate system of coordinate references for the information being stored. Statistics are already kept by various agencies on motor vehicles, births, deaths, welfare payments and the like so the collection of this tremendous volume of data would not be as great as might be expected.

Once the municipal control monuments have been placed and the survey completed it becomes the responsibility of the municipality to look after the monuments and to make sure that certain standards are maintained for any third order control that might be undertaken in the future. It is advisable for good reference azimuths to be established at each control station in the event that adjacent monuments are destroyed or the line of sight between monuments becomes obstructed. In addition, accurate ties should be taken to each monument in case it is moved due to construction or vandalism. The Hamilton engineering department hope to have descriptions filed with the Building Department for any monuments located on private lands. If a building permit is applied for and a monument is found to exist on the property, the City Surveyor will be notified and steps can then be taken to protect the monument or ensure that it can be relocated after the construction has been completed.

CONCLUSION

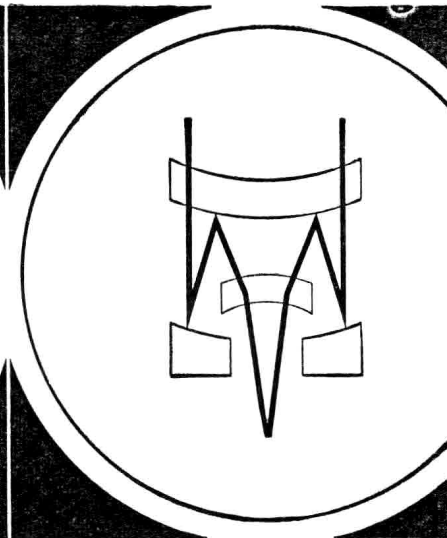
There is, at present, a very active interest in rectangular coordinate systems across Canada. New Brunswick has led the way by officially adopting such a system and you have probably heard from Mr. Willis Roberts concerning the progress being made there. British Columbia has adopted a coordinate system and legislated accordingly. Alberta is about to follow suit. The Surveyor-General of Ontario has recently instituted a feasibility study to report on the interest and uses of a provincial coordinate system and to determine the most suitable projection for Ontario. A pilot project covering the Bay of Verde Peninsula in Newfoundland is now under study and we understand that Quebec is also giving thought to the adoption of a coordinate system.

The establishment of a precise control framework is only a start. The municipality should fill in the framework with 3rd order surveys thus assuring that a well-established control point is within easy reach of future surveys. All interested agencies, or individuals, should participate in the breakdown into lower order surveys. Only when this stage has been reached will the full benefit of an integrated plane coordinate system be apparent.

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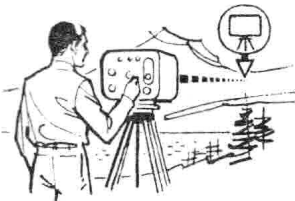
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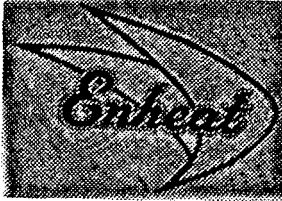
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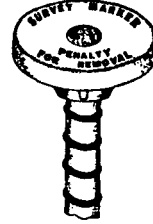


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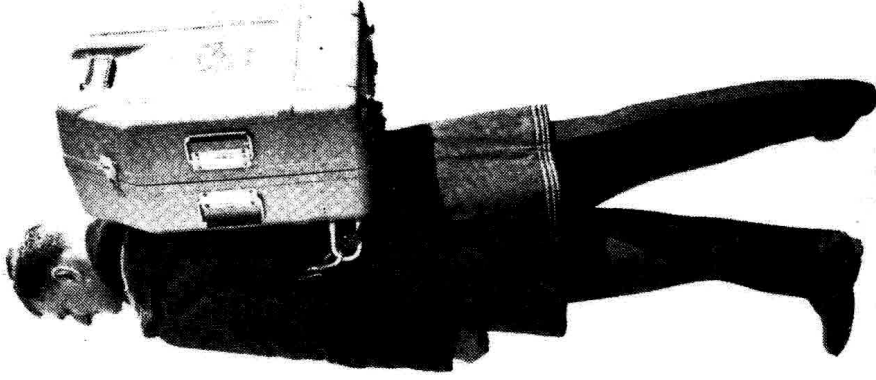
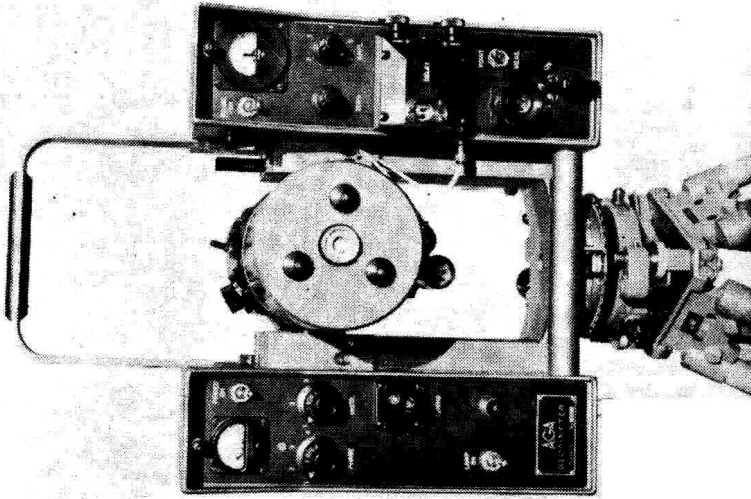
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