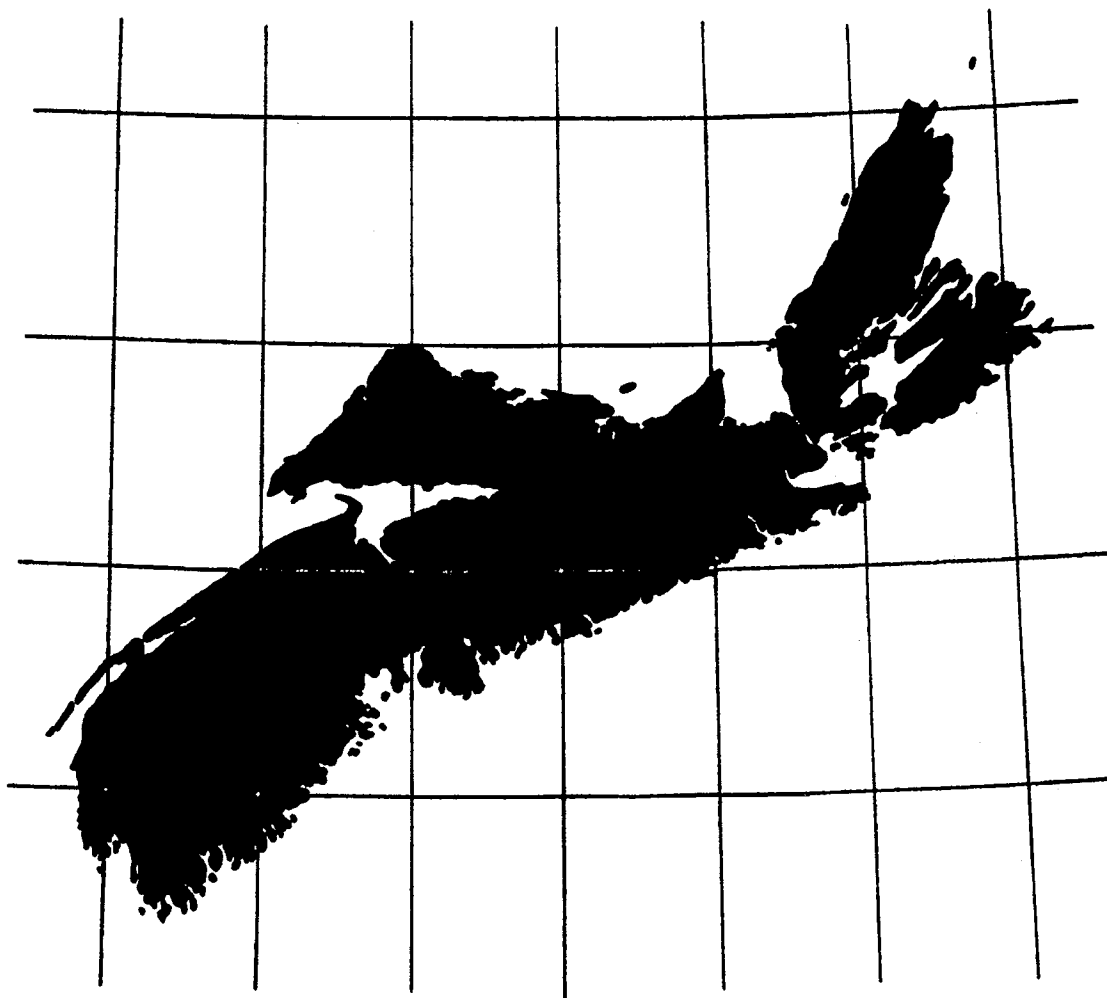


The NOVA SCOTIAN SURVEYOR



*Published by
The Association of Provincial Land Surveyors
of Nova Scotia*

Founded 1951
Volume 16

R. E. Millard, P.L.S.
September, 1964

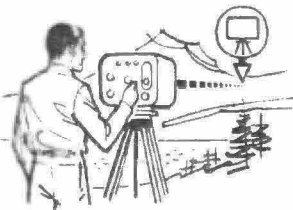
Incorporated 1955
Number 41

the **NEW** **MRA3** MICRO-DISTANCER

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



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



FEATURES:

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

TELLUROMETER CANADA LTD.

1396 Merivale Road, Ottawa

The NOVA SCOTIAN SURVEYOR

Published four times a year by

The Association of Provincial Land Surveyors of Nova Scotia Incorporated

J. F. ARCHIBALD
President

EDWARD P. RICE
Secretary-Treasurer

R. E. MILLARD
Editor

Volume 16

Number 41

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

Minutes of 13th Annual Meeting

Held at the Lord Nelson Hotel, November 7th and 8th, 1963

The meeting came to order at 10:20 a.m. and was opened by the president giving his address and annual report. Following his address, the president then introduced the guests and bid them a most hearty welcome. The president then read the names of members who passed away during the year and a minute of silence was observed in their memory. The deceased members were: Wallace Betts, Halifax, Edward S. Foster, Liverpool, A. C. Freckleton, Dartmouth, John Russell, Digby and John McLellan, Belle Cote.

The president read the names of those who joined the association during the year and welcomed them as members. They are:

David C. Clark, Tatamagouche, N. S.
Lawrence S. Long, Sydney, N. S.
John A. Kaulback, Springfield, N. S.
Stephen M. Bancroft, Fredericton, N. B.
John C. McLinnis, Dartmouth, N. S.
Garnet F. Clarke, Windsor, N. S.
David W. Latimer, Truro, N. S.
William N. Wildman, Don Mills, Ontario.

President Chisholm asked the Secretary to read the minutes of the 12th annual meeting. Mr. Rice said that the minutes of the 12th annual meeting were printed and mailed out to all members in the month of July. Mr. Rice moved that the minutes be adopted as printed and mailed out, seconded by Prof. Chisholm. Motion carried.

The secretary was then asked by the president to read the financial report. Mr. Rice moved that the financial report which was distributed to the members present be adopted as printed. Seconded by Roy Dunbrack. Motion carried.

The president asked the Secretary-Treasurer for his annual report. Mr. Rice thanked the committee which worked so hard to make the 13th annual meeting a success. The members of the committee were: Ted Hollingum, George Bates, Bob Gough, and Bert Robertson. It was suggested by Mr. Rice that when committees were appointed — they would function more efficiently if the members were from the same area of the province. It was very difficult to get committee members together for a meeting when they are dispersed throughout the province, Mr. Rice stated. It was reported by Mr. Rice that the association had 192 paid members. A special effort was made throughout 1963 to collect arrears in dues and the total of \$280.00 was realized from this effort. Copies of the Land Titles Act were made available to the members at 50c per copy. The secretary-treasurer ended his report by asking as many as possible

to attend the banquet and dance and offered his assistance to all the members with any problems they may have.

A discussion then took place concerning the location of the annual meeting. The by-laws of the association state that the annual meeting must be held in Halifax. However, due to increasing prices at the hotel in Halifax, it has become more and more difficult to hold the cost per member to a minimum and the funds of the Association cannot stand a continuing deficit each year. Many members suggested changing the by-law which states that the meeting must be held in Halifax so that the annual meeting could be held in various centres each year. Mr. Schofield stated that the Massachusetts Association held its annual meeting in a different centre each year and the meetings were always well attended. Mr. Lester Higbee remarked that this problem also arose in the American Congress of Surveying and Mapping. However, the annual meeting was always held in Washington, D. C. as it enabled the members to transact any business they may have with the various government departments and it also enabled the members to see the latest equipment which they couldn't see in any other part of the country. Mr. Higbee said there were many things in Halifax that were of value to the surveyor such as, equipment, procedures, people to consult with, etc. and that these things should be considered before making a change in the location of the annual meeting.

Mr. Donald Eldridge suggested that Truro would be a central location to hold the meeting and that excellent accommodations could be had at a much lower price than the association was now paying. He also said that a great deal of interest would be created if the meeting were held in a different location each year. The president stated that if the location was going to be changed it would have to be finalized before the close of the meeting. The discussion ended with no definite action being taken.

Considerable discussion took place on the fees to be charged by the surveyor. A committee consisting of Mr. Robert Donovan and Mr. Mel Wadden put a great deal of time and effort in preparing a proposed scale of fees. Surveyors in private practice were consulted and asked for any suggestions they may have. A questionnaire was sent out to over 21 surveyors in the province but the response to this was very poor. The committee also wrote to every association across Canada inquiring as to the rates they were charging and this also was taken into consideration when the proposed scale of fees were drawn up. It was moved by Mr. Donovan and seconded by Mr. Langley that the scale of fees be adopted as read. Motion carried. (This suggested scales of fees was published in the January issue of the Nova Scotian Surveyor.)

A brief report was given on the Town Planning Course which was given by the Dalhousie Institute of Public Affairs and attended by some 45 members of the association. It was the general opinion that the course did not delve deeply enough into the methods and designs used in town planning but did give some insight into the problems involved in town planning.

Prof. A. F. Chisholm gave a report on the committee on education. One of the projects undertaken by this committee was the obtaining of a certified tape and chain so that, for a nominal fee, any member could have his tapes compared with the standard or certified tape. The members would be notified when this service was available. Prof. Chisholm also gave a brief report as chairman of the Board of Examiners. He stated that two major sets of exams had been written since the last annual meeting, one set in December 1962 and the other in May 1963. Approximately 8 certificates had been sent out to students who fulfilled all the requirements, not only in passing the written examinations but also in fulfilling the apprenticeship requirements. Prof. Chisholm said that it had been a pleasure to serve as chairman of the Board of

Examiners but due to pressure of other business asked to be relieved of the post. He also paid tribute to the secretary of the Board of Examiners, Mr. Vincent Harrison for the excellent work he had done.

Walter Servant gave a report on the historical background of early surveyors in Nova Scotia. He also stated that Mr. Donald Thompson of Ottawa had been appointed to write a history of surveying in Canada. Mr. Servant said that any information that any member would have concerning surveying from a historical standpoint would be very much appreciated by Mr. Thompson.

A very interesting panel discussion on "Why I Use a Surveyor" was one of the highlights of the 13th annual meeting. This discussion was under the chairmanship of Mr. George Bates and the members of the panel consisted of a lawyer, architect, real estate appraiser, planner and an engineer. Two major conclusions evolved from this discussion 1) the importance to the surveyor of determining right at the outset the purpose of the survey which he is about to make and 2) the tremendous responsibility on the land surveyor to provide the services required by these various related professions. Mr. Bates thanked the members of the panel for the time and effort they put in to make the discussion such an interesting one.

The names of H. W. L. Doane, John A. Fraser, T. W. J. Lynch and Fred E. Saltman were put before the membership by the council to be made honorary life members of the association. It was moved by Major Church and seconded by Ken Robb that these men be made honorary life members. Motion carried. A special tribute was paid to Eric Millard, editor of the Nova Scotian Surveyor, for the excellent work he has done in the past and is continuing to do. A motion was made by Don Wagstaff that Mr. Millard be made an honorary member for his contribution to the association. Seconded by Lyndon Gray. Motion carried. At this point, Provincial Land Surveyor certificates were presented with the congratulations of the president and all the members present to Mr. Ingwald J. Osmond and John Donald McNeil.

A lively discussion took place on the Land Titles Act. Eric Millard explained that this was an act passed by the legislature of Nova Scotia in 1904 respecting the registration of titles to land but was never proclaimed. Mr. Millard recommended that the meeting set up a committee to make a study of the Land Titles Act with the view of recommending to council, a meeting with a similar committee of the Barristers Association for the province of Nova Scotia. Together these committees could discuss the problem and perhaps make a recommendation to the legislature. Major Church spoke briefly on how the Land Titles Act operates in the province of Alberta and further stated that until the Land Titles Act goes into effect in this province the association cannot function properly. Mr. Eldon Adams elaborated at some length on this act saying that one of the reasons why the act was never proclaimed was due to the objections of the Bar Association. If this act had been proclaimed in 1904, a master of titles would have been appointed in each district to look after the registration of titles to land and the lawyers saw that they would lose a great deal of revenue by this action. Mr. Adams felt that even now, in 1963, the Bar Association would object very strongly to this Act going through. Mr. Adams also stated that as surveyors the title of land should not be of any concern, as the field of endeavour for a surveyor was to lay out the boundaries of the properties involved; and the legal title was the lawyers field of endeavour. The president thanked Mr. Adams for his opinion on the subject and said that the association had no intention to try to certify titles but it was felt by many competent surveyors that the bias system of registration would help in the location of lots they were trying to survey. Mr. Jim Doig stated that there were two things of utmost importance to the surveyor and were needed in this province. They

are 1) a better registration system to keep track of the land that is to be subdivided and 2) a co-ordinate system to enable the surveyor to relate his work to some enduring system that will live beyond the immediate life of a description that stands only by itself and is not related to the land parcels in the surrounding area. Mr. Doig felt that an honest endeavour to improve the present registry system should be made and therefore nominated Eric Millard, Don Wagstaff and Robert Hunt as a committee to look into the Land Titles Act and report back to the next annual meeting. Seconded by Prof. Chisholm. Motion carried.

The next item that was discussed at great length was the **Provincial Land Surveyors Act**. The secretary, Mr. Rice, read the section which was the main point of discussion. This section stated in part that no person shall practise land surveying for gain unless he is the holder of a certificate of qualification as a Provincial Land Surveyor and (a) is an active member in good standing of the Association (b) or is entitled under the engineering profession act to practise professional engineering in the province. Another section stated in part that the above did not apply to any person who on the first day of January, 1959, was the holder of a certificate of qualification as a Provincial Land Surveyor and was not a member of the old association. In other words, Mr. Rice said, if a person held a certificate of qualification prior to January 1, 1959 and did not belong to the old association then he did not have to belong to the present one and a professional engineer could practise land surveying for gain as long as he paid his dues to the Association of Professional Engineers without having to become a member of the Association of Provincial Land Surveyors. Mr. Rice stated that these two points hindered him greatly in trying to collect arrears in dues and suggested that the Act should be changed. Mr. Eldon Adams said that he was a member of the council when the Act was passed and at the time, he objected very strongly to the very things that were causing problems today. Mr. Adams agreed with the secretary that a revision in the Act should be made without any anger against the engineering association and asked for a thorough discussion on the problem by all the members present.

Major Church stated that he was present at the time the Act was to be passed and that the delegation from our own association was told specifically that unless they agreed that the professional engineer engaged in land surveying for gain need not necessarily subscribe to the Association of Provincial Land Surveyors, the Act would be lobbied against. It was felt by the council at that time, that the Act was better than none at all and amendments could come later on. Walter Servant asked for some expression from the members attending the meeting as to whether they thought the association was any better equipped at the present time to pursue what the association originally intended to achieve in 1959. Jim Doig remarked that changes in the Act were necessary but it would be better if a mutual cooperation between our own association and the Association of Professional Engineers could be worked out. It was suggested by Brian Wolfe that it would be of some benefit to us to adopt an associate membership whereby instrument men who had come up to a certain level of qualification could become a member of our association. This, he said, would strengthen it considerably. The president mentioned briefly the new course given at the University of New Brunswick which grants a degree in survey engineering. If any graduates of this course came to Nova Scotia and obtained their P. L. S. they would not have to become members of our association and again, we would be powerless to do anything about it. It was a very difficult situation, the president said, when we are not able to discipline our members when such action is necessary.

Prof. A. F. Chisholm, a member of both associations, said a definite effort should be made to clear up the situation. He suggested that a delegation from our Association should request permission to be heard at the Professional Engineers Association

of Nova Scotia annual meeting to be held in January. Prof. Chisholm also remarked that the only control the association had over the practise of land surveying was through the Board of Examiners and it would have to be a flagrant violation of some sort of unethical practise or malpractise before the Board would take any action at all. Prof. Chisholm suggested that if the association did publish a list of members who were eligible to practise land surveying, as had been earlier requested, and included only our own members, the inference would possibly be drawn by the various registrars of deeds, lawyers, etc. that these were the only people who were permitted to practise land surveying. Therefore, the association could possibly be open to some sort of a legal suit by those others who are also entitled to practise land surveying such as engineers and those who did not belong to the old association. Prof. Chisholm stated that until the Act was changed, we should not publish such a list.

Following Prof. Chisholm's remarks, Rusty March stated that he did not see why the association could not publish such a list but perhaps it would be better to seek legal advice before proceeding. Mr. March said that any engineer who is also a land surveyor is a great asset but should become a member of the Association of Provincial Land Surveyors and be governed by its rules exactly as the rest of the members.

Mr. Rice stated that he was against publishing such a list until the Act was changed. Mr. Rice also suggested that more members be nominated to the legislative committee to assist Mr. March and Mr. Servant, as it would take a great deal of work just to get started on proposing the changes that have been suggested. He said that it was vital for every member to support the proposed changes in the Act and not leave it entirely to the legislative committee. The members could do his, Mr. Rice suggested, by seeing their local member of the Nova Scotia Legislature, if necessary, and explaining the situation to them and by attending any special meeting that they might be requested to attend throughout the year. Mr. Eldon Adams spoke again saying that he was disappointed that more members hadn't taken part in the discussion. Mr. Adams said that he was very much in favour of a list of members eligible to practise land surveying being published. Mr. Adams referred back to his earlier remarks in order to clarify a point. At the time the Act was passed in 1959 Mr. Adams said it was pointed out to the members of the council by the president of the engineering association that the Act was not being opposed by the official body of their association itself but by certain individual members. Mr. Adams suggested that the legislative committee or the council of the association look into the problem at once, and perhaps a special meeting of the association could be held sometime throughout the year. Mr. Adams said it should be possible to come to a good understanding with the council of the Association of Professional Engineers of Nova Scotia without too much difficulty. Major Church said that he felt the association could probably prove its point without too much friction as many of the engineers agreed that the Act was poorly set-up. Mr. J. W. Byers remarked that he was a member of both associations and although he had done very little land surveying he felt that if he were practising surveying to any degree, he would automatically want to belong to the Land Surveyors Association.

The president thanked everyone for their remarks and asked for a motion on the discussion held. It was then moved by Eldon Adams and seconded by Rusty March that the council be instructed to arrange a meeting with the council of the Professional Engineers Association for the purpose of discussing the Act of 1959. Motion carried.

The president then introduced the new executive and turned the chair over to the new president, Mr. Joseph Archibald. Mr. Archibald asked for the support of all the members during his term of office. He thanked the members for electing him president

and stated that he would do his best to keep the association progressing. Mr. Archibald extended a vote of thanks to the out-going officers and a special vote of thanks was extended to the secretary-treasurer for the excellent work he had done in the past year. The president then asked for any new business.

A discussion on the new set of subdivision regulations for the Municipality of the County of Halifax took place. Mr. Ken Robb explained the regulation that was the main point of objection. Firstly, a percolation test is a certain procedure that must be carried out to determine the suitability of the soil for a septic tank and disposal field. The new regulations stated that a percolation certificate could only be issued by a qualified sanitary inspector or a professional engineer. Mr. Robb said that the feeling of many surveyors in the area was that the new regulation made it more advantageous for clients to obtain the services of a professional engineer who was also engaged in land surveying as the engineer would be able to sign the percolation certificate while a land surveyor could not. Mr. Robb said that he had carried out many of these tests but it was necessary for him to have a professional engineer sign the certificate. Mr. Robb further stated that he could not see why he should not be allowed to sign the certificate and why some arrangement could not be made to qualify land surveyors to carry out these tests. The secretary, Mr. Rice, said that he had been working towards trying to get some sort of a course organized that would qualify land surveyors to perform the percolation tests and have them accepted by the County of Halifax, and by the provincial Department of Health. However, he had been unable to accomplish anything concrete thus far. The president explained the problem more fully to the membership saying that when a land surveyor was doing a subdivision job he was faced with the problem of having to have the lots approved by the County Planning Board. In order to receive final approval, it was necessary to carry out percolation tests on the soil and have the certificate signed by a professional engineer or a sanitary inspector. It was felt that this regulation puts a discrimination restriction on the land surveyor who was not an engineer. It was further stated that the association was told by the County that their sanitary inspectors would perform this service free of charge but it sometimes took 2 or 3 months for them to carry out these tests. Therefore, due to this percolation test, a client was not likely to hire a surveyor who would have to wait 2 months or more to have his plan approved over an engineer who could have his plans approved in two weeks.

Mr. Walter Servant stated that he felt it was up to the surveyor to acquire the necessary qualifications to meet the new regulations. Mr. March and Mr. Servant both asked for more information on the percolation test possibly from an engineer who was qualified to speak on the subject. A. F. Chisholm suggested that perhaps the surveyor was getting outside his field when he attempted to determine the suitability of the soil. Mr. Chester Keen suggested that perhaps a sanitary inspector should be given the duty and authority of carrying out the percolation test rather than surveyors trying to take over someone else's field. Mr. Robb stated that the land surveyor could better serve his client if the association moved with the idea of having its members become qualified to perform these very elementary tests. The president then asked for a motion on the point in discussion. It was moved by Ken Robb and seconded by Chester Keen that a committee be appointed to approach the Department of Public Health with the view of putting on a course which would qualify the land surveyor to make the necessary percolation tests, or otherwise to qualify him so that he might fulfill the requirements of the planning board. Motion carried.

A discussion then took place on the voting system that was used by the association. The secretary stated that of about 250 ballots sent out only 49 were returned and further since there were 65 members registered for the meeting, the members were very lax in carrying out their duty in this respect. The secretary asked that more in-

terest in the election of officers be shown at the next annual meeting. It was suggested by one of the members that the Secretary place a stamped envelope in with the ballot and that this would encourage more members to return their ballots. It was pointed out that any change in the present system of voting would involve a change in the Act. A suggestion was made by George Bates that possibly the executive could be elected by calling for votes from the floor as those who were present at the annual meeting were the ones most interested in the association.

Prof. Chisholm stated that the presently used voting system was the most democratic as it would surely happen each year that members may be ill or attending to legitimate business elsewhere or live so far away that they would be unable to attend. Prof. Chisholm stated further that as long as a member paid his dues he was entitled to a vote. Major Church endorsed Prof. Chisholm's stand. Mr. Bates said that his suggestion of electing the executive from the floor was merely a suggestion and that the present system of voting was quite satisfactory to him. It was agreed by all the members that the present system of voting was the most satisfactory and democratic.

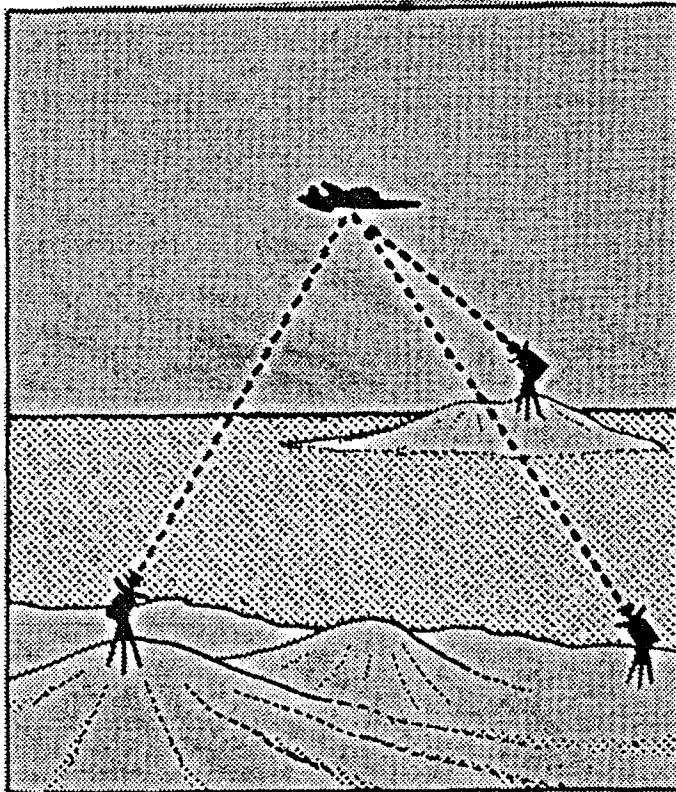
A discussion on the co-ordinate system then took place. Mr. Rusty March stated that he felt the government would not take the initiative in starting a co-ordinate system unless it was brought to their attention that it was a vital public service. Mr. March said it was a matter for the association to bring the co-ordinate system to the attention of the government. Mr. March said that this system had been started in New Brunswick with great success. Mr. Jim Doig remarked that although, at the present time, we cannot change original lines, a system of co-ordinate surveys would make it much easier to find a mathematical solution in the subdivision of parcels of land. When such a system was completed, said Mr. Doig, it would not be necessary to go to the Registry Office for days on end to look for information. Mr. Byers asked if it would not be possible for someone from New Brunswick who had been working on the co-ordinate system to come here and give a talk on television on the advantages of a co-ordinate system. This, said Mr. Byers, would help enlighten government officials and the general public as well as the land surveyor.

It was then moved by Eric Millard and seconded by Ron Chisholm that the association appoint a committee, some members of which would be familiar with the physical properties of the co-ordinate system and the economic advantages of introducing this system in the province of Nova Scotia. Motion carried. The president then asked for nominations to this committee. Moved by Mr. Keen and seconded by Mr. Servant that Rusty March serve on this committee. Moved by Ken Robb and seconded by Lyndon Gray that Walter Servant be appointed to the committee. Moved by Mr. Gray and seconded by Prof. Chisholm that Major Church serve on this committee. Moved by George Bates and seconded by Art Chisholm that nominations cease and that these three members, Rusty March, Walter Servant and Major Church constitute the committee with power to act on the co-ordinate system. Motion carried.

A motion was made by Walter Servant and seconded by Eric Millard that a vote of thanks be extended to the ladies committee for all they did to entertain the member's wives during the annual meeting. A vote of thanks was also extended to the exhibitors and to the program committee for the excellent work they had done to make the 13th annual meeting a most interesting one. Moved by Art Chisholm and seconded by Major Church that a vote of thanks be extended to the past president, Ron Chisholm. Moved and seconded that the 13th annual meeting be adjourned. Motion carried.

Respectfully submitted,
E. P. RICE, Secretary-Treasurer

Aerodist Helps Correct 400-Year-Old Nautical Chart Error on Seaboard



Canadian Municipal Utilities, Volume 12, No. 2, Issue 1964

SABLE ISLAND, well known as the graveyard of ships, now can be accurately shown off Nova Scotia on charts of the Western Atlantic Ocean.

Shown erroneously on nautical charts for 400 years, the Island's true position now has been determined by a precise new aerial survey method. Engineers of the Department of Mines and Technical Surveys carried out the survey.

To pin down this small island, a recently developed electronic positioning device called Aerodist was used. The Topographical Survey, aided by the Hydrographic Service of Mines and Technical Surveys, executed the survey.

Aerial support for the survey was contracted to Canadian Aero Service Limited, Ottawa, worldwide air survey company and an affiliate of Litton Systems, Canada. Canadian Aero has performed numerous surveys in the Far North and has a broad experience with Shoran, Decca, Doppler Radar, and other aircraft positioning systems.

The Department of Mines and Technical Surveys' Aerodist unit was carried in Canadian Aero's DC-3, which flew over the area at a height of 10,000 feet. Other Aerodist ground units were set up on Sable Island, and along the Nova Scotia coast.

The Aerodist on board the aircraft transmitted radio waves to the three ground Aerodists, which re-transmit the signal to the airborne unit. By measuring exactly the time it takes the signal to travel the round trip, the aircraft's position can be precisely determined at all times. So can the position of islands, lakes, rivers, or shoals beneath the aircraft.

To collect navigation data on the Hudson Bay and James Bay area, Topographical Survey and Canadian Aero crews based at Great Whale River on Hudson Bay are now flying the Aerodist over several thousand square miles there. They will take full-color aerial photos, blanketing the entire area and recording the islands and shoals.

The survey will include the whole of the dangerous area between the Belcher Islands and the Quebec mainland, recording all islands and shoals, some of which have not been previously mapped or charted. The hazardous sea route through James Bay to Moosonee, Ontario, has similarly been covered by low-level color photography. The islands are clearly defined and shoal areas indicated in subtle color changes seen in the hundreds of 9 x 9 color photos. Each photo's position is established with Aerodist.

Earlier, the Mines and Technical Surveys Department sent field survey engineers with Canadian Aero flight crews to Northwestern Ontario to survey more than 60,000 square miles with Aerodist. Information thus obtained will be used with aerial photos to produce topographic maps.

The Ontario aerial survey was completed in four weeks. Three years would have been needed to collect the same data with ground parties.

The Land Surveyor of the Future

Presented at the 12th Annual Meeting of the Indiana Society of Professional Land Surveyors, Purdue University Campus, Lafayette, Indiana, January 10, 1964. Publication rights are reserved by the author, with permissions granted to Purdue University, Indiana Society of Professional Land Surveyors, and the American Congress on Surveying and Mapping, to publish in their respective proceedings or journals.

By WALTER S. DIX, President, American Congress on Surveying and Mapping

Yesterday, today was tomorrow. Tomorrow is the future. There will always be a tomorrow—always the future. Today, therefore, is part of that future in which tomorrow's surveyor will be The Land Surveyor of the Future.

Secretary of State for the United States, Dean Rusk, has said, "The pace of events is so fast today — unless we keep sights on tomorrow we cannot expect to keep touch with today." And to that I say, we need also to keep a sight on yesterday to be really in touch with today, or tomorrow, or tomorrow's tomorrow.

To project intelligently into the future, one needs a very clear picture of today as the point of departure — a good backsight on yesterday for direction into tomorrow.

This audience of professional surveyors well understands that a surveyor must know fully where he stands before traversing to somewhere else, and that a back-

sight is necessary to control foresighting, if he wants to know where he is really going.

We could not probe space today if those before us had not probed the geological and archaeological past. Even as we probe for the moon, the Mohole project probes to the interior depths of earth itself.

Past, present, future — all are bound together, sometimes in smooth transition, sometimes with gaps between. Looking into the future of the surveying profession is not different. Before we can project into the future, we need to know where we are now, and we need to know by what paths we arrived.

By what paths did surveying and the surveyor arrive?

A brief backsight into the past indicates that if the Sphinx could talk we would know more facts about the history of surveying. We do learn, however, from historians and scholars, that Babylonian survey maps antedating 2000 B.C. show many sections of land composed of irregular polygons subdivided into right triangles, rectangles, and trapezoids, whose dimensions and areas are indicated.

From China — the Chou-pei — the oldest known Chinese document on surveying dates back to the second millenium B.C.

The history of mathematics records flooding along the Nile, that washed away survey marks each season, was cause to create geometry, by sheer necessity, to find ways to locate and re-establish those ancient landmarks. The name geometry, taken from the Greek, in fact means earth measure.

From the earliest measuring sticks and simple sighting and plumbing devices of the Babylonians, Chinese, Hindus, and Egyptians, surveying and the surveyor came. And in pace with surveying came mathematics, the means for the surveying computations.

The reed or rod measure of a Pharaoh's fields traces down through the pages of history to the rod measure you surveyors here tonight know so well. The harpedonaptae or "rope stretchers" of those surveys along the Nile, so long ago, are quite comparable to the chainmen and tapemen of recent years.

Whether notes and records were on papyrus or were scribed on the clay plaques of yesterday, the computing — by arithmetic, algebra, or geometry; in Greek, Egyptian, Arabic, or Hindu — is comparable to the way George Washington, Thomas Jefferson, Abe Lincoln, and even you and I have computed until today.

From the ancient water-level, the groma, the surveyor's cross, and the Grecian star; from the astrolabe, the square, and quadrant; from the backstaff and the Jacob-staff; and from the compass, still used today, we have come. Our spirit levels, our theodolites and transits, our plumb bobs and clinometers, our sextants and alidades are comparable today.

From the users of the chords of circles of Hipparchus of Nicaea more than 1000 years B.C.; from the "Opus Palatinum" of Rheticus, a 10-place, 10-second table of the natural functions, of the late 1500's; and from the 15-place sines of Pitiscus in the early 1600's we have come. In comparison, there are some of us today who have used and remember Crelle's tables for computers; Gurdon's famous traverse tables, for latitude, departure, and distance; the tables of logarithms; and Emma Gifford's natural tangents for seconds of arc, which, even with a residual error in early editions that was later adjusted by Andoyer, were adequate for most of our work not requiring

ultra precision. Then came slide rules and handcranked desk calculators, and motor driven calculating machines — all in use today.

Certain periods in our civilization have had influence to accelerate development and improvement of surveying from time to time. From the beginning through the time of Abraham, the Bible records the measuring and the laying out of lands and temples. The following are some of the stepping stones in the history of surveying progress, from 3000 B.C., to 1900 A.D.

3000 years B.C. — Babylonian and Egyptian surveys.

Late B.C. and early A.D., introduced the Roman Empire Surveys under Emperors Caesar and Augustus.

In the Middle Ages, still for wars on land and sea; and for commerce, boundary records, and taxes. Continued improvement of instruments, methods, mathematics, and records. From this came the Grundbucher of the continental European countries and the Domesday Book recording the surveys of English lands by William the Conqueror in 1085-1806.

In 1492, Columbus discovered America, at just about the time of great development in learning and culture, especially the arts and sciences including mathematics, navigation, and surveying; a period we know as the Renaissance.

On this new continent of America there followed: St. Augustine in 1565, Jamestown in 1607, and then the Pilgrims to Plymouth in 1620.

Then the early Colonial surveys until the Revolution, when General George Washington brought European trained surveyors to be military engineers for the Continental Army. After the winning of independence, these military surveyors and engineers carried on as the forerunners of the Army Corps of Engineers we know today.

In due time followed Thomas Jefferson's proposal for a Rectangular System of Surveys for the Public Lands; the Land Ordinance of 1785; and the Act of 1796. A civil Surveyor General, Rufus Putnam, was appointed in 1797 to serve under the Department of the Interior. In 1812 this function was named the General Land Office, which later, in 1942, became the Bureau of Land Management we know today.

By the 1850's the transition from military engineering to civil engineering was having its effect, and the American Society of Civil Engineers was founded in 1852 — the first of the engineering "founder societies" in this country. It was these early civil engineers who did the surveying to open the highways and railroads to the West.

In 1878, the Coast Survey, created in 1807, was renamed the Coast and Geodetic Survey and was charged with extending precise control surveys into the interior of the United States.

In 1879, the Geological Survey was established to survey and map the land resources of the United States.

Other Federal agencies made surveys of one kind or another, as many of them still do today.

From these land inventory and resource surveys, and the land record or cadastral surveys, surveying and mapping in the United States was to come of age during the nineteenth century.

Into the Twentieth Century

The turn of the century, 1900 A.D., saw some of our American cities growing into municipal areas with typically associated urban density problems. By 1920 planning commissions were progressively being established, sometimes with the city and surrounding county administrations in cooperation. I remember that Pittsburgh, Pennsylvania, had such a planning commission with offices in the City-County Building.

Urban planning created a need for precise, large-scale surveys and maps to bridge the gap between preliminary reconnaissance from U.S.G.S. quadrangle maps and the more exacting, detailed planning requirements. These large-scale surveys and maps required the extension of local control for coordinate systems, from the more widely spaced U.S.C. & G.S. geodetic control system. Pioneering in this field at that time, a company of geodetic and topographic engineers and map specialists was organized by R. H. Randall in Toledo, Ohio, to become established and well recognized as experts in precise surveying and mapping for municipalities. Another private firm in the mapping field at that time was W. N. Brown of Washington, D. C. Both of these names are well known in the history of the American Congress on Surveying and Mapping.

Leaders in these city-survey programs were influential in forming the Surveying and Mapping Division of the American Society of Civil Engineers in 1926. The Division was to give to the surveying profession the ASCE Manual No. 10, Technical Procedure for City Surveys in 1934, and Manual No. 15, Definitions of Surveying, Mapping and Related Terms in 1938.

It was also in the late 1920's and early 1930's, during the great, national, economic depression, that we saw the collapse of just about every kind of private survey enterprise and the creation of CWA, PWA, WPA, FERA, and eventually TVA. At this time colleges, professors, and students found themselves in much the same boat. This caused a mixing — a melting pot, so to speak — of professionals and educators from all fields of surveying and mapping, and from all parts of the United States. This was good for the profession. We had very little surveyor registration in those days. In fact, engineer registration was not yet in force in all our States then. Outside of association in ASCE's Surveying and Mapping Division, or the ASEE Committee VIII, many surveyors about the land had little communication with one another except at the local level in a few States where a surveyor society did exist.

This new and impromptu association with one another made it quickly evident that one half of the surveying profession did not know much about what the other half did or why they did it. It was just as evident that broad association was needed to exchange and communicate professional viewpoints. It was at this time that the seeds were sown for the formation of what was to become the American Congress on Surveying and Mapping — A.C.S.M., as it has become well known to most of you today.

It was at this time, in the early 1930's down in Tennessee, that TVA, in the effort to implement and expedite surveys and maps in advance of vast and comprehensive engineering planning operations, adopted and adapted then new and hardly tried photogrammetric methods, in cooperation with the U.S.G.S., for the pioneering first time in the United States, on a project of that magnitude and which extended into parts of seven States.

1941 saw the birth of A.C.S.M., just on the brink of World War II. The war period saw the production of more maps than had even been made or used before. At the war's end, those entering civil life again, after using so many maps, gave us a map conscious public. This peacetime civil support was influential in accelerating and expanding national surveying and mapping programs.

Each of these events had a salient influence in stimulating improvement and advancement of the surveying and mapping profession.

It could well be said that the first half of the twentieth century was a renaissance period for surveying and mapping, but — paradoxically — not for surveying education. As technologies and applied techniques were developed and improved, surveying, in the college curricula, was being de-emphasized, and in some cases well nigh abandoned and deleted altogether.

It is from all this we come. Here we are today, in a century of technical revolution — automobiles, airplanes, rockets, automation, speed, and space. Let us take stock and try to see where the surveyor and surveying stand today.

We have registration now required for Land Surveying license in at least 40 of our 50 States. Some of the others permit licensed Engineers to practice surveying, either as engineers or under the surveying option.

We have knowledge of organized surveyor associations in 29 states.

We know that, as of now, 28 States have adopted State Coordinate Systems.

A National Land Surveyors Conference is regularly held annually under the auspices of the Property Surveys Division, A.C.S.M.

By meetings, conventions, panels, and committees, and by newsletters, bulletins, and journals, today's surveyor does have some means of association with exchange and communication of technological and professional information on both local and national levels.

Because of all this, the land surveyor has gained considerable recognition of improved professional stature, over recent years. With this recognition he must stand ready and able to assume professional obligations.

No longer is mere knowledge of simple straight-line surveying sufficient for full professional status. Today's qualified professional needs to trace and retrace complex, curvilinear, boundary lines of railways and superhighways that twist and turn in modern design through our countryside, even through flat farmland in the typically rectangular-survey-system country.

High standard surveys are required for the National System of Interstate and Defense Highways. High standard surveys are required for city and metropolitan planning. Such surveys are not only recommended by the Urban Planning and Urban Renewal administrations of the Federal Housing and Home Finance Agency, but, as approved, the Agency allows funds for such surveys. Increased real-estate values and urban congestions have created a demand by both landowner and land-title insurance underwriters for adequate surveys in tune with the requirement. Recent agreement between A.C.S.M. and the American Land Title Association on specifications for such surveys attests to this. High standard surveys are required for survey control, for advantageous connection to and expansion from the national basic control system and for advantage in using and expanding from coordinate systems.

Opportunity goes hand in hand with increased professional proficiency and responsibility. Today's surveyor already finds that slow, time-consuming methods in field or office are insufficient for meeting a client's urgent and pressing demands, or for countermanding rising costs in these days of high wage scales. Time means money.

In meeting this demand for proficiency, the demand for higher education has already overtaken us. As reading for the law, or medicine, or the ministry, has

given way to formal education, and even as today's young agriculturalist turns to college to learn modern farming, today's beginner in surveying must seek the broad base of formal education if he intends to compete professionally and survive. Those of us who were successful in achieving professional stature by dint of hard study and long experience over the years, without benefit of formal education — or with it — would find it doubly difficult to do over again today and most likely find it impossible without the formal educational base.

But—thank goodness—we are able to tell you that surveying education is getting back on the track. Through the sheer courage and determination of a few loyal surveying educators, with support from dedicated organizations such as your own Indiana Society of Professional Land Surveyors, Committee VIII of the ASEE, the Surveying and Mapping Division of ASCE, and ACSM's Education Division; and with a lift from the National Science Foundation following ACSM's national and international reporting to that Foundation after the 10th International Congress of Surveyors at Vienna, Austria, in 1962; it is now possible to get a Master's degree at 12 schools, and the Doctor's degree at 6 schools, in the subjects required for professional surveying — the **master's** at Cornell, Georgia Tech., Kansas State, Ohio State, Princeton, Purdue, Syracuse, Illinois, Michigan, Texas, Washington and New Brunswick; and the **doctors** at Cornell, Ohio State, Princeton, Illinois, Michigan, and Texas—according to ACSM Education Division's last reporting.

We are able to tell you further that this last summer saw the successful completion of the first Geometronics Institute, at the University of Washington at Seattle, under a grant from the N.S.F. And we can report to you now that the second Geometronics Institute, under a similar N.S.F. grant, will be held right here at Purdue in your own State of Indiana this summer of 1964. These Institutes are for advanced teaching of teachers of surveying, which is very important to the advancement of the surveying profession at this time when it is so necessary to get surveying education solidly back into the university curriculums.

Geometronics—now don't let that word throw you. It is a term well understood by the National Science Foundation, where those important institute grants come from. Geometry, the name coined to describe the mathematical science created by the need to locate the Pharaoh's landmarks along the Nile, and geometronics derive from the same Greek roots and pertain to earth measure. You surveyors measure the earth, and the word applies to you. Even the name of the international federation of surveyors—F.I.G., or FIG—is Federation Internationale des Geometres.

The *ic* in *geometronic*, like that in *electronic* or *economic* comes from the Greek *ikos* and reflects pertaining to. In this day of catch-words, let us hope that *geometronics* catches on as well as *electronics*. This is an "icky" age, and even the work gimmick itself, without the ick, may well have been just a mere and probably unnoticed gim.

It would seem, then, that the surveyor and surveying stand today at a point where the true professional must be separated in identity from the technician, and the highly skilled technician recognized clearly and distinctly from lesser skilled survey party aids, with these identifies based in the main from here on out on the degree of education of each and his acumen from experience, with philosophy and technology paramount in the professional level, and technical knowhow at the technician level, and the proverbial strong back and willingness with a little bit of old fashioned horse sense for the party aids who complete the survey team.

Let us look to the future.

Any philosophy or viewpoint about the future of surveying must clearly recognize that technological advance is inexorable and that electronic or automatic data process-

ing is not only inexorable but essential to being more efficient producers than our competitors in a period when competition with another's professional skills and facilities, and against time and high rising costs, will get tougher every day. The alternative to such thinking would be an economic stagnation that would not even maintain—let alone elevate—either the standard of professional proficiency or an equitable standard of living.

Already distances are successfully measured by wave lengths of one kind or another, and combinations of electronics, optics, and mechanics are well recognized as modern automation—which, according to Labor Secretary Wirtz, will likely be “putting uneducated people out of work.”

With every new advance, new education must advance in parallel. As with the earlier, punched-card systems, ever since the introduction of the first electronic computer in 1950, manufacturers have had to provide systems-programing education and support services to create the market for the 10,000 computers of various sizes in operation today. This virtually means that the computer experts and those expert with the user's problems need a common middle ground or interpretation center for adequate communication and understanding of problems to be solved and the methods of solving them. This is where the understanding of basic fundamentals of both the problem and the computing device becomes all important. This was important when we first computed on the old, hand-cranked, desk-type calculating machines. It was just as important when we advanced to the motor-driven, electric, calculators. Just pushing buttons isn't enough. Thus, while the future surveyor will do most of his “drudgery computation” such as subdivision work, co-ordinate conversion, and possibly geodetic adjustments, by modern calculators, most likely at some computing center, it remains very important that he should never lose the fundamental understanding of his problems or the knowledge required to solve his problems by other means and by himself.

Everything in the projected future for surveying points to the need for more and more basic education. A future province of a professional land surveyor will be to trace the lines of his predecessor. This means that the surveyor of tomorrow must be prepared to trace the lines of a modern subdivision that have been derived from automatic data-processing calculations. He must know the philosophy and technology of modern, machine calculation as applied to professional surveying problems and related matters. To know surveying is not enough. To know modern calculation is not enough. Tomorrow's professional surveyor must know both.

Tomorrow's professional, property-line surveyor must know the philosophy of the legal line as well as the technology of the physically surveyed line. He must know the philosophy and technology of survey computations, and he must know the philosophy and technology of modern computing. To say that he must be a college educated and trained man is understatement. The land surveyor of the future must be a well educated and trained college man.

The surveyor of the future will use photogrammetry more and more to take off information from the ground, and he will use electronic or automatic data processing for much of his computing. But he will still use ground methods of surveying both to control his surveys and his photogrammetric take off, and to put back on the ground his planned and designed locations for project situs and construction controls, and, of course, for the land-title property or legal lines.

The land surveyor of the future must be a fully qualified professional, professionally capable and ethically responsible for surveys made under his direction, by surveying teams comprising technically skilled surveymen and less skilled, surveying party aids, and, perhaps, in association with other professionals.

Tomorrow's land surveyor will need to be attuned to an age of superaccuracy in earth measurements and the high speed of machine computations. There will be the refinements of continental and world geodetic datums, resulting from the surface-gravity, astro-geodetic and satellite-triangulation programs now planned or already under way. With such improvements in precision, and with the rapidity of machine-computed, datum adjustments, will come further refinement of coordinate systems for surveying and recording, and with all this will come an increased use of coordinate systems by professional surveyors of the future. Survey records and land property records of the future are destined to be microfilm, data-storage cards, or tape systems of some sort, streamlined to numbers, in elimination of lengthy descriptions written in words, the simplest format for which will be coordinates.

The economic outlook.

From an economic point of view for the surveyor, and from a professional viewpoint in the public interest, I would suggest that the land surveyor of the future seriously consider being concerned with land planning as an additional field of professional interest and for the added potential for increased income.

Those professional surveyors practicing today under both the Land Surveyor and the Engineer licenses know the advantages, from the business and financial standpoint, in being able to undertake major subdivision design or highway surveys including the incidental engineering problems — by doing and being paid for both the surveying and the engineering — as compared to those practicing under just the single, Land Surveyor license, who, by some statute, may be limited to just boundary work for their income.

Anyone in major subdivision work is already half in land planning as it is, and with the increased professional stature attending the predicted, higher educational qualification of the future surveyor he should consider well the idea of getting professionally further into the land-use planning field. This is the trend in Europe today, and has been so for a long time in the United Kingdom. Commissioners in F.I.G. are concerned with both rural and urban land-use planning.

The viewpoint of the Royal Institution of Chartered Surveyors on planning as it concerns the surveyor is well stated as follows:

“The Royal Institution of Chartered Surveyors does not claim for surveyors a monopoly in town and country planning; nor would it concede a monopoly to any other profession; it is convinced that the best results in planning are achieved by teamwork on the part of the professionals concerned, of which the professions of engineering, architecture, and surveying — if not the only ones — are at any rate fundamental.”

The Royal Institution of Chartered Surveyors further takes the position that no one person is capable of being the complete planner today, because the skills involved are so diverse that it is not within human competence to contain them all in one individual. Among those skills, from the R. I. C. S. viewpoint, three professions are thought to be pre-eminent — professionally recognized Architects, Planners, and Surveyors. Add to such skills to make the planning team, to name but five; the geographer, the traffic expert, the engineer, the economist, and the sociologist.

Now, from our standpoint, in similar view of future population and congested area growth in these United States of America, which will affect our cities, towns, villages, and rural areas; it would seem that our land surveyor of the future needs to be a professional part of the future land-planning team. And, with this in mind, he should be educated for that future responsibility.

The land surveyor of the future, then, it would seem to me, with the more formalized education in basic technologies and philosophies of surveying and associated civil engineering for town and country planning, would take his place in society in truly recognized and respected professional status.

He would, in effect, be the counterpart in stature of some of our early, great surveyors. This land surveyor of the future would be quite like our country's early civil engineers — like George Washington and those to follow, who laid out our canals and highways and the railroads to open the West, and who quite often laid out our early towns on the way. He would be like the old time civil engineer-surveyor we knew when surveying was well taught in the universities, before the trend to steel structures and modern concrete design and construction caused the civil engineer's public and professional image to be that of a construction or structural man — which image is causing a tremendous image gap between most civil engineers and land surveyors today, and which gap needs bridging by education and qualification and by professional recognition of the future surveyor as such a professional.

Until that time comes, we must insist on special license for the surveyor of land-title or property lines or locations, issued by qualification of his philosophical knowledge of the legal line on top of any qualification by technical knowledge of the physical line. On this point may I emphasize that a lawyer without knowledge of survey technology would not qualify as a professional land surveyor. Neither would an engineer, fully equipped with the technology of the physical survey, unless he further qualified with the philosophy and experience concerned with the anomaly of the legal, property bound. Even now, in true sense of land surveyor licensure, both qualifying elements are essential.

To expand his business in the economic sense, tomorrow's professional surveyor, or today's must concede that license to do engineering as well as surveying is an advantage. In that same sense, the planning license in addition — should such license be required — would be a further advantage in achieving an equitable living standard in the future.

The future is a challenge, both to old surveyors and to the new. Both — by tradition and the very history of the past — are up to it.

I believe that our late President, John F. Kennedy, summed it up well in his never-to-be-forgotten words to ACSM's 1962 convention:

“Since the beginning of our Nation, those of your professional calling have contributed in full measure to its opening, growth, and development. Today, our horizons have extended beyond the limits of the imagination of our forebears. They who founded our Nation included in their numbers men whose professional efforts were devoted, as are yours, to the description in ever more precise terms of the world about us. Then, as now, this effort has made possible even fuller use of the God-given resources available to us. I know that you, with the inspiration which has characterized the work of your profession, are more than equal to the challenge of the future. Among the great contributions on which all of us can count is your continued and valued support of the educational development of those who will follow you. Your efforts in their behalf will help to assure a furtherance of achievements thus far realized.”

In the spirit of that challenge and in memory of the late President's inspirational words, the land surveyor of the future has watchwords to urge and spur him on to professional greatness.

Surveyor and the Law

From American Congress on Surveying and Mapping

EDUCATION REQUIREMENTS FOR LAND SURVEYORS

It is interesting to note the wide variation of the scope of practice permitted surveyors. A few States have no limitations whatsoever (no registration); a few permit the preparation of improvement plans for subdivisions; others permit staking of improvement plans prepared by engineers (but not preparation of plans); and others do not allow the surveyor to either prepare or stake improvement plans. A few years ago (1958) a committee of the Property Surveys Division of the American Congress on Surveying and Mapping presented what they believed to be a good model law. Indiana has recently enacted into law a statute that most nearly approaches the thinking of that committee. According to the Indiana act, the surveyor may prepare improvement plans within subdivisions; he may stake improvements and do other things (this is also true in Virginia and Maryland). Of course, with this privilege much higher knowledge requirements for registration are imposed. The law reads (in part) as follows (63-1518):

(d) The term "land surveyor", as used in this act, shall mean a person who is qualified to engage in the practice of land surveying, as herein defined, as attested by his registration as a land surveyor.

(e) The term "practice of land surveying," as used in this act, shall mean the establishment or reestablishment of corners, boundaries, and locations of lots, parcels, tracts or divisions of land, including distances, directions, and acreage, or fractional parts thereof, including, but not limited to, the correct determination and description of the same for any of the following purposes:

(1) To furnish a legal description of any land surveyed to be used in the preparation of deeds of conveyance;

(2) To furnish a legal description of any land surveyed to be used in the platting or subdividing of said land; or

(3) To determine the correct amount of acreage contained in any land surveyed;

(4) To furnish a topographic plat of a lot, parcel, tract or division of land.

(f) The term "board", as used in this act, shall mean the state board of registration for professional engineers and land surveyors.

(g) The term "approved engineering curriculum," shall mean an engineering curriculum of four years or more that has been approved by the board. In approving such engineering curriculum the board may take into consideration the standards of accreditation adopted by the Engineers' Council for Professional Development.

(h) The term "practice of land surveying" shall also include the preparation of a legal description of any tract of land, to be used in the preparation of deeds of conveyance except:

(1) When the description is the same as the one in the deed of conveyance to the current owner, or

(2) When bearings, distances, or measurements are not needed to properly describe the tract being conveyed.

(i) The term "practice of land surveying" as used in this act shall also include, for and within subdivisions being laid out or having been laid out by the land surveyor, the preparation and furnishing of plats, plans, and profiles for roads, storm drainage, sanitary sewer extensions, and the location of residences or dwellings where such work involves the use and application of standards prescribed by local, state, or federal authorities. This shall include the necessary staking and layout work to construct said roads, storm drainage, sanitary sewer extensions or location of residences or dwellings where the plans and profiles were prepared by or under the direction of a land surveyor as defined in this act. This shall not be construed to include the design and construction of sewage disposal stations, lift stations, commercial buildings, pumping stations or bridges or their equivalents.

(j) The term "practice of land surveying" as used in this act shall also include preliminary surveys for preparation of plans for engineering and building construction projects and the staking out of the same from plans prepared by a registered professional engineer or by a registered architect. This is not to be construed so as to permit the land surveyor to prepare the plans for the construction of engineering projects.

(k) The term "practice of land surveying" shall include all the engineering work incidental to cleaning out, or maintaining existing drainage ditches.

(b) As a professional land surveyor: (Requirements for, 63-1528)

(1) Graduation in an approved engineering curriculum of four (4) years or more which includes the fundamentals of land surveying, and a specific record of one (1) year or more of experience in land surveying work acquired subsequent to graduation, which experience indicates that the applicant is qualified to be placed in responsible charge of land surveying work requiring the exercise of judgement in the application of surveying sciences to the sound solution of land surveying problems, and the successful passing of an examination as provided for in section 14 of this act; or

(2) A specific record of five (5) years or more of civil engineering education and experience in land surveying work, which indicates that the applicant has acquired knowledge and skill and practical experience in land surveying work approximating that required for registration as a professional land surveyor under the provisions of subsection (b) (1) of this section; and the successful passing of an examination as provided for in section 14 of this act.

The key to the knowledge requirements for the land surveyor is then equivalent to that obtained by a person graduating from a four year civil engineering curriculum which includes the fundamentals of land surveying. This law places the responsibility of offering land surveying courses squarely in the lap of Indiana universities, and, in response to the law, Purdue University (Lafayette, Indiana) is now offering land surveying courses within the framework of civil engineering (also photogrammetry, geodesy, and other related courses). It is also offering extension courses to update the education of former graduates and those interested in land surveying subjects.

Surveyors, as a group, have been repeatedly commenting that the colleges should teach land surveying. Is the fault with the laws and not the colleges? If the only prerequisite to taking a land surveyors examination is a high school education or equivalent, why should the colleges teach land surveying? If surveyors want colleges in other States to offer land surveying courses, should not the registration laws be changed to require the equivalent of a college education? New York State, at the last legislative meeting, raised the requirements to college equivalent. Should not other States follow? What is your opinion?

— CURTIS M. BROWN

Plum-Bobs

From American Congress on Surveying and Mapping

CURTIS M. BROWN* — Methinks a hint of a dissatisfied reader emanated from Santa Ana, California, in the September 1963 issue of SURVEYING AND MAPPING. We must admit that the gentleman did get his message across skilfully. He objected without saying he objected. Such literary talent needs further development. Forwarded is a do-it-yourself kit composed of 50 sheets of blank paper and two pencils. I am sure there are others, besides me, that would like to hear further from him.

It is true that there are many technical articles in SURVEYING AND MAPPING, and I believe that the editors will readily admit it. But whose fault is it? Yours and mine. The editors can only publish articles that they receive; they do not write articles. All of us enjoy reading about tricky, new developments that simplify work and save time. The plumb-bob mentioned is a good one. But who sends the articles in? Nothing written—nothing published.

W. & L. E. Gurley did put out a notebook disclosing many novel “wrinkles,” and it was a success. Many would like to see “Surveyors Tricks” or “Computing Shortcuts” regularly published. Why don’t you start it going by jotting down ideas on your “do-it-yourself” kit?

EDITOR’S NOTE — We do not look with favor on copy (manuscript, if you will) supplied on blank (unruled) paper and written in pencil. Material sent in for publication should be typed (face and one carbon) if at all possible. Use wide margins, double space everything, and use only one side of each sheet. Paper size should be 8 x 10½ or 8½ x 11, and the face copy, at least, should be on heavy (20 lb.) white paper. By “wide margins” we mean at least 1 1/4 inches at both sides and the top. Bottom margin may be as lean as 3/4 inch without causing difficulty.

The pages of SURVEYING AND MAPPING are open to free and temperate discussion of all matters pertaining to the interests of the Congress. It is the purpose of this department to encourage comments on published material or the presentation of new ideas in an informal way.

— Editor

Random Line Tree

HENRY C. SCHWARTZ* — This letter is directed to “The Surveyor and the Law” department of SURVEYING AND MAPPING.

I am a licenced surveyor working for a large forest landowner. One of my principal duties is the retracement of section lines of the Public Land Survey in order to establish the Company’s boundaries. Most of the lands in question were originally surveyed around the time of the Civil War and values being what they were, retracements of these lines often raise interesting questions. One such question is as follows:

In retracing a section line in the interior of a township, there arose a problem regarding a Line Tree on an original random line. The original Field Notes (1865) state:

“E on rand. line bet. secs. 20 and 29.
Var. 17 degrees 27’ E
2.25 Brook 5 lks. wide runs S. Ascend.

24.52 Pitch Pine 30 in. dia.
 40.00 Set temp. ¼ sec. cor.
 80.20 Int. N-S line 33 lks. S of cor. secs.

20, 21, 28, 29 from which cor. 1 run S 89 degrees
 46' W on true line bet. 20-29. Var.
 17 degrees 27' E

40.10 Mark a Red Fir 50 in. dia.
 80.20 Cor secs. 19, 20, 29, 30".

In retracing the line both section corners and the quarter-corner were found. In addition, the "Pitch Pine 30 in. dia." was found bearing unmistakable hack marks similar to those on other Line Trees found elsewhere in the Township and made by the same man. One of the hacks was chopped out with an axe, and a ring count disclosed that it had been made plus or minus one year of 1865. From this and from the experience gained in retracing many miles of this man's work, I could only conclude that this was the tree called for on the random line in the original notes.

The problem then became whether or not to use this tree in establishing the latitude of the section line opposite this point. Stated in another way:

(1) Since according to the "General Instructions of 1855" which governed the original survey, "On trial, or random lines, the trees are not to be blazed. . .", I could ignore this "random Line Tree" and run the section line straight between section corner and quarter corner. The section line would then pass 40 lks. North of this "random Line Tree." Or

(2) Since the tree checked within a few links of its record distance from the section corner, and since I was sure it was the tree mentioned in the original notes, even though section line could be done best by proportion from the 1865 Field Notes. In other words:

$$\frac{\text{Original distance along random section line (80.20)}}{\text{Offset North to sec. cor. at end of random line (0.33)}} = \frac{\text{Original distance to "random Line Tree" (24.52)}}{\text{Offset North from "random Line Tree" to true sec. line (X)}}$$

and, therefore, the true section line should be 10 lks. North of this "random Line Tree."

NOTE that the discrepancy in direction caused by making an angle point on the section line opposite this tree is well within the average accuracy of other lines run by the original surveyor in 1865.

I would certainly appreciate any comments you or some other member of the Congress would care to make on this problem. If the second solution is thought correct, would it also be correct to use record distance to this "random Line Tree" in proportioning and setting the West one-sixteenth corner between secs. 20 and 29?

This Should Interest You -- Does It?

Canadian Municipal Utilities — Vol 12, No. 2 Issue 1964

To the creaking of long-rusted armour and the strains of distant bugles, the elected representatives of Canada — responsible for the administration of the country's business and the well-being of the people — dust off their cross-bows in an effort to decide who elected them and under what banner they should serve.

It must be some fashion of tribute to the tranquility of our economy and in token of the prosperity of our age, that the two most vital issues under consideration by the senior administrative body are Bi-culturalism and "The Flag".

If one resists the temptation during a television programme to complete those odd jobs, on the hour; ten past; twenty past; half past; etc., and stays to watch, it becomes incongruous to have an earnest discussion about our cultural differences interrupted by an appeal to help feed the starving peoples of the world.

Perhaps it is this ability to devote such time and energy to what — in light of world events — must seem trivial matters to anyone outside of the arena, that has brought Canada to its present stage of material wealth and well-being. Or should the discussions be reflected against some recent, equally earnest debates about foreign ownership and tariffs. One may be the outcome of the other.

No doubt these deliberations and soul-searchings will end with us all having a new identity and a new symbol to show the world. Do any of us expect though, that overnight the unemployed will find jobs, the slums turn into sub-divisions, the problems that beset every community; every municipality; and every CANADIAN; vanish into a bi-lingual Utopia?

Ostensibly, it would be hard to relate these deliberations with municipal engineering. But while the Government and the country are taking sides; and changing sides; and not taking sides, the level of our Great Lakes is still falling; Prairie communities are forecasting drought for 64; the St. Lawrence is still an open sewer for most of its length; and you can still break a leg or a car spring on roads in almost any municipality in the land.

In this very material world, it should be a source of spiritual solace to realize that so much time and so much effort can be spent on matters so cultural and so traditional. We look forward with ill-concealed enthusiasm to what must surely be the next red-hot issue on Parliament Hill — one that could so easily topple a government.

What shade of red or green is the maple leaf to be?

**Association of
Provincial Land Surveyors of
Nova Scotia**

14th ANNUAL MEETING

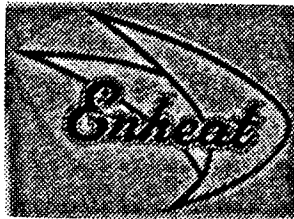
Date: NOVEMBER 6th and 7th, 1964

LOCATION — THE CITADEL INN.

BRUNSWICK STREET, HALIFAX, NOVA SCOTIA

PLAN NOW SURVEYORS AND BRING YOUR SURVEYORETTE.

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



SURVEY MARKER



A newly developed survey marker consisting of a corrosion resistant aluminum head threaded to a sharpened carbon steel rod and ribbed for better holding characteristics.

This marker has won approval from professional Land Surveyors in all the Maritime Provinces and is now in common use in this area.

Special heads, bearing the initials or registry number of the individual may be supplied, but time must be allowed for manufacture.

With "ENHEAT SURVEYORS' MARKERS" on the survey, it is no longer necessary to "begin at an old fence post" or such perishable reference point.

Another New Service From
ENHEAT STEEL DIVISION

Manufactured By

Enamel & Heating Products Limited

AMHERST, N. S.

MEASURE MILES WITH MILLIMETER PRECISION



AGA GEODIMETER®

ACCURATE ELECTRONIC LIGHT SURVEYING

Save time and money, and ensure complete accuracy of measurement with the Aga Geodimeter.

Depending on visibility, the Aga Geodimeter will precisely measure from 50 feet to more than 2 miles in daylight, and up to 15 miles at night.

For any geodetic distance measuring, including rough terrain with height variations, over water, through built-up areas and tunnels . . . in fact, wherever there is a free line of sight.

Write or call for a demonstration or further information.

AGA OF CANADA LIMITED

P.O. Box 550, 273 MacKenzie Ave., Ajax, Ont.
Toronto 924-0759
Telephone Ajax 942-2841

In MONTREAL, write P.O. Box 1764, Station "B" or telephone 482-6551

Reprinted from The Engineering Journal. February 1964 issue

Surveying and Drafting
Instruments
White & Blueprinting Machines
Instruments (1951)
LIMITED
4646 Decarie Blvd., Montreal, P.Q.
Montreal — Ottawa — Toronto
— Regina

Kelvin Hughes Division
21 Upper Water St. Halifax, N. S.
Cables: Kebab-Halifax
Telephone 423-6139
Reproduction Machines
Kern Surveying Instruments
Engineering Supplies

For Particulars write or call:
Norman Wade
COMPANY LIMITED
Vancouver — Toronto — Montreal
Ottawa — Quebec City — Saint
John — 213 Hollis St., Halifax,
N. S.
Exclusive Maritime Distributors
**Wild Theodolites
and Levels**
For any requirements in:
**Reproduction, Drafting, Surveying
and Engineering Equipment and
Supplies**

BETTER MEASURE WITH
LUFKIN
TAPES-RULES-PRECISION TOOLS
Send For Free Catalog
THE **LUFKIN RULE CO. OF CANADA, LTD.**
BARRIE, ONT.

A. E. SIMPSON LTD.



Aerial Photography, for all purposes. Photographic Mosaics for detailed "surface" studies. Accurate and economical planimetric or contoured maps or plans, at all scales, to meet your layout, planning, location or other engineering needs.
1810 Laval Road Montreal 8, Que.

**EASTWARD
INDUSTRIES LTD.**
exclusive representatives for the
Keuffel & Esser Company of
Canada
K & E Transits, Levels, Rods,
etc., in stock.
293 Young Street Halifax, N.S.

The Hughes Owens
COMPANY LIMITED
A complete line of Supplies for
the Engineer, Surveyor and
Draftsman
Ozalid and Blueprinting
165-169 Hollis St., Halifax

**Nova Scotia
Land Survey Institute**
Operated by
Vocational
Education Division
Department of Education
Province of Nova Scotia
The Two Year Course
Prepares One To Sit For the
Provincial Land Surveyor's
Certificate
Full particulars from:
The Principal
Nova Scotia Land Survey
Institute
Lawrencetown, Nova Scotia

**ATLANTIC AIR SURVEY
(1963) LIMITED**



Serving Surveyors and
Engineers in the Atlantic
Provinces with better service
at more economical cost.

Phone 469-7901 P. O. Box 187
Dartmouth, N. S.