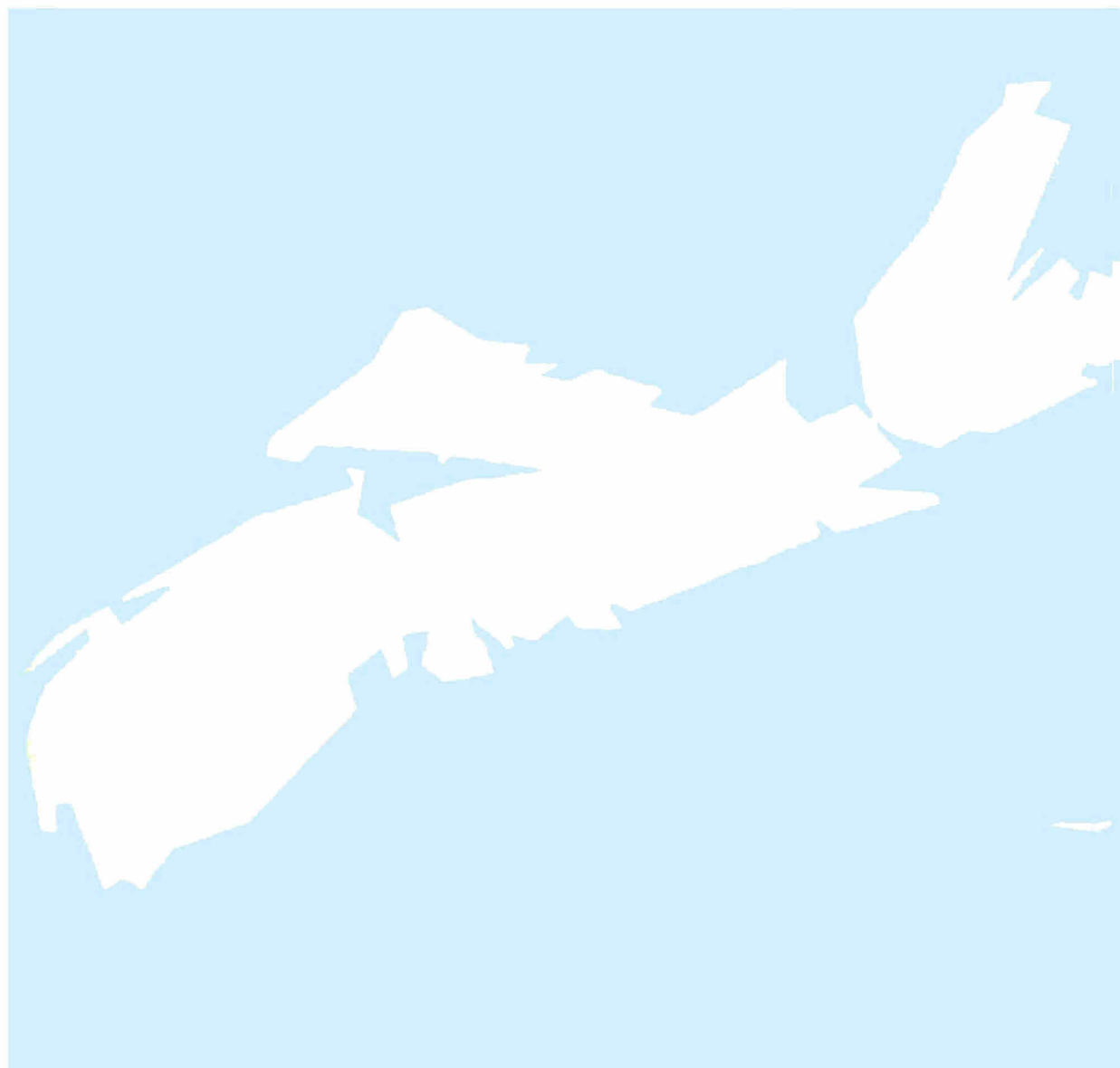
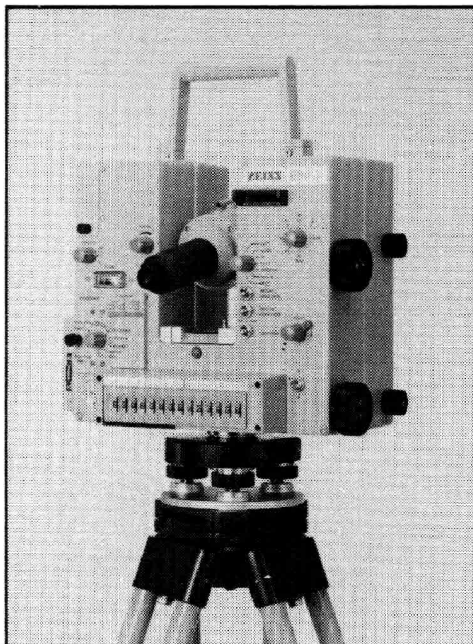


The NOVA SCOTIAN SURVEYOR



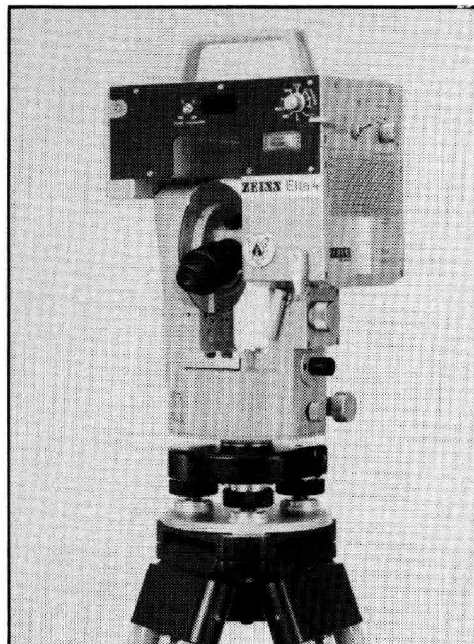
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**** C O N T E N T S ****

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

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** THE PRESIDENT'S PAGE **

The year is passing quickly and if the second half compares with the first, it will have been a busy year, at least from the point of view of Association activities.

REINSTATEMENT OF OUR REGULATIONS WITH RESPECT TO QUALIFICATION

Meetings have been held and are continuing with representatives of Nova Scotia Land Survey Institute, members from Atlantic Provinces Board of Examiners for Land Surveyors and government ministers. We believe that progress has been made and we are hopeful that this matter will be favourably concluded in the not too distant future.

CODE OF ETHICS, MOONLIGHTING, LIFE MEMBERSHIP

Following careful consideration of your comments through zone meeting reports (and some letters) on these matters, your Executive and Council have taken the following actions:

- a) Have formed a special committee to prepare a draft code of ethics for consideration of Council in May.
- b) Have approved definitions:
 - i. Moonlighting
 - 8.4.1. Moonlighting. "A N.S.L.S. who provides survey services to the public for gain on a part-time basis, usually at times other than normal business hours, is deemed to be a moonlighter."
 - ii. Full-Time Private Practice
 - 9.4.2. Full-time Private Practice. "A N.S.L.S. who provides survey services to the public for gain, ordinarily during normal business hours, is deemed to be in full-time private practice."
- c) Have asked Walter Rayworth to draft a statement of policy on moonlighting for consideration of Council.
- d) Have asked the By-laws Committee to prepare a special comprehensive form for the use of a zone when considering a member for life membership.

SUBDIVISION DEVELOPMENT

A special committee consisting of three surveyors and three members of the Engineers' Association, has been formed to consider matters which touch on the responsibilities of land surveyors and of professional engineers. Later this year we expect to have a report from this committee which is chaired by Roy Dunbrack.

CONTINUING EDUCATION

Based on the recommendations of the Regulations Interpretation Committee, the present activities of the Complaints Committee, and the Survey Standards Committee, your Executive has recognized the need for assistance to members in the implementation of our regulations. Plans are being formulated to conduct a one-day workshop to deal with this very important matter later this year. In the meantime, please note the details of questions and replies published under annex "D" of the last issue of the Nova Scotian Surveyor.

In conjunction with our 1980 Annual Meeting, a seminar will be held on Thursday, November 13th, dealing with the theme of the Annual Meeting which is "THE SURVEYOR -- A MEMBER OF THE LAND MANAGEMENT TEAM". Papers will be given by a surveyor and by other professionals who are involved in land management. Following the Annual Meeting during the winter months, plans are now underway to conduct two two-day workshops dealing with "Subdivision Design and Good Planning Principles". More on this subject will follow from the Continuing Education Committee.

ASSOCIATION OF SURVEY TECHNICIANS AND TECHNOLOGISTS OF NOVA SCOTIA

After having been asked to present a talk at the Annual Meeting of the Association of Survey Technicians and Technologists of Nova Scotia, on the relationship between their Society and our Association, and after completing my homework on this subject and preparing a talk, I found that except for a handful of our members (John MacInnis and others) we as individuals and collectively as an Association, have fallen short of our responsibility in assisting the Association of Survey Technicians and Technologists of Nova Scotia.

The vast majority of surveyors, including myself, do not at this time have members of the Association of Survey Technicians and Technologists of Nova Scotia on their staff. This gap, or lack of interest, exists for various reasons, all of which are wrong and weak. Space will not permit me to expand here, but your Executive will be making recommendations to Council, which if implemented, will cause our associations and members to become more aware of each others concerns and interests.

THE PRESIDENT'S TRAVELS

I attended the 27th Annual Meeting of the Association of New Brunswick Land Surveyors during January -- and the 88th Annual Meeting of the Association of Ontario Land Surveyors during February.

The New Brunswick members approved the appointment of a full-time executive director for a one-year trial period. Annual fees were increased from \$160.00 to \$200.00.

The Ontario members increased their annual fees from \$250.00 to \$290.00, and passed a by-law which makes professional liability insurance mandatory for all Ontario Land Surveyors. Because this subject is presently on the minds of many of our members, I will conclude this report by providing the words of the by-law and the resolution approved by the Ontario Council.

A. E. Wallace, President

** PROFESSIONAL LIABILITY INSURANCE BY-LAW **
(Association of Ontario Land Surveyors)

WHEREAS under and pursuant to Section 11 (1)(k) of The Surveyors Act, R.S.O. 1970, Chapter 452, Council may pass by-laws fixing and providing for levying and collecting or remitting annual and other fees, levies and assessments;

AND WHEREAS under and pursuant to Section 11 (1)(g) of the said Act, Council may pass by-laws respecting all other things that are considered necessary or convenient for the attainment of the objects of the Association and the efficient conduct of its business;

AND WHEREAS Council considers it essential to the public interest that certain of its members be covered by mandatory professional liability insurance as may be required by Council from time to time;

NOW THEREFORE BE IT AND IT IS HEREBY ENACTED THAT:

The Council of the Association may make arrangements for its members respecting indemnity for mandatory professional liability, and in connection therewith, may pass resolutions -

- a) prescribing fees to be paid by members or any class thereof;
- b) exempting members or any class thereof from all or any part of any such levy;
- c) undertaking any and all acts as may be necessary to implement the above.

In pursuance of the foregoing the Ontario Council approved the following resolution:

1. Professional Liability Insurance be mandatory for all Ontario Land Surveyors.
2. Council may allow, upon application, exemptions to those members not engaged in the private practice of surveying in Ontario on either a full time or part time basis. The decision of Council shall be final.
3. Any member who has been exempted from obtaining liability insurance shall obtain Professional Liability Insurance before engaging in private practice surveying.
4. There shall be a master policy held by the Association with individual certificates issued to each insured.
5. The minimum insurance for each insured shall be \$500,000 each and every claim, subject to an annual aggregate limit of \$1,000,000 each policy year.
6. Surveyors who obtain Professional Liability Insurance in lieu of the Master Policy must provide the Association with a copy of their policy, which must include a 10 day cancellation notice to the Association.
7. Each insured is responsible for notifying the Association of any change to their certificates.
8. The Professional Liability Program to become effective July 1, 1980. All members who have not received exemption must have subscribed to the master policy or have provided a copy of their policy as outlined in (6) above by July 1, 1980.
9. Failure to comply with this resolution shall constitute grounds for suspension under Section 20, Subsection (2) of the Surveyors Act.

** CIS NEWSLETTER **

Vol. 3, No. 2, November 1979

General news is for those who have heard the news when it was "hot" but want to see it printed.

The Association of Manitoba Land Surveyors held its 100th Annual Meeting May 14-18, 1980. The first organizational meeting was held six years prior in 1874 when it was resolved, "that it was advisable that the Land Surveyors resident in Manitoba and the North West Territories form themselves into an Association for the better organization of the profession and that the Association be composed of Deputy Surveyors employed under instructions from the Dominion Land Office and duly qualified Land Surveyors from any of the provinces of the Dominion". It has been suggested that no action was taken for six years due to the opposition of the federal government of the time.

While the AMLS does claim to be the first provincial land survey association in Canada, it makes no such claim for the remainder of North America or, indeed, the Western Hemisphere. If there are any incorporated professional associations of land surveyors older than 100 years the CIS NEWSLETTER would like to hear about them before declaring the AMLS the grandfather of them all.

A recent visitor to the CIS office was Reuben Deubry of the Central Housing Authority of Antigua. Reuben, a commissioned land surveyor, is a graduate of the Nova Scotia Land Survey Institute.

Robin Steeves of New Brunswick has joined the staff of the University of New Brunswick.

Atlantic Air Surveys has announced the appointment of Dave Coleman as, General Manager and, Len Kincaid as Product Manager.

Neil McNaughton, formerly with the Land Registration and Information Service in Fredericton has assumed the duties as Director of Surveys in Newfoundland.

Bob Aylward, Past President of the Association of Newfoundland Land Surveyors was a successful Conservative party candidate for the riding of Kilbridge in the provincial election. Alec McEwen, International Boundary Commissioner for Canada, articulated under Bob for his commission as a Newfoundland Land Surveyor.









H. B. (Bert) Robertson of Halifax has been appointed Senior Director, Land Services Branch, Department of Lands & Forests for Nova Scotia and Keith AuCoin (Provincial CIS Councillor for N. S.) has been appointed Director of Surveys for the same department.



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** THE INTERNATIONAL BOUNDARY **

UNITED STATES AND CANADA

*Proceedings of the American Congress on
Surveying and Mapping - Fall Technical Meeting
October 15-20, 1978
Albuquerque, New Mexico*

by Alec McEwen
*International Boundary Commission, Canadian Section
615 Booth Street, Ottawa, Canada*

Alec McEwen is the International Boundary Commissioner for Canada. He qualified as an Ontario Land Surveyor in 1952 and as a Dominion Land Surveyor in 1953. In addition to a variety of survey practice in Canada, Mr. McEwen has worked on overseas assignments in Malaysia, Seychelles and Tanzania, under Canadian and United Nations aid programs. Prior to taking up his present appointment, he was Director of Lands and Surveys for the Province of Newfoundland.

Mr. McEwen holds the degrees of bachelor of laws (LL.B.) from the University of London, and master of laws (LL.M.) from the University of East Africa. He is the author of a number of reports and articles, and has written a book on international boundaries.

ABSTRACT

A discussion of the structure and functions of the International Boundary Commission, with examples of the joint exercise of regulatory powers relating to transboundary construction. Problems concerning historical boundary anomalies, ambiguous boundary descriptions, river boundaries, statutory protection of boundary and reference monuments, and boundary vista maintenance are also considered.

THE INTERNATIONAL BOUNDARY COMMISSION

It seems to come as a surprise to some people to hear that there exists a permanent international organization whose sole concern is the boundary between the United States and Canada. A typical questioner wants to know what useful purpose can be served by such an organization, seeing that the territorial controversies between the two countries were all settled from coast to coast by the early years of this century. Even those who recognize the need for a permanent body to maintain the physical boundary, tend to regard its present work as restricted to routine operations such as monument repair and vista clearing. Because some of the other duties and concerns of the International Boundary Commission may be less obvious, an attempt is made to deal with a few of them in this short paper.

On its journey from the Atlantic to the Pacific and the Arctic oceans, the 5,526-mile boundary consists of a series of segments ranging in length from a course of only 23.5 inches in the Maine-Quebec highlands to a meridional line of 647 miles on the Alaska-Yukon boundary. This long and remarkable frontier, embracing almost every kind of geographical and topographical feature, is the result of various treaties, conventions, and other international arrangements involving the United States and Canada during the period from 1783 to 1925. Agreement as to the final location of the different sections of the boundary was followed by the establishment of the lines on the ground, and for this purpose *ad hoc* commissions, comprising one or more members from each country, were appointed from time to time. The first such international body arose from Jay's Treaty of 1794 which made provision for three Commissioners to determine the true identity of the river known as the St. Croix, since its description in contemporary maps and texts was vague and uncertain.

The International Boundary Commission, as presently constituted, finds its legal origin in the Treaty of Washington, 1908, which provided for two Commissioners,

one representing each country, to jointly complete the survey work and to furnish official maps showing the boundary in its correct geographical position. Some minor adjustments to the line were made by treaty in 1925, at which time the Commission was placed on a permanent footing and was charged, among other matters, with the power and responsibility to maintain an effective international boundary, and to determine the location of any point of the line which may become necessary in the settlement of any question arising between the two governments. The specific powers and duties of the Commissioners are set out in Article IV of the 1925 Treaty.

The Commission's offices are located respectively in Washington, D. C. and Ottawa, and each Commissioner has his own staff, equipment and budget. All surveys are performed by permanent employees, assisted by casual help, and field operations are planned by the Commissioners and their senior engineers at joint meetings held at least twice a year. It is a measure of the confidence and trust that exists between the United States and the Canadian sections of the Commission that a field party of one country works on both sides of the line in the particular part of the boundary to which it is assigned, without the need being felt for supervision or scrutiny by the other section. By arrangement with national customs authorities, the staff and their assistants are allowed to pass freely across the border with their vehicles and equipment during the course of boundary survey or inspection. The rights accorded the Commissioners and staff in the performance of their field duties represent an unusual example of the reciprocal granting of extraterritorial power to foreign nationals, in the exercise of which the utmost tact and integrity is required to avoid any action that might injure the sensitivities of property owners whose lands are entered upon or crossed during survey and other work.

The work of the Commissioners may be summarized as (1) regulatory (2) advisory, and (3) operation and maintenance. They report respectively to the Secretary of State for the United States, and the Secretary of State for External Affairs for Canada. An annual joint report, describing the activities of the Commission during the previous calendar year is submitted to the governments of the two countries. The Commissioners also undertake a joint annual inspection of field parties working in various sections of the boundary.

DEMARCATIION

The maintenance of an effective boundary requires that it be marked in a permanent and unmistakable manner. Where the line passes through bodies of water, such as the Great Lakes or the St. Lawrence River, it is referenced by monuments on the shores, and its course is also marked on the various international bridges and tunnels. On the Pacific Coast a series of lighted range towers has been established by the Commission to mark the 49th parallel across Boundary Bay and Point Roberts into the Strait of Georgia. In forested areas the boundary is further indicated by a vista that is cleared to a width sufficient to give a 20-foot sky line. This makes the boundary conspicuous from the air, and it is also an aid to government officials of both countries in law enforcement. Several types of monument, made of concrete, granite, cast iron, aluminum bronze, stainless steel, and other material, are used to mark the line, and each is placed so that it is visible along the boundary from its nearest neighbour. Approximately 8,000 monuments and reference marks, and 1,000 control stations, are used to define the boundary, and these points are all mathematically coordinated with and adjusted to the continental geodetic network.

The principle that original monuments govern the location of a line, regardless of its theoretical position, extends also to the international boundary. The treaties of 1908 and 1925 confirm that the courses as defined and laid down on the ground by the Commission shall be taken and deemed to be the boundary between the United States and Canada. Because of limitations of the then available technology, and also the inevitable errors resulting from such causes as the adoption of astronomic positions and the effect of gravity anomalies, the original boundary demarcation does not everywhere coincide with its intended location. For example, the monuments at the western end of the 49th parallel were placed about 800 feet too far north, and might thus appear to represent an encroachment on Canadian territory. As this section of the line proceeds to its eastern extremity, however, the positions of many of the

monuments are now found to lie south of the true parallel. Similarly, the monuments placed on the Alaska-Yukon boundary are all too far east of the 141st meridian which they were intended to mark. Yet neither country has significantly gained or lost ground because of imperfect demarcation. The acceptance of the line as originally marked, notwithstanding its theoretical discrepancies, is a practical and commonsense approach which ensures certainty of boundary location, and avoids the positional alterations and possible controversies that might otherwise arise from periodic network adjustment and datum redefinition.

Statutory protection of the boundary, reference and control monuments that mark or assist in the determination of the line is provided by Canadian legislation. Section 7 of the International Boundary Commission Act, R.S.C. 1970, c. 1-19 states:

"7. Except with the permission of the Commission, no person shall

- (a) pull down, deface, alter or remove a boundary monument erected or maintained by the Commission; or
- (b) have a boundary monument or any portion thereof in his possession or custody."

Section 8 provides that a person who has committed an offence under the Act is liable to a fine of \$500 and/or imprisonment for six months. Unlike the provisions of some other legislation, for example Section 399 of the Canadian Criminal Code, the International Boundary Commission Act does not appear to require the unauthorized removal or defacement to be a wilful act in order to constitute a punishable offence. If this is a correct interpretation, then the legal protection extends not only to instances where monuments are deliberately disturbed but also to the usual situation where a defendant admits having caused damage but pleads that it was accidental and not intentional.

Over 2,000 miles of the boundary run through water, and in the case of a river the line was originally intended to pass along the middle of the stream. In every such situation the direction of each course of the river boundary is mathematically determined and, in most instances, is related to permanent reference marks. The line remains in its position, regardless of any alteration to the bed of the river. This may be contrasted with the normal rule in municipal law, where riparian boundaries shift with the natural and imperceptible movement of the water. On the other hand, the retention of a fixed line in circumstances where a river substantially changes its course by natural water action means that the owner of a farm abutting an international boundary river may enter, perhaps unknowingly, the territory of another country, and the property of another person, if for example he makes use of his livestock or cuts hay on the exposed land. A good illustration is Halls Stream on the Quebec-New Hampshire boundary where the line has been fixed in the position that it occupied at the time of the Webster-Ashburton Treaty, 1842. Since that date certain stretches of the waterway have changed their position significantly and, in the absence of permanent reference marks in this area, it is difficult for a layman to tell exactly where the boundary is situated. Two unauthorized, and intentional, diversions of the waters of Halls Stream, created by neighbouring proprietors, were investigated by the Commission in 1977.

An interesting attempt to apply common law principles to international boundary water was made in Re Village of Fort Erie and Buffalo and Fort Erie Bridge Co., (1928) 1 D.L.K. 723. The municipality sought to impose taxes on the company that owned the Peace Bridge which crosses the Niagara River, and argued that its territory extended to the middle of the river under the doctrine of ad medium filum aquae. In rejecting this contention, the court held that even if the common law presumption could ever apply to any international waters it did not extend to the Niagara River because the boundary there had been permanently fixed by the Commissioners, and it could not be said that at any point the international line coincided with the middle thread.

VISTA REGULATION

For the further protection of the boundary and its vista, the United States and Canada have set apart as a public reservation certain lands immediately adjacent to the line. By Presidential proclamations in 1908 and 1912, a strip of land 60 feet wide was reserved for this purpose. The governments of Canada and of each of the border provinces have also officially set aside a similar reservation. It will be evident that these actions took effect only where public lands were available when the respective orders were made, which means that lands already alienated at that time are not affected by this type of reservation.

The vista itself is subject to the provisions of the International Boundary Commission Act, Section 3 of which empowers the Commission, inter alia, to clear from the land of any person such trees and underbrush as it deems necessary to maintain a vista ten feet in width for the boundary. Section 4 provides that any unauthorized construction which has taken place in the ten-foot strip since July 6, 1960 may be removed by the Commission at the owner's expense. Regulation of other construction is dealt with by Section 5 which states that except with the permission of the Commission no person shall construct any work within ten feet of the boundary, or enlarge any work that existed there on July 6, 1960, the date on which the statute came into force.

As a result of treaty and statute, the Commission is able to keep the vista clear not only of trees and other natural growth, but also of undesirable man-made features such as billboards and barbed wire fences. In the eastern part of the border area there exist a number of line houses, that is to say, buildings which straddle the boundary or lie within ten feet of it. One well-known example is the Haskell Opera House, opened in 1904, which lies across the boundary between Derby Line, Vermont and Rock Island, Quebec, in such a way that the audience sits in the United States and watches a performance on a stage in Canada. Although line houses are seldom found along other parts of the border, it is appropriate to mention an old stone storehouse, built by U.S. military engineers in 1896, which sits on the boundary between Hyder, Alaska and Stewart, B.C. This small but historic building, one of four constructed at the same time in different parts of the then disputed Portland Canal area of the Alaska Panhandle, was the scene of a Bicentennial ceremony held on July 4, 1976 and attended by representatives of both countries.

Applications to alter or enlarge boundary structures, under Section 5 of the Act, are often dealt with by the Commissioners who, after appropriate consideration, issue a joint decision in writing. Typical requests are for the installation of water and sewer facilities, and these are usually acceded to as a matter of course. Other applications may come from utility companies wishing to construct transmission or pipe lines above or below ground, and here also there is usually no objection by the Commissioners, provided the proposed construction will not obstruct the boundary line or cause damage to monuments. The Commissioners recently approved an application for the undertaking of certain improvements to the historic house situated on Lake Champlain at the northwest corner of Vermont. Applications to erect fences along the boundary are not normally accepted, though in very special circumstances, permission may be given to place a fence a few feet to one side of the line, provided it does not obstruct the boundary or cause disturbance to monuments. On the other hand, requests to use the vista for convenient but non-essential purposes, such as a landing strip for small aircraft or as a logging road, are unlikely to be acceptable.

BOUNDARY ANOMALIES AND AMBIGUOUS DESCRIPTIONS

In committing to the ground a boundary whose position had already been negotiated through diplomacy and settled by treaty, the early Commissioners were given little or no opportunity to exercise independent judgment, even where this would have avoided anomalous consequences. Two noteworthy instances of absurd territorial results arising from literal adherence to the terms of a treaty are the landlocked portions of the United States situated at Point Roberts, Washington and at the Lake of the Woods, Minnesota. On the Pacific Coast, approximately five square miles of peninsula in the State of Washington are cut off by the 49th parallel and made inaccessible by land except by way of Canada. A somewhat similar situation exists at the Lake of the

Woods, where ignorance by the negotiators of the Treaty of Paris, 1783, as to the respective locations of the Mississippi River and the 49th parallel, led to the adoption 59 years later of a meridional line extending southward from the "most North Western Point of the lake of the Woods" to the parallel. Although a minor adjustment to the boundary was made in 1925, the effect of this ill-considered line was to place about 100 square miles of nearly uninhabited landlocked territory, consisting mainly of cedar swamp, inside the limits of Minnesota.

Uncertainty concerning the true location of the boundary led to the interesting case of Pettibone v. Cook County, (1941) 120 F. 2d 850, which involved the ownership of certain islands in Saganaga Lake, an international waterway lying between Minnesota and Ontario. In 1879 the United States filed an official plat showing the islands as part of Cook County, and a patent was subsequently issued to an American citizen who in turn deeded the property to third parties. Taxes on the islands were collected by the county from 1888 to 1934 when, following the completion of surveys by the International Boundary Commission, the filed plat was revised to show the islands as part of Canada. In a suit to recover taxes paid by themselves and their predecessors in title, the appellants contended that their cause of action accrued on May 31, 1939 when they first demanded the return of the payments. The Court held that the appellants had constructive notice of the Commission's report dated October 27, 1931 which showed the islands to be in Canada, and that the recovery of all payments made six years prior to May 31, 1939 was barred by the statute of limitations. With respect to taxes paid after May 31, 1933 the court ruled that such payment was voluntary, made under circumstances when the appellants were conclusively presumed at law to know the location of the boundary, and that they could not recover.

An illustration of a claim by a municipal corporation to the ownership of land situated outside national jurisdictional limits is provided by Town of Richford v. Di Paolo, (1961) C.S. 271. A public road that extends easterly from Richford through East Richford to Jay, all of which are communities in Vermont, crosses the boundary and for a distance of about 1,000 feet occupies a parcel of Canadian territory before returning south of the line. It is with respect to a portion of this parcel that the applicant municipality asserted title against the defendant, and at the same time sought to prohibit him from obstructing that part of the road.

Evidence was adduced to show that the road was public and had existed since time immemorial. But the court held that the portion of the road in Canada had always been under the jurisdiction of the Township of Sutton, Quebec. By Quebec law, such a road is imprescriptible, and the court rejected the assertion of ownership by the applicant who claimed title on the grounds of having exercised care and control over a piece of land that had been abandoned by its previous owners for sixty years or more.

Nor did the laws of Vermont permit a municipal corporation to build or maintain a public road outside the State. Although the road originally veered to the north into Canadian territory to avoid a ravine or gully, another possible reason for its presence in Canada was the uncertainty of the boundary at the time the road was opened. In dismissing the plaintiff's action, the court concluded that if there is a municipal authority which must respect the use to which the public has always made of the Canadian portion of the road, it is the Township of Sutton.

A current, and still unsolved, problem relates to uncertainty as to the exact location of two courses of the international boundary in Lake Ontario and Lake Erie. The boundary through the Great Lakes is defined in the Report of the International Waterways Commission, 1916, and is generally described as a series of straight lines, the intersections of which are called turning points. A complete metes and bounds description of these courses is declared to be the true location of the line, and it is with respect to two such courses that a possible ambiguity arises.

In Lake Ontario, two of the turning points lie on the same parallel of latitude, at a distance of about 95 miles apart. The course of this line is described as "due West" and both this direction and the stated distance are consistent with information shown on the accompanying charts which form part of the report. The question is how should the words "due West" be interpreted? In survey terminology, where

long lines are used and geographical positions are required to be precisely defined, the ordinary meaning of due West can only be a course following a parallel of latitude, which is necessarily a curved line. Had the intention been to employ a straight line as the location of the boundary between the two turning points, then this line would have to be described as a geodesic which is the shortest distance between the points and the azimuth of which differs significantly from a due West line. Definition by the geodesic, instead of by the parallel, means a territorial difference of over 17 square miles.

A similar situation occurs in Lake Erie with respect to a much shorter line, and here the difference of territory is only 37 acres. These two problems are still under discussion by the appropriate authorities.

CONCLUSION

The work of the International Boundary Commission has changed drastically since the agency was established by treaty seventy years ago. No longer is boundary-making the principal task at hand, and the Commission's role has evolved into that of a custodian and regulator of the boundary. More and more, the organization can be seen as the authoritative source of boundary information of every kind. Many requests are received by the Commission for positional data, the lack of which might otherwise lead to misunderstanding, controversy and perhaps litigation. Examples are inquiries from police, customs, other government officials, and land surveyors in private practice, for maps and documents showing the precise location of the boundary. The Commission is also a repository of manuscripts and documents that provide much useful source material to those engaged in historical and other studies. In this connection the official reports published by and available from the Commission, that deal with the eight geographical sections of the boundary, provide a wealth of illustrated text that is available to the researcher.

Perhaps the hypothetical questioner at the beginning of this paper could be asked what he believes the result would be of having no agency to take responsibility for the maintenance of the international boundary. Territorial limits that are well defined and well cared for are a peaceful contribution to the preservation of national sovereignty. It is no exaggeration to say that the activities of the International Boundary Commission can be likened to those of an insurance underwriter, for the consequences of their non-existence are not altogether unlike those of failing to keep up an essential insurance policy.

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** MEAN HIGH WATER - REVISITED **

J. F. DOIG

"The trouble with the future is that it usually arrives before we are ready for it."

J. H. O'Donnell, President
Canadian Institute of Surveying
1978-79

INTRODUCTION

This paper is a consequence of two articles on mean (or ordinary) high water which appeared in the October 1979 issue of The Nova Scotian Surveyor. It attempts to synthesize the two approaches into a unified whole which will be more useful than either one by itself.

It is possible to get a general idea of what each article had to say from this one without reading them in detail. Those particularly interested in the topic of mean high water will doubtless wish to read each article.

References cited in the earlier articles will not be repeated here, but any new reference will be listed at the end of this article. Detailed cross reference will not be made from this article to either of the others; it should be clear from the context which one is being referred to, and the reader will be left to identify further detail as it suits his particular purpose or desire.

DEFINITION OF MHW

The earlier articles attempted to define the line of mean high water; in so doing they varied considerably in their approach. The one dealt with the topic primarily from the point of *what* it was, while the other definition concentrated upon *how* it was found.

On reflection, despite the very divergent views expressed in the earlier articles, it seems that it should be possible to produce a definition which incorporates both approaches. This definition would embody not only *what* the line of mean high water is, but *how* it might be found.

The following would seem to do this:

"Ordinary or mean high water mark" means the line of medium high tide between the springs and the neaps. Frequently, this line is to be seen in the limit or edge of the water where land has been covered by water so long as to wrest it from vegetation or as to mark a distinct character upon the vegetation where it extends into the water or as to mark a distinct character upon the soil itself.

Superficially this appears to combine the two definitions which were separately advocated earlier. But it is not quite as simple as that. The operative word above is *frequently*. It leaves open the possibility that the actual location of the line of mean high water may neither be associated with where vegetation ceases nor with where vegetation changes character nor with any mark upon the soil of the shore itself.

ANALYSIS

This being the case it will be unsatisfactory to the extent that advocates of how the line is found on the ground are committed to the idea that all possible cases are covered either by the line where vegetation ceases or where vegetation changes character or where a line is marked on the soil itself.

In fact there are areas in which the action of the water is such as to place the line of vegetation well above the line of mean high water, where there is no vegetation of changing character in the vicinity of the line of mean high water and where the action of the water has made no distinct mark on the soil. At least two such areas are found along Annapolis County's shoreline on the Bay of Fundy. The one is Phinney Cove and the other is Keatings Sand Beach. In both areas the range of the tide is rather more than 20 feet in the vertical plane. At Phinney Cove much of the shore is exposed bedrock on which in the area of mean high water there is neither vegetation of any sort nor any mark on the rock itself. At Keatings Sand Beach (which is not sand but coarse gravel) high tides over the normal lunar monthly cycle will move a ridge of gravel up and down the foreshore over a considerable distance in the plane of the shore; but there is no vegetation in the vicinity of mean high water line anymore than there is a stable position to the line of gravel which marks successive tidal levels.

It is just this situation that sparked the article which criticized the definition suggesting that mean high water line could be found either through vegetation or from a mark impressed upon the soil. Such definition posed three possibilities: The line where land had been wrested from vegetation; the line where vegetation changed; the line marked upon the soil itself. If there is no vegetation in the area of high water mark and if there is no mark upon the soil, then such a definition throws mean high water line onto the line where vegetation ceases. There is no room for manoeuvre, there is no possibility allowed that other circumstances might be called up to resolve the question.

The whole point is that a definition must cover all possible outcomes if it is to be valid. As succeeding situations are examined, the definition must still apply if it really is an effective statement of the case. Quite simply, if a definition of the line of mean high water is to have any validity in Nova Scotia, it must cover all possible situations arising within the province. It may seem a special case is being pleaded here; indeed, this is quite true. When it comes to assessing the location of mean high water, each case is a special affair. Canadian courts take *Attorney General v. Chambers* as the guiding principle and then look at the locus in question to decide the specific location of the line.

So to the extent that a definition goes beyond a reiteration of the legal meaning and attempts to give guidance, it should clearly show the attempt at guidance and not attempt to lay such guidance down as absolute.

If the definition is otherwise, it will not stand up when a single counter example that does not fit is produced. It should be remembered that a million examples do not prove a theorem, but one counter example can destroy it.

PAST PRACTICE

The point has been made that the definition now in the regulations is acceptable and does work because it has been applied successfully in the past.

The preponderance of these surveys and the resultant plans were subjected to scrutiny, field inspection, and comparison with previous and subsequent documentation . . . and approving authorities never saw cause to challenge this component of any of these surveys.

However, a definition which has proved suitable in the past may have appeared this way for two reasons: first, it is a good definition which is applicable to a great many locations and circumstances. Had the locations of the line of mean high water established under that rule and shown on the various plans been challenged, the result in most cases would have been that the line had been located properly for all practical purposes anyone might have had in mind at the time. Second, the precise location of this line, as the border between private ownership and the Crown, has not been a topic burning concern; there have been fewer than a dozen court cases in Canada in the last hundred years which have had the question as their central issue. Few

surveyors have had to lose any sleep over how to locate the line and even fewer members of the general public have worried about the matter.

There is no essential reason why this situation could not change dramatically. The following examples are given which could well develop parallels in Nova Scotia:

- a. There were no problems in California till valuable oil deposits were found in or near the foreshore. (Borax Consolidated Ltd. v. Los Angeles 1935).
- b. There were no problems in the State of New York until a planning development permit was sought over vacant lands bordering on the foreshore. (Greulich 1978).
- c. There were no problems in Florida (where considerable research on the tidal behaviour is now going on) till real estate prices, a growing leisure population, and the affluent society combined to render tidelands exceedingly valuable in a place where the consequences of small differences in water height can be very significant.

OTHER DEFINITIONS

Existing definitions from other jurisdictions have been brought to notice and offered in support of the definition now in our regulations. Let us examine them.

Section 19, Chapter B2, *Manual of Instructions for the Survey of Canada Lands* reads:

The "bed" of a body of water has been defined as the land covered so long by water as to wrest it from vegetation or as to mark a distinct character upon the vegetation where it extends into the water or upon the soil itself.

Chapter B2 is a part of the "General Instructions for Survey". It is titled "Definitions", and of these it contains twenty-three. Twenty-two of the definitions (each is a Section) conform to one or the other of the following patterns.

- a. "CLS Act" means
- b. A "traverse" is

The "lone ranger" of the piece is Section 19: The "bed" of a body of water has been defined as

This is a very interesting situation. The definition does not say what, for the purposes of the Act, the "bed" is or what the word means. The definition simply offers the comment that someone, somewhere, has taken what follows to be the definition. Lest anyone think that this analysis is overly fussy please recall the general rule in writing deed descriptions: *Don't use synonyms*. If, for example, one starts things off by calling for "the sideline" of a highway as an adjoiner in the first three paragraphs, one must not use "the boundary" of the same highway in the other paragraphs if the same thing is being described. To employ synonyms leaves a clear opportunity for the reader to infer that a different thing is being dealt with. So when one departs from "is" and "means" to "has been defined as", the reader is entitled (indeed, perhaps obliged) to put a different interpretation on things.

What this boils down to in the final analysis is whether one would be prepared to offer this definition in support of one's actions or opinions before a court of law.

Now let us look at Section 20 of the *Manual of Instructions*:

The "ordinary high water mark" of a body of water is the limit or edge of its bed and in the case of non-tidal waters it may be called "the bank" or "the limit of the bank".

Since we are here concerned only with tidal waters, let us eliminate the latter part of the definition. Thus we have the statement:

The "ordinary high water mark" of a body of water is the limit or edge of its bed.

So Section 20 is dependent upon Section 19 and can have no more validity, authority or weight than has Section 19.

The other definition offered in support of the one in our regulations has its origins in the United States. It was prepared by a joint committee of ACSM and ASCE:

"'High Water Line' - the place on the bank or shore up to which the presence and action of water are so usual and long continued as to impress on the bed of the stream a character distinct from that of the bank with respect to vegetation and the nature of the soil. In tidal water, the high water line is, in strictness, the intersection of the plane of the mean high water with the shore. The high water line is the boundary line between the bed and the bank of a stream."

The definition consists of three sentences. The first refers to the bed of *the* stream, and the last refers to the bed of *a* stream. Streams are not normally tidal so we are left, for our purposes here, with:

In tidal water, the high water line is, in strictness, the intersection of the plane of the mean high water with the shore.

This sort of definition is of no immediate assistance when it comes to identifying the line of the ground. It might be noted in passing that the Supreme Court of New York didn't agree with the ACSM/ASCE definition in 1975. The court took a different approach and chose a line of vegetation.

SUMMARY

A definition of ordinary or mean high water is needed which will say what it is, how it may be found in most instances, and yet be general enough to allow the definition to cover every possible case.

The following is submitted as one which will meet these specifications:

"Ordinary or mean high water mark" means the line of medium high tide between the springs and the neaps. Frequently, this line is to be seen in the limit or edge of the water where land has been covered by water so long as to wrest it from vegetation or as to mark a distinct character upon the vegetation where it extends into the water or as to mark a distinct character upon the soil itself.

It might be noted that this definition is silent about how to identify spring and neap tides, but that is another question for another day. So also is an account of the search for the line of mean high water at Saint John, N. B., through the use of tide tables and a tide gauge. (*Irving Oil Ltd. v. Eastern Trust Co.* 1967).



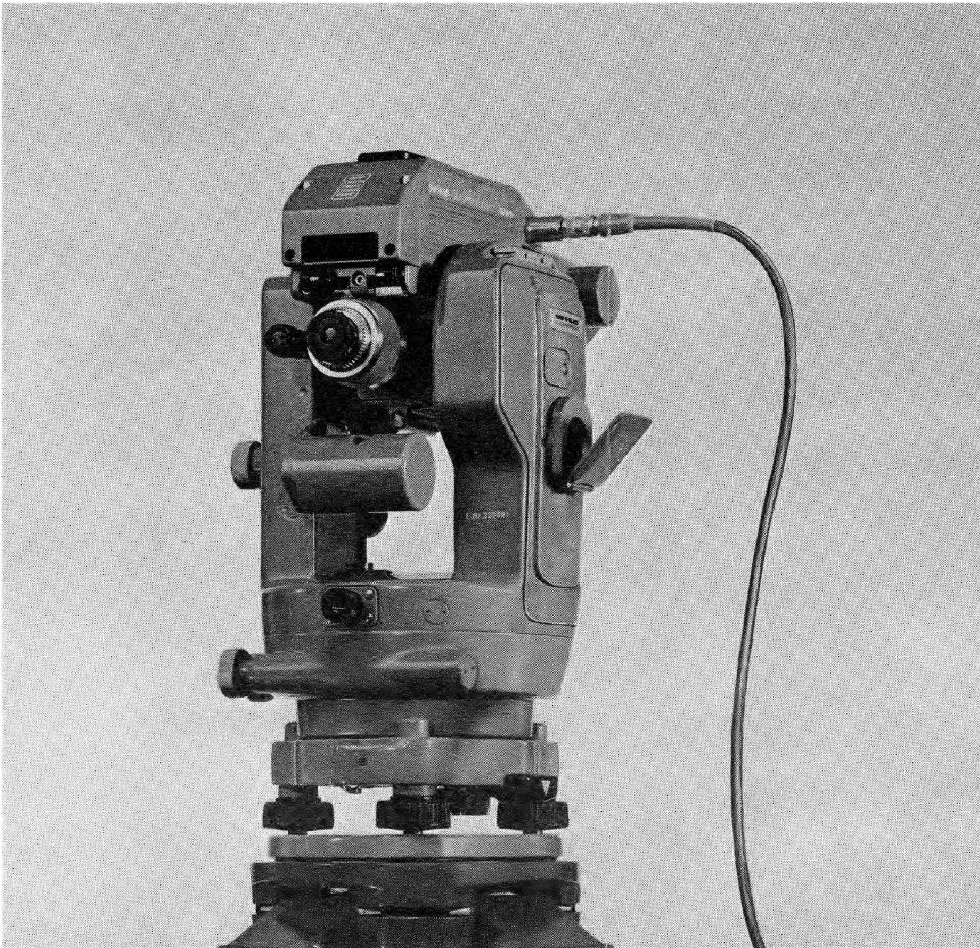
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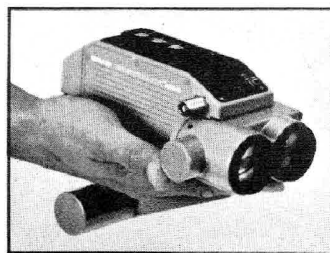
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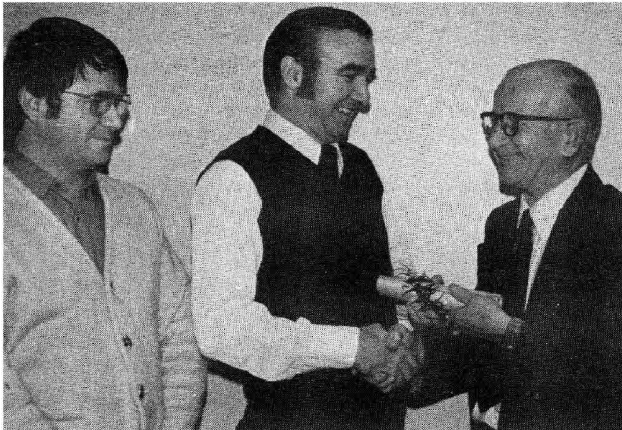
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* * * * *

**** LAND SURVEYOR HONORED ****



Lawrence S. Long (right) of 41 Old King's Road, Sydney, N. S., was voted a life member by the Association of Nova Scotia Land Surveyors. He is shown being presented with his life membership certified by Marcellin Chiasson (centre) Vice President of the Association while James Grant, a District Councillor looks on.

* * * * *

** UNRECORDED LAWS . . . **

Murphy's Law: Nothing is as easy as it looks; everything takes longer than you expect; and if anything can go wrong, it will and at the worst possible moment.

Weiler's Law: Nothing is impossible for the person who doesn't have to do it.

Finagle's Law: Once a job is fouled up, anything done to improve it makes it worse.

Chisolm's Law: Anytime things appear to be going better, you have overlooked something.

Donsen's Law: The specialist learns more and more about less and less until he knows everything about nothing, while the generalist learns less and less about more and more until he knows nothing about anything.

Gumperson's Law: The probability of anything happening is in inverse proportion to its desirability.

Douglass' Law: Clutter tends to expand to fill the space available for its retention.

Zommerman's Law: Regardless of whether a mission expands or contracts, administrative overhead continues to grow at a steady rate.

Man's Law: No matter what happens, there is always somebody who knew it would.

Gerhardt's Law: If you find something you like, buy a lifetime supply because they're going to stop making them.

Zall's Law: How long a minute is depends on which side of the bathroom door you are on.

The Legislative Paradox: People in groups tend to agree on courses of action which, as individuals, they know are stupid.

Dr. Levitan's Rule: If it smells bad or is sticky, it will eventually find its way onto your children or your shoes.

** UNREPORTED DECISIONS **

REAL PROPERTY

Reprinted from the August and October 1979 issues of Nova Scotia Law News with permission of the Nova Scotia Barristers' Society.

ADVERSE POSSESSION -

Leslie v. MacNearney et al., S. H. 19619, Morrison, J., May 7, 1979. S98/4

The defendants were granted a declaration that they had good title to an area of land containing a fish house and a wharf since their predecessors in title had acquired the land by adverse possession, which consisted of use of the land for fishing for a period in excess of 20 years.

EASEMENTS -

Hewey v. Lohnes, S. BW. 0252, Glube, J., May 17, 1979. S100/7

The plaintiff was granted a declaration that he was entitled to use a hauling road over the defendant's land as access to his own lands, since he and others had acquired a right-of-way over the hauling road by prescription, provided that he obtained the necessary permission to cross Crown land. He was awarded \$100 general damages for the two years during which he was prevented from using the road and it was ordered that each party should bear its own costs, since the matter should have been settled long before the defendant purchased the land.

BOUNDARY DISPUTE -

Meister v. Rafuse et al., S.C.A. 00171, Pace, J. A., May 11, 1979. S95/19

In a proceeding commenced under the Quieting Titles Act, it was held, on appeal, that

- (1) the trial judge had erred in not accepting the known location of a brook which affected the respondent's northern boundaries;
- (2) the respondents did not obtain constructive possession of the disputed area by occupying the land under colour of title since their document of title did not extend to the disputed area;
- (3) the respondents' acts of possession (very occasional cutting of wood) were not sufficient to satisfy the requirements of the Limitations of Actions Act.

The doctrine of colour of title and the requirements for adverse possession were discussed.

DECLARATION OF TITLE -

Atwell v. Atwell, S. K. 685, Glube, J., July 25, 1979. S103/8

Plaintiff claiming damages for trespass, loss of quiet enjoyment, and injunction restraining defendant from entering upon land -- successful defendant granted declaration that plaintiff had no proprietary interest in lands -- Crossland v. Dorey (1978), 27 N.S.R. (2d) 139 cited.

ADVERSE POSSESSION -

*DeAdder v. Northkent Developments Limited, S.C.A. 00421, MacKeigan, C.J.N.S., September 11, 1979

The Appeal Division dismissed the appeal from a decision of Morrison, J., dismissing the action for possessory title to land.

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OTHER PROPERTY DECISIONS -

*Hatt et al. v. Zinck, S.C.A. 00353, Cooper, J. A., August 13, 1979. S102/9

A determination of title under the Quieting Titles Act was confirmed on appeal.

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** LETTER TO THE EDITOR **

Dear Editor:

At the Annual Meeting of our Association (The Association of Nova Scotia Land Surveyors) held recently in Halifax, we heard many people including Professor Arthur Chisholm speak about the need for our members to improve their ability to communicate, to improve in public relations, to get involved, to improve themselves to be better citizens.

There is an organization which can help!!! It is Toastmasters International. Toastmasters International is a non-profit, non-partisan, educational organization of Toastmaster Clubs throughout the world.

SELF-IMPROVEMENT - That is the goal (and other than to be at least 18 years of age, the only requirement) of each Toastmaster. The clubs meet regularly providing their members with a professionally designed program, designed to improve the communicating abilities of each member and develop their leadership abilities. The club meetings are conducted by the members themselves in an atmosphere of friendliness and fun. Members have the opportunity to deliver impromptu talks, prepare speeches, and to learn proper parliamentary procedure.

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If you think this is a sales pitch. You're right. I feel so many of our membership (N.S.L.S.) could benefit from this organization and yet, I believe there are only 3 other surveyors in this organization other than myself. As you no doubt can see, I am a relatively new member of this organization, however, I can see the many benefits which can be derived from belonging to this group.

I am sure any of the 10 Nova Scotia clubs would welcome your visit at any time. Don't wait for an invitation. For information of clubs in your area please contact the undersigned.

The Toastmaster Motto - "Listen, Think, and Speak".

Yours truly,

Marcellin S. Chiasson, N.S.L.S.
President, Ship Harbour Toastmasters Club
P. O. Box 69
Port Hawkesbury, N. S.

** STATUS OF OLD ROADS **

*(The following information was contributed by
Forbes Thompson - he found it in his Highway file
and suggested it is still timely)*

From time to time enquiries are received concerning the status of old roadways and the rights of the public with respect to them even though they may not be "listed". These notes may help to resolve these difficulties.

1. The original Public Highway Act was enacted in 1919 as Chapter 64 of the Acts of 1919. That Act has been amended many times and in many particulars but not at all with respect to what constitutes a "public highway".

2. Section 10 of the Public Highways Act reads as follows:

10 (1) Except in so far as they have been closed according to law:

- (a) all allowances for highways made by surveyors for the Crown;
- (b) all highways laid out or established under the authority of any statute;
- (c) all roads on which public money has been expended for opening, or on which statute labour has heretofore been performed;
- (d) all roads passing through Indian lands;
- (e) all roads dedicated by the owners of the land to public use;
- (f) every road now open and used as a public road or highway;
- (g) all alterations and deviations of, and all bridges on or along any road or highway;

shall be deemed to be common and public highway until the contrary is shown.

3. Any road, whether listed on the road list or not, is a public highway if it meets one or more of the criteria above.

4. Every public highway is deemed to be not less than 66 feet in width, "until the contrary is shown" (Public Highways Act, Section 14). There are exceptions to the 66 feet width in cases where the municipalities took over on established roads of a lesser width. These exceptions are usually recorded in municipal records.

5. The Minister may close any highway to public use "for such time and from time to time as he deems expedient" (Public Highways Act, Section 19). This provision was inserted in the Act generally to protect the highways from excessive damage in the Spring and to allow for the closing of highways during reconstruction, etc.

6. The right of the public to use any public highway can be extinguished permanently only by the Governor in Council. (Public Highways Act, Section 17). This means that no matter how old a public highway may be and no matter whether it is maintained or not, no person may close it and the public have a right to use it until that right has been extinguished according to law. When the Governor in Council extinguishes the right of the public to use a public highway or any part thereof he may dispose of the land as he sees fit. (Public Highways Act, Section 17).

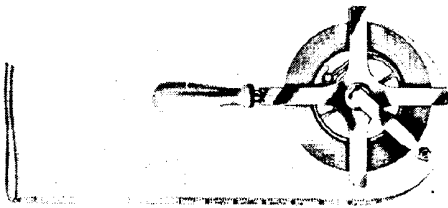
7. No person can acquire title to any public highway or part thereof by "possession, occupation, user or obstruction thereof for any time whatever" - "but the

highway or part thereof shall..be and remain a common and public highway". (Public Highways Act, Section 16). This answers the arguments of those people who say that a road which goes through or past their property is now theirs because it has been abandoned for years.

* * *

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** REPORT ON A.C.S.T.T.N.S. **

by G. H. Bourbonniere, President

The Association of Certified Survey Technicians and Technologists of Nova Scotia (A.C.S.T.T.N.S.) was incorporated in December 1976. Some of the Association's main aims are:

1. To bring together, within the Society, non-commissioned persons involved in land survey and related fields;
2. To provide for and promote the certification of the members of the Society;
3. To encourage and improve the knowledge, skill and proficiency of the members of the Society;
4. To advance the status, accreditation and welfare of the members of the Society;
5. To encourage and stimulate a high standard of service in land survey and related fields in Nova Scotia;

In its formative years, two and one-half years before incorporation and another two and one-half years after, a great deal of support was received from the Association of Nova Scotia Land Surveyors through the input of a number of individuals and with financial grants. This input continues as the Certification Board of A.C.S.T.T.N.S., includes two Nova Scotia Land Surveyors. This assistance has been greatly appreciated over the years.

A.C.S.T.T.N.S. is affiliated with the Canadian Association of Certified Survey Technicians and Technologists, an organization whose aims are to advance the status and welfare of certified survey technicians and technologists and to promote good relations and communication between similar and related organizations, both national and international.

The Council of A.C.S.T.T.N.S. consists of a President, Vice-President, Secretary, Treasurer, the immediate Past President and for the year 1980, four councillors. The third annual meeting of A.C.S.T.T.N.S. was held on March 24, 1980 with the following slate of officers being elected:

President	- Gerry Bourbonniere
Vice President	- Jim Davison - Membership Committee
Secretary	- Cherie Russell
Treasurer	- Nick Dearman
Councillors	- Dave Wedlock
	- Caleb Durling - Publicity Committee.

The Past President is Len Kincaid - other councillors in the second year of their term of office are Ken Smy, Education Committee and Dan Getson.

Guest speaker at the annual meeting was Mr. A. E. Wallace, President of the Association of Nova Scotia Land Surveyors, who gave a very informative and enjoyable talk based on the relationship between the two Associations.

Councillor Ken Smy, presented a fairly extensive report from his one-man Education Committee. Ken has investigated available correspondence courses and prepared recommendations as to which may be acceptable for technicians to upgrade themselves for certification and for reclassification with the Association. These recommendations are not quite finalized. Ken is to be commended for his hard work and thoroughness in taking on one of A.C.S.T.T.N.S.'s most important committees

To date, the Certification Board has reviewed twenty-four applications for certification and two for reclassification since their first meeting in March 1978. Growth has not been rapid, however, it has been fairly constant.

Membership has not been confined to any one area of the Province, although the majority are from the Halifax-Dartmouth area. Certified Survey Technicians and Technologists can be found in Cape Breton, the Amherst area and the Annapolis Valley.

The Association is embarking on a membership campaign. The first event in this campaign is the scheduling of a meeting at the Nova Scotia Land Survey Institute on April 22, 1980 to inform students at the Institute and technicians in the area of the Association.

The membership committee would appreciate if its land surveyors would inform technicians in their employ of A.C.S.T.T.N.S.

Interested parties can obtain further information by writing to:

The Association of Certified Survey Technicians and
Technologists of Nova Scotia
5450 Cornwallis Street
Halifax, N. S. B3K 1A9.

* * * * *

** BULLETIN **

ACADIA UNIVERSITY CREDIT

FOR

N.S.L.S.I. LAND SURVEYING GRADUATES

1977 - 1978 - 1979

The following arrangements were concluded as a result of discussions between N.S.L.S.I. and Acadia University:

- a. Graduates of the two-year Diploma Program in Land Surveying at N.S.L.S.I. may be admitted to the third year of a four-year (20 credit) B.Sc. program at Acadia University.
- b. It is expected that such applicants would receive specific credit for Acadia courses Math 170 (Introduction to Applied Mathematics through Calculus) and Math 173 (Linear Algebra), and for eight and one-half unspecified credits.
- c. The courses taken at Acadia would include all other specific degree requirements; that is, courses would have to be chosen to satisfy requirements for a major and a minor field of study. Students without a credit in Nova Scotia Grade XII English 012 would be required to complete English 010 at Acadia.

* * * * *

Ivan P. Macdonald, N.S.L.S.
The Editor
The Nova Scotian Surveyor
39 Doull Street
Halifax, N. S. B3N 1Y8

80-03-07

Dear Ivan:

1. Reference is made to our conversation of this date.
2. As you know, I have been appointed to a committee that is to catalogue and file, for the use of our members, the various periodicals and reference material which arrive at the Association office. One of the terms of reference is that lists of these be published, from time to time, in The Nova Scotian Surveyor.
3. It has been suggested that I gather these papers from the Secretary, catalogue, number and peruse same for articles of interest and file the appropriate ones in the Association office. As a modest start a listing of 79-80 items has been prepared and will be forwarded to D. E. Lowe within the next few days. This is not complete as some issues are not readily available. Looking to the future, we are not interested at this time in any pre-1979 material and perusal will begin for 1980.
4. It is proposed to make these publications available to the membership. They may be obtained at the Association office or by sending a self-addressed label and thirty cents in stamps thereto. No second item will be issued until the first is returned except under special arrangement.
5. Probably something in the way of cross-referencing subject/publication will be attempted in the near future. The subject matter being a judgment situation I look forward to discussing this with you.

Yours truly,

Allison B. Grant, N.S.L.S.
13 Wallingham Street
Dartmouth, N. S., B3A 2G8

**** A LIST OF PERIODICALS AND REFERENCE MATERIAL ****

FILED AT THE ASSOCIATION OFFICE

'A' SERIES - CANADIAN SURVEY ASSOCIATIONS

<u>The Canadian Institute of Surveying</u>			A4-99	ALS News	Winter 78
A1-100	The Canadian Surveyor	Mar 79	A4-100	" "	Summer 79
A1-101	" "	Jun 79	A4-101	" "	Fall 79
A1-102	" "	Sep 79			
A1-103	" "	Dec 79	<u>The Corporation of Land Surveyors of the Province of British Columbia</u>		
A2-100	C.I.S. Newsletter	Aug 79	A5-98	Annual Report	77
A2-101	" "	Aug 79	A5-100	" "	79
<u>The Alberta Land Surveyors Association</u>			A6-99	Cumulative Nominal Roll	78
A3-97	Annual Report	77	A7-100	The Link	Mar 79
A3-100	" "	79	A7-101	" "	Jun 79
A4-98	ALS News	Fall 78	A7-102	" "	Sep 79
			A7-103	" "	Dec 79

The Association of Land Surveyors of Manitoba

A8-100	Manitoba Surveyor	Part (1)	79
A8-101	"	Part (2)	79

The New Brunswick Land Surveyors Association

A9-98	24th Annual Report		77
A9-100	26th " "		79

The Newfoundland Land Surveyors Association

A10-97	Annual Report		77
A10-98	Newfoundland Surveyor	Nov	78
A10-99	Annual Report		78

The Association of Ontario Land Surveyors

A11-95	Ontario Land Surveyor	Spring	75
A11-96	" " "	Summer	76
A11-97	" " "	Winter	78
A11-98	" " "	Spring	78
A11-100	" " "	Winter	79
A11-101	" " "	Spring	79
A11-102	" " "	Summer	79
A11-103	" " "	Fall	79
A11-104	" " "	Winter	80

A12-98	Annual Report		77
A12-100	" "		79

Order of Quebec Land Surveyors

A13-95	Quebec Land Surveyor	Jan	75
A13-98	" " "	May	78
A13-99	" " "	Dec	78

The Saskatchewan Land Surveyors Association

A14-97	Annual Report		77
A14-100	" "		79

'B' SERIES - OTHER CANADIAN

The Association of Certified Technicians & Technologists Ontario

B1-94	Northpoint	1st Qtr	76
B1-95	"	2nd Qtr	76
B1-96	"	3rd Qtr	77
B1-97	"	4th Qtr	77
B1-98	"	1st Qtr	78
B1-99	"	4th Qtr	78
B1-100	"	1st Qtr	79
B1-101	"	2nd Qtr	79
B1-102	"	3rd Qtr	79

Barristers' Society

B2-97	N. S. Law News	Jul	78
B2-98	New Legislation List		78

The Professional Engineers of Nova Scotia

B3-100	The P. Eng. in N. S.	Fall	79
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Nova Scotia Technical College

B4-99	List of Publications		78
B-100	" " "		79

The University of New Brunswick

B5-100	Cadastral Studies		79
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Central Mortgage & Housing Corporation

B6-96	Annual Report Nova Scotia		77
B6-97	" " National		77
B6-98	" " Nova Scotia		78
B6-99	" " National		78

Canadian Directory Public Legal Information

B7-98	Nova Scotia		78
B7-99	National		78

International Boundary Commission

B8-98	Annual Joint Report		77
B8-99	" " "		78

'C' SERIES - INTERNATIONAL

14th International Congress on Photogrammetry

C1-100	Program, 14th Congress	Jul	80
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Commonwealth Association of Surveying and Land Economy

C2-99	Surveying & Land Economy	Jan	78
C2-100	" " " "	Jan	79
C2-101	" " " "	Jul	79

The New Zealand Institute of Surveyors

C3-97	New Zealand Surveyor	Aug	77
C3-100	" " "	Feb	79
C3-101	" " "	Aug	79

'D' SERIES - UNITED STATES OF AMERICA

American Congress on Surveying and Mapping

D1-100	Surveying and Mapping	Mar	79
D1-101	" " "	Jun	79
D1-102	" " "	Sep	79

D2-100	ACSM 'Bulletin'	May	79
D2-101	" "	Aug	79

D3-100	" Newsletter	Aug	79
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D4-100	" Testimony Before the Senate Committee on Energy	Jun	79
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D5-100	ACSM Annual Meeting		79
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D5-101	ASP/ACSM Joint Tech. Meeting		79
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'E' SERIES - INDIVIDUAL STATESThe Arkansas Association of Registered Land Surveyors

E1-100	Newsletter	Apr 79
E1-101	"	Jul 79
E1-102	"	Oct 79

The California Land Surveyors Association

E2-98	California Surveyor	Fall 78
E2-100	" Convention	79

The Florida Society of Professional Land Surveyors

E3-98	Backsights & Foresights	Dec 78
E3-100	" "	Aug 79

E4-100	Newsletter	May 79
E4-101	"	Jun 79
E4-102	"	Nov 79

The Surveying & Mapping Society of Georgia

E4A-100	The Georgia Land Surveyor	Feb 80
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The Idaho Association of Land Surveyors

E4B-100	Gem State Surveyor	Winter 80
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The Illinois Registered Land Surveyors Association

E5-98	Illinois Surveyor	Fall 78
E5-100	" "	Winter 79
E5-101	" "	Spring 79
E5-102	" "	Summer 79

The Kansas Society of Land Surveyors

E6-100	Kansas Surveyor	Aug 79
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The Indiana Society of Professional Land Surveyors

E7-100	Hoosier Surveyor	Summer 79
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The Maine Society of Land Surveyors

E8-100	The Main Land Surveyor	Sep 79
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The Massachusetts Association of Land Surveyors & Civil Engineers

E9-98	The Massachusetts Surveyor	Jan 78
E9-100	" "	Mar 79
E9-101	" "	Jun 79
E9-102	" "	Sep 79
E9-103	" "	Dec 79
E9-104	State Survey Newsletter Listing	Dec 79

The Michigan Society of Registered Land Surveyors

E10-100	The Michigan Surveyor	Summer 79
E10-101	" " "	Fall 79

The Minnesota Land Surveyors Association

E11-100	Disclosures	May 79
E11-101	"	Aug 79

The New Jersey Society of Professional Land Surveyors

E12-100	Coordinate	Jul/Aug 79
E12-101	"	Sep/Oct 79
E12-102	"	Nov/Dec 79
E12-103	"	Jan/Feb 80

The Nevada Association of Land Surveyors

E13-100	The Nevada Traverse	Mar 79
E13-101	" " "	Sep 79

The North Dakota Society of Professional Land Surveyors

E14-100	The 49th Parallel	Dec 79
E14-101	Newsletter	Jul 79

The Professional Land Surveyors of Oregon

E15-98	The Oregon Surveyor	Nov/Dec 79
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The Association of Tennessee Professional Surveyors

E16-100	The Tennessee Surveyor	Jul 79
E16-101	" " "	Sep 79
E16-102	" " "	Jan 80

The Vermont Society of Surveyors

E17-100	The Cornerpost	May 79
E17-101	" "	Sep 79
E17-102	" "	Dec 79

** SUBJECT/PERIODICAL CROSS REFERENCE **

Class 01

Educational

CANADA LANDS SURVEY EXAMINATION REGULATIONS..... A1-104
 THE PURSUIT OF A DEGREE PROGRAM IN SURVEYING FOR WESTERN CANADA
 (Alex Hittel)..... A1-104

Class 01

Legal

THE SOLAR SURVEYOR: SCANNING NEW HORIZONS (Gunther Greulich)..... E4A-100

Class 03

Business

COMPETITIVE BIDDING..... E4B-100
 THE CAPITAL GAINS TAX (Deemed Dispositions) (R. Scott White, FSA FCIA).... A11-104

Class 04

Historical

SURVEYORS OF THE PAST (N. W. Rebellion) (Charles Fairhall)..... A11-104

Class 05

Technical

THE WORLD'S FIRST COMPUTER ASSISTED ORDNANCE SURVEY MAP (Royal Institution
 of Chartered Surveyors in U. K.)..... A11-104
 LAW OF THE SEA AND DEVELOPING COUNTRIES (L. H. Legault, High Commissioner
 for Canada, Lagos, Nigeria)..... A1-104
 PRELIMINARY PROGRAM AND REGISTRATION FORMS (14th Congress of the
 International Society for Photogrammetry)..... C1-100

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** NOVA SCOTIA LAW NEWS **

Volume 6, No. 3, Page 52, December 1979

REAL PROPERTY

RIGHT OF WAY

King v. Brookins, S. AM, 0514, Glube, J., November 20, 1979. S107/12

The plaintiff had a right of way by express grant for purposes of repairing and maintaining his greenhouses and for snow removal; the defendant blocked the right of way for a time while constructing a house and brought in fill in order to plant a lawn; this created a slope which was partly on the right of way.

The defendant was required to return the right of way to its former condition by removing part of the lawn; the plaintiff was awarded \$4,000 for loss of greenhouse crops because of the difficulty in renovating greenhouses, \$1500 for deterioration in the greenhouses, and \$500 general damages.

POSSESSORY TITLE*Stevens v. Mackenzie, S. H. 24722, Glube, J., October 5, 1979. S105/4*

An application under the Vendors and Purchasers Act, R.S.N.S. 1967, c. 324, to resolve an objection to title by the prospective purchaser of land was dismissed, because evidence as to possessory title to the lands was insufficient.

If evidence as to possessory title had been sufficient, the Court had jurisdiction to grant an order under this Act.

* * * * *

** WHEN SLOWER IS FASTER **

The difference between driving 70 mph and 55 mph is a little like Aesop's fable of the hare and the tortoise. You may think you're getting somewhere quicker when you drive fast, but it's really steadiness that wins the race.

Because of wind resistance and engine efficiency, 55 will get you better results than 70. Pass 55, the experts say, and you're using more gas to travel the same distance.

By slowing down from 70 to 55, they point out that you could actually increase your gas mileage by as much as 39%, depending on your car. And to cover a 10-mile stretch would take you only 3 minutes more.

Last but not least, they say that limiting your speed to 55 will decrease your chances of having an accident and increase your chances of surviving if you do have one. At 70 mph or faster, your chances of surviving an accident are only 50-50. If you hold your speed to between 50 and 60, the odds jump to 31 to 1 in your favor.

MORAL: Stick to 55 - it's faster than you think. "IN BRIEF", FALL 1979, VOL. 2, NO. 3, PUBLISHED BY METROPOLITAN LIFE INSURANCE COMPANY.

THE MAN WHO IS TOO OLD TO LEARN WAS PROBABLY ALWAYS TOO OLD TO LEARN.

* * * * *

** THE NEW ADJUSTMENT OF THE NORTH AMERICAN DATUM **

American Congress on Surveying and Mapping
Bulletin No. 67, November 1979

It has been brought to my attention that none of the other articles in the adjustment of the North American Horizontal Datum series details the datum to which the coordinates will refer. This article describes the requirements for a datum and the reasoning behind the decisions that have been made for NAD 83.

To locate or fix a point in three-dimensional space, it is necessary to define a coordinate system. A three-dimensional coordinate system can be defined by selecting an origin and the direction of each axis, i.e., a total of six parameters consisting of three coordinates and three angles. Such a coordinate system could be called a datum.

In geodesy we use additional parameters--the dimensions of an ellipsoid--to assist in locating or establishing coordinates and in defining a datum. Because the Earth or, more precisely, the geoid closely approximates an ellipse which has been revolved around its minor axis, we use an ellipsoid as a reference figure. (For a discussion of the relationship between the geoid and the physical surface of the Earth, the reader is referred to *Geodesy for the Layman* (Burkard, 1968). The ellipsoid itself requires that two parameters be defined, usually the semi-major axis (a) and the flattening (f). It can also be defined by the semi-major axis (a) and the semi-minor axis (b). To many control surveyors ellipsoid is synonymous with datum, although, as explained, the definition of a datum usually requires at least six additional quantities. Most of us are aware that the North American Datum of 1927 is based on the Clarke 1866 ellipsoid and that the European Datum of 1950 is based on the International (Hayford) ellipsoid. Both datums are being redefined. Although the definition of a datum usually requires more than the eight parameters mentioned, e.g., the height of a particular point above or below the ellipsoid, etc., this article considers only the six parameters mentioned above.

Theoretically, the first six parameters, along with a yardstick for scale, clearly would be adequate to determine the location of a point on a stable Earth. However, the local horizontal, defined as perpendicular to the direction of the plumb bob, is somewhat necessary and convenient in surveying procedures for several reasons. First, three-dimensional positioning devices are just now becoming commercially available at affordable prices. Second, a common reference, the horizontal, is a practical requirement for the description of land parcels and for construction and engineering surveys. To aid control surveyors in establishing horizontal points (latitude and longitude), the ellipsoid, as stated, closely approximates the shape of the geoid, and therefore, it is used as the reference surface. The phrase, "closely approximates the shape of the geoid", leads into one of the main thoughts in this article.

If the size and shape of the ellipsoid closely approximate the geoid, we can neglect the differences between the reference figure and the geoid. If this condition is optimized globally, it will not be optimized locally. The latter has been the primary consideration in the past when datums were defined. As discussed in article 15 of this series (Schwarz, 1979), the effects of geoid heights and deflections of the vertical will be accounted for fully in the new adjustment of the North American Datum. Because the differences between the geoid and the ellipsoid, no matter how large, will be accounted for and not neglected, one must reconsider the problem of defining a datum. Most recent datums have been geocentric, i.e., the center of the reference figure coincides, as closely as measurements allow, with the center of mass of the Earth. The Defence Mapping Agency (DMA) of the Department of Defence (DoD) defined such a datum in 1972, identified as WGS 72. This datum has been used extensively by the world mapping and charting community. One of the main reasons for a global datum is increased global applications both for civilian and defence purposes. There are only a few disadvantages of a globally best-fitting datum. For instance, one may assert that a larger separation of the geoid from the ellipsoid will

result from a geocentric datum. While this is true, we still need to examine the problem. In the conterminous United States, the change in the separation of the geoid and ellipsoid for a global datum, as compared with the NAD 27, will be a maximum of about 35 m. Because this affects the reduction of distances by an amount approximately equal to $35/6,378,135$, or $1/180,000$, this quantity concerns only those of us involved in extremely accurate surveys. It is probably fair to speculate that at least 90 per cent of the U.S. surveying community could ignore this error for nearly all of their surveys. Certainly, it is true for surveyors involved in lot surveys, subdivision layout, and similar activities.

Considering the global applications and weighing all considerations carefully, the countries involved in the project formally have decided that the NAD 83 would be a geocentric datum, or best fitting in a global sense. This decision means that the center of the ellipsoid must coincide with the origin of the coordinate system--the center of mass. But how do we define the origin? Fortunately, we have the means to accomplish this. The orbits of the Navy Transit satellites have been determined by DoD, and Doppler signals from these satellites are used when one determines positions using Doppler receivers. If the orbit is considered to be known, then positions referred to the orbit are determined. These positions are, to a very close approximation, referred to the center of mass of the Earth, because the orbit of a satellite is clearly referenced to a mass center. By including the geocentric Doppler positions in the adjustment, the datum will be referenced to the center of mass of the Earth. The directions of the coordinate axis of our datum can be determined by defining a pole and reference for longitude.

In space, the direction of the rotational axis of the physical Earth is not invariant with time. There are many reasons for this condition. (See Mueller (1969) for a complete discussion). Here, we need to consider only the relationships between the instantaneous axis of rotation (pole) of the Earth; the axis of the reference figure, which is the semi-major axis of the ellipsoid (b); and a mean or established direction of the axis of rotation. A successful orientation of the datum would be accomplished if we make the axis of the ellipsoid coincide with the mean value of the axis of rotation (mean pole). This orientation has also been agreed upon by the countries involved in the NAD project. How do we accomplish this?

Again, we have a solution at hand. NGS has been observing polar motion, which is the difference in direction between the instantaneous axis of rotation and (b), for more than 75 years. These optically observed values have been combined with values from other countries by several international organizations that publish the positions of the mean pole. All pertinent data in the adjustment will be referred to the mean pole and, therefore, our datum will be so oriented. Defining the direction of the pole fixes two of the three required angles. The third is defined by adopting a zero longitude. We have agreed to orient the datum by referencing our zero longitude to the Greenwich meridian.

The International Association of Geodesy (IAG), a body of the International Union of Geodesy and Geophysics, has agreed to adopt new dimensions for the reference ellipsoid. The formal agreement will be executed in Canberra, Australia, in December 1979. Meanwhile, a study group of the IAG has been studying the result of recent determinations of (a) and (f). The best values for a range $a = 6,378,135$ m to $a = 6,378,140$ m. The present uncertainty, Δa , is less than one-half of the range shown. A change in position of a point on the North American Continent, resulting from a change, $\Delta a \leq 2$ m, will be less than 0.01 m. Relative positions will change even less. The value for f, $f = 1/298,257$, has already been accepted at the required level of accuracy. For most surveying purposes, including geodetic applications, determining the dimensions of the reference ellipsoid is more of an interesting scientific experience than a practical concern. Future articles in this series will discuss other aspects of the datum.

REFERENCES

Burkard, R. K. (1968), *Geodesy for the Layman*, Aeronautical Chart and Information Centre, St. Louis, Mo., reprinted by U.S. Army, Defense Mapping School, Ft. Belvoir, Va., 97 pp.

Mueller, I. I. (1969), *Spherical and Practical Astronomy*, Frederick Ungar Publishing Co., Inc., New York.

Schwarz, C. R. (1979), *The New Adjustment of the North American Horizontal Datum*, Article 15, "Deflections of the Vertical", *ACSM Bulletin* No. 65, May 1979, pp. 17, 19.

Reprinted - Article No. 17
Datum Parameters

By - Captain John D. Bossier
Deputy Director
National Geodetic Survey
NOS, NOAA, Rockville, Maryland



SURVEY MARKER



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

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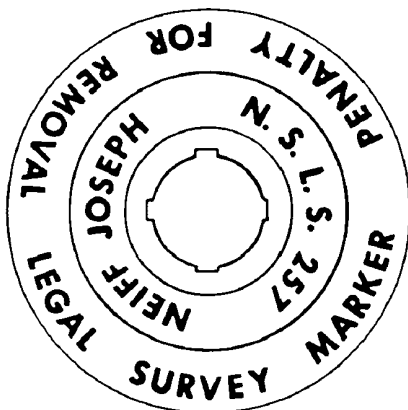
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