

# The NOVA SCOTIAN SURVEYOR



# The NOVA SCOTIAN SURVEYOR

*Published four times a year by*

**THE ASSOCIATION OF NOVA SCOTIA LAND SURVEYORS INCORPORATED**

Roy A. Dunbrack  
President

Edward P. Rice  
Secretary-Treasurer

R. E. MILLARD  
Editor

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

---

Founded 1951

Incorporated 1955

Vol. 21

April 1969

Number 60

---

Eight case histories that illustrate  
typical problems occurring  
under the land registration  
system in Eastern Canada

compiled  
by

Angus C. Hamilton  
President

Canadian Institute of Surveying

For presentation  
in a paper entitled

"Some examples of problems with  
existing procedures for land  
registration and for filing environmental  
data in Eastern Canada"

Symposium  
on

Land Registration and Data Banks  
University of New Brunswick  
Fredericton

November 13 — 15, 1968

## Case I

### The Peat Bog Lot:

The road allowance between Concessions 4 and 5 of Gloucester Township in Carleton County some 20 miles from Ottawa follows a straight course across a peat bog. Needless to say this road allowance was never used; in its place a "natural" road developed which skirted the bog at a safe distance.

In 1957 when Mr. A. sold a piece of property to Mrs. B. the description on the deed read:

"Commencing at the south-east corner of the said South Half of Lot number Nine (9); Thence Westerly and along the southerly line of the said South Half of Lot number Nine (9), a distance of One Hundred and Forty Seven (147') feet to a point; Thence Northerly and at right angles to the last described course, a distance of Two Hundred and Sixty-Seven (267') feet to a point; Thence Easterly and paralled with the Southerly line of the said South Half of Lot number Nine (9), a distance of Three Hundred and Ten (310') feet to a point; Thence in a south-westerly direction a distance of Two Hundred and Sixty-Four (264') feet to a point; Thence in a south-easterly direction a distance of One Hundred and Eighty-Five (185') feet to a point of commencement.

Every surveyor will immediately note several defects in this description. However, even more serious is the gross misidentification of the point of commencement. The writer of the description he was at P' (fig. 1) when he actually was at P. How he came to this conclusion we'll never know!

This deed was registered and Mrs. B. thought she owned the land around her house whereas in fact her house was on a road allowance and the land she did own was part of a peat bog.

This case was discovered and rectified by surveyors of the National Capital Commission by several days' diligent work. Investigation showed that Mr. A. and his sons had done the survey and that he had written the description himself.

## Case II

### The Wandering Lot:

"Twinkle, twinkle, little lot,  
Now you're here, and now you're not."

When Mr. C. sold part of his lot (shown as L in fig. 2) in Gloucester Township, near Ottawa, to Mr. D. His lawyer wrote the description for the deed without the assistance of a surveyor.

The description in the first deed (No. 59339, filed April 10, 1958) began, "Commencing at a point in the southerly limit of the said lot, distant 1155 feet from the southeast corner of the said lot; thence southerly and paralled with the easterly boundary of the said lot a distance of 150 feet to a point, for the purpose of this description called the point of Commencement; thence .....etc.

This placed the lot in the location designated L' on fig. 2. When this error was drawn to his attention by a surveyor, he tried again. In a correction deed (No. 63348, filed February 9, 1960) the description began, "Commencing at a point in the southerly limit of said lot, distant 1155 feet from the southeast corner of the said lot; thence northerly and paralled with the easterly boundary of the said lot a distance of 150 feet .....etc." This placed the lot in the location designated L" in fig. 2!

In despair the surveyor wrote a correct description and donated it to the lawyer who then filed a second correction deed and the wandering lot came to rest.

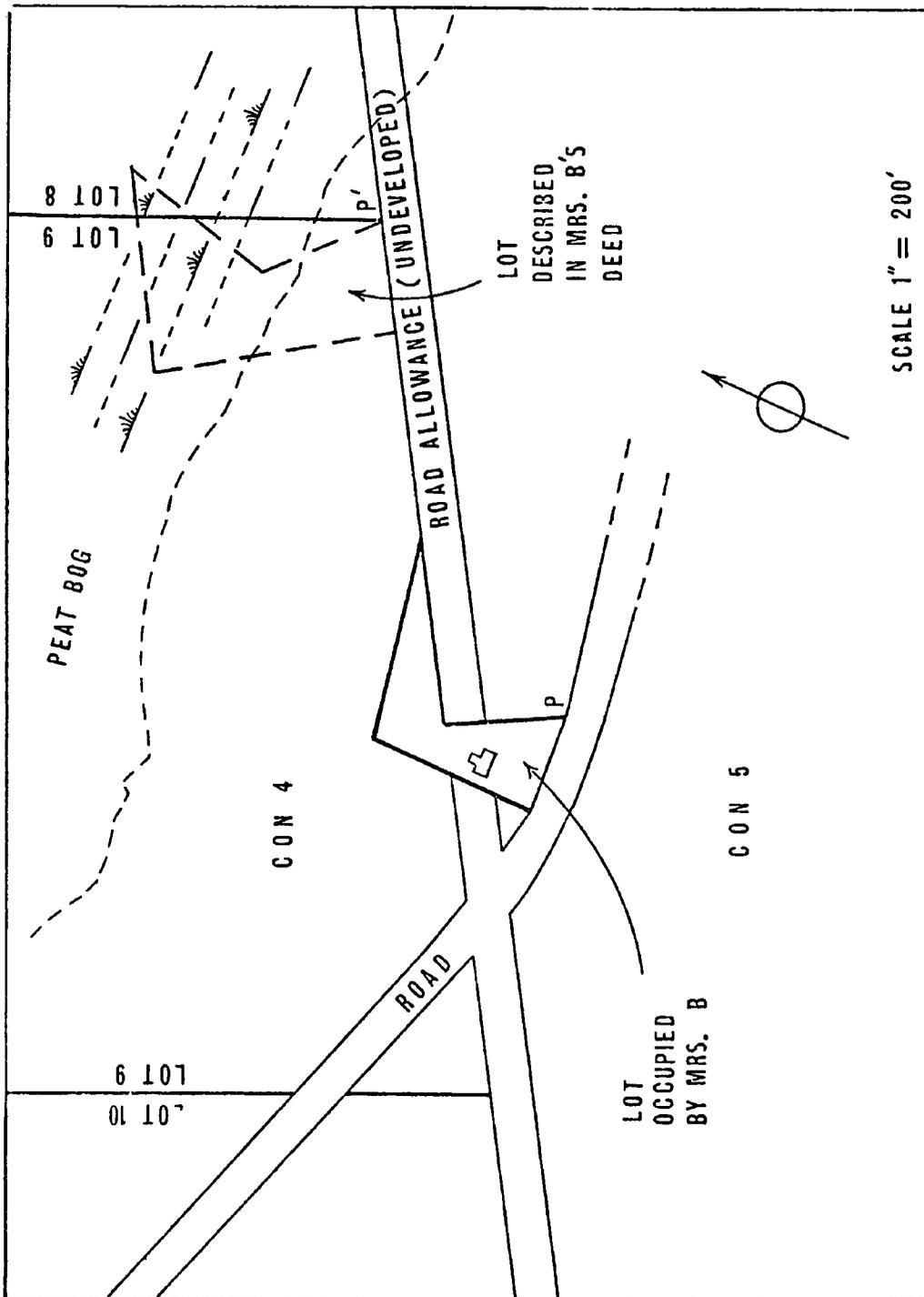


Figure 1

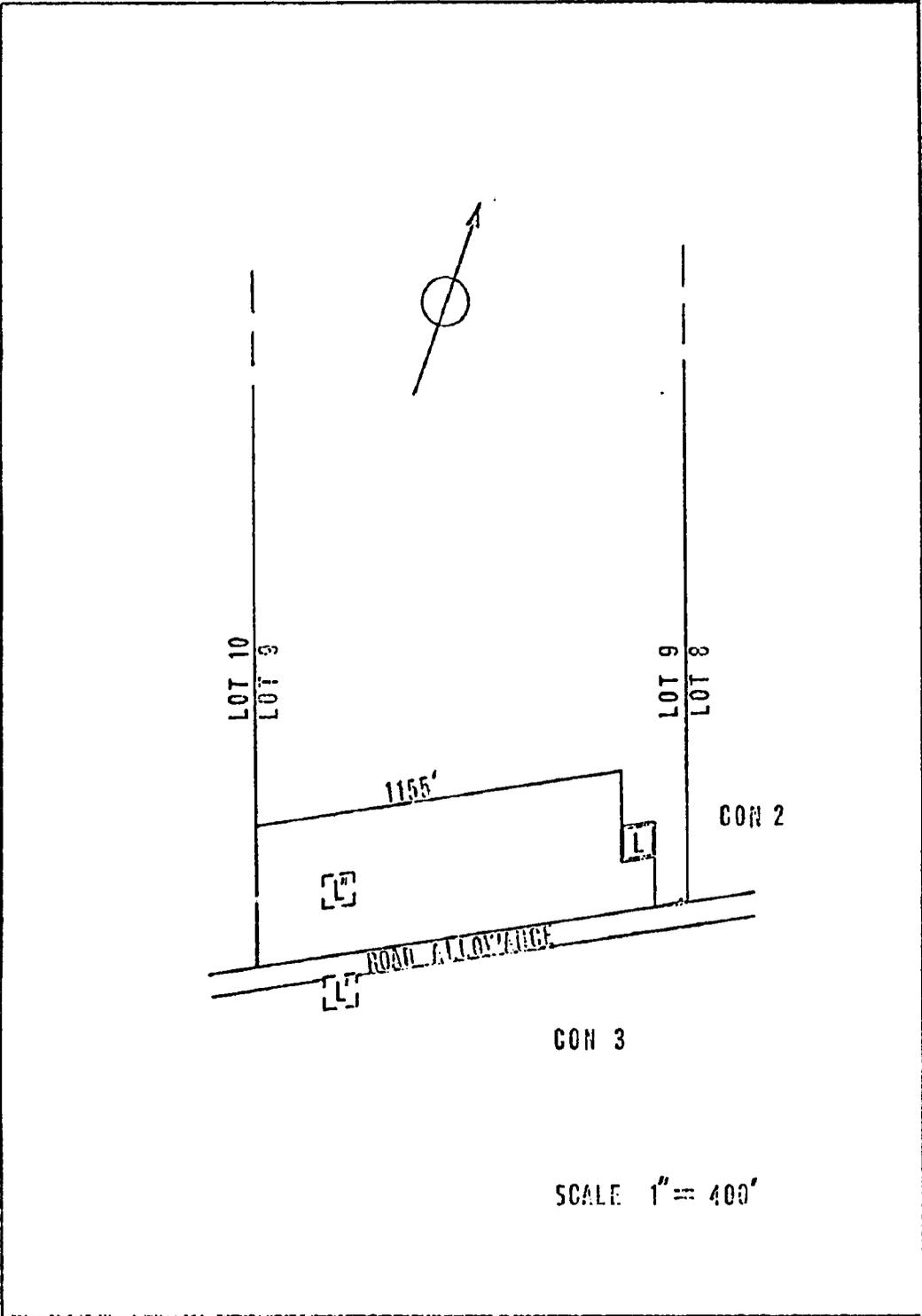


Figure 2

## Case 111

### The forgotten strips in Lot 11

“All the king’s horses and all the king’s men  
Couldn’t put Humpty Dumpty together again.”

In Concession 4 of Gloucester Township, lot 11 was subdivided on a piecemeal basis starting at different corners at different times. When surveyors of the National Capital Commission undertook to put the lot back together for the Green Belt they couldn’t find all the pieces. As illustrated in fig. 3, there were two gaps which did not fall within the descriptions of any of the parcels in the subdivision.

To find out how these gaps occurred would call for better detective work and more dedication than that possessed by either the writer or the N. C. C. surveyors. They took the easy way out and arranged for the N. C. C. to buy the two strips (included in Inst No. 73665, December 17, 1963) from the owner of Lot 11. The writer, too, is taking the easy way out by suggesting that this would not occur if a system of co-ordinate survey control had been used in the sub-division.

## THE OBJECTIVES OF AN ENVIRONMENTAL INTEGRATED DATA BANK

### Introduction

The Atlantic Provinces Surveying and Mapping Program was designed to operate in successive phases, four in all. The first phase is the establishment of precisely established monuments at pre-determined intervals in each province. The second phase is the establishment of a Provincial large scale topographic series at scales of 1:24,000 to 1:600. The third phase is a proposal to implement a computer based land titles system based on the Torrens principles. Lastly the fourth is the implementation of a data bank.

The first two phases are within the survey engineers capability and considerable progress has been achieved. In phase III and IV the survey engineer is only one of the team, thus we are appreciative of this opportunity to not only communicate with members of other professions, but to have this opportunity to understand your problems. Finally, an up to date cataloguing of computer programming and software will benefit all participants.

### The Objectives of an Environmental Data Bank

1. A Common Denominator — Data banks, as we loosely use the words today, seem to imply some tinge of falsehood when one looks deep into the objective. It resolves itself mostly into data warehousing, in fact, the data stored and retrieved are similar and in most cases handled by the same agency. A bank on the other hand implies the storage and retrieval of data by persons of different professions and not necessarily by one profession or for one purpose.

Two problems evolve in the proper storage and retrieval of data. First, the establishment of a common currency and secondly, being able to relate data to that currency.

The dictionary defines a “Bank” as an establishment for receiving, keeping, lending, or sometimes issuing currency and making easier the exchange of funds by cheques, notes, etc. The problem then is to define a currency that will have not only provincial or state, but national and international acceptance. With such a currency our bank will come of age.

The dictionary defines data as “things known or assumed; facts from which conclusions can be inferred”, thus, again the user must relate the facts to one currency or our first objective for want of better description, a common denominator.

2. The unit of land as a common denominator — The search for a common denominator, although it has been going on for around five years, has now and correctly so

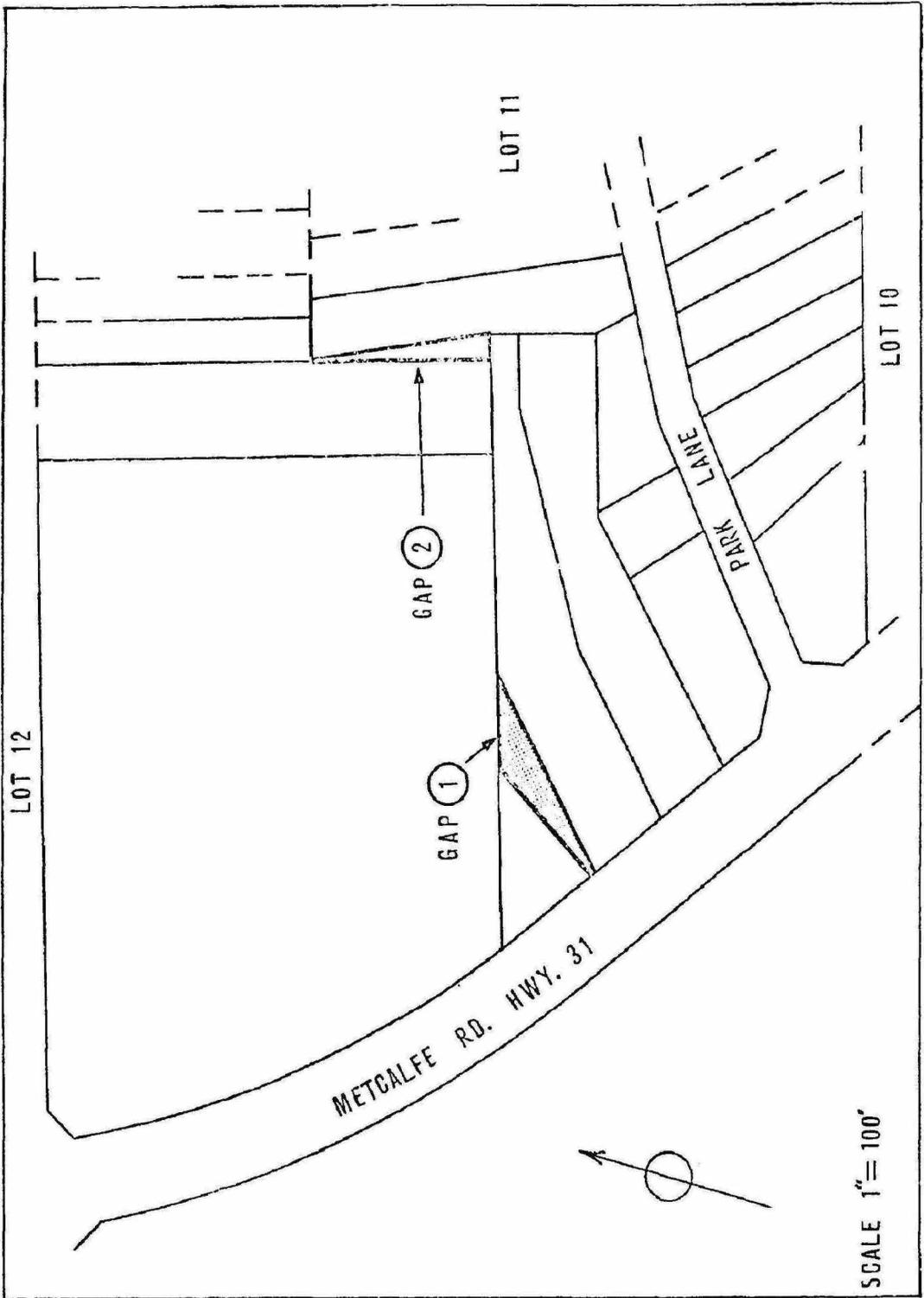


Figure 3

been established as a unit of land. It is based on the principal that our survival on this planet depends on four basic facts being the natural resources of LAND, WATER, AIR, and MAN, with all other commonly referred to resources being either renewable or non renewable at the dictates of the four basic facts. Of the four basic facts land is static while water, air, and man are highly mobile, thus we have one constant LAND and three variables. Land is also unique in that any unit of land is different in size, texture and topography from another unit of land. Furthermore, it is now possible for the Survey Engineer to define the infeasible location of any unit of land on this planet of ours. Is it not a logical deduction then to have the one constant land of our natural resources divided into units with the infeasible location of each unit being our common denominator?

3. **Infeasible location and presentation** — The infeasible location of each unit of land can be numerically expressed either in geographical or cartesian co-ordinates in a manual or automated form and presented numerically or geographically on a map. The definition and presentation will be fully covered in the papers to follow.

4. **The Horizontal Approach** — In adopting a unit of land as our common denominator a second problem of large magnitude is created. A problem so critical it must be aired now as it will underly the thinking of not only the participants, but every profession, government, union, or private enterprise on our planet. The problem is that we have inherited a unilateral approach through departments and even components of departments to collect and disseminate data; A unilateral or vertical approach that cannot solve today's problems but so entrenched that it has become venerable. The solution of this problem lies in education and willingness to adopt the horizontal approach; an approach where many agencies or departments may collect data pertaining to one resource or one agency may collect data pertaining to one or more resources both in a standard form for input, but with a variable print out according to the demands of the user.

5. **Integration of data** — Many data banks are existent today and using the same computer facilities that are independent of each other and impossible to integrate although similar data is contained within each bank. The word integrate means "to make whole or complete, to bring parts together into a whole, unified, to indicate the sum total of"; thus, is it not paramount that a data bank designed for one purpose has the capability of being unified with additional or existing data banks and conversely all existing resource data banks should be redesigned using the infeasible location of a unit of land as its common denominator.

6. **Environmental data** — With the use of co-ordinates to define a unit of land it would then seem logical to first design a computer based land titles system being in itself a data bank, to which can be integrated all data required for engineering services such as the routes of water mains, sewers, transmission lines, underground installations, highway including an orderly program for maintenance, repairs, or extension of these services. The bank could eventually encompass all applied science data and present the data either on computer output sheets or assembled on maps geometrically related to the specific co-ordinates of the unit of land.

Environmental in itself means "Surrounding, especially the conditions and influences under which we live." The integrated data bank then could support an additional function which is the recording and storing of social and environmental data which when required can also be directly related to specific land holdings or again to our common denominator. Environmental factors could include population of specific area, size of families, age, levels of education, work force status, incomes etc. This type of detail and the ability to relate it geographically is essential to any form of an

integrated environmental data bank and its ultimate use in any comprehensive land use planning project.

Most of the recent graduates and all future undergraduates in the applied science disciplines have been introduced to the computer and have done preliminary programming. Universities are now starting similar courses for the social science students. The feasibility of an environmental integrated data bank has been acknowledged, the Universities are training the students, it is only left to the users to establish a basis on which to build an environmental data bank.

7. **Economic approach to data banks.** — It is equally important in our deliberations to constantly be reminded that the dollar sign comes before detailed planning and establishment of a data bank. Our experience to date shows that many independent data banks are in use mostly in the fields of taxation and accounting with a smaller number in the resource field, all cannot be classed successful or economical to the user. Using the approach outline above, a proposed data bank, such as a computer based land titles system may not be economical in itself, but when it has the capability of forming the base on which additional data banks can be integrated it may then become economically sound and at the same time make additional data banks feasible.

### **Summary**

In communicating between professions little problem is foreseen in the definition of the words Integrated Environmental data bank, but the co-operation required for a unified approach to the problem of data banks remains unsolved. The magnitude of the problem is so large it can be frightening, so encompassing as to cover all professional bodies even affecting the conditions and influence under which we live. The survey engineer is only one of a team, with a product being the definition of a unit of land, that other members of the team collectively or individually not only could but should demand its uses as the basis of or integration for data banks.

The building blocks as outlined above can then be defined and bear repeating once more:

1. A common denominator — the establishing of an international currency of a the relationship of data to that currency.

2. The unit of land as a common denominator — the indefeasible location of a unit of land being our common denominator.

3. Indefeasible Location and Presentation — the unit of land being defined in geographical or cartesian co-ordinates and with presentation on a map having identical geometric value.

4. Horizontal Approach — a non duplication in the collection of data with a standard form of input but a variable print out to suit the demands of the user.

5. Integration of data — the storage of applied science data for multiple use.

6. Environmental Data — the ability to relate our surroundings geographically to a data bank.

7. Economy — the putting of first things first so successive data banks strengthen the economic base of previous data banks, and make future data banks feasible.

### **Conclusion**

The information contained in this paper is not all original but an attempt to summarize present day thinking and thus debatable. If the basic building blocks are not

correct or acceptable let us redesign our house. Thus symposium will have an enormous effect on the design of data banks. Let us do our basic home work thoroughly, constructively with an absence of fear in the face of "big ambitious ideas", and of necessity with close professional co-operation.

Date: November 8, 1968

W. F. Roberts  
Technical Director  
A. P. S. A. M. P.

#### Case IV

##### The gore lot overlap

"You must know — " said the Judge  
but the Snark exclaimed "Fudge!  
That statute is obsolete quite!  
Let me tell you, my friends, the  
whole question depends  
On an ancient manorial right."

A Statement of Claim and a Statement of Defence were filed in the New Brunswick supreme court as No. 85, Causes, 1930, over some 36 acres of marginal land in Charlotte County.

Essentially, the dispute hinged on the location on the ground of the boundary (AA' in fig. 5 (a) between the northern part and the southern part of the northern half of a gore lot (fig. 4) lying between the rear of the lots along the Oak Hill Road and the lots facing on the Basswood Ridge Road in the parish of St. James. The plaintiff could trace his title to land in the gore lot south of this boundary back to the Crown grant of 1826; similarly the defendant could trace his title to land north of this boundary to the same Crown grant.

In support of his claim the plaintiff cited a recent retracement by H. Sheldon Laughlin, Deputy Land Surveyor of a line originally surveyed in 1845 along the south boundary of his property; the defendant cited a survey of the "northern part of the northern half" in 1919 by H. M. Balkam, Deputy Land Surveyor, and it was on the strength of this survey that the defendant had occupied the disputed parcel.

Many surveys have been done on these and on adjoining lots; several plans of survey by Deputy Land Surveyors have been found, notably those of Campbell, 1826; Mahood 1831, 1839, and 1845; Jack, 1857; and Gillespie, 1903. In a recent resurvey E. R. Jamieson, N. B. L. S. examined all the available evidence and concluded that by the 1903 survey lot 22 overlapped the original gore lot. Presumably Balkam in 1919 accepted the 1903 survey as defining the north boundary of the gore lot and on this assumption, located the boundary at BB' (fig. 5 (b) ) some 15 chains south of AA'.

Fortunately, the case was settled out of court, otherwise the total of the legal fees and costs would greatly have exceeded the value of the land.

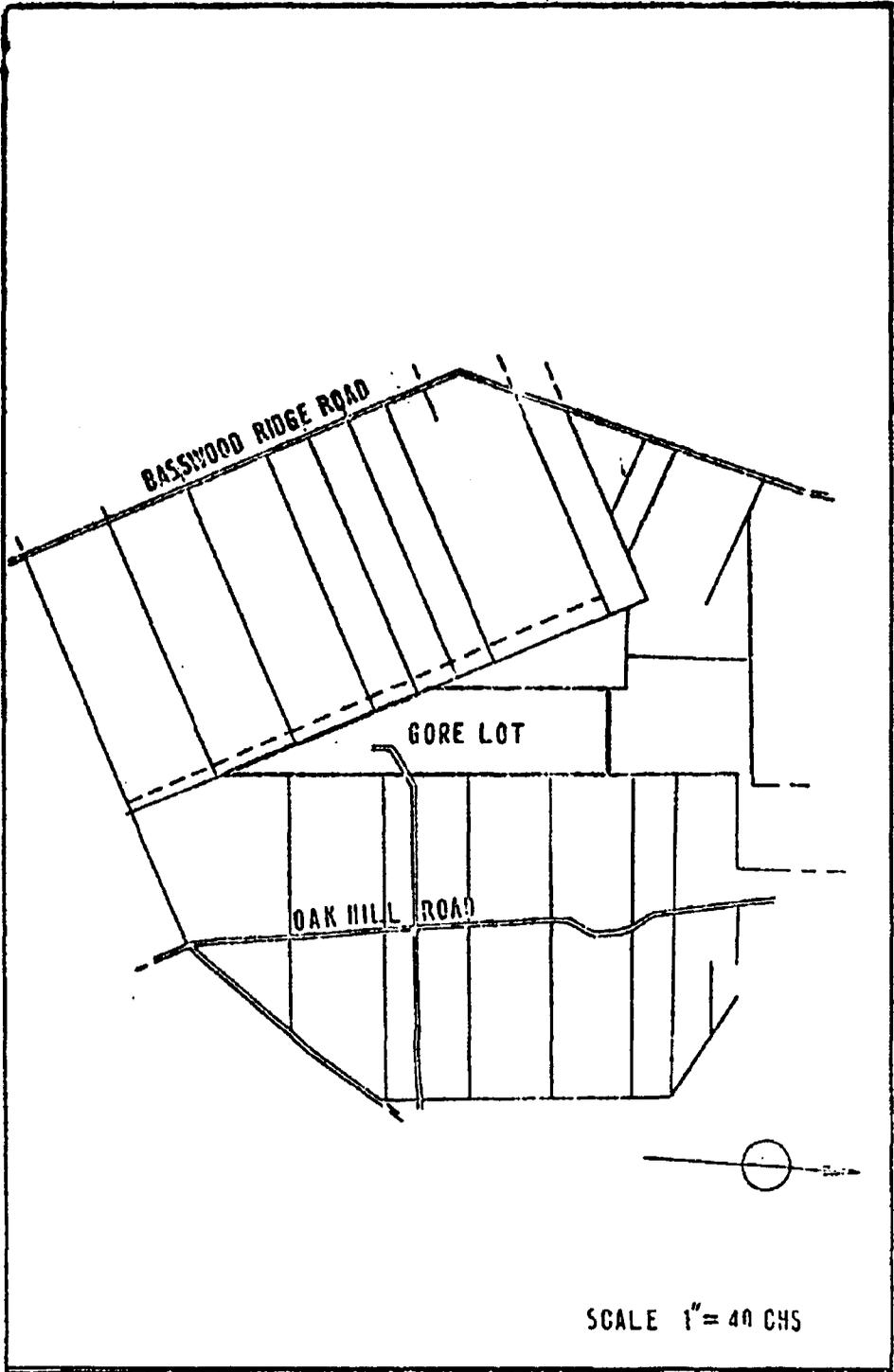


Figure 4

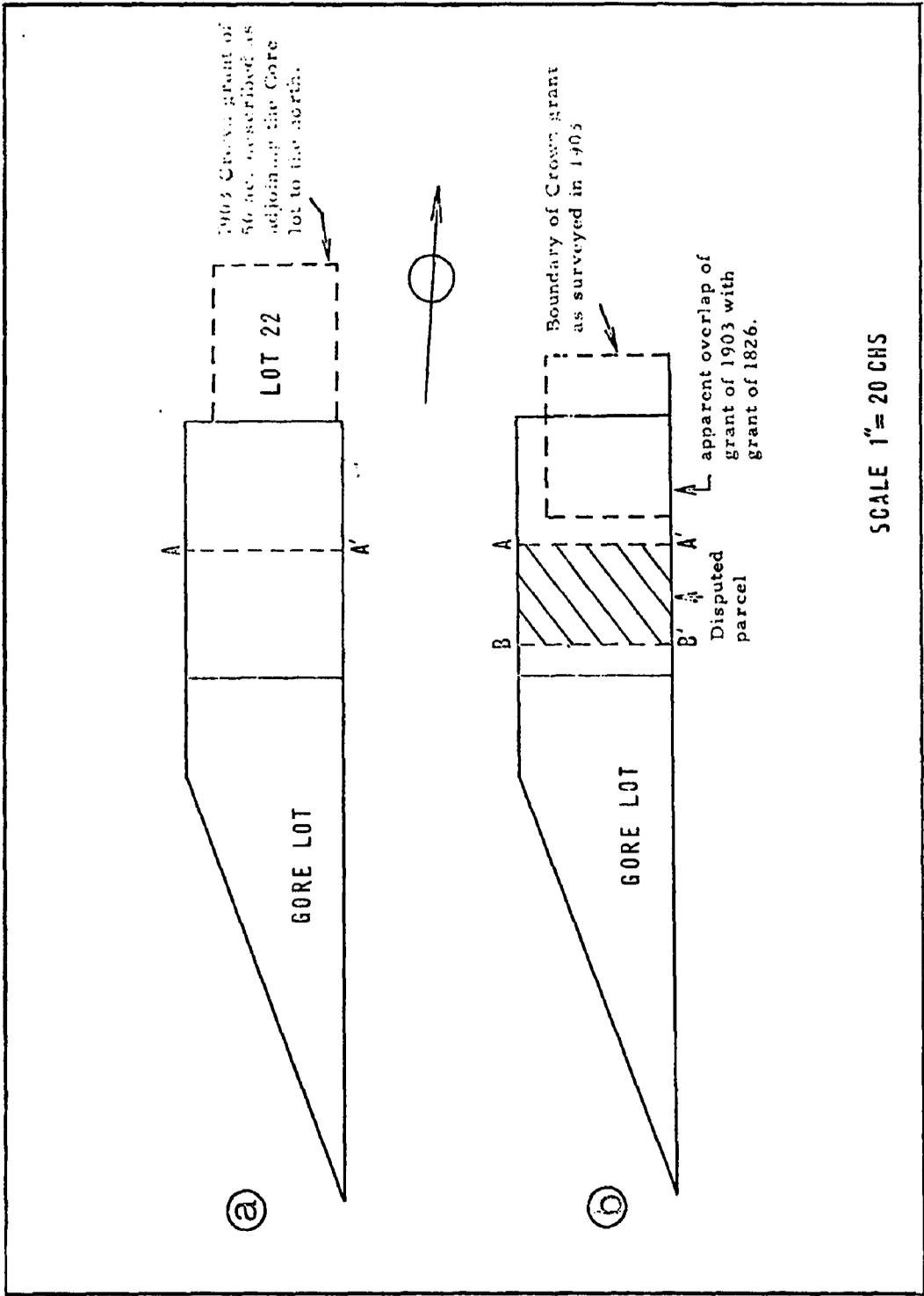


Figure 5

## Case v

### Lot No. 7 — In Duplicate

“Caveat emptor — let the buyer beware;  
He may buy a title that never was there.”

On June 17, 1957 by deed No. 17741 the ownership of the area bounded by the heavy line in Fig. 6 was transferred from Mr. and Mrs. A. to the C Corp. Ltd. Part of a long metes and bounds description reads “...thence southwesterly and southerly by the various courses of MacKenzie Street a distance of 275 feet, more or less, to the intersection of the west line of MacKenzie Street with the south line of Lot No. 7, as shown on a plan of lands of Charles J. Campbell, dated August, 1886 and filed in Book P at page 63 in the Registry of Deeds at Baddeck, Nova Scotia; thence westerly 93 1-2 feet along the southern line of said lot No. 7 to the southwest corner thereof; thence by the west line of said lot No. 7 northerly a distance of 59 feet, more or less, to the northwest corner thereof; thence easterly a distance of 66 feet along the boundary between said lot No. 7 and lot No. 11 as shown on said Plan; thence northerly .....

On March 11, 1958 by deed No. 17939 the same purchaser, the C. Corp. Ltd., bought property from Mr. B. described as being bounded:

“On the west by lands in the possession of Peter MacLennan;  
On the East by MacKenzie Street;  
On the North by lands formerly owned by the late Charles J. Campbell;  
On the South by lots 5 and 6, the lot herein conveyed being lot No. 7 on a Plan registered in the Office of the Registrar of Deeds at Baddeck in Book P at page 63.”

Clearly Lot 7 was included in the first description and it is equally clear that it is described in the second deed. Why was it purchased twice?

The origin of the confusion will never be established with certainty but it is certain that lot 7 was being occupied and had been, for a long time, accepted as part of the A's property. Nevertheless, the last registered deed on Lot 7 was in the name of Mr. B. This was not the only point of confusion: Mr. B. who, on paper, owned Lot 7 was living on and thought he owned lot 6; the registered owner of Lot 6 was living on and thought he owned the northern part of Lot 5!

To ensure clear title the C. Corporation thus was obliged to buy lot 7 from the occupants of it and also to buy it from the registered owner. Presumably the Corporation, after discovering the confusion could have let M. B. and the A's resolve the ownership problem in court but this would have taken years. To avoid a delay that could have cost more than the value of the lot the C. Corporation took the quick and honorable alternative of buying the lot twice!

## Case vi

### Angles vs. Distances

“Good boundaries make good neighbours”

In April 1952 by deed no. 117976 Mr. A. conveyed to Mrs. B. a parcel of land in the parish of St. Mary's, County of York, New Brunswick, bounded and described as follows: “Commencing at a point on the northeast side of the Richibucto Road where the Harry Barker property meets the said road boundary; thence following along the northeast boundary of the said Road towards Barker's Point a distance of two hundred sixty feet (260') ; thence at right angles to the said road in a northeasterly direction a distance of one hundred sixty feet (160') ; thence at right angles and parallel to the Richibucto Road in a northwesterly direction a distance of two hundred sixty feet (260') to the

Harry Barker sideline; thence at right-angles along the said Harry Barker sideline toward the Richibucto Road a distance of one hundred sixty feet (160') to the point of beginning."

As illustrated in fig. 7 Barker's line does not make a right angle with Richibucto Road! Three of the many possible interpretations of this description are sketched on the figure as the quadrilaterals, PQRS, PQR'S', and PQR'S''. To say that a description such as this is laying the groundwork for debate is understatement. The successors in title to this and adjoining properties have been in disagreement for years and a case arising from it is now in litigation.

#### **Case VII — Large Scale Squatting**

In Newfoundland the practice for settlers to take possession of land by prescription was firmly established prior to the 1900's and is continuing today to a limited extent. The percentage of land lots so alienated cannot be easily determined but it has been estimated that between 50 per cent and 60 per cent of land owners have neither lease nor grant to the lands they occupy. (There is no property tax in unincorporated settlements.)

The Crown Lands Division of the Department of Mines, Agriculture and Resources has made an attempt in certain areas to determine the boundaries of lands which have been alienated from the Crown. In dealing with this problem land lots occupied in one isolated settlement (Graes Cove) were delineated from aerial photographs (Fig. 8) and the grants of land within this area were also determined. The result showed that there were approximately 150 occupied lots and only 6 valid titles, four of which could not be plotted on a plan because of indefinite descriptions (Fig. 9). With reference to Fig. 8 it should be noted that no attempt was made to define boundaries between adjoining lots. Maps now being compiled show land in two categories: (1) alienated land and (2) Crown land. Claims to land now alienated will be legalized, where possible, upon request but further squatting on what is now Crown land will be neither permitted nor condoned. In Fig. 9 (a), (b) and (c) copies of the plans and descriptions from three of the six Crown grants made in Graes Cove are reproduced.

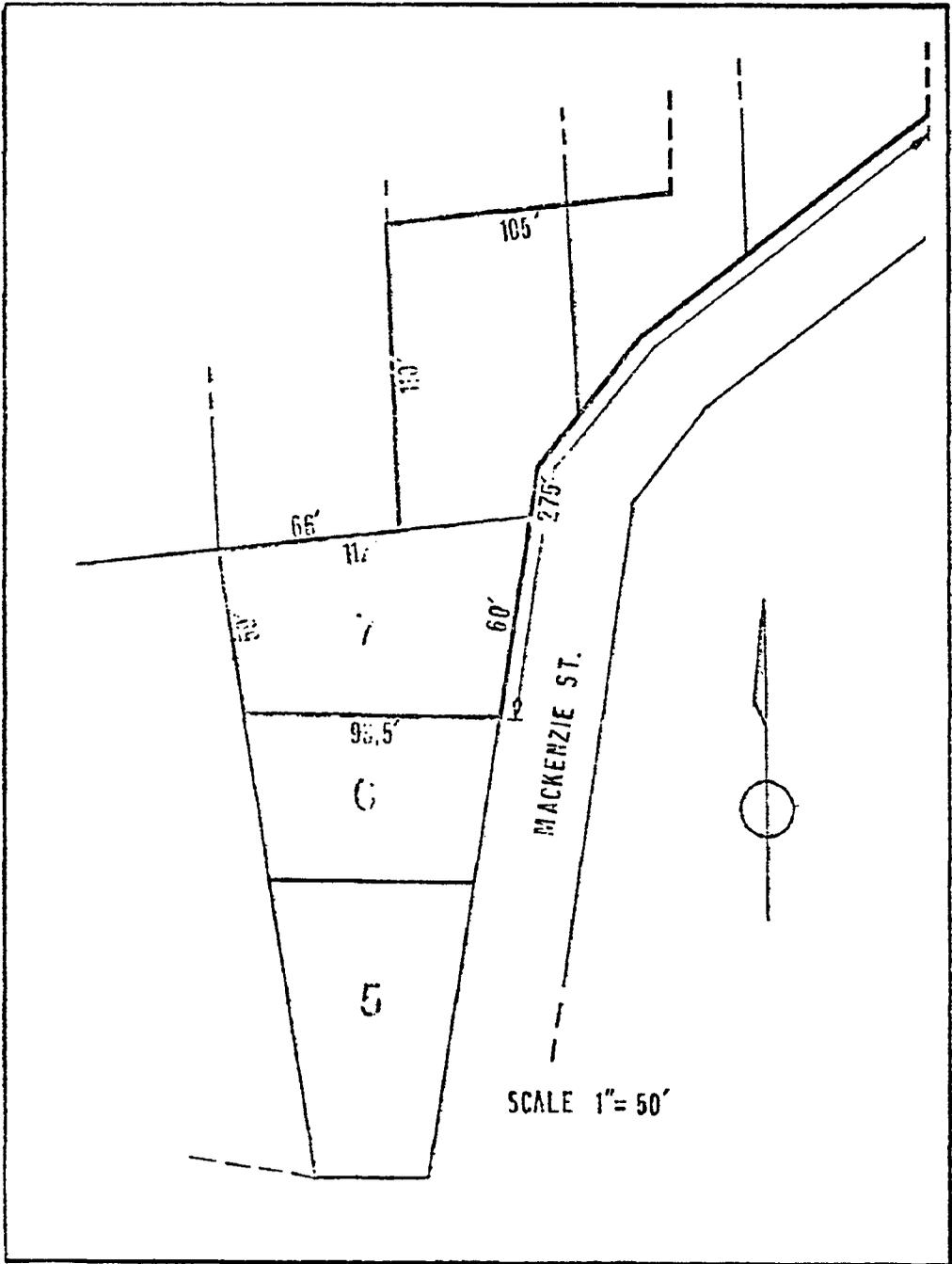


Figure 6

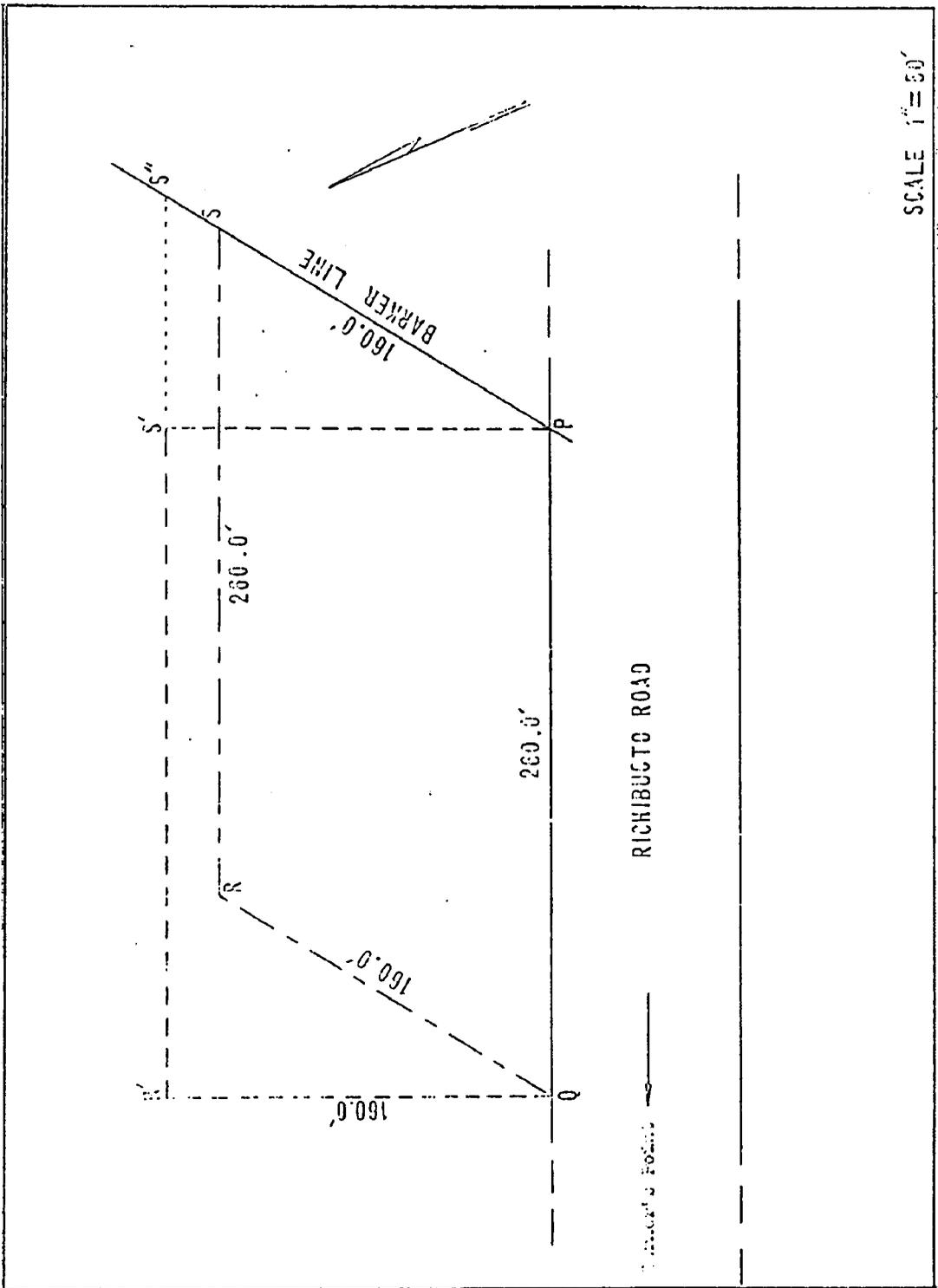


Figure 7

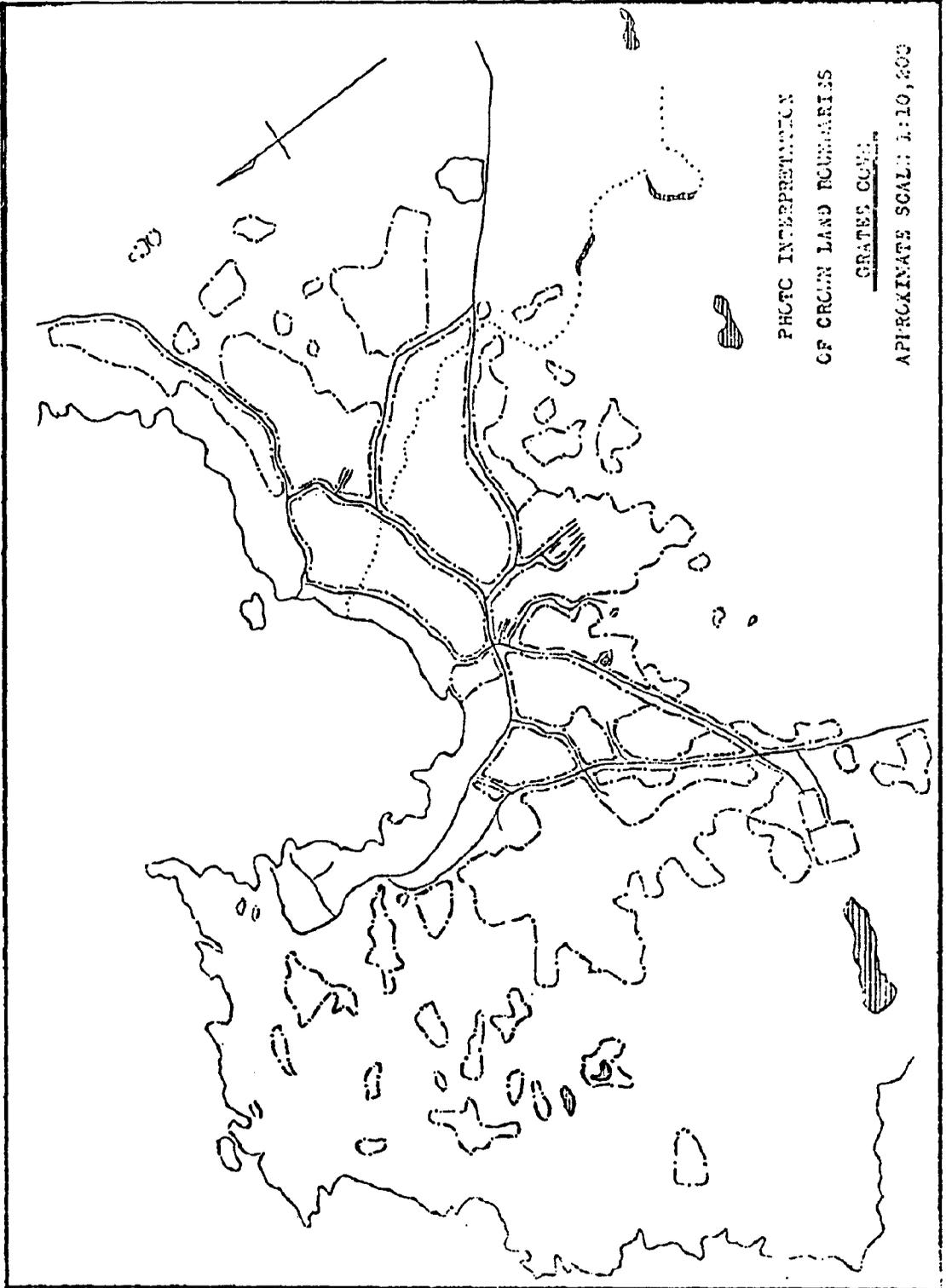


Figure 8

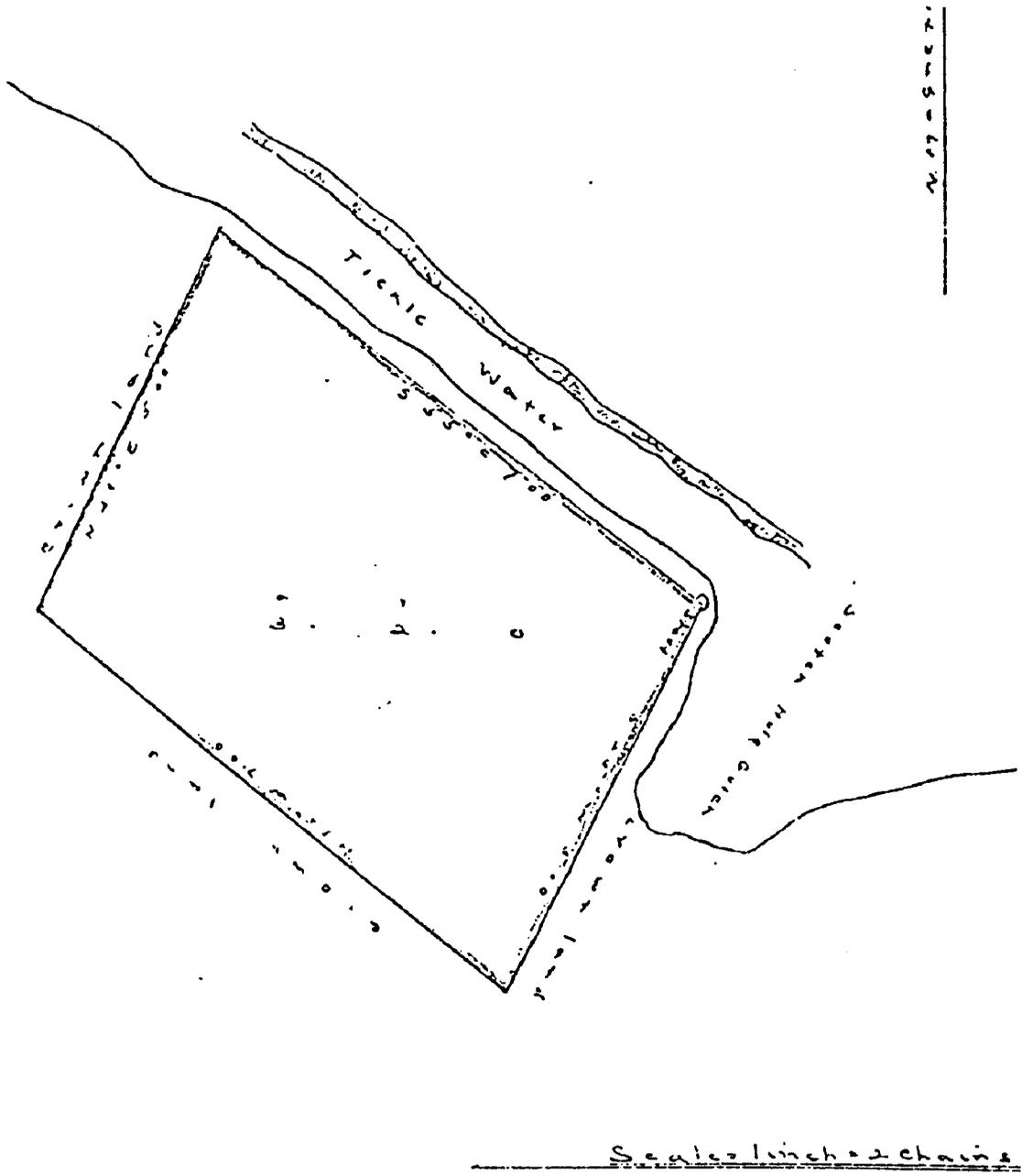
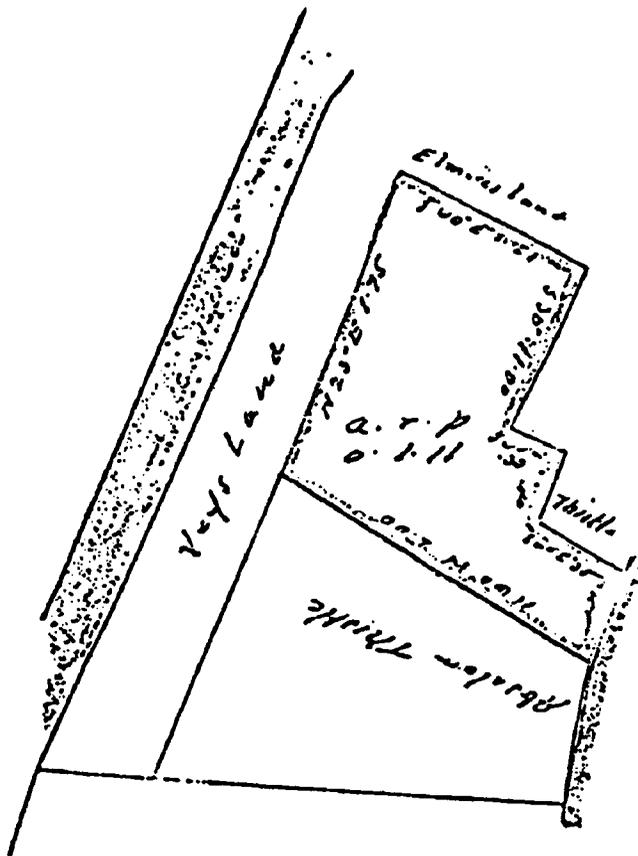


Figure 9a

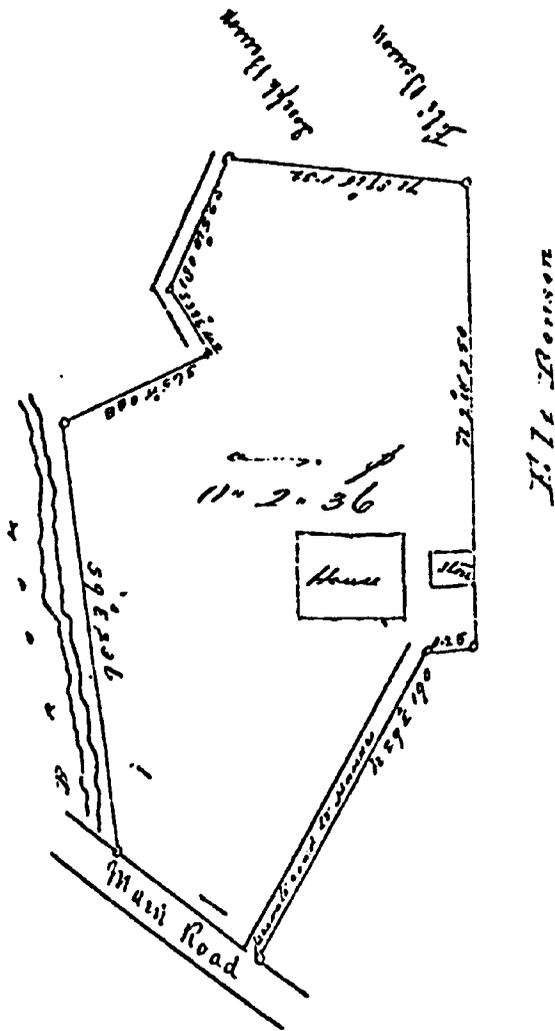


Scale 1 inch = 1 chain

Figure 9b

“All that Piece and Parcel of Land situate and being at Grates Cove aforesaid abutted and bounded as follows, that is to say, by a line commencing at a point: on the shore at high water mark the North-East angle of land of A. Thistle running thence by said land North sixty degrees west two chains more or less thence by land of one Vey North twenty-three degrees East one chain and seventy-five links more or less thence by Elmore’s property South sixty degrees East one chain and twenty-five links more or less and thence by the shore at high water mark to the place of commencement. Reserving nevertheless out of the above described land a space fifty links wide along the shore above high water mark for Public Use if required. And being of the dimensions specified in the diagram delineated ....., and containing one rood and eleven perches more or less .....”

Crown Grant No. 14196, 16th March 1916



*Rule 50 in R to the land*

Figure 9c

“All that piece and parcel of Land situate and being at Grates Cove aforesaid abutted and bounded as follows that is to say commencing at the junction of the public road (which is to be kept one hundred feet wide if required) with a private road to Grantee's House, thence along the same North twenty-nine degrees East one chain and ninety links more or less: thence in an Easterly direction twenty-five links: thence bounded by land in possession of Eli Benson North two degrees West two chains and fifty links more or less: thence North eighty-seven degrees West one chain and thirty-two links more or less to another road thence along the same South five degrees West eighty-one links more or less thence South thirty-two degrees East forty-two links more or less thence South sixty-five degrees West eighty-eight links more or less thence bounded on the West by a brook South nine degrees East two chains and thirty-six links more or less to the aforesaid public road thence along the northern side of the same fifty links more or less to the place of commencement. And being of the dimensions specified in the diagram delineated ....., and containing two roods and thirty-six perches more or less .....”

### Case VIII — Chains, Links and Feet

Until 1935 dimensions of land lots in Newfoundland were recorded in chains and links and the surveyor's diagrams, without accompanying descriptions, were used for the preparation of documents of title. After 1935 land surveyors were required to submit survey plans with dimensions in feet rather than in chains and links.

During the transition period it was inevitable that misinterpretations would occur. In the preparation of the description for lease no. 622 dated 19th September 1936 the figure of 300 on the surveyor's plan was taken as 3 chains (198 feet) instead of 300 feet (Fig. 10). In 1947 a Crown grant for agriculture (no. 20,840, in Vol. 115, Folio 90) was made using the same description. The grantee assumed thereby that he became the owner of the lot originally staked by the surveyor, whereas he had valid title only to the parcel described in his grant. He subsequently sold portions (see fig. 10) of what he believed to be his grant but only recently was the mistake discovered and action initiated to correct it.

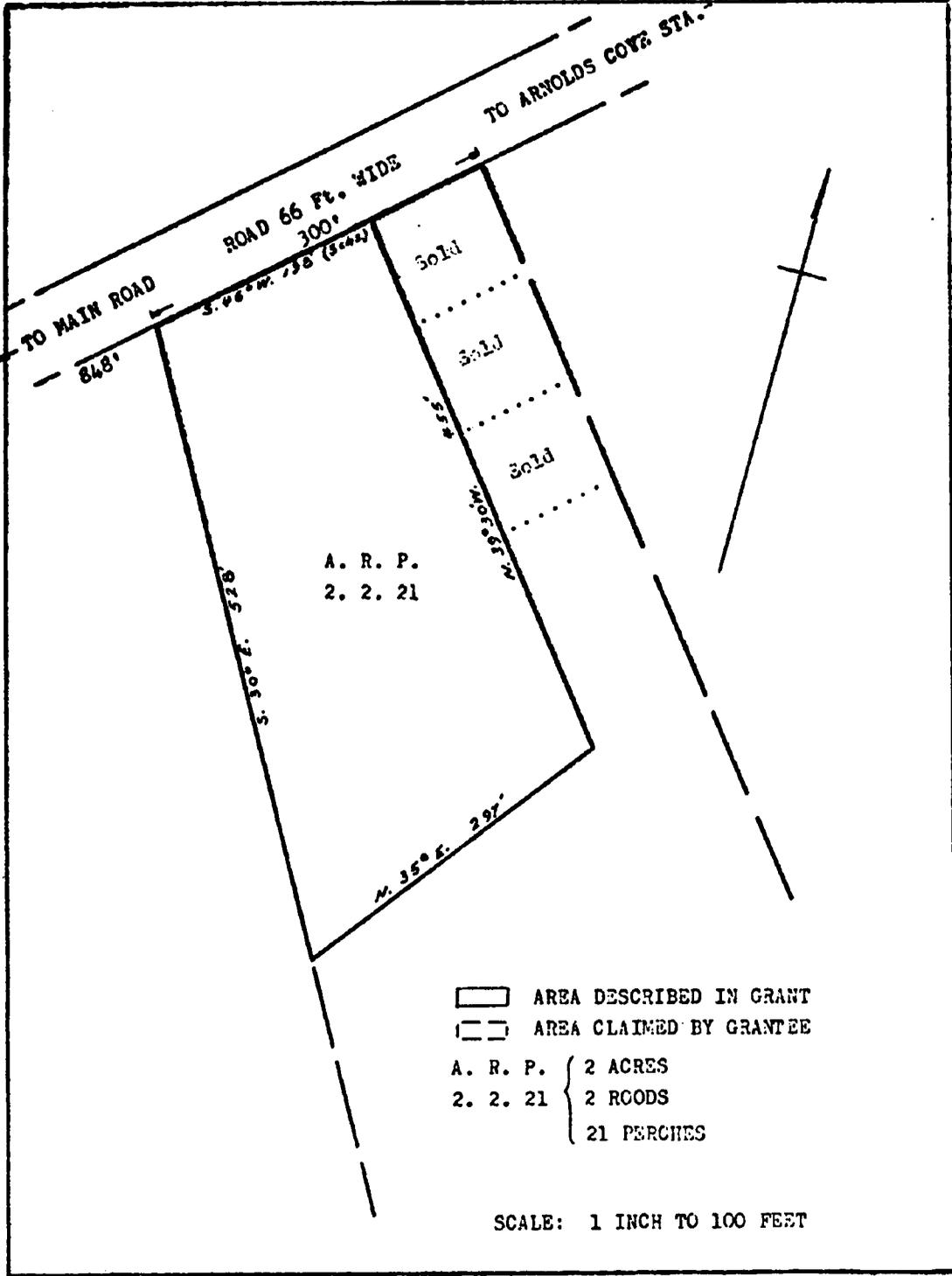
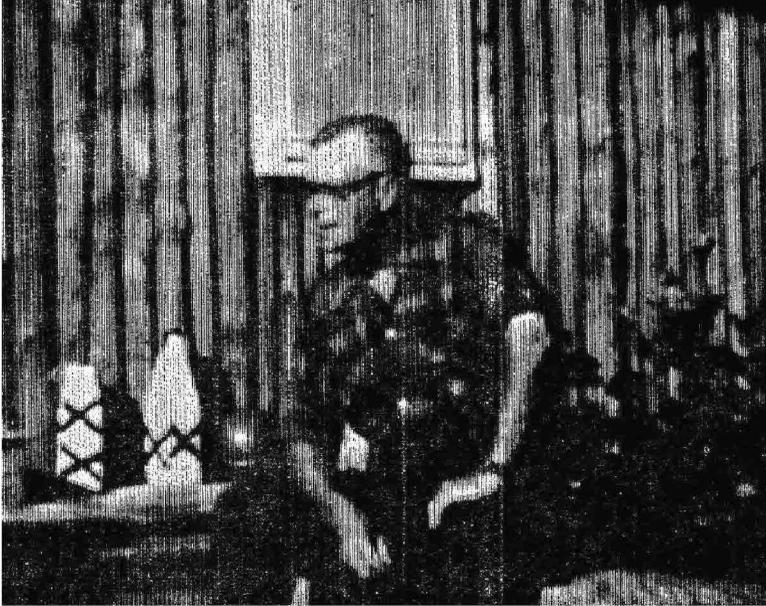


Figure 10

## REGINALD EVAN DICKIE



As we go to press, we pause, to record the passing of one of our staunchest members, one who was a charter member, recorded on our rolls as Number 2.

Reginald Evan Dickie N. S. L. S., passed away at his home in Brooklyn, Queens Co., N. S. on July 1st, 1969 at the age of 74 years.

Reg, as we all knew him, was a Land Surveyor and a man with a remarkable memory of places that he had been many years ago in the woods and of the geneology of the many families he met with in his work of land surveying.

Reg's day on the survey began as soon as it was light enough to see and finished when it was too dark to work. Time and distance were irrelevant when searching for line marks and family geneology. His drive and energy were one of the major factors in the formation of the Provincial Land Surveyors Association of Nova Scotia. There were those who said it was tried before and would not work. Reg either didn't understand or didn't hear them and persisted in the effort and along with a few others the Association came into being in 1952 and was incorporated in 1955. Shortly after its incorporation he was elected to the office of President where he served for a one year term, then was for several years a councillor for the Western part of Nova Scotia; later he was elected an Honorary Member of the Association. Whether in office or out, Reg kept a weather eye on the progress of the Association, being quick to add constructive criticism when he felt it was necessary.

His untiring energy permitted him in his spare time to record much of the history of land transfers in Queens, Annapolis, Shelburne, Lunenburg, parts of Halifax Counties and Cape Breton Island.

His hobby was geneology and land title searching, in this work he was among the best in the Province. When he had a survey crew in the bush country their welfare came first even if it meant his coming in by car, canoe and on foot with a pack half his weight on his back; this more times than not being after he had spent a full day in the office, preparing plans and information for his work crew.

He was born at Upper Brookfield, in Colchester County, Nova Scotia, where he received his early education, then attended Nova Scotia Technical College, receiving his license as a Provincial Land Surveyor in 1920. He then went with Hollingsworth and Whitney on surveys of their land in Nova Scotia, Completing this job, he then joined the F. J. D. Barnjum group in 1923 in surveying their large holding scattered over the province.

Completing this work he worked as a private surveyor in his home county up until 1929 when he joined the staff of The Mersey Paper Company in Brooklyn, Queens County and became their Chief Surveyor, which position he held up to the time of his retirement in 1965.

He was keenly interested in the Nova Scotia Land Survey Institute in Lawrencetown and served on the Advisory Board of the school.

Following his retirement he did title searching for several large projects, some being the Earth Station at Mill Village in Queens County and the Kedgie National Park in Queens, Annapolis and Digby Counties.

He was for many years a Trustee of the Township of Liverpool and became Chairman upon the death of Freeman Tupper, this job he held until his death on July 1st, 1969.

Surviving are his wife, Lottie, Liverpool; one daughter Joyce (Mrs. Donald Matheson) Denmark, Colchester County; one son Ted, Halifax; an adopted daughter, Irene (Mrs. Nelson Amiro), Halifax; one sister, Miss Helen M. Dickie, Halifax. One daughter, Merle (Mrs. Edward Pike) is dead.

#### NOTES FROM THE SECRETARY'S DESK

On March 29, 1969, I attended a regional meeting of Association members from the Eastern section of the province, held at the Heather Motor Inn, New Glasgow. A total of 19 members were present and the meeting was chaired jointly by the Councillors for the area, Mr. Emerson Keen and Mr. Albert MacCallum. A full report on this meeting is published elsewhere in this issue.

On the first of April this year, our President, Roy Dunbrack became associated with W. E. Servant Surveying Ltd. as vice-president and director. We wish Roy the best in his new endeavour. Roy previously served as chief surveyor for eleven years with the city of Halifax.

Max Rafuse, one of the councillors for Halifax City, has opened his private practise in Beaverbank, N.S. Max had previously been employed with the Department of Lands and Forests for the past four years. We wish him much success in private practise.

Peter Dodge has returned from South Viet Nam where he was surveying for K. C. Irving on a dredge enlarging the harbours of Saigon and Da Nang. Peter has resumed his private practise in Halifax. I have asked Peter to write an article for the Nova Scotian Surveyor on his work in Viet Nam and his return trip home via Australia and India.

The proposed changes in the Regulations have been forwarded to the Board of Examiners for their consideration. The proposed changes to the By-laws have been forwarded to our solicitor so that a proper Notice of Motion can be drawn up and mailed out prior to the Annual Meeting in November.

You are asked to keep in mind the dates for our 19th Annual Meeting. It will be held on November 7th and 8th, at the Citadel Inn, Halifax, N. S. Last year 78 members registered. Plan now to attend and see if we can top that number. Our regular exhibitors and some new ones will be in attendance.

Congratulations are extended to Fred Newbery who has just been appointed chief surveyor for the City of Halifax replacing Mr. Dunback. Congratulations also to Fred Roberts who has been appointed Supervisor of Surveying and Drafting for the City of Halifax.

Since our last Annual Meeting, the following new members have been accepted into the Association: Edward J. Webber, Lake Charlotte, Halifax County, N.S.; W. Russell Atkinson, Bedford, N.S.; William A. Thompson, Lower Sackville, N.S.; Arthur A. White, R.R. No. 2, Armdale, N.S.; Gordon R. Kressner, Kentville, N.S.; Fred W. Roberts, Oyster Pond, Jeddore, N.S.; Marcellin S. Chaisson, Belle Cote, Inverness Co., N.S.; Robert Kent Carrick, Halifax, N.S.; Harold E. Burton, Shubenacadie, N.S.

For those who are interested, the opportunity to obtain Group Insurance through the Association will be available in the near future. You will be receiving information directly from the insurance company.

We welcome Ivan P. MacDonald to Halifax and to Nova Scotia. Ivan has accepted employment with the survey section of the Department of Lands and Forests after several years with Legal Surveys, Department of Mines, Energy and Resources, in Ottawa. Glad to have you aboard, Ivan!

In closing, I would ask all members to watch for the dates of Regional Meetings to be held in your area and make an effort to attend. These meetings are certainly worthwhile and are very important to the growth of this Association.

Edward P. Rice, Secretary-Treasurer

#### **REPORT ON REGIONAL MEETING HELD AT NEW GLASGOW, N. S., MARCH 29, 1969**

A meeting of association members in the Eastern Region was held on March 29, 1969, at the Heather Motor Inn, New Glasgow, with nineteen members present, including Secretary-Treasurer E. P. Rice.

The meeting was opened by E. Keen, who reviewed the work presently being carried on by the Council using the agenda of the last Council Meeting as a guideline. A keen interest was displayed by those present resulting in many questions and inquiries which were answered by the two councillors present with the able assistance of Ed Rice.

The following items or suggestions were brought forth:

1. An editorial should be run in the local newspapers informing the public about land surveyors and their work.
2. All deeds recorded should be accompanied by a plan covering the lands described therein.
3. A definite minimum rate should be established.
4. Proper monumentation strongly recommended.
5. Registry Act should be fully proclaimed.
6. The idea of transferring unused portions of old highways back to the adjacent property owners was suggested as something the Highway Committee might work on.
7. A surveyor's Manual or Handbook should be drawn up containing all the rules

and regulations and useful data pertaining to land surveying, and made available to all surveyors.

The meeting appeared to be very successful and another meeting in the fall prior to the annual meeting was strongly recommended.

E. C. Keen,  
Councillor, Eastern Region

Ladies and Gentlemen:

I think I should preface my talk this morning by stating that just because I come from south of the border, I did not bring this storm. I left Boston in the driving rain, sheets of it; one could hardly tell if Logan were above or below sea level but when I got to Saint John the storm was just beginning, thus I feel I beat it here and did not bring it with me.

There are some underlying factors behind my talk which I feel should be explained. The Boston Edison Co. area includes about 1,500,000 people living in about 600 square miles or about 2500 people per square mile. These people live from the City of Boston with 14,273 people per square mile to Somerville with 21,967 per square mile to the small town that has 154 people per square mile. Therefore, you can see that I go from the tightly packed urban area to a rather sparsely settled urban area all within a 40 mile radius of Boston. Prices of land as you may imagine vary as does the population density. But we in the surveying, engineering, and law fields are apt to be like the two Vermont cows standing on the hill looking down the valley across the river and railroad to the winding road below. Along came a dairy tank truck with the following sign in large letters, "O'Shaughnessy Dairy, Pasteurized, Homogenized, Vitamin D added and Irradiated." One cow looked at the other and said, "Makes you feel rather inadequate doesn't it?" And that's the way I feel this morning. I'm not quite sure why I should be here addressing you.

When I was first approached I had some vague idea I would somehow be talking on computer use to the legal-surveying field of which I have a limited knowledge. But when the preliminary drafts of this Symposium was sent to me and I noted what I was listed for, apprehension set in. My first reaction was negative — what use could Industry get out of Land Registration and Date Books? The more I thought of the cost involved the more convinced I became I was right. But then the serious thinking started. I abandoned my parochial land surveyor-attorney thinking, and we attorneys are bound by precedents; we love them, and upon precedents we base most of our moves. Surveyors are apt to be this way, too. Thus I have arrived at my next tale of the day, the story of St. Peter and Satan discussing the boundary line of heaven and hell, probably recorded by one of the old precedent established methods. After this discussion had carried forth for a long period of time, St. Peter threw up his hands and told Satan, "I'll see you in court" Satan roared with laughter and asked St. Peter where he could find an attorney. There is my precedent. But I do believe we all know that we in industry, surveying, or law have been bound for years by precedent or "don't rock the boat" or "why should we change now?" Why shouldn't we change and why shouldn't industry change now, to newer thoughts, more progressive ideas, and a realism that the boat HAS to be rocked?

Directors of corporations are responsible to the stockholders to exercise at least the degree of care that an ordinary prudent and diligent man would exercise under similar circumstances. With this mandate long established in the courts the directors have a duty to use computers and allied facilities. Thus, we in industry are continually looking for the most progressive way to get the most done for the best per unit

cost. That is why aerial photography has made such strides, automation almost everywhere. I said everywhere but I do question if land data has kept up, when one considers that we are still using archaic title systems of listing by persons names. The last great improvement in that system was the Torrens system and that has not been universally accepted. We today cannot get a record of a particular parcel of land without a laborious, tedious title research, the same basic title search procedure that was done 50 or 100 more years ago. This is ridiculous. What other industry has stayed this stagnant? I think those industries that have, have failed, vanished; the long lost arts so called. Perhaps this is why conveyancing as it is known today is a vanishing art.

Where do we go then? Well, industry soon is going to demand that improvements be made. Soon we will go to a central clearing house, possibly government run, and get all pertinent information about a certain tract of land; not a particular persons name, but a parcel. People die, move, sell, but the land basically remains constant. This information will tell us in industry the facts about the land, give a reference, or if we get sophisticated enough, give a print out of the description, where and when the last plan of the parcel was recorded. Eventually we could insist that, after a certain interval of time or number of transactions, a new plan or certification of the old plan be recorded. This we already know about, but what else does industry demand to know?

It does not take much imagination to include zoning in our record bank. It may seem funny in this age, but I can go into one town in Massachusetts, and to find out what the zoning areas are, I have to have the one person in the town hall unlock the door to an inner office. Now, this office is where the select men, planning board, assessors, and board of health etc., meet on successive nights. Hanging on the back of this door is the official zoning map of the town.

To my knowledge it has never been reproduced. After you locate the area you have in question, then you have to examine the yearly town records to see if any town meeting voted to change the zoning in the area in which you are interested. Can you imagine telling a client or board of directors that you either could not get into the back room or that you just misread some action in the town meeting? That is probably an overly dramatic instance of non-availability of record keeping, but it has and does affect me personally. Thus, how would or could you convince industry into moving into such an area with this type of records? Perhaps I should say why should industry have to go and ferret out this public information? It should be readily available. Zoning plans can be established to the accuracy we need in industry just as easily as assessor or tax maps are. Building codes requirements as to set backs and building heights which are frequently done by areas could also be incorporated. These factors are of prime importance to industry when considering moving or relocating.

What is industry looking for when we study an area? The basic factors have not changed radically over the years — a raw material, a ready and able employee market, ease of transportation, and tax incentive. When inducing industry to locate in a certain area then our data bank can readily pick out the factors. The ease of determining not only where the plant should be located but the proximity to its potential use, ease with which people can get to the plant, cost of utilities are all factors that a forward looking industry wants to know and a progressive industrial group could have stored for easy referral.

But is this up to industry to provide? Industry as a whole is not in the land study business except at a few isolated times in its life. At least, the average industry is not. If I may digress for a minute, the title insurance or mortgage business could easily use such a system. I know some banks are not sure when they last checked their prop-

erties. This could be stored and a print made out indicating the last time a visual check was made, condition, description, etc. But this is one industry that is in the land business. There are not many of these businesses.

The average industry does not care about how the land records are kept. Usually it owns one or two lots of land and gets its tax bill periodically. What else then could such a system provide. Everybody has heard that industry has and does use the computer to print payrolls, and keep inventory. Why can't an inventory of all tangible goods be kept, all the property tax bills, assessment values, depreciation rates, number of times a facility was used for a particular purpose? These are factors that directors and industry need to know in order to fully analyze the efficiency of the operation as a whole. As an example we can talk about the mining or the lumber industry, the potential remaining based on a total growth or supply vs. the yearly rate of use. Or even to a higher degree of sophistication could be when and where to start the next major operation to synchronize with the exhaustion of the present operation. Take for example the idea that a new mine or lumber operation has to be commenced within five years. If the program were established properly, it could say when to start the preliminaries of the new aspect and at what location and what key personnel to be transferred and when. Another phase would be to keep records of rainfall and growth, thus a yearly prognostication could be given of when to start the cutting if it is a lumber operation. These are some of the more important facets and there are many more.

For the industries with large holdings there is a comprehensive tax record program—basic real estate tax, assessment, depreciation, depletion allowance, age and obsolescence of the physical plant. Just think what such a broad picture this could present when tied to various wage patterns as to which plant should be closed down, modernized or left as it is. Just think of the industry that has a large supply of a raw product, either rate of consumption or rate sale. These are just a few of the positive approaches.

We can not and should not think that such a date bank system as we contemplate will be used just for property work. Industry is not going to pay any more for a printed out title search, with accurate control data for the property corners than it has to. We will not be able to sell some industries if their competition does not also have the same inherent costs. Thus, who is going to pay is the old problem we in industry have to face. I stated earlier it is the directors duty to use due care for the companies benefit, and they must be progressive. But conversely, they cannot be so progressive that they are trying all experiments. There is little advantage to the average industry in just keeping the land title record information. If industry is going to gear itself or its program into a governmental system can it efficiently do so? Usually a governmental body buys a machine and then has to keep it until it is way past obsolescence; industry could not afford to do this with average competition. Newer machines are often used by industry before a governmental office gets close to having them. Another point is if industry ties itself into a governmental record keeping date book will there be the secrecy that is frequently needed in the study situation? These are a few of the drawbacks of a governmental-industrial relationship.

These are just a few examples of what I consider the more obvious advantages and disadvantages, but what about the people who will have to implement these innovations? Basically we land surveyors, attorneys, and engineers have been and probably will be too narrow minded in our thinking. We fail to want to change. If we do not change our thinking about implementing changes and do not continue to strive for these changes, we will be by-passed. Industry will tell us what they have done; you figure out how you want to record it. We have to lead, we have to get the far sighted leaders who can force these innovations. We, at the present moment, are like the old

tale of vitality of man; compared to the lion, monkey or donkey. What bracket are we in?

## CONTROL SURVEYS AS A FOUNDATION FOR AN INTEGRATED DATA SYSTEM

By G. KONECNY, Head, Department of Surveying Engineering  
University of New Brunswick

### 1. Introduction

Environmental data systems usually refer to objects on or close to the earth's surface. In most cases the data refer to specific points (geo-physical data such as measured gravity, temperature, radiation). In other cases they refer to areas (land parcels, water surfaces, municipalities; or they may apply to volumes (ore bodies)

As most human beings think in a three-dimensional concept the definition of a point is given by the coordinates of a three-dimensional coordinate system. Unless special identification is available for which the process of interpretation is necessary the coordinates constitute the only means to identify the point geometrically within its environment. If the point, by definition, lies on the earth's surface then it is possible to define it by a curvilinear two-dimensional surface-coordinate system, such as latitude and longitude, ignoring the height. A number of possibilities exist to project such curvilinear coordinates onto a plane or surfaces physically or mathematically developable into a plane. As long as the geometrical relationship on the surface is defined by one such curvilinear or plane coordinate system the point becomes identifiable. The choice of the coordinate system is immaterial in this context, and will be subject to practical considerations to be discussed in subsequent papers.

The coordinates must refer to a well defined, unique origin of the coordinate system, which can be related to monuments on the ground. The laws of simple analytic geometry provide the means to deduce distances and directions between adjacent objects out of their coordinate values.

An area applies to a surface and is described by its boundary. The boundary consists of a series of points which are interconnected by straight lines or by curve segments. This also applies to irregular natural boundaries (rivers, lakes), since they may be thought of as extending between a great number of points interconnected by very small lines or segments.

The effort in defining an area is considerably bigger than that in defining a point. For this reason the description of areas is often restricted to the course of the boundary in terms of distances and directions (at best to a badly determined magnetic or astronomic north direction), without reference to coordinating the origin of the boundary course to the general environment in which the described area is located. The first symposium paper clearly demonstrated these deficiencies in practice; for the cases cited the land area boundaries had been described, but not defined. The definition of an area requires that the coordinates of its boundary points can be determined.

The definition of a volume presents even bigger problems. A volume is bound by a closed surface which must be described by the sum of all points defining it.

Whenever the data refers to a field (e.g. gravity, terrain elevations, barometric pressure), selected point data can sufficiently describe this field, so that interpolation between the data for these points will permit the determination of data anywhere in that field.

For the purposes of a data file it is relatively easy to combine the data related

to a point of observation with its geometrical coordinate description in one file.

For areas and volumes the problem of storing the data and of geometrically defining its environment must be split into the following parts:

(a) the geometrical definition of the boundaries for each area (or volume), which can be uniquely identified by a special code.

(b) the establishment of an index which contains the special codes for all uniquely identified areas (or volumes), so that the total object of study is covered without gaps or overlaps.

(c) the establishment of the data file containing other information with reference to the coded areas (or volumes.)

## **2. Data System Based on Land Areas**

It has been suggested, that an integrated environmental data bank be based on land areas. Due to the fact that real estate along with stocks, bonds and commodities is of major economic significance there is a special reason to combine the legal aspects of land transactions concerned with land titles and mineral rights with those aspects of statistical nature of value to the community, without which proper resource planning, just taxation and management of public affairs is not possible.

The requirements for the establishment of a data bank based on land parcels are so obvious, that one wonders why one has not generally proceeded along these lines so far.

The difficulties in the implementation principally lie in:

(a) the geometrical definition of land boundaries requiring a control survey and to a lesser extent in

(b) the establishment of a land parcel index requiring a map, based on a control survey.

(c) The establishment of the data file, since the introduction of modern computer technology, presents the least serious problems once the pertinent data are collected. The development of intricate computer software is a problem which can be solved in months, while the proper definition of land boundaries and its mapping is a task for years. Nevertheless it is of essence to look far enough ahead to avoid time and energy consuming blunders which could have been avoided by laying emphasis on a proper foundation.

The main obstacle in establishing a proper foundation is based on the fact that coordinates defining the location of points must be derived from ground surveys involving the physical measurement of directions and distances. The establishment of a data system on land parcels is an easy task once the geometrical relations are established.

## **3. Control Surveys and Mapping**

A piece of land is identified to its original purchaser by boundary markers. Due to the high cost of marking the boundaries with not easily removable "permanent" monuments usually inexpensive pegs or rods are used, which are lost within days, months or years. This malpractice dates back to the times when real estate had a relatively low commercial value. Unless the lost moments can be reestablished from "permanent" reference monuments the original purchaser has lost the definition of his land.

The necessity of providing a network of "permanent" control points, from which other points can be easily reestablished has been recognized over two centuries ago. While small and densely populated countries have been able to establish horizontal control points down to a density of 2 to 3 points per square mile already 100 years ago, countries with vast land areas have merely succeeded to provide a first order horizontal control network with points at 20 mile intervals along triangulation chains

in quadrilaterals or triangles, with gaps between the chains so that certain areas may be as far as 100 miles away from the nearest horizontal control point. Chiefly responsible for the slow progress was, until the advent of electronic distance measurement only a decade ago, the incapacity to measure long distances on the earth surface directly with any appreciable accuracy, so that distances had to be computed from angular measurements, which were very tedious to obtain.

Vertical control, in form of elevation benchmarks has merely been carried along railway lines and some highways.

Depending upon the availability of control this has led to a difference in mapping procedures for the various countries. In the densely populated European countries it has been possible to compile large scale maps from ground surveys tying topographical and legal boundary features into the established control network with an accuracy to satisfy modern demands. Small scale maps were merely derived from reductions and generalizations of the large scale maps.

In the vast areas of North America, where the control network was not sufficiently dense enough for such a purpose the only possible approach was to adopt photogrammetric procedures to densify the control network by methods of aerial triangulation and to compile topographic maps from aerial photographs. During one generation Canada has been able to accomplish a full small scale map coverage at the scale of 1:250 000, a coverage of the populated areas of the country at the scale of 1:50 000 and a coverage of the largest cities at the scale of 1:25 000.

It is obvious that such relatively small scales of mapping cannot depict the legal boundaries of land, and therefore do not fulfill the requirements for a data system based on land areas.

On the other hand, isolated, disconcerted efforts have been made by some municipalities, governments or industrial organizations for photogrammetric large scale mapping of limited areas. In many cases such maps do not refer to "permanent" control points and therefore are difficult to integrate into a data system for general use without the risk of serious errors. While such maps show considerable detail of buildings, hedges, roadway and fences they do not attempt to describe legal entities such as land parcels.

The preparation of any map, large or small in scale, require adequate reference to a control network marked by "permanent" monuments. The larger the scale of the map, the denser the network of control monuments must be.

While the establishment of a dense control network would have been an insurmountable task in North America only 15 years ago, the use of electronic survey instruments has revolutionized the methods of densifying the first order control network economically to a density where it can be useful to large scale mapping and for other uses such as engineering or legal land surveying. For these purposes triangulation procedures now have been replaced by traverse methods. We have witnessed the establishment of secondary horizontal control networks in New Brunswick since 1959 and several other Canadian provinces and large cities have followed suit since then.

It is due to the efforts of the Atlantic Provinces Mapping Programme that for the first time in North America a provincial map series will be available which will be able to combine topographical features at large scales with legal descriptions of land boundaries, even if these at first can only be incorporated for so called "integrated survey areas" for which legal land surveys can be described defining the location of a parcel in terms of provincial coordinates.

Until such time, when all legal surveys will be making reference to a provincial

coordinate system and thus will be in a position to clearly define the boundaries of a land parcel, the large scale maps must serve as the basis to describe land boundaries for use of a land parcel index on which the data file containing other information may be based.

#### **4. Definition and Description of Land Boundaries**

Unless each land parcel boundary could be "permanently" monumented on the ground, it should be defined in terms of a coordinate system, which permits its fast and reliable reestablishment from permanent reference monuments.

The coordinates may also serve as a description, but it is a purely technical matter whether the boundary points are described directly in terms of coordinate values or indirectly in terms of distances, directions and reference directions of a traverse originating and terminating at two coordinate monuments.

For the purpose of simplifying a land description, particularly in the computer, it would be most appropriate to agree upon a convention whereby a boundary line will consist of a straight line extending between boundary points defined by coordinate values.

#### **5. Data Files for a Data Bank Based on Land Parcels**

The description of land boundaries for each piece of land identified in the land parcel index should be contained in Data File No. 1 in digital form.

In order to prepare the land parcel index a large scale map is required. Such a map may serve as a graphical substitute for Data File No. 1 in analog form. While the internal precision of the digital Data File No. 1 based on surveys may be of the order of 1.10 000 or higher, the precision of an analog representation in form of a map is usually less than 1:1000.

The parcel index serves to assign identification codes for each parcel. The identification code may be chosen according to different aspects:

- a) Each parcel appearing on a map sheet may receive a separate number. The identification number of the map plus the parcel number identify the parcel.
- b) Each parcel in a municipality may be given a separate number. The community plus the number identify the parcel.
- c) Coordinates values for the approximate center of the parcel may sufficiently identify the parcel. Specifically, if the boundaries of the parcel are given in coordinates, then any coordinate values within the enclosed area of the boundary may refer to the parcel.

A detailed discussion of these aspects will no doubt be presented in the following papers.

Data File No. 2 (and subsequent data files) should contain all information pertaining to the identified piece of land such as ownership, mortgages, rights, taxable value, land use, resources, population and similar items.

It is quite clear that Data File No. 2 cannot be established without Data File No. 1 or at least its poorer substitute, a large scale map. Even then it is obvious that control surveys must be considered as a foundation for an integrated data system.

#### **6. Data Bank for Control**

Since land surveys and even control surveys are carried out by a multitude of persons and organizations there is a need for conserving this information in a separate data file.

A few years ago the number of first order horizontal control points in New Brunswick provided by the Geodetic Survey of Canada was 137. Since 1959 monumental con-

trol has been established in New Brunswick by the Provincial Department of Natural Resources at the rate of 500 points per year. Other agencies, such as the Department of Public Works, the Power Commission, the municipalities and the land surveyors have established their own monumented control based on the national and provincial horizontal control network. Similarly vertical control has been extended over the Province, So far each organization has kept its own partially not too satisfactory files, which has prevented that this vital information was made available to the user at large.

As has been suggested from several sources it might be very useful if a central data file, perhaps at the Federal Government level, was established, which would collect and classify the information of every horizontal and vertical control survey carried out in the country.

## **7. Conclusions**

The problems in establishing an integrated environmental data system have only just began. More difficulties will be encountered with the continuous revision of the information. The establishment of the data files for describing the geometrical boundaries, the identification for and the information about a particular land parcel should be made having the difficulties in mind to keep the data system up to date.

There is no better assurance for a long term value of a data bank than the use of control surveys as its geometrical foundation.

For Particulars write or call:

## Norman Wade COMPANY LIMITED

Vancouver — Toronto — Montreal  
Ottawa — Quebec City — Saint  
John —

The Trade Mart Building  
Scotia Square, Halifax, N. S.  
Exclusive Maritime Distributors  
Wild Theodolites  
and Levels

For any requirements in:  
Reproduction, Drafting, Surveying  
and Engineering Equipment and  
Supplies

## EASTWARD INDUSTRIES LTD.

exclusive representatives for the  
Keuffel & Esser Company of  
Canada

K & E Transits, Levels, Rods,  
etc., in stock.

Bayers Road Shopping Centre HALIFAX  
LOWER PLAZA N. S.

## The Hughes Owens COMPANY LIMITED

A complete line of Supplies for  
the Engineer, Surveyor and  
Draftsman

Ozalid and Blueprinting

1685-1687 Hollis St., Halifax

Mailing Tubes — Open and Closed  
Ends.

Storage Tubes — for prints and  
tracings

Write —

Sonoco Products Company of  
Canada Limited  
8415 Mountain Heights Ave.,  
Montreal 9, Quebec.

## Kelvin Hughes Division

5140 Prince Street, Halifax, N.S.

Phone 423-6139

Engineering & Drafting Supplies  
Instrument Rentals

## BRUNING DIVISION

Addressograph

Multigraph

Company Limited

Drafting, Engineering Supplies

Cronoflex Printing a Specialty

Revolute — Copyflex

Electrostatic Machines

6100 Young Street, Halifax, N. S.

## ATLANTIC AIR SURVEY (1963) LIMITED

Now with two new of-  
fices to serve you even  
better



— Aerial Photography  
— Photographic Mosa-  
ics

— Topographic Map-  
ping

— Photo Interpretation

P. O. Box 187, Dartmouth,, N. S.

Phone 469-7901

1115 Regent St., Fredericton, N. B.

Phone 454-2702

**BETTER MEASURE WITH**

**LUFKIN**

**TAPES-RULES-PRECISION TOOLS**

Send For Free Catalog

THE LUFKIN RULE CO. OF CANADA, LTD.  
BARRIE, ONT.



## 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.

# Nova Scotia Land Survey Institute

OPERATED BY

## Vocational Education Division

DEPARTMENT OF EDUCATION  
PROVINCE OF NOVA SCOTIA

CARTOGRAPHIC DRAFTING (1 year)  
PHOTOGRAMMETRY (2 years)  
SURVEYING (2 years)

The survey course prepares one for the Intermediate and Final Part I Examinations for registration as a Nova Scotia Land Surveyor

FULL PARTICULARS FROM

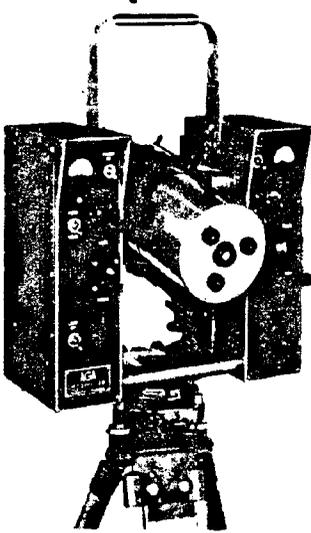
**The Principal**  
**Nova Scotia Land Survey Institute**

Lawrencetown, Nova Scotia.

This is a Joint Federal and Provincial Project.

# AGA Geodimeter® Model 6A

# AGA



## Technical data for the Model 6A

The range depends upon the type of lamp, the visibility conditions and the size of the reflector. The data presented below are relevant under normal conditions.

Range: up to	Daylight	Darkness		
With standard lamp	5 km (3 miles)	15 km (9 miles)		
With mercury lamp	10 km (6 miles)	25 km (15 miles)		
Accuracy (MSE):	6 mm + 1 mm/km (0.02 ft + 1 ppm)			
Measuring time:	5—10 minutes per distance			
Elevation:	—55° to +90°			
Weight:			kg	lb
	Instrument		16	35
	Tripod		7	15
	Mercury lamp kit with generator		20	44
	Reflector (1 prism)		0.5	1.1
	Reflector (3 prisms)		1.1	2.5
Powerconsumption:	Standard lamp: 30 W/12 V from battery or generator			
	Mercury lamp: 300 W/12 and 50 V from generator			
	Modulation system: Bjerhammar			

WANT PRODUCTION?

RANGE ?

RELIABILITY ?

AGA offers all three at low cost

Over 100 Geodimeters in use across Canada

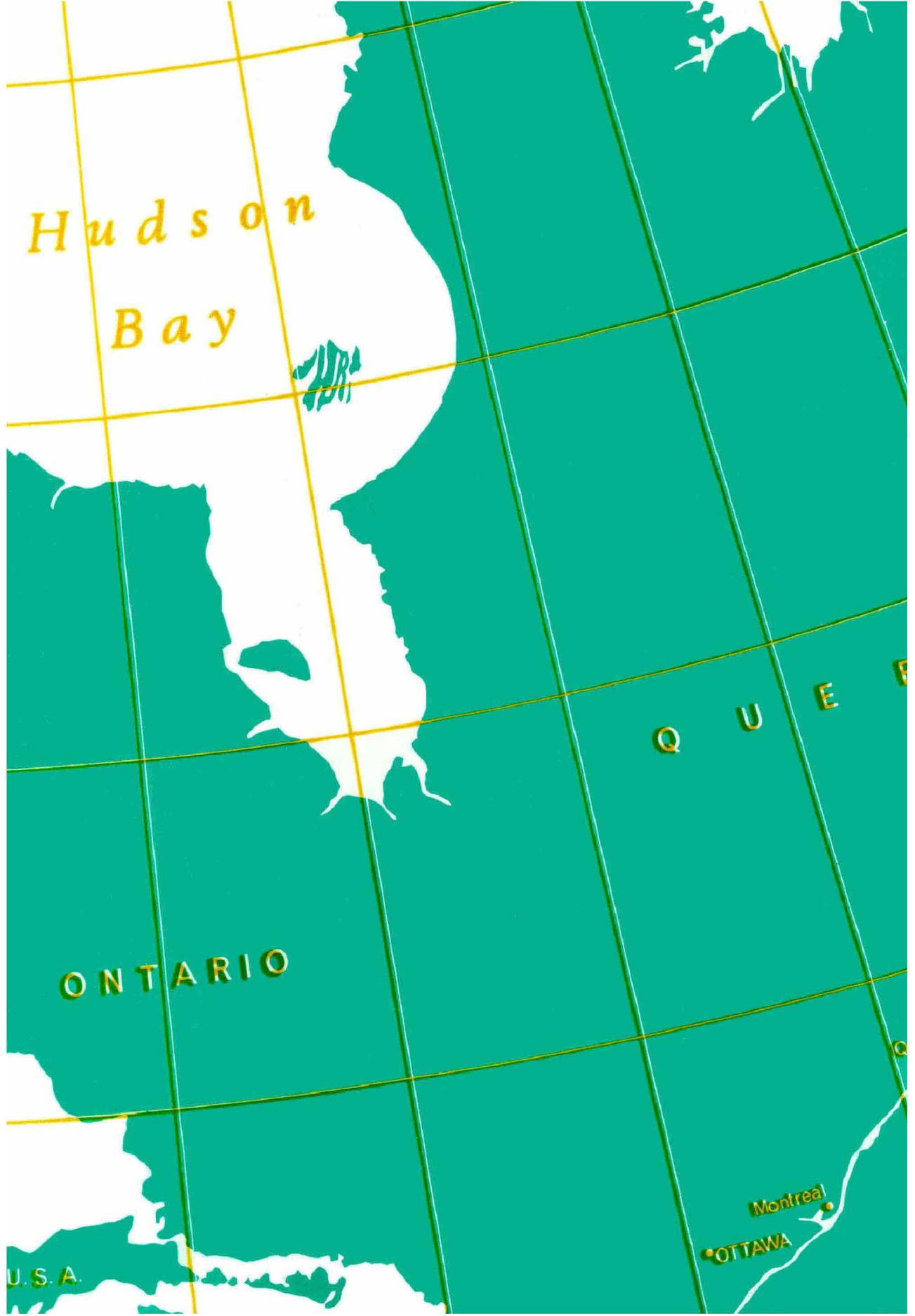
Why not investigate

call for a free trial now!

**AGA** TRONICS LTD

178A Queen Street East  
Brampton, Ontario

Telephone 459-0238 & 677-2569



Hudson  
Bay

ONTARIO

QUEBEC

U.S.A.

Montreal  
OTTAWA