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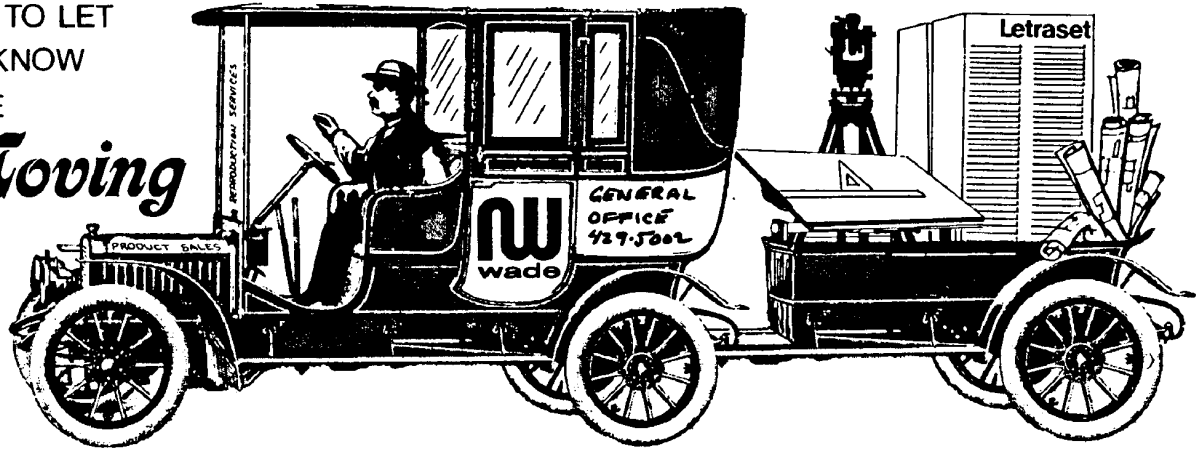

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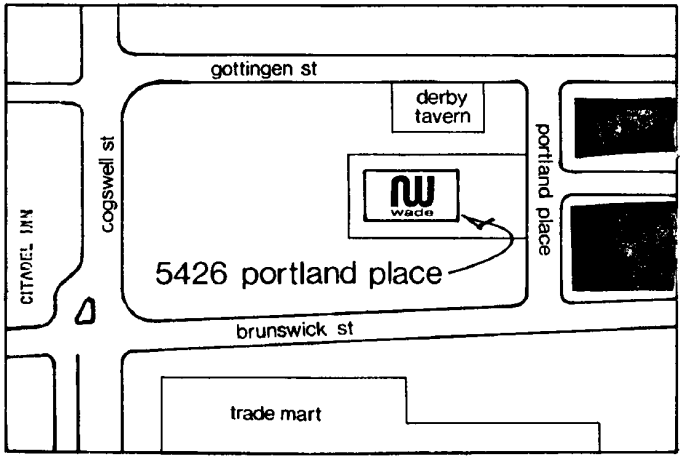

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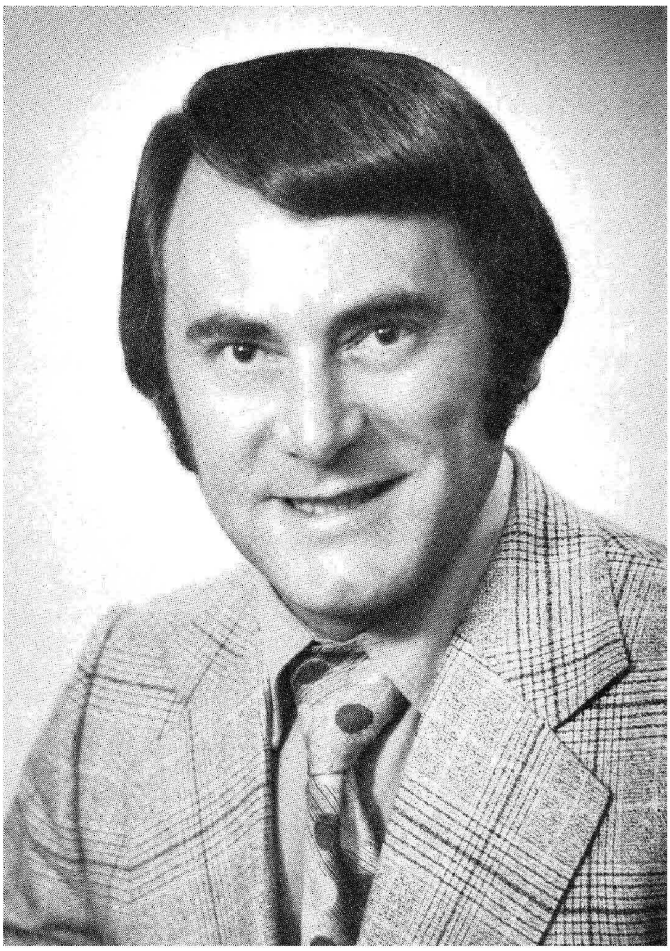

WILLIAM S. CROOKER, N.S.L.S., P. ENG.

- 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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COOPERATIVE EDUCATION IN SURVEYING ENGINEERING

by John McLaughlin

INTRODUCTION

A variant of the concept of cooperative education has been adopted by the Department of Surveying Engineering at U.N.B. and a programme for co-op education has been accepted by Senate for inclusion in the 1972-1973 curriculum. Initially, it will involve the third year students.

Cooperative education is an integral part of the university curriculum within which the students' employment is an integral part of their academic programme. The concept of cooperative education is based upon the principle that a sound academic programme combined with relevant technical experience can provide the most effective professional development during the undergraduate years.

THE DEVELOPMENT OF COOPERATIVE EDUCATION

The first cooperative education programme on this continent was inaugurated in the engineering school of the University of Cincinnati in 1906. It was developed under the inspiration and leadership of Professor Herman Schneider who believed that while principles might be studied in the abstract, their applications should be presented by means of concrete, realistic observations and experiences. Although at the time a revolutionary concept, it was eventually adopted by other institutions, especially within the professional schools, until today there are nearly 200 colleges and universities offering cooperative education programmes in the United States.

The first cooperative education programme in Canada was pioneered at the University of Waterloo in 1957, again with the initial impetus coming from within the school of engineering. Subsequently the programme was enlarged to the point where, today, over 50 per cent of Waterloo undergraduates are cooperative students. The Waterloo programme operates on a tri-semester year with alternating terms on campus and in industry. It is structured such that at all times approximately one half are in the work period. One indication of the success of this programme is the fact that the University of Waterloo now has the largest undergraduate engineering enrolment in Canada.

There are, in addition, several other schools in Canada which have cooperative education programmes. These include Memorial University, Nova Scotia Technical College, the University of Sherbrooke and the University of Saskatchewan.

THE COOPERATIVE SURVEYING PROGRAMME AT U.N.B.

The Department of Surveying Engineering has adopted a variant of the concept of cooperative education in that the requirement for suitable work experience can only be satisfied during the summer months. The University of New Brunswick does not operate on the tri-semester system and no professional courses are offered on campus during the summer.

Within our cooperative programme, undergraduate surveying students will be expected to acquire at least six months relevant work experience and to prepare two work reports prior to graduation. Students who do not or, for various reasons, cannot participate in the cooperative programme will have the option of taking special surveying laboratories and preparing an undergraduate thesis prior to graduation. The programme will operate in eight phases:

1) preliminary student interviews
2) initial contacts with employers
3) preparation of job descriptions
4) job interviews and employer/student selection

5) the summer work period
6) exit interviews
7) employer/student evaluations
8) completion and submission of the work report.

The preliminary student interviews are scheduled for the first two weeks in October. They are carried out by the coordinator of the co-op programme and serve to develop an understanding of the previous work experience of the students, their professional and technical interests, special family or personal problems which might affect their summer work programme, etc. With this information, the coordinator can then go to potential employers and attempt to develop job opportunities in the areas of interest to the student. It is hoped that other faculty members will also participate in contacting potential employers.

Those employers who are interested in participating in the cooperative programme will then be asked to prepare job descriptions. These descriptions will describe the nature of the position offered, its location, any special working conditions, and, hopefully, the salary attached to the position. These job descriptions will be posted within the Surveying Department.

The employer is free to choose any reasonable method for interviewing and selecting interested students. He may choose to carry out on-campus interviews, he may choose to accept applications through the mail, or he may rely on the co-op coordinator to select suitable candidates. Conversely, the student will be free to apply for any position he desires and may, in certain circumstances, even seek out and make arrangements with some other unlisted employer.

The arrangements for the summer work period are the responsibility of the individual employer and student employee. The work experience should be such that the student gains an insight into the profession of surveying and that he gains significant technical experience. In return, the student is expected to execute his duties with a high degree of responsibility. At the end of the summer work period, it is hoped that an exit interview can be arranged between the employer and the co-op student to review the student's progress and to generally evaluate the success of the work period.

Following the summer work period, the employer will be asked to forward to the co-op coordinator a complete student evaluation form. The student will be evaluated on such things as interest in the work, initiative, quality of work executed, dependability, judgment, etc. This form should be completed by the student's immediate supervisor - the person most directly and intimately concerned with the student. It is hoped that the employer will allow this evaluation form to be shown to the student as the objective of the evaluation is not to grade the students comparitively, but to evaluate their individual development and to offer guidance where required. At the same time, the student will be asked to evaluate the position held, especially with respect to its suitability within the concepts of cooperative education.

Finally, a work report will be required from each student within one month after his return to campus. The topic and scope of the report, while subject to departmental regulations, should be decided by the student in consultation with the employer. The objective in preparing work reports is to provide the technical writing experience similar to that required by employers of their professional staff.

EMPLOYERS AND THE COOPERATIVE PROGRAMME

It must be acknowledged that in a cooperative education programme the role of the employer is much more demanding than that of simply supplying summer jobs. Not only must the participating employer strive to provide a meaningful working environment for the co-op students, but he must show a continuing interest in their professional development. In addition, he must have the time and be willing to accept the responsibility for preparing an evaluation of the student's progress. These are no easy requests to make of the employer.

At the same time, however, there are many advantages which can accrue to the employer who accepts the challenge of participating in the programme:

1. He will be employing highly motivated students, who will be eager to succeed, knowing that their employment is not merely a summer job but rather a vital part of their academic programme.

2. Often the cooperative student can bring fresh insight, new ideas and viewpoints into an organization, which can be both refreshing and stimulating.

3. The programme offers the employer the opportunity to evaluate the ability and suitability of the student as a potential permanent employee.

4. The employer has the opportunity to play a role in developing the future leaders of the profession, to project a corporate image to a large segment of the surveying profession of tomorrow.

5. The programme can help to foster links between the university and the professional community which should be invaluable to both.

STUDENTS AND THE COOPERATIVE PROGRAMME

For many years it was assumed that the concept of cooperative education offered positive advantages for the student, especially within the professional schools, but there was little actual quantitative and qualitative analyses to support these claimed values. Then, in the late 1950's a comprehensive study of the value of cooperative education was carried out in the United States. The results of this study were published in a book entitled "Work-Study College Programs" authored by James W. Wilson of Rochester Institute of Technology and Edward H. Lyons of the University of Detroit. It concluded that there were five fundamental educational advantages to the student:

1. By coordinating work experience with the campus education programme, theory and practice are more closely integrated and students find greater meaning in their studies.

2. This coordinating of work and study increases student motivation. As students see connections between the jobs they hold and the things they are learning on campus, greater interest in academic work develops.

3. For many students, work experience contributes to a greater sense of responsibility for their own efforts, greater dependence on their own judgment and a corresponding development of maturity.

4. Because the work experiences involve the students in relations with co-workers who come from a variety of backgrounds, and because success in these jobs requires constructive relationships with colleagues, most students in cooperative education develop greater understanding of other people and greater skills in human relations. It is particularly valuable for these students to work with adults as a bridge between their years of academic living almost entirely with their own contemporaries - and their own adult life among mixed age groups.

5. Cooperative education helps markedly to orient college students to the world of work. Most college students are generally concerned about their future life work. They want to know more about the range of occupations open to them and the potentials and limitations of these fields. They want to know about the qualifications demanded and their own fitness. In cooperative education programs, students have opportunities for exploring their own abilities in connection with real jobs and they find a direct means of gaining vocational information and guidance, not only in the occupations in which they are employed, but in a number of related fields as well. They have a chance to test their own aptitudes more fully than is normally possible on the campus. With this realistic try-out, a student may discover that he wants a different career than

.....continued on Page 11

MARITIME LAND REGISTRATION & INFORMATION SERVICE

by

WILLIS ROBERTS

COUNCIL OF MARITIME PREMIERS

My topic for the past 10 or 15 minutes - The Maritime Land Registration and Information Service - arises from the need to overcome certain disadvantages inherent in the division of some 52,000 square miles of terra firma into three small autonomous provinces. Separation has its virtues, its bitter-sweet joys and its headaches - none of them new.

For example, just after the turn of the century a Maritime editorial writer (R.V. Harris in 1908) arguing that only a united effort could stimulate the development that the Maritimes so sorely needed wrote:

> "We cannot do it while separated. We are ignored by the Dominion Government; the West gets whatever it asks for; we get no portion whatever of the immense immigration into Canada. A considerable percentage of the revenue we contribute is expended to bonus and advertise the western end of the Dominion, which constantly drains us of our very best people; thus with the expenditure of our own money the younger generation, on whom the development of these provinces must depend, is induced to follow the immigrants westward."

You will appreciate of course that to some of us down here the term "The western end of the Dominion" means everything west of Edmundston, New Brunswick.

In more clinical terms than those sometimes used by the editorial writers, the authors of the Maritime Union Study, 1970 said:

> "What is needed is the ability to develop and carry out plans, policies and programmes on a regional basis. The economies of the Maritime Provinces are individually too small and too interdependent for the effective planning and execution of development programmes in the face of present day social and technological trends."

Accepting the recommendation that regional (i. e. Maritime) programmes - as opposed to individual provincial programmes - be developed, the Council of Maritime Premiers (itself a result of the Maritime Union Study) in 1971, decided upon a regional approach to survey, mapping and land tenure problems.

There are several advantages to an integrated regional approach to this program:

1. It ensures programme compatibility with respect to outputs;
2. It results in relative financial savings; and
3. It results in increased outputs and efficiency.

THE PROPOSAL

Subject to satisfactory cost-sharing arrangements with the Federal Government, the Council will assume responsibility for the operation of Land Registration and Information Service next spring. The program will be administered by a regional agency consisting of four divisions:

a) a headquarters directorate and an adjoining systems planning division,

b) a surveys and mapping division,

c) a land titles registration division,

d) a land statistics division.

Although in some ways it would be ideal to have all components of this Maritime agency located together, there are no compelling reasons for this from a technical point of view but there are special reasons in favour of locating parts in the three provinces and this has been agreed.

An independent study, commissioned for the purpose of investigating and quantifying the costs and benefits of a Maritime land-property information and control system, returned a report indicating that such a system could result in significant savings. Details of a proposed cost-sharing agreement between the Council of Maritime Premiers on the one hand and the Federal Government on the other hand are now being negotiated.

Some of you might be wondering as to the distinction between this new Land Registration and Information Service, (which I must emphasize will not become an operating agency until April 1, 1973) and the Atlantic Provinces Survey and Mapping Program (APSAMP) which is presently in operation and has been in operation since April, 1968.

Basically, the difference lies in integration as against coordination of services. Under APSAMP each province individually pursues its own survey and mapping programs and creates and administers its own budget; however, there does exist an APSAMP Management Committee consisting of personnel who have other primary responsibilities but who meet periodically to oversee the spending of the Federal contribution to the program, and to effect a general coordination of effort and a standardization of contractual arrangements with private industry. This Management Committee consists of representatives of each of the provinces and of the federal administration.

Within the new Service the work in the three provinces will be completely integrated under the auspices of the Council of Maritime Premiers. The personnel and equipment of the provinces will be pooled and the operation will be financed by contributions from the provincial and federal governments.

The projected time frame for the program is ten years. The financial framework has been worked out in detail for the first five years and in rough for the remaining five years. The recommended program consists of four phases, which I shall now describe in rather general terms.

PHASE I

Based on the first order geodetic survey provided by the Department of Energy, Mines and Resources, Phase I consists of the establishment of a second order control system of coordinates plus the establishment of monuments throughout the entire Maritime region. This is merely a continuation, but now on a completely integrated basis - of work started under ASAMP. This phase is already more than half complete in New Brunswick, better than one quarter complete in Nova Scotia, and has been completed entirely in Prince Edward Island. It is projected that it will be completed throughout the Maritime region by the end of 1976. After that it will be necessary to conduct a maintenance program to systematically replace those monuments which are displayed or otherwise rendered unusable. The density of monumentation that we intend to establish and maintain is approximately 35 control monuments per square mile in urban areas and one monument per square mile in rural areas. This density should make it possible to tie any property into the

grid without undue inconvenience. Accuracy of location in urban areas will be possible to within one tenth of a foot and in rural areas, to within one-half foot.

PHASE II

Is the production of various map series to meet growing demands associated with resource management, urban development and property identification.

Our resource mapping in New Brunswick and Nova Scotia will be of the orthophoto presentation at scales of 1:10,000 and 1:20,000. In Prince Edward Island, where this aspect of the mapping program has been practically completed under ASAMP, the scale selected was 1:5,000. We expect to achieve total resource mapping coverage by 1982, and in that year begin a ten-year revision cycle of this type of mapping.

Urban mapping was started under APSAMP in the Maritime Provinces in 1968. Scales used are 1 inch to 100 feet and 1 inch to 400 feet. The standard line map presentation is employed. In Prince Edward Island the mapping of Charlottetown, Summerside and a few smaller communities, is well underway while in New Brunswick and Nova Scotia the urban mapping programs are already a bit better than two-thirds and one-third complete respectively. It is expected that complete coverage will be attained by 1979, at which time a five-year revision cycle will be started.

PHASE III

The third phase of our program envisages the gradual replacement of our archaic - indeed, almost medieval - land registry system with a new registration system which would exploit the advantages of modern technology and of the survey and mapping programs which I have just mentioned. Our present land registry system was instituted here in 1785, and to the present day has been subject to very little change. There is a total of 39 registry offices in the three provinces. These offices are, in effect, archives of documents registered and deposited there by purchasers of land who wish to establish the fact that they claim merchantible title to the land in question.

There is, however, no legal requirement to register such documents, for example deeds, in a land registry office, much less to store them there. Furthermore, processing documents through a registry office imparts to them no legal creditability. The onus remains on the prospective purchaser to ensure that the party who presently claims ownership does in fact hold title to the land and is, therefore, qualified to sell it. This usually requires the would be purchaser to search back through a half-century accumulation of documents.

Quite apart from the uncertainties which are entailed in the question of ownership, not to mention location and boundaries, the sheer volume of work which is now being generated by the increasing numbers of land parcels resulting from more and more subdivision, as well as from the vastly increased pace in turnover of ownership, has rendered our present land registry organization and system inadequate.

It is, therefore, the intent to have the present registry system replaced by a land titles system based on the Torrens concept, which would eventually - as resources permit - be fully computerized. There would be one coordinating land titles office, at which would be found the system manager and a master of titles, and there would be several district offices scattered throughout the Maritime region. All of these offices would be interconnected by an electronic communications system; however, before any start can be made on such a system two things must be accomplished:

a) The adoption of a parcel index system common to the three provinces, and

b) the implementation of property laws in each province which would be compatible with the effective application of one land registration system throughout the Maritime region.

PHASE IV

The final, and most distant, phase of our projected program is the establishment of a computerized storage system "land data bank" for certain land statistics. Studies associated with such matters as industrial site selection, powerline routes, highway corridor exploration, watershed evaluation and environmental impact all require a capability for data acquisition, storage and rapid retrieval, however, the present lack of detailed definition of the factors involved and the magnitude of the resources of money and expertise needed rule out any significant progress in this direction for some time to come. In the interim, however, at no great expense, we are making provision for developments in this field and will maintain contact with the problems and the possibilities.

These then are the four projected phases of the work of the Maritime Land Registration and Information Service:

1) the establishment of a coordinate survey grid throughout the Maritime region, at a suitable density of monumentation;

2) the creation of up-to-date map coverage, of types and scales appropriate to present-day needs;

3) the implementation of an improved land registration system;

4) the establishment of a land statistics bank.

Technical direction, and internal administration of the Service, will be vested in an Executive Director who will be located in Fredericton with a directorate staff. Sharing the same accommodation will be the Systems Planning Division with responsibilities for such things as:

a) Drafting of specifications for the various operations in control survey, aerial photography, aerial triangulation and mapping.

b) Development of methods to be used in the work of the Service, particularly in regard to the operation of the land titles system.

c) Collection and processing of data, and the integration and updating of computerized information.

d) Evaluation of new equipment as related to the needs of the Land Registration and Information Service.

e) Evaluation of the effectiveness of the Service by contact with users.

The detailed implementation of Phases I and II will be carried out by the Surveys and Mapping Division, which will be located in Prince Edward Island, with responsibilities for such things as:

a) Establishment of coordinate control.

b) Emplacement of permanent survey markers at convenient locations and ground intervals.

c) Establishment of photo control for the scaling and orientation of aerial photography.

d) Maintenance of control by replacement of disturbed survey markers and surveillance of coordinate values.

e) Filing of control values.

f) Acquisition of aerial photography for mapping purposes.

g) Establishment of secondary map control by aerial triangulation.

h) Production and up-dating of maps of the orthophoto (from aerial photography) and line-drawn varieties.

i) Map and photo distribution.

j) Toponymy as it relates to place names in the Maritime Provinces.

k) Collecting of property data from land registry and files, municipal files, government departments and private surveyors.

l) Mapping of property data on large scale map series.

The implementation of Phase III will fall under the Land Titles Division, which will be located in Nova Scotia, with responsibilities for such things as:

a) Establishing a Maritime regional approach to land tenure.

b) Changing the present land registry system to an improved registration system based on the use of a parcel index;

c) Evolving property laws which would be compatible with the application and effective working of one land registration system throughout the Maritime Provinces.

d) Setting up a Regional Land Titles Office.

e) Progressive amalgamation of the present 39 registry offices in the Maritime region into a smaller number of district land registration offices, all having direct communications with the Regional Land Titles Office.

While Phase IV is the least clearly defined, it will be carried out by the Land Statistics Division, which will be located in Nova Scotia, with probable responsibilities for such things as:

a) To file, integrate, correlate and display in various forms; that is:

   i) data sets produced by the Surveys and Mapping Division and by the Land Registration Division of the Service;

ii) data sets associated with physical resources of urban areas in order to produce statistical data, reports and summaries which relate the data to the land tenure of the area, and

iii) land-based resource data.

b) To provide software for user organizations interested in producing data sets and statistics related to land tenure; and

c) To analyse and present data which will enable more effective planning within the Land Registration and Information Service.

With respect to the overall organization of the Service, it is very likely that some form of Board of Directors will be established, with membership from each of the three provincial governments and the Council of Maritime Premiers. The Executive Director would be a member of this Board and would report administratively to the Council of Maritime Premiers through the Secretary to the Council.

This integrated Service is one of the first projects to be undertaken by the Council of Maritime Premiers in their efforts to create economies and greater effectiveness through the regionalizing of activities which lend themselves to an integrated approach. We are convinced of the possibilities and look forward to the official birth of the Land Registration and Information Service in the coming spring.

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COOPERATIVE EDUCATION from Page 5

the one he thought he wanted on entering college, he can then change academic plans to prepare for this more informed vocational choice. Furthermore, students are able to understand and appreciate more fully the meaning of work to the individual and the function of occupations in providing the wide range of goods and services characteristic of our economy.[1]

1. Tyler, R.W. and Mills, A.L. - Report on Cooperative Education, Summary of the National Study, National Commission for Cooperative Education, 1961.

It is hoped that the U.N.B. surveying engineering cooperative programme will allow our students to develop a better understanding of the surveying profession and an awareness of their role with it. This, of course, should be fundamental responsibility of any professional school.

UNDERGROUND SURVEYING IN THE CAPE BRETON COALFIELD

by Wilfred Crompton, Chief Surveyor
Cape Breton Development Corporation
Coal Division

In the limited time available since being asked to prepare this paper, it has not been possible to go into all the aspects of mine surveying as thoroughly as one might wish to, nevertheless, it is a pleasure to try and contribute something that I trust may be of interest to the members as you meet together for the 22nd Annual (1972) Meeting of the Association of Nova Scotia Land Surveyors.

Mine Surveyor is defined as a person holding a certificate of competency in mine surveying, and who is designated by an owner to perform survey work in or about a mine. No person shall be accepted as a candidate for a certificate of competency as a mine surveyor unless:-

(a) he has completed Grade X of the public school course of Nova Scotia, and has also completed the geometry and trigonometry of Grade XI and XII or their equivalent;

(b) he holds a certificate of first aid to the injured;

(c) he holds a diploma or certificate from an approved correspondence, technical or mining school certifying that he has satisfactorily completed a course of study in surveying, or has completed a course in surveying at an approved college or university; and

(d) he has had twenty-four months experience underground in coal mining, of which at least twelve months have been with a survey crew.

In the paper you will find a history of how surveying was carried on many years ago, before the turn of the century up to the present day, with the take of existing mines in the Glace Bay, New Waterford, and Sydney Mines areas, present workings of which are all submarine and extending considerable distances out and along the shoreline to a depth of approximately 3,000 feet below sea level. Also the Lingan mine which officially started production on the 16th of October 1972. A brief summary of an underground connection, from opposite sides of Sydney Harbour which I feel may be of interest concludes the paper.

In the early days of mining in this area, when more than one mine was working in the same seam and relations between workings had to be known accurately, and position of workings in relation to surface structures and workings in other seams had to be known, it was decided to set up a co-ordinate system with a known zero point and a base line to work from. "Sterling Hydrant" in the Glace Bay area was selected as that zero point, and a magnetic base line laid out. This was sometime before "the turn of the century", when collieries were working at Reserve, Dominion, Caledonia, Lingan, and Harbour and Sterling areas in Glace Bay, and Nos. 2, 3, 11 and Waterford collieries were projected or under construction.

Before this time, each colliery staff made up plans from their own surveys, their surveying gear being usually a magnetic compass on a tripod capable of reading to 3 minutes on a Vernier on the latter models, and on the early ones depending on how close the surveyor could read the end of the needle on a 4" to 6" circle marked in 1/2 degrees. Room end surveying being done using a 50' tape and more accurate surveys in levels and deeps, etc., with a 66' gunter's chain.

When the magnetic co-ordinate system was adopted, accurate transit surveys were carried from "Sterling Hydrant" and base lines were set up on each side of Glace Bay Harbour and a colliery base line and zero at each mine. These base ends were concrete blocks deep enough to be below frost line, with an upright piece of 85# rail in the centre, and a chiselled cross denoting the actual point on each base rail. Accurate surveys and check surveys were carried down each shaft by plumbing,

and down each slope and into each level, heading, or deep still remaining open to travel with permanent stations being set in roof to carry surveys forward as necessary. For older workings, now impossible to travel or survey, the old plans had to be used, joining them up to newly surveyed areas. This accounts for many sections in some of our older mines being shown with regular room and pillar widths, leading some of our present day surveyors to suspect that a lot of places were shown where they were supposed to be, but slightly away from where they actually were, these suspicions being caused by fact that more recent places, surveyed by 1' or 20" transits and using good 100' Engineer's chains did not always end up quite so straight and regular.

A large surveying and drafting section was kept busy for many years, running mine and surface surveys and plotting them. Streets and buildings in Glace Bay, New Waterford, and surrounding town and villages were located and plotted with complete maps made on heavy canvas rolls and tracings of the same. 1" = 200', 1" = 400', 1" = 1000', 1" = 1/2 mile, and 1" = 1 mile scale plans and tracings were made of mines and surface areas. 1" = 100' scale plan was made for some mines and larger scale plans such as 1" = 20', 1" = 40', 1" = 50', of selected areas where construction was being done. Accurate superimposed plans were made and kept up showing all seams workings over one another. With 16 to 18 collieries working at one time in three different seams, this was a considerable job, and with surface surveying going on at the same time and office force making plans, at times our Survey Department had 50 to 60 men working.

In the early 1900's, traverse tables were used, later 7 figure naturals were used, one of the office force working out co-ordinates by this method, another one checking the work by slide rule. At this time no suitable table of logs to 10" were available. In the 20's, Bruhns log tables became available and these were used speeding up the work considerably. In recent years, electronic calculators are in common use, and now one man can do the calculations which required several to do in the older days.

Around 1927, the Geodetic Survey of Canada had carried their surveys into this area. By this time, the mines had spread to considerable distances under the sea and newer ones had been started at greater distances apart, thus with the inclusion of the Sydney Mines area, the extent of our mining included practically the whole area from Mira Bay to Little Bras D'Or, and from Reserve - Gardiner - Dominion area to 2 or more miles out the Atlantic ocean. It was decided to select a zero point more nearly in the centre of the area and to use astronomical bearings to tie this zero with the Geodetic Survey Station and the standard co-ordinates used over the U.S. and Canada. The Geodetic Survey of Canada agreed to send crews in, partly or all at Company expense, to set more Geodetic Stations in areas where they could be conveniently used by our surveyors. Consultation between the heads of the Geodetic Survey and the Mining Engineering Department resulted in a point in the Town of New Waterford, the intersection of the 46° - 15' meridian of North latitude with the 60° - 50' line west longitude being selected as the zero for the area. All surface and mine co-ords were to start from here and to be calculated as N & S and E & W of this point. By using plane co-ordinates covering the area no point was so far from the zero that the curvature of the earth would affect it to any practical extent. Distances were calculated from this zero, but the use of a simple calculation could also give us the figures used by the Geodetic Survey maps for the whole of Canada and the U.S.A.

The big job then started of converting the old co-ords from Sterling Hydrant with magnetic bearings to our new zero and astronomical bearings. Mr. S. C. Mifflen and Mr. D.S. Morrison did the initial calculations, Mr. Morrison continuing on this job for practically the whole time until he retired, some 8 or 10 years later, following which many of the older hands in the office carried on the work for a long time. Check surveys and plumbing of shafts were made, connecting with the main underground lines. Many new base lines were set, since construction work, new buildings, etc. had lost or blocked view of older bases. A great deal of this work was done by or under supervision of our present Chief Surface Surveyor, Mr. Lawrence Long, who no doubt could probably fill in a lot of the detail on this work, not included herein.

Mine and surface canvas plans were kept in use as long as possible, by plotting our new co-ords on them in a different colour from the old magnetic co-ords. Our standard practice is to use 10" squares on all plans, thus a 100' scale plan has 1000' squares, a 400' scale plan 4000' squares and so on.

Since our Mines Act requires a periodic report on the extraction from leases for purposes of royalty payments, and since standard leases are now a square mile approximate - 0° - 0' - 50" latitude by 0° - 1' - 15" longitude, it has been necessary to prepare a lease plan covering the frontage of the whole area from Mira Bay to Point Aconi, to a distance of about 5 miles from "line of headlands" and to calculate the plane co-ordinates of the corners of each lease, then apply the Government index number in order to determine the amount of coal extracted from the lease in each period. It takes quite a bit of calculation to convert the geographical location by latitude and longitudes to plane co-ords from our zero. To facilitate this a standard work sheet made up in pads of 50 or 100 sheets is used so that each person will follow the same method and no correction will be left out. The plan now in use is done so far in advance that it is quite likely no one presently working will still be here when further extensions to the plan are required.

The underground connection mentioned in my introductory remarks refers to tunnels driven from opposite sides of Sydney Harbour, a body of water more than three miles wide at that point, the completion of which marked a world's first in coal engineering.

Designed to improve the ventilation system for Princess Colliery at Sydney Mines, the tunnels eliminate some four miles of existing airways, decreasing costs and greatly increasing the ventilating efficiency. The project marked the first time in the world that a Colliery ventilation system utilized both sides of a body of water of such size. The operation was started late in 1957 and completed in June 1961.

Driven from a point at New Victoria one thousand feet away from the shore side of the Sydney-New Waterford highway, the new aircourse and tunnel first advances 3,345 feet in a northerly direction through the Barrachois coal seam at a 33% pitch. Coal recovered from the Barrachois seam through driving the 3,345 foot roadway, a companion driveway and crosscuts at 150 foot intervals, to facilitate ventilation during construction, was utilized to produce electricity at the Seaboard Power Plant. The airway in the Barrachois seam of coal connects with a tunnel driven from the face of No. 11 South level in Princess Colliery. The latter tunnel through the strata is driven on a pitch of 45 degrees and is 630 feet long. As the crow flies and on the surface, the distance between the mouth of aircourse at New Victoria and the mouth of Princess Colliery tunnel is three and three-quarter miles. The combined length of the airway driven through the Barrachois Coal seam and the tunnel through the strata is actually 3,975 feet long. The remainder of the three and three-quarter mile distance constitutes a part of Princess Colliery. The minimum vertical distance between the roof of the aircourse or tunnel and the bottom of Sydney Harbour is 825 feet.

Travelling around the shores of Sydney Harbour through New Victoria, Low Point, Whitney Pier, Sydney, Coxheath, North Sydney and Sydney Mines, the distance is thirty-five miles.

Meeting of the two tunnels as expected is an indication of the meticulous accuracy required in the engineering of the project and represents a tribute to all who were associated with it.

In conclusion, may I thank you for the opportunity to present some insight in the work of our survey and engineering staff, and to extend greetings to your Association on the occasion of your 22nd Annual Meeting.

** GEORGE T. "I'M FROM NOVA SCOTIA" BATES **

At the 22nd Annual Meeting held in Sydney in November 1972, the Association membership voted unanimous to make George T. Bates an Honorary Member. George has been a member of our Association for more years than he wants to remember.

The following write-up will give you a little better insight of this man, GEORGE T. BATES:

George Tressler Bates, our lovable Nova Scotia ambassador is probably both the best known member of our Association and the Canadian Institute of Surveying. His persistent efforts to enliven survey conventions have been his kilted figure and stridently voiced "I'm from Nova Scotia" familiar to hundreds of surveyors. But who would guess that his talk of quiet dignity and decorum represented the true George Bates?

George was born in England (he won't say when). He picked up some of his artistic learnings from his master-painter father. George dreamt of going to Canada the way other boys dream of becoming firemen or astronauts, and it was the subject of considerable discussion with his family. When he was 15, his father gave him a difficult choice, a motorcycle or his fare to Canada, George chose Canada.

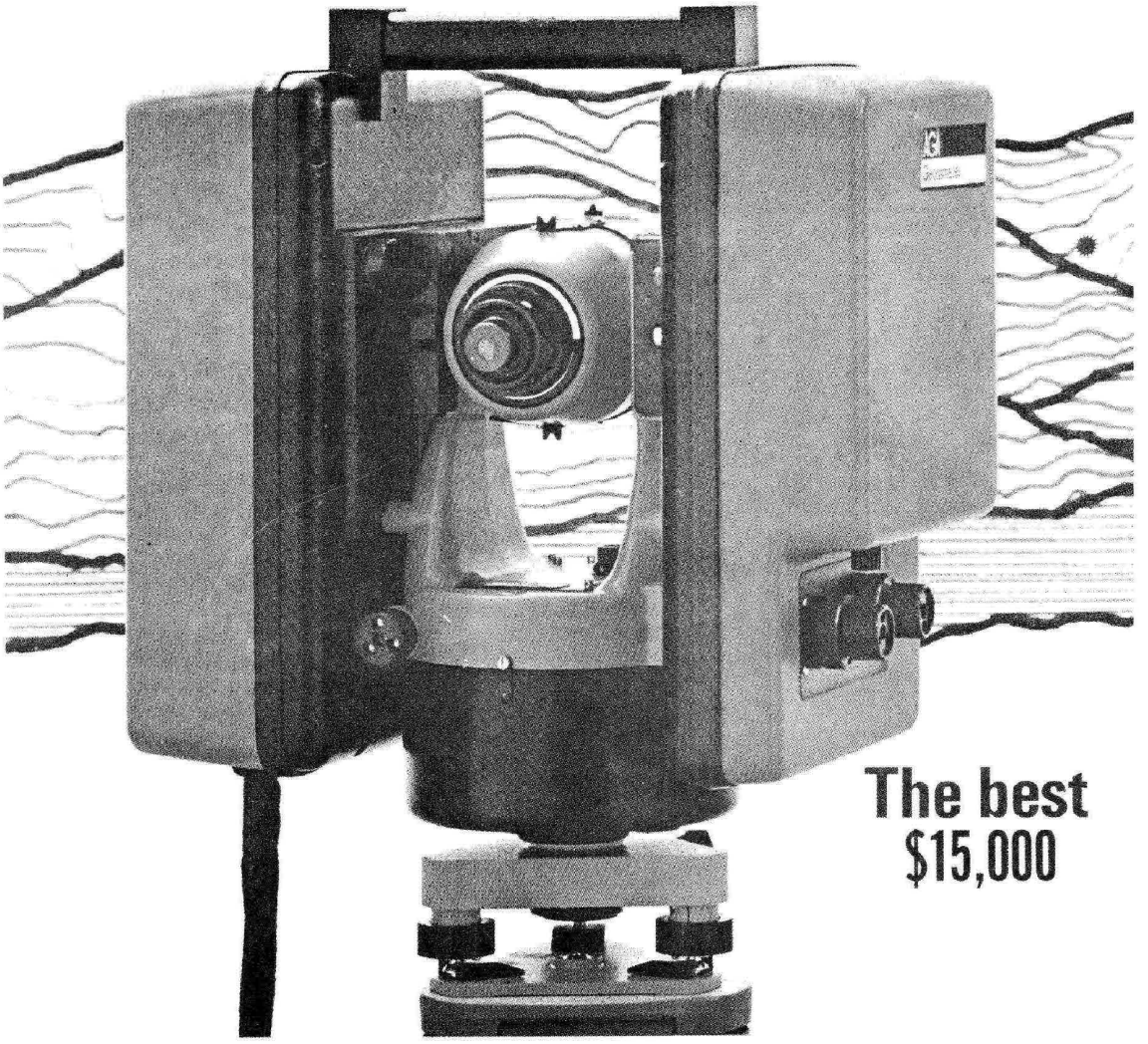
His native city, Nottingham, had a help-organization, the Daykene Street Lads Club, that operated a farm near Windsor, Nova Scotia, to ease the path of immigrant boys. From there, the boys were generally sent to work on other farms, but George followed a boyhood friend to employment in a laundry in Windsor. There he learned to iron and is still an expert on ironing shirts - and kilts. Over the next several years, he worked on farms in Nova Scotia and Ontario, learned a lot about picking apples and milking cows, and cut a few hundred cords of wood. For one year, he taught manual training at Kings College Institute in Windsor, saving enough money for a trip to England.

This was a journey of consequence - on the boat he met Helen Cooke, who was celebrating her graduation from Dalhousie with a three-week trip to England. George was smitten on the spot, but six long depression years passed before he felt they could afford to marry.

In 1936, George moved to Halifax, got a job as an axeman on a survey crew and, by the end of the first day, was convinced that he had found his true calling. He soon progressed to better jobs on the survey crew and, in 1937, was apprenticed to Charlie Roper, NSLS. He took mathematics and draughting at night school, and surveying by correspondence from the Nova Scotia Technical College, and qualified as a Nova Scotia Land Surveyor in 1939.

George took up the study of town planning, becoming a consultant to the Halifax Planning Commission, as a result of a screed he wrote on the housing problem in the city. In 1942, he worked for the Planning Commission and produced a master plan of Halifax.

He set up in private practice as a land surveyor in 1944, and built up a staff of 25 employees. A good part of his business was as a town planning consultant, advising local municipalities on town planning and CMHC requirements. From 1949 on, his entire staff worked for C. A. Fowler and Co. on the survey of bridge approaches and land acquisition for the Angus L. MacDonald Bridge, and later on surveys for military installations. Eventually, George transferred his staff to the Fowler payroll.



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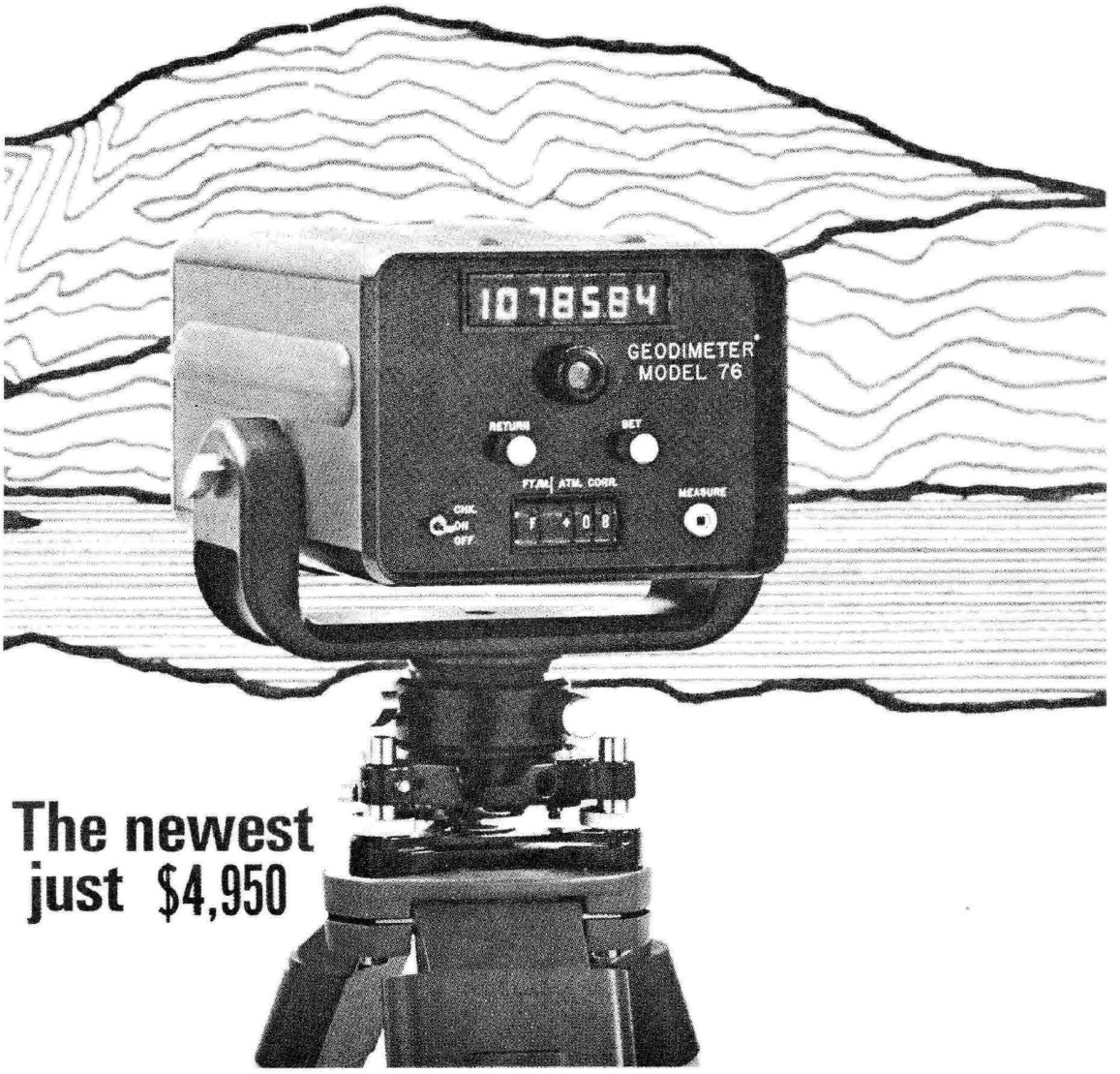

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In 1959, George returned to private practice and, since that time, has confined his operations to smaller and more easily-managed operations, hiring temporary assistance when necessary. He has lately been phasing out his survey business and devoting more time to his hobbies of studying history and making historical maps.

George was led into drawing an illuminated map of the old forts in the Halifax area by provincial archivist, Dr. C. Bruce Ferguson. His interest once captured, historical maps became a major hobby. He has now completed more than 40 of these illuminated masterpieces. A set of 10 maps won him an award for "outstanding achievement in local history" from the Canadian Historical Association. A set of 15 maps submitted to the American Association of State and Local History won an Award of Commendation. George has since assembled a set of nine maps, *A New Series of Historical Maps of Nova Scotia*, neatly bound in clear plastic and Nova Scotia Tartan, that sells for $7.50 at a Halifax shop, The Book Room.

George has a stock of membership certificates from some 20 organizations, for whom he letters members' names in fine Olde Englishe lettering. One of his steadiest customers is the provincial Department of Trade and Industry, for whom he letters the Order of Good Times certificates for presentation to Important personages. Lesser lights have their certificates typed. For the Canadian Institute of Surveying convention in Halifax in 1970, George made up hundreds of these certificates, with the "V.I.P." lettering, at his own expense, for presentation to CIS members - a typically generous Bates' gesture.

George has also been active in the work and worry end of survey associations, serving on the council of the Association of Nova Scotia Land Surveyors for five years, and being its president in 1967; he was chairman of the Halifax Branch of The Canadian Institute of Surveying from 1961 to 1966. In 1971 he was appointed an Honorary Life Member of the Massachusetts Association of Land Surveyors and Civil Engineers.

George's career, as what he wryly describes as "Clown prince of Nova Scotia", began almost by accident at the 1961 convention when Jim Jones, dressed in seafaring hat and raincoat, presented President Jim Canning with a large cod. Since then George has always taken his tartan kilt, a piper (if available), and a supporting cast of similarly attired Nova Scotians (and honorary Nova Scotians) to each CIS meeting, where they have paraded with flags, presented bells, tartan hats, and even tartan-covered wooden shoes, all in the name of Nova Scotia. This year, lacking a piper, George played march music on a mouth organ. His "I'm from Nova Scotia speech" has brought forth applause at survey meetings from Edmonton to St. John's, Newfoundland and this year his contribution was recognized by a special plaque, presented by President Gil Simard, perceptively worded, "To the best ambassador of Joy and Quiet Dignity at survey meetings." George, reportedly for the second time, was speechless.

In addition, George boosts his province with several hundred Nova Scotia pins each year, presenting them to survey queens, surveyors' wives, chambermaids, and waitresses with high impartiality. Each pin is accompanied by an expert kiss (Practice makes perfect), and a speech imploring the recipient to "wear this pin with honour, behave yourself while you wear it, and take it off if you feel devilment coming on". George himself does all this and more, is very careful indeed to behave himself with "dignity and decorum" while wearing the blue tartan and never takes so much as a drop of liquor while "representing the province."

Actually, George takes all of this very personally and feels that his contribution to good humor and conviviality is something from HIMSELF, a gift from George T. Bates to the survey convention he is attending. He pays all his own expenses to each meeting.

On behalf of the membership, we'd like to say "Thanks" to George T. Bates who has helped to make the world more interesting.

** NOVA SCOTIA LAND SURVEY INSTITUTE **

The following is a study that appeared in the Powergram written by M. S. Schofield in Vol. 1, No. 7:

The lives of two men, separated by a gap of two generations, born 10,000 miles apart and of vastly different educational backgrounds and vocations, were largely responsible for the establishment of Nova Scotia's unique surveying institute at Lawrencetown, Annapolis County.

The first was Dr. James Barclay Hall, Ph.D.(1843-1928) who, in his will, left funds in trust (about $90,000) for the establishment and maintenance of a vocational school in the County of Annapolis. With accrued interest and dividends, these monies, by 1958 when they were finally given release for use by the trustees of the fund, amounted to about $118,000.

DR. J. B. HALL

Hall was born in Lawrencetown, Annapolis County, Nova Scotia in the year 1843 and he attended Horton Academy in Wolfville, of which, in 1879, he became Vice-Principal. Previously he had been Principal of the school in Lawrencetown and also had conducted a private school in that village.

When he was thirty years of age he obtained his B.A. from Acadia University and a few years later his M.A. and Ph.D. from Boston University.

The years from 1880 until 1911 were spent as a Professor of English at the Normal College in Truro, during which period he also travelled in Europe and polished his academic attainments in Munich and Edinburgh - two leading educational centres in the nineteenth century.

Among his other accomplishments and activities, he was a promoter of the Summer School of Science for the Atlantic Provinces, Provincial Examiner in Education and Educational Methods, Vice-President Dominion Educational Association and he represented Nova Scotia in the Dominion History Competition, 1895-96.

With all this activity, he found time to write two books; "Outline Study of German Schools" and "Outlines of Psychology, Logic and History of Education"; however, he was too busy to marry until he was 78.

The second man in the educational drama first saw the light of day in India in the year 1883. Born of Scottish parents, Major James Archibald Hepburn Church, D.S.O., M.C., P.L.S., was educated in England and Scotland; migrated to Canada in

1902, became a successful civil and mining engineer, and retired at the early age of 47 in Lawrencetown as a "gentleman farmer" in 1931. Hall had died there previously, leaving his estate in trust.

World War II broke out in 1939, and Major Church, who had won his spurs with the 19th Alberta Dragoons and the 251st Tunnelling Company of the Royal Engineers in World War I (1914-1918), volunteered his services. He organized the No. 6 (Army) Vocational Training School, Surveyor Class, at the Nova Scotia Technical College, Halifax.

With the end of that conflict in 1945, Ottawa was anxious for demobilization and the axe was slated to fall on one of the Major's classes in land surveying which was halfway through their course. The army had ordered the termination of the educational project, without considering the vision, vigor and tenacity of this resourceful Scot.

Church pointed out that the military agencies had an obligation to find employment for these trainees. "Why", he argued, "should the course be cancelled at the midway mark when this type of training fitted men for useful civilian careers?"

In this battle the Major was ably aided by the late Dr. F. H. Sexton, at that time director of technical services for the Atlantic Provinces. New Brunswick and Prince Edward Island approved of the plan for continuing the school and the Department of Veterans' Affairs financed the fledgling training scheme for three more years as a rehabilitation project for veterans of the Second World War.

In 1948, "Major Church's School" moved to Annapolis County and led a nomadic existence, not only in being supervised by various government agencies, but in moving between Middleton and Lawrencetown and located in such places as the Agricultural Demonstration Building and a lean-to shed adjacent to a Canadian Legion Hall.

Finally, in 1958, both Halifax and the trusts administering the Hall bequest were satisfied with the merits of the school and a new building of steel, cement and brick was erected on an acre of land donated by the Lawrencetown Branch, #12 Royal Canadian Legion. It is a two-storey structure, built on a full basement and measuring 82 feet by 56 feet, with facilities for about seventy students. Major Church's dream to establish an institution devoted exclusively to training surveyors had been realized. It was a pioneering concept with no precedents in Canada.

Over a period of years he had worked fourteen-hour days, six days a week with no vacations. Such single minded dedication is not conductive to the arts of diplomacy and the Major, always forthright and fearless, was at times brusque in manner. He did not suffer human frailties gladly. While idolized by his students, both as a teacher and a person, and highly respected by the Nova Scotia Department of Education, some of his blunt "feed-backs" must have been jolting.

He was also acidly critical of the general standards of education in this province. As late as 1963, when he retired at the age of 79, he wrote of English: "The average student's proficiency in the language, oral or written, is meagre and the poverty of his vocabulary fantastic." He was referring to high school graduates admitted to his school, and their performance in mathematics and physics received scarcely less adverse comment: "The variation in proficiency in a class of 15 students is deplorable. The majority, having memorized a few formulae, are not aware of the principles involved."

And yet, with young people handicapped with such a poor educational background, his no-nonsense approach achieved wonders in a field which calls for a high degree of skill and precision. For example, in the years 1950-53, of forty students enrolled in the land survey course, all forty obtained their P.L.S. certificates with consequent 100 per cent employment in their craft. Their average age was twenty-three.

While the necessity of rigid screening for an exacting profession has resulted in many applications failing to be considered each year, (in 1966/67 there were 150 applicants and only 46 accepted) - more than three hundred have graduated. They came from the Atlantic Provinces, as far west as Ontario, as far east as Africa and as far south as the West Indies. There was one application received from India.

The name Lawrencetown has become a household word for surveyors from the Atlantic to the Pacific, and from Labrador to Trinidad. The Institute is highly regarded by engineers south of our border with the U.S.A. Brigadier-General Charles Lawrence, Governor of Nova Scotia, 1853-60, (who was stricken in his prime while dancing at Government House) would be pleased to know that the village named after him had attained fame through its educational institute.

The Institute offers three allied courses, Land Survey, Cartography, and Photogrammetry. The first two have a very aged history among man's disciplines. The ancient Egyptians and Babylonians, among others, were very skilled surveyors and the making of maps is as old as the wanderings of the human race. Photogrammetry is largely the development of this century, especially associated with aircraft photography and it has become an invaluable tool for the surveyor.

The Institute has no student residences and there are no "town and gown" confrontations. Here are serious young people, most with a Grade XII diploma, intent on acquiring the knowledge and skills the school has to offer. They live in the community and the relationship with Lawrencetown and the surrounding countryside is, and has been, excellent.

The science of surveying has made great strides since Samuel de Chaplain explored the shores and interior of Canada with his astrolabe, almost three hundred and seventy years ago. Now, a host of instruments and appliances are available to the surveyor. Probably the newest and most sophisticated is the laser, used for ultra accuracy in laying down lines, as in tunnel building.

But maybe the words of Lester C. Higbee still apply at times and in various places, "A good instrument man, it may be said, has the sensitive touch of a surgeon, the sense and understanding of things mechanical, a sound comprehension of the principles of geometry, the language of a mule-skinner and the back of a pack-mule."

There is a positive side to Major Church's criticism of our educational system. He wrote: - "Give the youth of Canada an integrated educational system through primary, secondary and technical schools to universities and you could make the atomic bomb look like a firecracker." In our most costly government department in Nova Scotia, as across the Dominion, we have yet to realize that potential.

Finally, regarding the Nova Scotia Land Survey Institute at Lawrencetown, it may well be said to the younger generation and their successors: "Remove not the ancient landmarks which the fathers have set."

Proverbs 22:28

NOVA SCOTIA LAND SURVEY INSTITUTE

ADVISORY COMMITTEE - 1972-73

Chairman	Walter E. Servant, N.S.L.S. Servant, Dunbrack and MacKenzie, Land Surveyors, Halifax.
Members ex officio	President, Association of Nova Scotia Land Surveyors.
	Arthur F. Chisholm, B.E., P. Eng., N.S.L.S., M.E.I.C. University Engineer, Dalhousie University, Chairman, Board of Examiners, Association of Nova Scotia Land Surveyors.
Members	Donald E. Wagstaff, N.S.L.S. Chief Surveyor, Bowaters Mersey Paper Company Limited.
	S. E. Daykin, President, Atlantic Air Survey (1963) Limited.
	H. Bert Robertson, N.S.L.S. Director of Surveys, N. S. Department of Lands and Forests.

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Principal	James F. Doig, C.D., B.Sc., N.S.L.S.
Instructors:	
Surveying	Philip M. Milo, N.S.L.S.
Surveying	William E. Chambers, N.S.L.S.
Photogrammetry	Leonard W. Telfer, N.S.L.S.
Photogrammetry	Charles Hogg, C.D.
Cartography	John F. Wightman, B.Sc., B.Ed., M.Sc., C.C., P. Eng.
Cartography	Walter K. Morrison, B.S.Ed., M.A.
Secretary	Mrs. Frances M. Baltzer.

- DEED DESCRIPTIONS -

Some deed descriptions are the cause of despair. Theymake Land Surveyors tear out all their hair, especially the old ones, some modern ones too. You know what I mean, it has happened to you.

Take heart and have courage, things could be much worse. Just suppose someone tried to describe land in verse. Oh! Oh! someone DID it, and if you've the time, what follows is actually a WHOLE DEED, in Rhyme!!!

State of New Hampshire
Carroll County Registry of Deeds - Book 68, Page 519

To all men by these presents be it Known,
Our Secrecy enjoined, to woman one -
That or who "mongst my agricultural peers,
Am "Farmer" Rogers called these many years
My Christian prefix being David C,
By my respective Sire bestowed on me,
Having a habitation and a name
Since first upon this mundane Sphere I came,
In Wolfeborough, New Hampshire Carroll County,
In full consideration of the bounty.
Of my good friend and amicable wisher,
Of piscatory promise, O. M. Fisher,
Who "books" his name (See Belvie's record on it)
As dweller at Montpelier, Vermont,
And of Five Dollars erst ycleped a "V",
By the said Fisher truly paid to me,
Have quit-claimed and released, remised and to
Remise, release, forever Quit claim to
Grantee, his heirs, and his and their assigns,
Forever and for AYE - as run these lines
A certain Island, some-what rough and rocks,
In that Aquatic Pond called Winipesseogee,
Or better Known, by those who don't live near it,
As the Sweet Orient "Smile of the Great Spirit,"
Containing one-fourth acre, less or more,
Some few stones throw from Winslow Banfield's shore,
Or Jethro Furber's, not in any town,
But in said Carroll County, now set down
In William Crocker's Critical Survey,
But Known as Coffin's Island many a day:

To Have and Hold said premises remised,
All privileges, much or little prized,
And all appurtenances to the same,
To said Grantee his, heirs of whatever name,
Fisher or Fish, of high or low degree,
And true assigns, While Fish or Fisher's be,
With Said Grantee I also covenant
To warrant and defend (nor say I can't)
The same to him and each heir and assign
'Gainst lawful claimants under me or mine.

So let the name of Coffin buried be,
And Fisher Stand while Rivers seek the Sea;
From Fisher Island may the Fish-House rise,
Its Fish Crowned Smoke-Stack peirce the lucky skies,
Its walls be cheered with ever happy faces,
And all our Fish-Lines fall in pleasant place".

In witness whereof, without more ado,
I have my hand and seal set hereunto,
Upon the tenth of March's lengthening day's
In the first year of Presidental Hayes.

Signed Sealed and delivery made o'er
In presence of us two-as good as four.

1877 Stephen Durgin
William C. Fox David C. Rogers seal

ANOTHER DESCRIPTION

(This description is only directed to the skilled and competent surveyor!)

(From the Probate Court records of Hartford,
Connecticut 'National Surveyor, July 1962')

Commencing at a heap of stones about a stone's throw from a certain small clump of alders near brook running down off from a rather high part of the ridge, thence by a straight line to a certain marked white birch tree about two or three times as far from a jog in the fence going round said ledge and the "Great Swamp" so called, thence in line of said lot in part and in part by another piece of fence which joins onto said line, and by an extension of the general run of said fence to a heap of stones near a surface rock, thence aforesaid to the "Horn" so called and passing around the same aforesaid, as far as possible, to the "Great Bend" so called, and from thence to a squarish sort of jog in another fence so on to a marked black oak tree with stones around it and thence by another straight line in about a contrary direction and somewhere about parallel with the line around by the "Great Swamp" to a stake and stone mounds not far off from an old Indian trail, thence by another straight line on a course diagonally parallel, or nearly so, with "Fox Hollow" run, so called, to a certain marked yellow oak tree on the off side of a knoll with a flat stone laid against it, thence after turning around in another direction, and by a sloping straight line to a certain heap of stones which is by pacing just 18 rods more from the stump of the big hemlock tree where Philo Blake killed the bear, thence to the corner begun at by two straight lines of about equal length which are to be run in by some skilled and competent surveyor so as to include the area and acreage as herein set forth.

A DISCIPLINE - LAND SURVEYING

by Ivan P. Macdonald

We are told by the old Egyptian chronicles, that in those times, when the waters of the Nile, which had overflowed the neighbouring cultivated fields, had receded, a group of officials was ordered into these fields to ascertain the extent of the changes caused by the inundation. These officials were in most cases accompanied by a group of land surveyors and it was the task of these men to make sure that the land marks had not been displaced in the course of the last year. For this reason the most aged land surveyor compared the position of the land marks with the registration in the land registers. While at least three clerks were busy in noting and attesting the correctness of the measurement, three other men were, at the same time engaged in holding the rope measure. It is about the year 2500 B.C. that these groups of land surveyors are mentioned for the first time. In the Egyptian land registers there were not only inscribed the size of the property, the name of the owner and the kind of cultivation, but the extent of the canals and that of the cultivated areas as well.

The foregoing historical account is the source that surveyors often refer to when making the statement, "Land Surveying is the second oldest profession".

With the early beginning let's come down through time to the early 1600's when Champlain marked off the Habitation at Port Royal and showed it on maps which also showed the Annapolis Basin survey.

For about 150 years since the days of that first surveyor and mapper of Nova Scotia, lands have been marked off as original lots and eventually grants from the Crown. Among some of those notable men who marked off land and kept the peace were:-

James Cook, Louisbourg and Halifax - 1758-1762

Capt. Lieut. Samuel Holland, Louisbourg - 1758

Joseph F. W. Desbarres, Louisbourg - 1758

Thomas Holland, Halifax County - 1817

John S. Mossis, Surveyor General of Nova Scotia - 1830

Robert N. Henry, Deputy Receiver of Quit Rents, Antigonish in the Upper District of the County of Sydney - 1833

Alpheus Jones, Annapolis County - 1831

Cereno Purdy, Annapolis County - 1844

Charles Taylor, Guysborough County - 1861

James A. McKay, Shelburne County - 1877

Charles W. Pye, Guysborough County - 1885.

Soon after the British established Halifax many of the above-mentioned men were appointed as Cadastral surveyors. They were responsible for the definition of land boundaries, tax assessment, land usage and those who used the land. The duties bestowed on these men and the further delegation of exclusive franchise by Acts of Parliament for the purpose of protecting the public from the unqualified thus points to the fact that society regards the Cadastral or land surveyor as a professional.

During the early settlement days, lands for many uses were in great demand by the new settlers. The number of demands were so great that the qualified land surveyors could not fulfill all the requests so the government appointed skilled men to act as Deputy Surveyors to the Surveyor General of Nova Scotia. The Surveyor General issued written instructions to his bonded deputies. These deputies surveyed thousands of lots with their surveyor's compass and link chain. Present day comparisons indicate that these men in most cases did excellent work. Some of the Deputy Surveyors became so proficient in the science of surveying that after examination they were made Provincial Land Surveyors. Some of the early P.L.S.'s were:

Arthur E. Archibald - October 21, 1912

Reginald J. Freeman, Queens County - August 11, 1903

John J. M. McDougall - 1910

Harry J. Knight - 1910.

Surveying took on a new meaning around the period 1910-12 when 14 active surveyors banded themselves together which was the start towards the enactment of the Nova Scotia Land Surveyor's Association Act. This Act was not proclaimed but was the forerunner of other acts to follow. It is interesting to note that those men stated the objects and purposes of the Association which are to facilitate the acquirement and interchange of professional knowledge among its members, and more particularly to promote the acquisition of that species of knowledge which has particular reference to the profession of land surveying and further, to encourage investigation in connection with all branches and departments of knowledge connected with the profession. The same objects and purposes still apply today but stated in a newer terminology.

At the beginning of the twentieth century Nova Scotia land surveyors were making strides to form an association of colleagues as well as other surveyors in the rest of Canada. Manitoba, Ontario and Quebec had incorporated their land surveyors before 1900 and Saskatchewan, Alberta and British Columbia land surveyors were incorporated before 1910. The remaining provinces now have incorporated their land surveyors with Prince Edward Island, the last province to incorporate, which took place in 1968. The Nova Scotia Association was refounded in 1951 and incorporated in 1955. Today there are over 230 members in good standing in the Association of Nova Scotia Land Surveyors.

The Nova Scotia Land Surveyor's Act give the commissioned land surveyor the exclusive franchise to land surveying. Land surveying is defined as, the determination of any point, or of the direction or length of any line required in measuring, laying off, or dividing land for the purpose of establishing boundaries or title to land.

Land surveying has from its early beginning undergone a complete cycle. The allocation of surveyed lots, parcels and grants of which the land owner could see marked out by the land surveyor is the beginning of the cycle.

The original surveys were recorded in the local registry offices in forms of survey plans or written descriptions and because of our deed registry system further boundary surveys are not required. Lands have been transferred, subdivided and resubdivided over and over again without any actual ground definition and as time passes many boundaries, monuments have become lost.

We are at a similar position in the cycle as those in the early days when land was first allocated. The present day registry of deeds system is very inadequate and out-dated. To determine title to land today is a very laborious and usually vague job which involves a lawyer and a legal surveyor. As the Courts have decreed, absolute title to land in Nova Scotia must be based on a monumental legal survey. For the reasons just mentioned the Nova Scotia Government has embarked on

a system of surveys and mapping which will ultimately lead to a Torrens Land Titles system of land registration based on the Nova Scotia Coordinated control grid work of reference points.

Today the land surveyor is setting his surveyor's compass and Gunter's chain up as museum pieces replacing them with the one second theodolite and electronic distance measuring (E.D.M.) devices. In his office he has programmable electronic calculators and has access to the largest computers in the county by terminal link-up.

As we move into this new era the professional land surveyor will be faced with the basic responsibility of defining boundaries of land which are in a great number of cases vague or lost. With the new instrumentation of our times the land surveyor will be able to carry out these boundary surveys on a higher professional plane. He is relieved of the drudgery of time consuming calculations by the availability of technician-operated programmable electronic calculators which are programmed to mathematically check all input. He is also relieved of the equally time consuming job of linear measurements taken along trial lines and final boundaries by the use of the quick and accurate E.D.M. devices. With these time saving instruments the land surveyor will be able to concentrate on the search for the primary evidence of the corner monuments, research in the registry of deeds office and interviews with long time residents of the community whose views and evidence help piece together the fragmented title evidence.

The land surveyor will still be responsible for the dividing for subdivisions of larger lots or parcels into proportional parts according to wills and family inheritance and into community building lots. He will continue to define the limits of roads and highways by straight lines and curves or by other methods which are appropriate to the class of road or highway being surveyed.

All surveyors have skilled instrument men to carry out any job that involve turning angles, establishing elevations, or making accurate linear measurements. More and more these just mentioned operations will be performed by survey technicians and technologists who will work under direct supervision of the land surveyor.

The future for the land surveyor is a challenge which must be met with higher standards of qualifications and work procedures. Since the introduction of the Nova Scotia Control Surveys system, the passing of the new Surveyor's Act, (Chapter 20 of the Statutes of Nova Scotia 1970-71) and the necessity of positioning of oil wells and mining leases, the Association of Nova Scotia Land Surveyors have been taking steps to insure that the membership is well informed. Opportunities to become acquainted with highly skilled colleagues from across our nation have been possible through our three day annual meetings and active council of twelve elected members. The Nova Scotian Surveyor is our official journal that each Association member receives which contains articles presented at the annual meetings, articles written especially for the journal and articles from other authoritative sources.

Land surveying is undergoing many changes nowadays and will undergo other changes in the future. Such changes in the profession will be structured along the following lines:-

1) The Science of Surveying

This may be defined as the innovation sector, embracing the entire field of surveying, where knowledge is accumulated on a systematic basis in response to new ideas and concepts.

2) The Technology of Surveying

This is the sector which also encompasses the whole field of surveying but its development is directed more towards immediate practical problems and opportunities.

Both these technical sectors should be represented in the professional organization which manages the profession, where such management includes the definition of objectives and goals in relation to the demands of society as a whole. This involves a wide range of professional and technical people within the profession; for example - geodesists, control surveyors, legal surveyors, hydrographers and photogrammetrists.

It is fortunate that we have such an organization in the shape of the Canadian Institute of Surveying. The C.I.S. is a national organization which brings all the above related disciplines together. Already with sponsorship of the C.I.S., an executive member of each Provincial Survey Association across Canada has been meeting over the past few years to consider, research and recommend changes in the profession. The two most significant changes requiring a lot of attention are:-

1) We must cooperate and encourage universities to offer courses in related survey subjects, just not the usual one semester, one hour a week course. There is more to surveying than logarithms and plane-tabling. U.N.B. recognized the situation and has been offering a full degree course in Survey Engineering for a number of years now.

2) The national body of the Provincial Survey Associations will have to manage and reorient the course of the profession in relation to anticipated requirements of the future. If this concept of management of the activities of the profession is not applied, we shall be carried away by technological advancements without direction. We will be applying 20th century gadgets, such as computers and electronic instruments within a 19th century concept of the profession.

During the course of his career the professional surveyor will spend considerable amount of time keeping abreast of technical and scientific developments and studying peripheral subjects such as managerial sciences.

It is our hope that all Nova Scotia Land Surveyors will become members of the Association of Nova Scotia Land Surveyors so that we may all contribute to the survey discipline in a well informed and consistent manner, now and in the future.

* * * *

** CLASS OF '62 GRADUATES **

On November 3rd and 4th, in conjunction with the 1972 Annual Meeting of A.N.S.L.S., held in Sydney, a reunion was held for the Class of '62 of N.S.L.S.I. Nine of the fifteen graduates were in attendance.

Slides and pictures taken during school days were shown by John MacInnis for the reminiscing of the graduates and the enjoyment of their wives.

During the closing dance, held by the Association, a presentation was made to Jim Doig, Instructor of the Class at N.S.L.S.I., making him an Honorary Member of the Class of '62.

Of the fifteen graduate members of the class, ten have qualified as N.S.L.S. and two as N.B.L.S. In addition, one has qualified as a D.L.S., one as a P. Eng., and one as a Maine Land Surveyor.

David C. Clark
David W. Conrod
John W. Covert
Robert A. G. Fulton
Michael Milner
Kenneth F. MacDonald
John C. MacInnis
Donald J. MacNeil
I. Jack Osmond
Robert E. O'Brien
Brian D. Peel
Donald L. Rix
Leonard Telfer
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Carleton Warner

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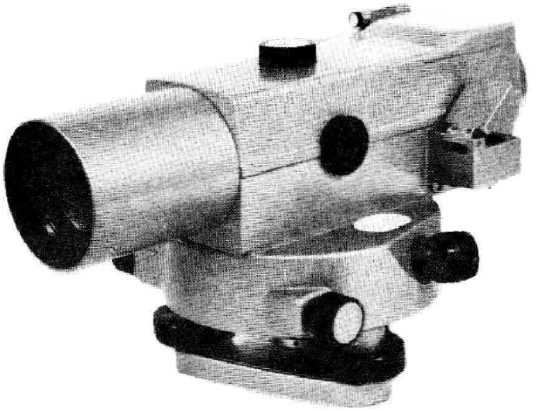

SPECIFICATIONS

Telescope:	10-3/4" internal focussing with anallactic optics erect image with 32X magnification, built-in sunshade, objective has effective aperture of 1-9/16" and minimum focus of 5'11". Field of view 1°6'. Parallax free external optical peep sight.
Horizontal Circle: (AL24c only)	Etched glass circle 3-1/8" diameter, reading through microscope eyepiece on side of upper plate. Graduated 1° vernier to 5'.
Reticle:	Etched on glass stadia lines with ratio 1:100 (0.3:100 available). Constant is 0. Stadia lines short to distinguish from cross hairs.
Level:	Circular level vial 10' per 2mm. Mounted on side of instrument has hinged mirror viewer.
Compensator:	Ribbon-type compensator of precise construction, friction-free suspension, not affected by outside elements, rough levelling using circular vial will place compensator into line of sight. "Instant Precision" is established. The compensator will compensate tilt to plus or minus of 10'.
Features:	Three replaceable levelling screws are enclosed and dust proof. The base plate is of heavy construction which allows greater accuracy and protection, made to fit 5/8" x 11 tripods. Instrument fitted with friction clutch which eliminates clamp screw. Just align telescope with target and fine sighting is done with either of two knurled knobs on endless tangent screw "up front"
Accessories:	Ruggedly constructed plastic carrying case for utmost protection, objective cap, adjusting pins, screw driver, brush and plastic rain hood (Plumb Bob AL-24c only).
Tripods:	Recommended for this instrument: 353 7145 Wide Frame Extension Leg Tripod 353 7125 Regular Extension Leg Tripod 353 7135 Fixed Leg Tripod
Catalogue Numbers for instruments	353 1142 AL-24 Automatic Level 353 1144 AL-24c Automatic Level with circle.

INFORMATION

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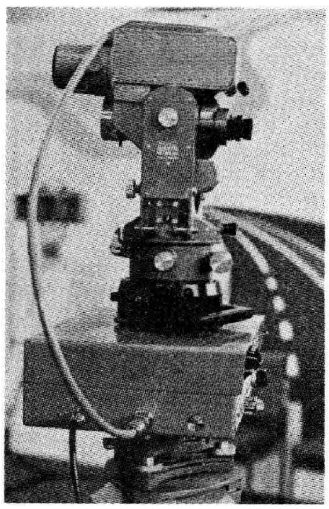

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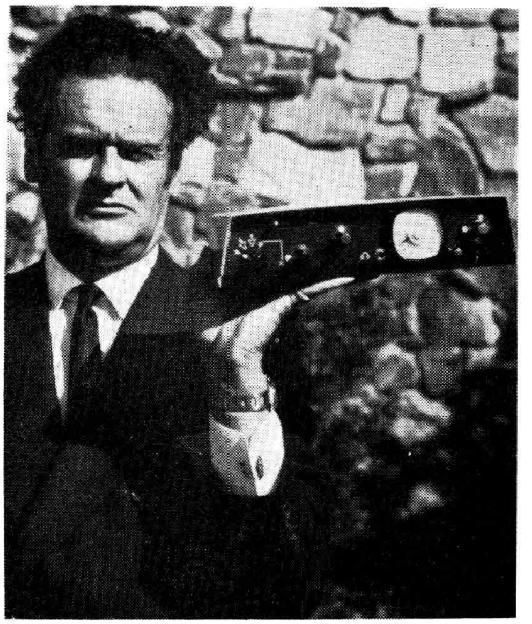

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