

Canadian Cartographic Association  
L'Association canadienne de cartographie

# Newsletter

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*Department of Geography*

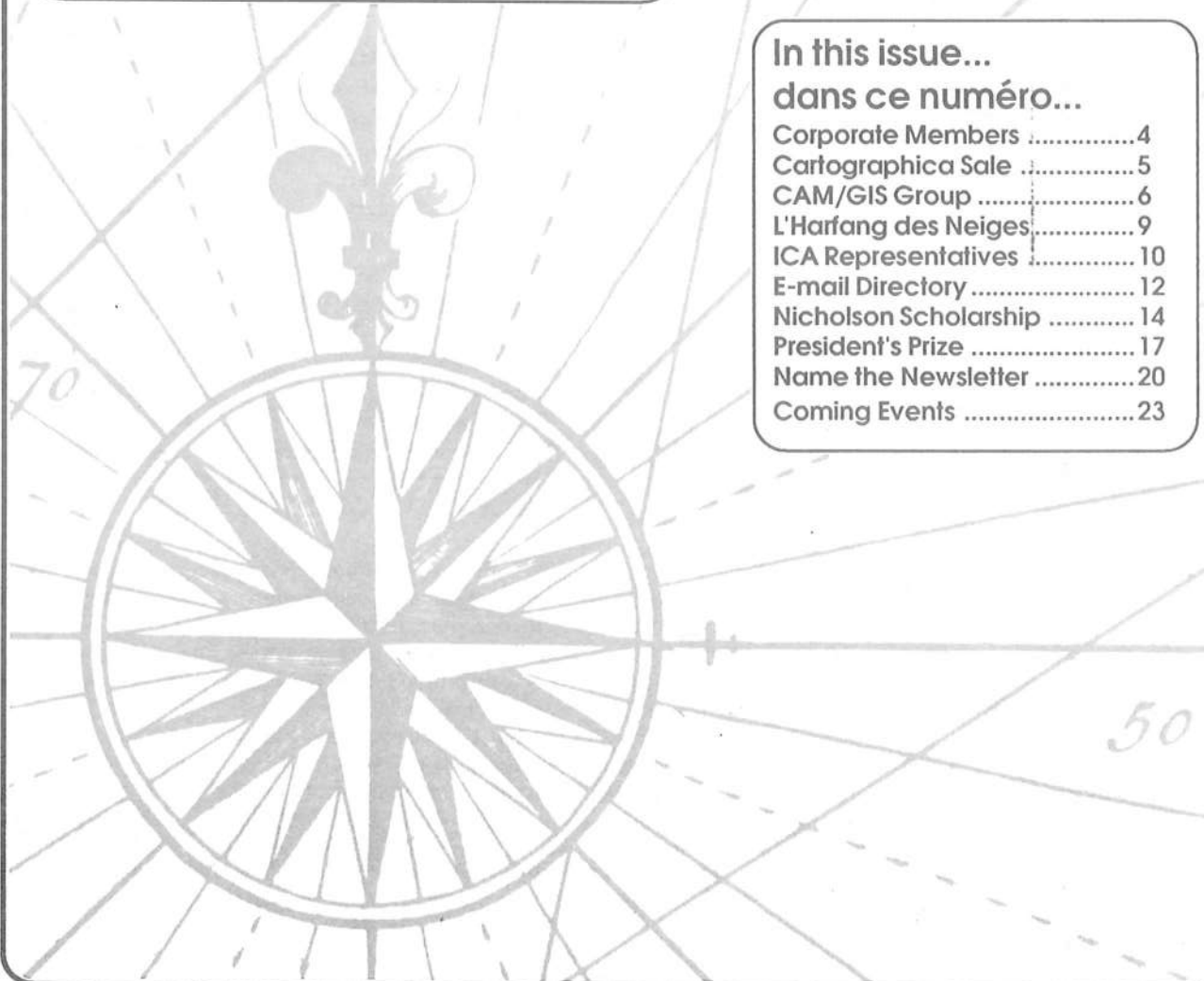
*The University of Western Ontario*

**Volume 15, #4, 1989**

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***Keeping in touch...***

If you have news or information that you would like to pass along to others in the cartographic community, please send your material to the Newsletter Editor at the above address. Contributions are welcome in either English or French and will be published in the language in which they are received. The submission deadline for the next issue (Vol. 16, #1, 1990) is March 1, 1990.

*We welcome the following new members  
 to our association/  
 Bienvenue aux nouveaux membres de l'ACC*

|                      |                            |
|----------------------|----------------------------|
| Ian Crain            | Calgary, Alberta           |
| Nicolino Di Vincenzo | Montréal-Nord, Québec      |
| Richard Gorecki      | Calgary, Alberta           |
| Michael Hanley       | Victoria, British Columbia |
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**CORPORATE MEMBERS**

|   |                   |
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| Defence Mapping Agency  | Washington, D.C.  |
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| J.M. Ellis Ltd.   | Metcalfe, Ontario |
| Intergraph Canada Ltd.  | Calgary, Alberta  |
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| Schwerdt Graphic Arts Ltd.  | Brampton, Ontario |
| Stanley Associates<br>Engineering Ltd.                                      | Calgary, Alberta  |
| Tydac Technologies Inc.   | Ottawa, Ontario   |
| Weller Cartographic Services  | Surrey, B.C.      |

***News on Cartographica...***

The editor of Cartographica apologizes for the delays in preparation and distribution of the last two issues of Cartographica for 1989.

Owing to health problems, the editor's work schedule has been interrupted. They will be published as one double issue as soon as possible

Bernard Gutsell  
 Editor, Cartographica

The Canadian Cartographic Association gratefully acknowledges the financial support given by the Social Sciences and Humanities Research Council of Canada

*L'Association canadienne de cartographie remercie vivement le Conseil de recherches en sciences humaines du Canada pour son apport financier.*

## FROM THE CCA OFFICE

Best wishes to all CCA members for 1990.

The beginning of a new year of course means that among other things, it is once again time to renew your membership, and part with a few more tax-deductible dollars.

**If you have not yet renewed for 1990, the top line of your address label reads "12/31/89". Late renewals cause a problem both for the Association and the University of Toronto Press, and hence a speedy response is much appreciated. You should have received a renewal form in the mail; If you did not, or it has disappeared under paperwork, please use the form enclosed in this newsletter.**

Since this is the last newsletter issue for 1989, it will indeed be the last one you will receive before renewing: there will be no 'grace' copy as was done in the past, since this adds considerable expense. However, to date, there are still two issues of *Cartographica* to be distributed for the year 1989. These will be received whether or not you rejoin, to be followed by four more issues for 1990 members. To ensure continuity of both newsletters and journals, please renew as soon as possible.

It has come to my attention that members who joined or renewed in the second half of 1989 have not yet received an issue of *Cartographica*. Unfortunately we have no control over the distribution of the journal. However, the U of T Press assures me that issues 1 and 2 will be distributed to those members in the next month, followed by issue 3/4 when printed. Our apologies for the delay.

Roger Wheate, CCA Office Manager

## For those who may be curious...

This newsletter is composed using PageMaker 3.02 software on a Mac II and output to a LaserWriter II printer.

Your submissions to the Newsletter, if received via e-mail, are transferred first to WordPerfect 5.0 and converted into DCA format. These formatted text files are then transferred into MSWord 3.0 for the Macintosh using the Apple File Exchange utility. Finally, the MSWord files are placed in PageMaker to achieve the final proof.

If your submission is received in high quality typewritten form, it is scanned using MacinText software, tested for errors using a spelling check function in Word and placed in Pagemaker.

If, however, your submission is received as a Fax or as handwritten copy, I must then retype your text with considerable consternation. I can't scan a Fax very well, as there is considerable loss of image quality. So if you can, please send a typewritten copy through the mail or better yet, use e-mail!

## The Name Game... or letters to the Editor

November 30, 1989

Dear Sir:

May I join others who have suggested for a Newsletter title the word: "Perspectives". Not only bi-lingual, but a fundamental dimension in the preparation of any spatial (or even digital) data, perspective is a word we are all familiar with. In fact cartographers have historically created new perspectives for understanding our world, our earth that revolutionized religion, education, navigation, economics, etc. In fact our single most important contribution to learning is our unique perspective.

May I congratulate the Canadian delegates to the ICA in Budapest for their strong showing and the quality of their presentations. As well they showed the typical "bonhomie" that often distinguishes Canadians overseas. For those who didn't go to Budapest, "too bad!, you missed something special".

For cogency, quality of presentation, and humour my vote goes to Mike Coulson from the University of Calgary, for his paper "In Praise of Dot Maps", and Jean-Claude Muller formerly of Edmonton now a big gun of Enschede in the Netherlands as runner-up. In honourable mention for "evangelism-in-gis" goes unreservedly to Jack Dongermond from ESRI for a really blood-stirring presentation on our role in global monitoring of the environment that received a rousing response at its close. Some guy that Jack! My vote for most distinguished session chairman goes to our friend Henri Gorski from Poland for his humour and laid-back style. Best and most persistent interlocutor goes hand-down to Nicholas Chrisman from Seattle. And a special congrats must go to Dr. Taylor as the ICA President who has provided excellent leadership, diplomacy, and his drole Canadian humour throughout the Congress.

The Hungarians were incredible as hosts and convenors of the event and Budapest the city was, well, marvellous! - the food, the architecture, the crowds in the streets, the women (!) - quite a town! Quite the people!  
Now, back to work.

Regards,  
Stephen Pattison  
Brussels

Editor's note: I think we've been scooped on another possible name for our newsletter. NACIS has recently renamed their publication "Cartographic Perspectives". Are we infringing on territory that's already claimed?

Dear sir and CCA members,

Following up on my letter in the last issue, re a new name for the newsletter, which is long overdue, a fellow cartographer has suggested "Cartouche". Surely this says it all. It evokes our historical ties, avoids those annoying acronyms, and is presentable in either official language. It's French, it's English and in certain northern dialects means "Have a good day" (No, not really!). The 'touche' even evokes the physical closeness maps encompass as a manner of scale, and the close contact a medium such as a newsletter can produce in terms of communication.

How about it? Send in alternate suggestions to the editor, or if you are on Bitnet, send a note to the manager (wheate@uncamult).

Yours suggestively  
Roge LeBle

Editor's note: It's better than Digééh Edeht'ehé!

# News from Corporate Members

## New Era Software Products Inc.

..was incorporated in 1982 to sell LOIS, the Lot Oriented Information System, and since has expanded to cover a complete range of hardware and software products for local government offices, including word processing, office automation and complete financial packages. They provide complete network computer solutions to local governments.

LOIS is a targetted GIS that was built to fulfil the needs of local government, linking the mapping and assessment databases and providing advanced reporting, data storage and interfacing capabilities. LOIS uses existing map bases, or can be used to digitize new information. LOIS is installed across Canada from Sidney, BC to Bedford, NS.

Clifford Quinn and Michael Hanley are the two CCA members for New Era Software Products.

For more information contact:  
Patrick Deakin, client coordinator,  
NEW ERA SOFTWARE PRODUCTS INC.  
Suite 205, 3347 Oak Street,  
Victoria, BC V8X 1R2  
Tel: 604-380-0821  
Fax: 604-381-6080

## Stanley Associates Engineering Ltd.

In September 1989, Stanley Associates Engineering Ltd. of Calgary, Alberta, submitted an interim report to the Department of Energy, Mines and Resources regarding an evaluation of the commercial viability of marketing a new type of National Topographic Series Map. The research work undertaken gave a clear identification of the need for an informative and up-to-date tourism oriented map of the Banff/Canmore area. There was also a definitive requirement to continue and enhance the communication portion of the program at both domestic and international levels. As awareness of the project grows, the government agencies, private organisations and individuals have become more broadly based.

Based on the market research, it has been established that a considerable demand exists for a more detailed and focused map. response to the domestic and international surveys has indicated that individuals and tour operators are looking for a map product that provides a broad range of information. In developing the design and data set framework, the objective is to have a visual display of facilities and activities which is also organised in a referenced matrix format. This will give people the opportunity to evaluate what areas in the Banff/Canmore area are suitable to support their facilities and/ or activity demands.

The release of the new map is slated for mid-March 1990. A prototype map will be available in early January for purposes of market evaluation and modification. The final product will be in full colour, at a scale of 1:50,000 and in a folded format. As work continues, the firm will be releasing additional information on relevant aspects of the project. Further information or registration of interest can be obtained by contacting the following individuals: Frank Greif, Project Director,  
Gregory Kovacs, Project Manager  
Stanley Associates Engineering Ltd.  
Suite 230, 2635 37 Avenue N.E.  
Calgary, Alberta, T1Y 5V7  
Tel: 403-291-2100  
Fax: 403-250-1308

## DataSpan Technology Inc.

DataSpan was formed in 1985 in response to an industry and government need for an efficient, comprehensive service in digital data capture (DDC). The DDC process involves the conversion of hardcopy documents, such as maps, charts, engineering drawings and facilities management diagrams, to a digital form. Since then, the company has expanded its services to include high-resolution plotting and data processing (seismic, aeromagnetics and satellite imagery). DataSpan currently employs 28 people at its Calgary office, and is presently conducting research and development in DDC under a joint venture agreement with the Alberta Research Council. DataSpan's main exportable services are in automated digitization, remote sensing and data processing. the company is a world leader in the adaptation of artificial intelligence to DDC, and has developed advanced modules in number recognition and line following. DataSpan maintains a large programming staff who have practical experience in survey engineering, cartography, GIS, CAD and digital mapping.

Two software products have recently been released: RVCS which is designed for high-speed raster-to-vector conversion, and ALF which represents the state-of-the-art in interactive vector editing. These software products may be installed on any UNIX-based computer platform including SUN, MIPS and APOLLO, and would be of value to any organization undertaking a data conversion project.

DataSpan also provides services in high-resolution plotting using its Scitex laser plotter. As a result, they can offer a complete range of mapping and data processing services including the generation of high quality hardcopy products.

## Tydac Technologies Inc.

TYDAC Technologies Inc. will be hosting the Second Annual SPANS Users Group Meeting March 1 and 2, 1990 at the Westin Hotel in Ottawa. This is just prior to the National GIS Conference in Ottawa, "GIS for the 1990s".

This year's event will showcase new developments in SPANS, technical workshops, presentations and poster sessions, as well as hands-on experience using the OS/2 version of SPANS and IBM's Presentation Manager.

The registration fee is \$200.00 per person and includes breakfast, lunch and dinner for both days. Please contact either Adla Worobec or Bob Madill for further information

- tel.: (613) 722-7472 fax: (613) 722-8682.

We look forward to another exciting meeting!

TYDAC has been presented with the Silver Award for Innovation in the 1989 Canada Awards for Business Excellence. The Honourable Harvie Andre, Minister of Industry, Science and Technology Canada announced the bronze, silver and gold winners in nine categories on Tuesday, November 7, 1989.

We are honoured and proud that TYDAC was selected for this prestigious award and look forward to building on this success by providing exciting new SPANS product developments and applications for GIS users in Canada, the United States and worldwide.

## SALE ON BACK ISSUES OF

### CARTOGRAPHICA MONOGRAPHS!!

- 01 1971 The 17th Century Cartography of Newfoundland
- 02 1971 Map design and the Map User
- 03 1971 Russian Maps + Atlases as Historical Sources
- 04 1972 National Atlases
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- 11 1974 The 7 Aspects of a General Map Projection
- 12 1974 Index/Abstracts, Canadian Cartographer, 1-10
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- 14 1975 Studies in History of Russian Cartography
- 15 1975 Studies in History of Russian Cartography
- 16 1976 Conformal Projections based on Elliptical Functions
- 17 1976 Explorations and Mapping of Samuel de Champlain
- 18 1976 The Surveying and Mapping of British East Africa
- 19 1977 The Nature of Cartographic Communication
- 20 1977 Computer Cartography in Sweden
- 21/22 1978 The Riel Rebellions: a Cartographic History
- 23 1979 National and Regional Atlases
- 24 1979 Index/Abstracts, Canadian Cartographer 11-15
- 25 1980 The Dynamics of Oceanic Cartography
- 26 1980 Concepts in the History of Cartography
- 27 1981 Maps in Modern Geography
- 28 1982 Perspectives in the Alternative Cartography
- 29/30 1983 Mapping for Development
- 31 1984 New Insights in Cartographic Communication
- 32/33 1984 Auto-Carto 6

Sale price: \$6.00 per single issue, \$10.00 per double issue

Send orders to: University of Toronto Press  
5201 Dufferin St.  
Downsview, Ontario M3H 5T8

Or enquiries to: Roger Wheate (CCA),  
Geography Department,  
University of Calgary,  
Calgary, Alberta, T2N 1N4

## New product: available through the CCA disk library

UVIC\_SDT: Spatial data Translation Routines, by C. Peter Keller and J. Michael Gartrell, Department of Geography, University of Victoria.

Over the last few years, considerable effort has been spent converting analogue cartographic data into digital format for storage, display, manipulation and analysis. Developments of the interfaces in an interactive and user friendly manner have consumed considerable time and efforts.

Given the assumption that other cartographers and geographers share some of our format translation needs, we have decided to publish the translation, and to make the software available through the CCA's software library (see library listing elsewhere in newsletter). The program(s) has been written under DOS 3.3, with 640K RAM, and VGA graphics adapter with 250K video RAM. It is composed of three main options:

- World Digitized to Atlas\*Graphics
- ARC/INFO to PAMAP
- Area Master File to PAMAP

The World Digitized is a collection of boundary files for the coastlines, islands, lakes and national boundaries of the world. It is separated into 30 data files of types of boundaries for given continents. The Area Master File (AMF) contains a set of digital data marketed and maintained by the Geography Division of Statistics Canada. This includes street features and other physical and cultural geographical features for census metropolitan and agglomeration areas in Canada. Atlas\*Graphics is a thematic mapping package, while PAMAP and ARC/INFO are Geographical Information Systems.

## Journals take on new names

The American Cartographer, the leading professional and academic journal of cartography published in the United States has announced that its name will change to Cartography and Geographic Information Systems effective January 1990. The name change is intended to reflect the increasing importance of geographic information systems within the field of cartography.

Similarly, Cartographic Information, newsletter of the North American Cartographic Information Society (NACIS), has been superseded by Cartographic Perspectives, which is to become the society's bulletin. The publications has expanded to include "more original contributions about cartographic activities in the Americas." Aside from news items and notices and reviews of new publications and mapping software, the bulletin will publish a solicited feature article and synopses of articles appearing in obscure or non-cartographic publications.

## New Publication from the Feds

Canada Year Book, 1990 Biennial. (Catalogue No. 011-402E and 011-402F)

This indispensable source of up-to-date statistical information is authoritative and encyclopedic in scope. Agriculture, Culture, Demography, Environment, Geography, Land Use and Transportation are just a few of the subjects to be found in the Canada Year Book. The comprehensive range of topics is easily found through an expanded cross-referenced index that is simple to use.

As well as its usual 850 page complement of text, tables and charts, the 1990 Canada Year Book contains some visual innovations. Complementing the existing charts which show major trends, a number of computer-generated maps are included that show various social and economic themes.

The Appendices provide supplementary information including Federal Government Departments, Agencies, Crown Corporations and Federal Legislation since May, 1987. The 1990 edition also directs the reader to additional reading sources in a new section called "For Further Reading".

## CAM/GIS Interest Group

CONTROL STRUCTURES IN  
PASCAL

by Ron Eastman

This is the second installment of the CCA short course in Pascal and Automated Cartography. In the first installment, we examined some of the fundamental tools of the Pascal language — basic functions and procedures that provide the “calculator” like capability that most high level scientific languages require. Our programs, however, were rather elementary. For example, we left off with a problem to calculate distance. Perhaps your attempt looked something like this :

```

program distance;

var x1,x2,y1,y2,dist : real;
    delta x,delta y : real;

begin

    write('Enter the X coordinate of the first point : ');

    readln(x1);
    write('Enter the Y coordinate of the first point : ');

    readln(y1);
    write('Enter the X coordinate of the second point : ');

    readln(x2);
    write('Enter the Y coordinate of the second point : ');

    readln(y2);

    delta x:=(x2-x1);
    delta y:=(y2-y1);

    dist:=sqrt(sqrt(delta x)+sqrt(delta y));

    writeln('The distance is ',dist:10:2);

end.

```

The logic is quite straightforward. We first get the data we need, we then carry out some manipulation of those data, and we finish by outputting our result. In this case we input the X and Y coordinates of the two points between which we are calculating the distance and then determine the difference in X and the difference in Y between them. The differences form two sides of a right angled triangle with the line joining the two points forming the hypotenuse. We then apply Pythagoras' Theorem that states that the square of the hypotenuse is equal to the sum of the squares of the two opposite sides and square root the result. Notice that when we output our result, we ask for it to be printed using 10 print positions with two of those positions being used for decimal places. This is Pascal's very simple means of formatting.

In a program such as this, the order of execution starts at the top and proceeds sequentially from one statement to the next. In most programming, however, we find it necessary or convenient to change this order. This is done with control structures of which we can identify three : unconditional transfers of control, conditional structures, and repetition structures. We will examine only the first two in this installment and concentrate on the latter in the next.

## a) Procedural Calls

One of the most fundamental means of altering program flow is to break the program up into tiny blocks and then direct the flow of operations through these smaller sections of code. These smaller program chunks are called procedures and functions. We have already encountered a large variety of procedures (eg. writeln) and functions (eg. sqrt) that are built into the Pascal language, but we can equally create our own — and the meaning remains the same. A procedure is a program chunk that does some action while a function is one that returns a specific result. We will look at user defined functions later. However, here is our distance program reworked using procedures and unconditional transfers of control :

```

program distance;

var x1,x2,y1,y2,dist : real;
    delta x,delta y : real;

procedure get data;

begin

    write('Enter the X coordinate of the first point : ');

    readln(x1);
    write('Enter the Y coordinate of the first point : ');

    readln(y1);
    write('Enter the X coordinate of the second point : ');

    readln(x2);
    write('Enter the Y coordinate of the second point : ');

    readln(y2);

end;

procedure calculate dist;

begin

    delta x:=(x2-x1);
    delta y:=(y2-y1);

    dist:=sqrt(sqrt(delta x)+sqrt(delta y));

end;

procedure print result;

begin

    writeln('The distance is ',dist:10:2);

end;

begin main program begins here

    get data;
    calculate dist;
    print result;

end.

```

Let's begin by looking at the overall structure. First we see a series of procedures that all start with the keyword “procedure”. Notice that each procedure has the exact same structure as a complete

program. In fact, a procedure is essentially a mini program — a “subroutine”. The only differences come at the beginning and end. At the beginning the keyword “procedure” is used rather than “program” and at the end, the “end” statement is followed by a semicolon rather than a period. Finally we notice that the procedures all fall between the end of the declaration block (where the “var”iables are declared) and the main body of the program.

In reading a Pascal program, we will always look for the main program first. Unlike a language such as BASIC, the main program falls at the end. Notice the use of braces to identify where the main program starts (this is not a requirement, only a helpful annotation). Braces are used to enclose comments that are not meant to be interpreted by the Pascal compiler. You can put comments such as this anywhere you wish.

Reading the main program, we see that the first statement says “get data”. This statement literally says “look for a procedure named ‘get data’ and execute its contents NOW”. This is an unconditional transfer of code. There is no choice. Program flow thus moves up into the “get data” procedure and continues execution until the last statement is reached. Then when the “end;” of the procedure is reached, control is returned to the main program at the line following the one that caused the unconditional branch.

The next line contains the statement “calculate dist” which can also be understood to say “do not go to the next statement ... go the the procedure named ‘calculate dist’ and execute the statements within it ... then you may resume”. Similarly, the final statement in the main program branches to the “print result” procedure. (Notice, by the way, the use of the underscore “\_” character in these names. The underscore has no special significance. It is commonly used by programmers to help space out the words that compose and variable or procedure name since embedded space characters are not allowed).

At this point, you may be wondering what is the point? In fact, it would seem that we have only just added more work. However, this breakdown of the program into little pieces is essential. First, it helps us lay out the logical organization of our program. This example is trivial, but with more difficult programs a structural layout into logical pieces is an important step. Start writing a program from the top down. Begin by thinking in procedural blocks and use this as the basis for developing the main program first. Most of us could easily have developed the main program without too much thought — get the data, then calculate the distance, then print out the results! Then tackle each of the procedures in turn.

Breaking down the program into small procedural blocks makes any programming task manageable. Some programmers even believe that no procedure should be longer than what will fill a single computer screen (about 25 lines, but with spacing for clarity, perhaps only half this much). The programs we are learning to write at the beginning may seem trivial, but with proper attention to program structure, virtually all programming can be reduced to sequences of small procedural blocks. The simpler the block, the less likely we are to make a mistake! Do not be impressed by terse “tight” code. Such programs may seem “deep” but usually the only thing that is deep is the trouble they get the programmer into.

The second reason why we break down a program into blocks is that we often find that we may wish to use the same procedure again and again. Which then leads us to the second kind of unconditional transfer of control ... the “dreaded” GOTO statement!!!

#### b) The Dreaded GOTO

In order to save space, the procedures will not be reproduced in the listing below. However, in practice they must appear. Here is an example of the use of a GOTO unconditional transfer and multiple repetitions of procedures :

```

program distance;

label loop;

var x1,x2,y1,y2,dist : real;
    delta x,delta y : real;

procedures go here

begin main program begins here

    loop: get data;
        calculate dist;
        print result;
        goto loop;

end.
```

First, notice that the declaration block contains a new section — a label declaration section. Here we have defined the name “loop” to be a line label. This label is then attached to the first statement in the main body by preceding the statement with the label and a colon. Then notice that the last line in the main program says “goto loop”. This can be interpreted to say “do not go to the next statement, but go to the statement named loop”.

Can you see what happens? We have put the program into an endless loop! The program starts by getting data, calculating the distance, printing the result, then looping back to get more data, calculating the distance and printing the result, then loop back again ... and again ... and again ... (remember, the computer has the brains of a toaster — it is quite happy occupying its time with this kind of insanity). How do we stop it? Hold down the control key and press either the letter C or the break key. This will usually stop a runaway program.

The GOTO statement has a bad reputation. Not because of what we just did (we will correct our endless loop in a moment) but because it is considered to “seduce” one into undisciplined transfers of control. Clearly with the GOTO statement we can redirect program flow all over the place. However, you will find quite soon that you leave the GOTO statement behind. Pascal has a very rich set of control structures that rarely require us to use it. For now, however, it provides an appropriate introduction and a lead in to a conditional structure that will get us out of the problem we’ve developed.

### CONDITIONAL STRUCTURES

The primary conditional structure is the IF statement. The IF statement is fundamental to programming — it allows something to happen only IF some condition is met, and hence its name. Consider the following :

```

program distance;

label loop;

var x1,x2,y1,y2,dist : real;
    delta x,delta y : real;

procedures go here

begin main program begins here

    loop: get data;
        calculate dist;
        print result;
        if dist>0 then goto loop;

end.
```

The use of the IF statement is virtually self evident. The syntax is IF some condition holds THEN do something ELSE do something else. The ELSE part is optional. What follows the THEN or ELSE parts can be any valid Pascal statement. In this example, if the calculated distance is greater than zero then it causes execution to loop back for another repetition. However, if it is not (eg. the person entered 0 for all coordinates) then the THEN portion is not executed and control passes to the next statement (which is the "end." statement in this case).

Note that the testing of the condition after the IF portion can use any combination of what are known as relational and logical operators. The relational operators include :

```
= equals          <> does not equal
> greater than    < less than
>= greater than or equal to  <= less than or equal to
```

The primary logical operators are AND and OR. Thus our IF statement could have read :

```
if ((x1=0) and (x2=0) and (y1=0) and (y2=0))
then
begin
  clrscr;
  goto loop;
end
else writeln('All Done');
```

You should look at your Pascal text for further examples here, but notice that this statement illustrates the optional ELSE portion and the additional ability to have either the THEN or ELSE portions execute multiple statements by enclosing them in a begin/end pair. IF statements can be nesting and can become exceedingly complex. Again, simplicity is the key to good programming and Pascal provides us with an alternative in situations where things become difficult. This is the CASE statement. Consider the following :

```
program distance;

label loop1,loop2;

var x1,x2,y1,y2,dist : real;
    delta x,delta y : real;
    option : integer;

procedures go here

begin main program begins here

  loop1: get data;
  calculate dist;
  print result;

  loop2: writeln('Enter your choice : ');
  writeln('          1 : Calculate another distance');
  writeln('          2 : Quit');
  readln(option);

  case option of
    1 : goto loop1;
    2 : writeln('Bye');
  else begin
    writeln('You choice must be either 1 or two');
    writeln('Please try again');
    writeln; this simply prints a blank line

    goto loop2;
  end;
end; case

end.
```

As you can see, the CASE statement is simply an IF statement with multiple IF/THEN possibilities. Indeed we could have written the CASE statement entirely with an IF statement. Whichever seems the easier to write in any given situation is the correct choice. They do the same thing with equal efficiency. Generally, whenever an IF statement gets complex a CASE statement is a wiser choice. Review the CASE statement further in your Pascal text and note particularly that the variable that CASE examines ("option" in this illustration) cannot be a number of type real, that any section may contain multiple statements if encased in a begin/end pair, that an optional ELSE portion is permitted (as in this illustration), and that the CASE statement MUST end with its own "end;" statement.

## CONCLUSIONS

We now have the basic elements of a true programming language. We know how to use the basic "calculator-like" functions and procedures the language provides and how to direct the flow of operations the program follows. In our next installment we will finish our discussion of control structures by looking at repetition structures. In the meantime, try modifying the program above so that it uses an IF statement rather than a CASE statement to achieve the same results. Enjoy!

---

## Grass "Yellow Pages"

Contact: Ms. Marlo Oechsel  
USA-CERLEN  
P.O. Box 4005  
Champaign, IL 61824-4005  
217/352-6511 ext. 533

The GRASS Interagency Steering Committee wants to put together a GRASS "Yellow Pages." The purpose of this document is to consolidate information on organizations providing services for GRASS users. The document will be revised annually. Any organization that provides training, software distribution, data development, data translation, hardware configuration, programming applications, documentation, turn-key systems or other services that might be of interest to GRASS users is welcome to submit a listing. Advertisements can also be placed.

The GRASS "Yellow Pages" will be distributed annually with an issue of the GRASS Clippings newsletter and also distributed at technical meetings, through the GRASS Information Center and through various GRASS distribution and training sites.

Please contact Marlo Oechsel with the following information if you would like to place an entry:

Name of Organization  
Point of Contact  
Service/System provided to GRASS users  
Address  
Telephone number

Please contact Ms. Oechsel for information concerning format, deadlines, fees, copies, and other information.

## CHRONIQUE DE L'HARFANG DES NEIGES (4) THE SNOWY OWL CHRONICLE (4)

Par/by Majella-J. Gauthier

Le présent article concerne les orientations de la géomatique au Gouvernement du Québec; les sources de renseignement proviennent notamment de *GÉOinfo* qui est le Bulletin d'information sur la géomatique et les systèmes d'information sur le territoire au Gouvernement du Québec (vol. 1, no 1, février 1989).

This article concerns the new orientations of the Province of Quebec in terms of land information systems. Sources for this paper come from *GÉOinfo*, the Bulletin d'information sur la géomatique et les systèmes d'information sur le territoire au Gouvernement du Québec (vol. 1, no. 1, Feb.1989).

C'est le 30 novembre 1988 que le Conseil des ministres adoptait une décision de principe visant à doter le gouvernement du Québec d'un Système d'information sur le territoire en réseau et à en jeter les bases dans le cadre d'un premier plan géomatique gouvernemental triennal. En plus de faire appel à la contribution harmonieuse des ministères et aux technologies nouvelles, le système permettra de moderniser la gestion d'un ensemble de bases de données reliées au territoire.

Des efforts considérables doivent être déployés pour connaître les ressources et toutes les activités et événements humains de toutes sortes qui prennent place sur le territoire. Les informations, de par leur grand nombre et leur variété, vont permettre à l'usager de mieux protéger, utiliser ou mettre en valeur les ressources de la province, ainsi que de mieux planifier, contrôler ou développer les activités humaines.

Il faut se rappeler qu'actuellement les informations liées au territoire québécois sont recueillies, traitées et mises à jour par 62 unités administratives réparties dans 24 ministères, qu'elles portent sur plus de 150 phénomènes localisables et qu'elles exigent annuellement 70 millions de dollars pour s'en occuper. On constate aussi que les données sont hétéroclites, que la pénétration des nouvelles technologies s'avère faible et qu'il est urgent de combler le retard.

La liste des nouvelles orientations relatives à la géomatique est longue: nécessité de la concertation et de la coordination en ce qui concerne l'utilisation des bases de données communes et l'interconnexion des systèmes et des technologies; établissement et application d'un cadre de gestion définissant les responsabilités, les fonctions et les tâches; reconversion systématique et sans duplication des cartes géographiques vers un format numérique; conception des systèmes et automatisation des fonctions de manière efficace et efficiente visant à la rentabilité des investissements; mise en place d'une infrastructure intégrée de gestion; choix judicieux des logiciels et des équipements; plan d'ensemble regroupant tous les ministères.

Le Gouvernement a établi un plan triennal de mise en place requérant la collaboration particulière des ministères de l'Énergie se des Ressources et celui des Communications. Il a de plus autorisé la création d'une structure d'encadrement comportant trois volets: un comité directeur du plan géomatique gouvernemental, le forum des usagers, et le comité des sous-ministres. Les coûts estimés de l'opération pour le plan triennal s'élèvent à près de 9 millions de dollars et ceux pour l'ensemble de la rénovation des systèmes d'information à référence spatiale atteignent la somme de 300 millions de dollars.

Majella-J. Gauthier  
Université du Québec à Chicoutimi, G7H 2B1  
Téléphone: (418) 545-5096  
Télécopieur: (418) 545-5012

## RETIRED...

The following CCA members have announced their retirement from cartographic careers. We wish them all the best for 'life after cartography':

John T. Blozis, Washington D.C. (National Geographic)  
Charles Lowrance, Calgary  
Charles G. Lind, New York  
Geoffrey Lester, Edmonton

## RETIRED?

Dear friends and colleagues,  
I have decided to accept the University's offer and accept early retirement as of 31 December 1989. I have also accepted the offer to take a post-retirement position till May 1990, and thereafter till May 1991. I also will be chairman of the Canadian Cartographic exhibit at the ICA congress in the UK, Sept. 1991, and at the IGU meeting, Aug 1992, and co-ordinator of the CCA/Carto-Quebec meeting in June 1992.

Norman Drummond (CCA Past-President)

Response from the CCA office manager:

Dear Norman,  
Congratulations on your 'retirement'. Being close to two other high-ranking CCA persons, who have for some time pretended to be enrolled in part-time Ph.D degrees, in an attempt to pay lower student fees, I recognize your ploy as a variation on the above, even though you have renewed for 1990 as a regular member. However any attempt to renew in the future as a retired member, will require the signature of a full-time student to verify your status!

## CHAMPLAIN INSTITUTE

The Champlain Institute was created by the Council of Maritime Premiers as one of a series of initiatives to accelerate the development of a regionally based geomatics industry. The Institute was federally incorporated as a non-profit organization in July 1988, with a Board of Directors appointed representing government, academic and private sector interests in geomatics.

The goal of the Institute is to foster the development and growth of the geomatics industry in the Atlantic Provinces and in Canada as a whole. This will include:

- assisting the geomatics industry in the development of new markets within Canada and abroad
- facilitating geomatics technology transfer and diffusion
- advising on government policies, research priorities and funding in geomatics

Membership in the Institute is open to any organization which subscribes to this goal.

The initial emphasis of the Institute has focused on the design of a market development strategy (including the publication of the Geomatics Atlantic Market Study in September 1989), the promotion of strategic alliances to work on the construction of distributed information networks (the Landnet and ICOIN projects), and the preparation of a geomatics research agenda.

For further information concerning the Institute (membership, current activities, etc.), please contact:

Dr. John McLaughlin  
President

or

Michael J.A. Butler  
Director of Development  
Champlain Institute  
512 George Street  
Fredericton, N.B. E3B 1K1 Canada

Phone: 506-450-8909  
FAX: 506-459-6997

**Canadian National Committee (CNC) for  
the International Cartographic Association  
15 November 1989**

1. Pacific Institute of Cartographers Society (PICS)  
- Prof. C. Peter Keller, University of Victoria, Victoria.
  2. Canadian Cartographic Association (CCA)  
- Prof. R. Norman Drummond, McGill University,  
Montreal.
  3. Association of Canadian Map Libraries and Archives  
(ACMLA)  
-Mr. Lou Sebert, Agincourt, Ontario.
  4. Carto-Quebec (CQ)  
- Prof. Jean Carriere, Université du Quebec à Montréal,  
Montréal.
  5. Ontario Institute of Chartered Cartographers (OICC)  
- Ms. Claire Gosson, Energy, Mines and Resources,  
Ottawa.
  6. Canadian Institute of Surveying and Mapping (CISM)  
- Prof. Clifford H. Wood, Memorial University of  
Newfoundland,  
St. John's.
- Chairman, Canadian National Committee  
and Head of Delegation  
-Prof. Clifford H. Wood.
- Vice-Chairman and Deputy Head of Delegation  
- Prof. Jean Carriere.

**Canadian Membership on  
International Cartographic Association  
Commissions and Working Groups  
24 November 1989**

1. Commission on National Atlases  
- Dr. Eva Siekierska, Energy, Mines and Resources,  
Ottawa.
  2. Commission on Thematic Mapping from Satellite Imagery  
- Prof. Andrzej B. Kesik, University of Waterloo,  
Waterloo.
  3. Commission on Map and Spatial Data Use  
- Prof. C. Grant Head, Wilfrid Laurier University,  
Waterloo.
  4. Commission on the History of Cartography  
- Prof. Richard Ruggles, Queen's University, Kingston.
  5. Commission on Advanced Technology  
- Prof. Christopher Gold, Memorial University of  
Newfoundland, St. John's.
  6. Commission on Tactual and Low Vision Mapping  
- Prof. Michael R.C. Coulson, University of Calgary,  
Calgary.
  7. Commission on Population Cartography  
- Mr. Sidney Witiuk, Statistics Canada, Ottawa.
  8. Commission on Map Production Technology  
- Mr. Neil G. Grant, Energy, Mines and Resources,  
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  9. Commission on Urban Cartography  
- Prof. Y. C. Lee, University of New Brunswick,  
Fredericton.
  10. Commission on Education and Training  
- Prof. Clifford H. Wood, Memorial University of  
Newfoundland, St. John's.
  11. Commission on Marine Cartography  
- Mr. David Monahan, Canadian Hydrographic Service,  
Ottawa.
  12. ICA Publications Committee  
- Prof. Bernard V. Gutsell, York University,  
Downsview.
  13. Working Group on the Marketing of Spatial Information  
(Chairman)  
- Prof. Gerald McGrath, Queen's  
University, Kingston.
  14. Working Group on Cartographic Definitions  
- Prof. Jean Carriere, Université du Québec à  
Montreal, Montreal.
- Other Commissions/Working Groups without Canadian  
representation:
1. Commission on Concepts in Cartography
  2. Commission on World Digital Data Base for Environmental  
Science
  3. Working Group on Integration of Digital Map Data in  
Navigational Systems
  4. IFLA/ICA Joint Working Group on Documentation in  
Cartography

**Sub-Committees of the  
Canadian National Committee for ICA  
8 December 1989**

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Member: Ms. Claire Gosson (OICC)

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Member: CCA

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1455 De Maisonneuve Blvd. W.  
Montreal, Quebec H3G 1M8

Member: PICS

## ELECTRONIC MAIL ADDRESSES

Electronic mail supplies a system of virtually free and fast communication between nodes on the system, which is worldwide. These are locations with a mainframe computer, which have been connected, notably at colleges and universities, and also major departments. Listed below are electronic mail addresses for (76) CCA members. More extensive lists of people working in the general field of cartography are maintained by two of those listed below— Michael Blakemore and David Mark. Please send omissions or corrections to the CCA Manager, Roger Wheate (wheate@uncamult)

January 1990

| Name                | Address                       | Institution/City     |
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| Alberta Wood        | awood@mun                   | Memorial,St.John's |
| Cliff Wood          | chwood@mun                  | Memorial,St.John's |
| David Woodward      | woodward@wiscgps            | Wisconsin          |
| Leon Yacher         | yacher@ctstateu             | CN State Univ.     |

*detach and keep for reference purposes*

## Bay of Fundy/Gulf of Maine/Georges Bank Information and Mapping Project

There are many different and often opposing uses of the coastal and marine environment, such as fishing, aquaculture, waste disposal and ocean dumping, recreation and tourism, hydrocarbon exploration and extraction and ocean mining to name but a few. With increasing demands upon coastal and ocean space, including the sea surface, the water column and the sea bed, comes an increase in the frequency and intensity of conflicts. Such conflicts result not only from the often opposing objectives of environmental conservation and development, but also as a result of competition between resource-users themselves. These conflicts are usually inherently spatial in nature and often reflect the cumulative environmental impacts of development, requiring an area-wide or regional approach to environmental and resource management rather than the more traditional site-specific approach.

Before any fair resolution of these conflicts can be achieved, a comprehensive knowledge of the resources and uses of coastal and marine environments is required. This information must then be placed in the hands of decision makers in a usable form so that they can intelligently address the interests of the various stakeholders. Unfortunately, such comprehensive information is seldom readily available and rarely in the possession of decision-makers. Most often, the bulk of the data is held and controlled by individuals in separate and often widely different departments at all levels of government. Also, the formats of these data sources range from written records to a variety of electronic systems.

In an unprecedented pilot study, the Bay of Fundy/Gulf of Maine/Georges Bank Information and Mapping Project (known as the FMG Project for short) is attempting to interface a wide selection of data bases and to allow for information derived from those data to be displayed in map form (i.e. spatially). The FMG Project is a joint venture between the Department of Geography at Saint Mary's University, the School for Resource and Environmental Studies at Dalhousie University, and the Land Registration and Information Service (LRIS) at Amherst, N.S. The project is funded through the Department of Supply and Services (DSS) Unsolicited Proposal programme. The \$422,000 grant includes contributions from five federal government departments (including Environment Canada, which is the lead agency, and Fisheries and Oceans Canada), the Council of Maritime Premiers and Texaco Canada Resources Ltd.

This information is being mapped at a scale of 1:2 million. The maps and text will cover physical, ecological and socio-economic characteristics of the region, including such topics as bathymetry, bedrock and surficial geology, bottom sediments, physical and chemical oceanography (e.g., tidal range and phase, currents, water temperature, salinity and density), fish species distributions, political and administrative boundaries, population and land-use characteristics. Also, critical resource and environmental management issues will be addressed, such as coastal and marine pollution, ocean dumping, acid rain and aquaculture development. In the GIS, each map will be backed up by data files which will include numerical data from which the map has been derived (where appropriate), additional data of relevance to the map topic, and a detailed identification of all the sources (called an audit trail) used to compile the map and accompanying text.

The FMG Information System is being developed using the CARIS GIS software, which is produced by Universal Systems Limited in Fredericton, N.B. CARIS is a mainframe GIS, requiring a mini-VAX computer. However, mainframe GIS systems are difficult to operate and require technical skills and expensive hardware that are usually beyond the means of decision-makers, especially in this age of user-friendly micro-computers. To overcome this, the FMG System will also be available on a PC software package called GeoMate. Developed by LRIS, GeoMate will allow the user to access the FMG data base, display maps and undertake relatively simple routines such as overlaying maps, undertaking data searches, etc.

The FMG System is scheduled for completion by the end of March 1990.

For further information, please contact:

Dr. Peter Ricketts  
Project Coordinator  
Department of Geography  
Saint Mary's University  
Halifax, Nova Scotia  
Canada  
B3H 3C3

Claudette LeBlanc  
Project Manager  
LRIS  
P.O. Box 310  
Amherst, N.S. Canada  
B4H 3Z5

Tel 902-667-7231

Tel 902-420-5740

## La bourse Norman L. Nicholson en cartographie

L'Association canadienne de cartographie est fière d'offrir la bourse Norman L. Nicholson en cartographie pour honorer cet illustre collègue. Cette bourse, dont la valeur est au départ établie à 500\$, est remise annuellement par l'Association canadienne de cartographie dans le but de reconnaître et d'encourager les étudiants dont les réalisations et les talents sont exceptionnels dans un aspect ou l'autre de la cartographie.

Pour être admissible, un candidat doit être:

1. un citoyen canadien ou émigrant reçu
2. un étudiant qui se propose de poursuivre des études à plein temps en cartographie dans un des cas suivants:

a) entrer dans l'année terminale d'un Collège communautaire ou de CEGEP.

b) entrer dans l'année terminale d'un programme honneur de premier cycle.

c) avoir été accepté en première année d'un programme d'Études Supérieures.

Pour postuler, il faut soumettre les documents suivants:

1. un formulaire de demande dûment complété
2. un relevé de notes officiel de tous les cours terminés dans un université ou dans un collège avec les notes reçues.
3. des lettres de recommandation de deux membres du corps enseignant qui connaissent bien le travail et les qualités de l'étudiant. Les lettres de recommandation doivent être expédiées directement par les enseignants au Comité des bourses à l'adresse sous-indiquée.
4. un exposé d'une page dactylographiée indiquant vos buts dans le cadre d'études avancées en cartographie.

Les documents doivent parvenir au Comité des bourses le 15 mars 1990 au plus tard.

On peut se procurer un formulaire en appelant le (403) 220-4892 ou en écrivant au

Comité des bourses - Association canadienne de cartographie  
a/s Roger Wheate  
Département de géographie  
University of Calgary,  
Calgary, Alberta T2N 1N4

## CANADIAN EAST COAST SEA SURFACE ATLAS

Seakem Oceanography Limited of Dartmouth, Nova Scotia, is developing a computer data archive and access system (atlas) of satellite sea surface temperature images of the east coast of Canada. The atlas will enable users at various locations in Canada to use the images, rather than at a single location (Bedford Institute of Oceanography (BIO), Dartmouth, N.S.) as at present. The atlas contains magnetic tape records of sea surface temperature and visible channel images from key areas of the east coast for a four year period from 1984 to mid-1987. Seakem is using the image analysis facilities at BIO to set up the system and create the archive. PCI Inc. EASI/PACE image processing software is used in the accessing system under development. The final product is a time series set of daily 1000 km by 1000 km maps with a 1 km spatial resolution and a 0.125 Celsius degree temperature resolution. Advanced very high resolution radiometer (AVHRR) sensors carried on the NOAA series of polar-orbiting sun-synchronous satellites are the primary source of the data for the atlas.

For more information contact  
Dr. Brenda Topliss at BIO (tel 902-426-8232) or  
Dr. Martial Thiebaut, Seakem Oceanography Ltd.,  
P.O. Box 696, Dartmouth, N.S. B2Y 3Y9 (tel 902-463-0932).

## First there was Kontiki, then RA 1 and now... the CCA Manager's 1967 Beaumont!

En route to the 1990 CCA annual meeting in Victoria, CCA members are invited to join an intrepid herd of adventurers in Calgary, who will attempt to make the 600 mile journey to the west coast in a primitive vehicle in order to prove that early cartographers may well have taken this route to reach the west coast (or indeed vice versa). They will be armed only with the basic necessities: topographic maps and a fair supply of six-packs, enduring the toughest of conditions, foregoing even cable television for up to four days, to reach the enticing goal of lotus land.

The journey will include sighting the highest waterfall in the land, giant cedar trees, glaciers descending almost to the road and an enchanted forest. Should there be sufficient adventurers, an additional vehicle of the same ilk will be acquired.

Interested voyageurs should contact the CCA manager: Roger Wheate (address/phone in this issue on page 2.)

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## Norman L. Nicholson Scholarship in Cartography

The Canadian Cartographic Association is proud to offer the Norman L. Nicholson Scholarship in Cartography in honour of our late colleague. This scholarship, valued initially at \$500, is awarded annually by the Canadian Cartographic Association. It is intended to recognize and encourage exceptional student achievement and ability in any aspect of cartography.

To qualify, the applicant must be:

1. A Canadian citizen or landed immigrant
2. a student who proposes to continue full time studies in cartography in one of the following situations:
  - a) entering the final year of a community college or CEGEP program;
  - b) entering the final year of an undergraduate honours program;
  - c) entering the first year of a graduate program.

To apply, the applicant must submit the following:

1. A completed application form;
2. An official transcript of all college/university courses completed and grades received.
3. Letters of recommendation from two faculty members who are familiar with the work and abilities of the applicant. Letters must be sent directly by the faculty members to the Awards Committee.;

4. A one-page typed statement outlining the applicant's goals for continuing education in cartography.

All materials must be received by the Awards Committee no later than March 15, 1990.

Persons wishing to apply may request an application form by calling

Roger Wheate, CCA Manager at (403) 220-4892 or writing:  
Awards Committee- Canadian Cartographic Association  
c/o Roger Wheate  
Department of Geography,  
University of Calgary,  
Calgary, Alberta T2N 1N4



## Computer map to guide drivers

– Road maps, those billboard-size papers that are bent, spindled and mutilated the first time they are opened and never fold properly again, soon will be replaced – by a computer, of course.

General Motors Corp. has moved the navigator out of the passenger's seat and into the instrument panel.

Called Navicar, the computer-controlled electronic navigation system was developed by GM's Delco Electronics division, which demonstrated it in Chicago.

Navicar displays maps that cover from 1/8th of a mile to 40 miles (that's 0.2 km to 25 km) on a cathode-ray tube screen in the dash. A push of a button on either side of the screen displays a map that pinpoints where you are and where you want to go.

Navicar uses cassettes programmed with the streets and expressways of various cities. For instance, in Chicago, a driver who wants to go from a restaurant near the intersection of Grand and Milwaukee Avenues to Ohio and Clark Streets can punch up a map that shows, with one blinking dot, where his car is located. Another dot pinpoints the intersection of Ohio and Clark Streets, and all streets in between are clearly named. An odometer indicates it would be a trip of 0.9 of a mile.

An arrow at the top of the screen indicates whether the driver is pointed in the right direction.

"It doesn't tell you the best or shortest way to get where you're going, but it's useful if you're in an unfamiliar area in a big city," said John Moretti, program manager for Delco's automotive electronic systems.

"There are no production plans now, but the first application would be in a limited edition luxury car," he said.

"In the production car, we'd use a compact-disc player rather than cassettes. It took two cassettes to program all the streets in Chicago, whereas the entire US. can go on one disc," he said.

Moretti said rental fleets, emergency vehicles and vacation travellers would be logical customers. The system also could be programmed to locate gas stations, hotels and restaurants.

There's no price yet, but he said a similar system on the Toyota Crown sold in Japan is a \$2,700 US option.

Delco also demonstrated HUD (Head Up Display), in which a dash-mounted pod serves as a projector to display digital speedometer, turn signal indicators and high-beam and low-fuel warnings onto the windshield, so that a driver needn't take his eyes off the road.

Oldsmobile installed 54 HUD systems in 1988 Cutlass Supreme Pace Cars for testing and will offer 500 as options in the Cutlass Supreme International Series for 1989. Pontiac will offer 2,000 of them as standard in its 1989 Grand Prix SE turbo model.

*Chicago Tribune, Sept 1988*

## Hereford Map gets a reprieve

Hereford Cathedral has accepted a \$4.8 million (US) offer, partly financed by oil heir John Paul Getty, to keep the 13th century Hereford map from the auction block. The money will be used to build a new museum on the Cathedral grounds and set up a trust fund to ensure that the map is never sold.

*London Free Press, November 13, 1989*

## "Map Reading and Wayfinding" explained...

Ottosson, Torgny, Map-reading and wayfinding. Gothenburg: Acta Universitatis Gothoburgensis, 1987. 150 pp. (Goteborg studies in education sciences. 65)

The aim of the study is to make an analysis of map-reading as a cognitive phenomenon, with the use of a map for finding one's way as the specific focus. As a point of departure, the nature of human beings' knowledge of spatial relationships in their physical environment (here termed macrospatial relations) is discussed. On this basis a conceptualization of cognitive functions as relational (human-world) phenomena is introduced. It is concluded that macrospatial cognition should be studied as conceptions of topographies.

Some basic and general characteristics of maps are discussed. Two different aspects of maps, a referential and a structural, are distinguished and a view of map-reading as harmonization of different versions of reality is developed. One main conclusion is that an analysis of map-reading should be based on an analysis of the map-reader's conception of the task.

The research approach adopted is qualitative-descriptive and four studies of map-reading-for-wayfinding are reported. The first concerns children's map understanding. A total of 37 children, aged 5 to 12 years, were individually interviewed and then observed while performing some wayfinding tasks. A result of that study is the identification of three different conceptions of the relation between map and reality: the map as a representation of presence, sequence, or structure. The remaining three studies concern map-reading by performers of the sport of orienteering. Among other things, three different wayfinding approaches are identified.

On the basis of the theoretical view developed in the thesis, some implications for teaching map-reading and map understanding are discussed. It is argued that the "view-from-above" metaphor common in introductory map teaching is inadequate and that viewing the map as a miniature provides a better basis. It is recommended that introductory teaching of maps should not take symbolization and projection as its starting-point but, instead, the pupils' conceptions of topographies, as already present.

For more information on this publication, contact:  
Torgny Ottosson; Gothenburg University, Dept. of Education and Educational Research; P.O. Box 1010; S-431 26 Molndal; Sweden.

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## Short courses in GIS and Remote Sensing

offered by Cook College, State University of New Jersey (Rutgers), New Brunswick, New Jersey

-Introduction to Grass 3.1 GIS

11-15 June 1990 \$795.00 (US)

-Grass Imagery and Remote Sensing

6-8 March 1990 \$595.00 (US)

-An Intro to GIS

2-6 April 1990 \$595.00 (US)

-Intro to Remote Sensing using ERDAS

14-17 May 1990 \$695.00 (US)

For more information on these courses, contact:

Office of Continuing Professional Development, Cook College,  
The State University of New Jersey, Rutgers Campus,  
PO Box 231, New Brunswick, NJ 08903 USA  
tel: (201) 932-9271

**Canadian Cartographic Association  
L'Association canadienne de cartographie**

# President's Prize Competition

## Concours pour le Prix du Président

### 1990

Submissions are invited for the 1990 President's Prize Competition.

The competition is open to students of post-secondary institutions and to persons occupying junior positions in places of employment where maps are made or used.

Vous êtes invités à soumettre votre projet cartographique au concours pour le Prix du Président 1989-90. Ce concours est ouvert aux étudiants et étudiantes de niveau post-secondaire ainsi qu'aux personnes venant d'accéder au marché du travail et occupant depuis peu un emploi dans un organisme fabriquant ou utilisant des cartes. Le concours comprend cinq catégories et, dans chacune d'elles, un prix en argent (de l'ordre de 50,00\$) accompagnant un certificat sera décerné lors de la réunion annuelle de l'ACC à Victoria en juin prochain.

#### **The competition includes five award categories/ Les cinq catégories comprennent:**

##### **Monochromatic Map/ Carte monochrome:**

A printed map (or map taken to the proof stage) in black and white. Emphasis in this category will be placed on innovation in data manipulation, symbolization and graphic design. **Each entry must be accompanied by a brief (500 words max.) typewritten text describing the purpose of the map.**

Une carte monochrome (conventionnelle ou de type journalistique): une carte imprimée en noir et blanc. **Un court texte (maximum de 500 mots) devra définir la problématique et les objectifs de la carte.** Dans cette catégorie, l'évaluation portera sur l'innovation en regard du sujet choisi, de son interprétation, de sa symbolisation et de la qualité graphique.

Award value/valeur :\$50 CDN

##### **Colour Map/ Carte couleur:**

A printed map (or map taken to the proof stage) Emphasis in this category will be placed on excellence of execution and fulfillment of stated design objectives. **Each entry must be accompanied by a brief (500 words max.) typewritten text describing the purpose of the map.**

Une carte imprimée couleurs (ou à l'étape de l'épreuve couleurs) **Un court texte (maximum de 500 mots) devra définir la problématique et les objectifs de la carte.** L'évaluation portera sur la qualité de l'exécution de la carte et la réalisation des objectifs prévus dans le projet. Award value/valeur :\$50 CDN

##### **Formal Written Paper/ Texte écrit conventionnel:**

A paper of approximately 2000 words on any theme relating to cartography, submitted in the style and format required by the journal "Cartographica".

Un texte écrit conventionnel portant sur des sujets cartographiques d'ordre théorique, administratif ou pratique. L'article, comptant plus ou moins 2 000 mots, devrait être soumis dans le style et le format exigés par la revue CARTOGRAPHICA.

Award value/valeur :\$50 CDN

##### **Computer Algorithm/ Algorithme d'ordinateur:**

Computer algorithm (specific to a cartographic problem) submitted in code form in any language with a brief description and evidence of operation.

Un algorithme d'ordinateur (spécifiquement conçu pour résoudre un problème cartographique) soumis sous forme de code, de quelque langage que ce soit, accompagné d'une brève description et d'une preuve de son fonctionnement.

Award value/valeur :\$50 CDN

##### **Journalistic map/ Production "carto-journalistique":**

A map suitable for reproduction in a popular newspaper or magazine. **Each entry must be accompanied by a brief (500 words max.) typewritten text describing the purpose of the map.**

Award value: The award for the winning entry in this category is \$200 US, generously donated by Time Magazine.

5. La meilleure production "carto-journalistique": le prix de 200,00US\$ est offert par Time Magazine. La carte devrait être accompagnée d'une brève description (maximum 500 mots) décrivant le but poursuivi. **Un court texte (maximum de 500 mots) devra définir la problématique et les objectifs de la carte.**

- **Submissions must reach the CCA office in Calgary (address on page 2 of this Newsletter) by June 1, 1990. or may be brought directly to the Victoria meeting./Les candidatures au concours doivent parvenir à l'ACC à Calgary (voir page 2 pour l'adresse) au plus tard le 1 juin 1990.**
- **Membership in the CCA is not required./ Il n'est pas nécessaire d'être membre de l'ACC pour participer au concours**

## Notice to Students/Avis Aux Etudiants

### *Le Prix Intergraph*

### *The Intergraph Award*

Intergraph Systems Limited presents the Intergraph Award annually to a full-time student for excellence in computer cartography. The award is open to any undergraduate or graduate student of a Canadian educational institution. Candidates must register by submitting graphic output of their work accompanied by a description of the project and the work carried out. Submissions must be countersigned by a teacher or professor verifying its authenticity. The deadline for receipt of materials by the chairman of the CISM Cartographic Committee is 30 March 1990.

Send submissions to, or for further information contact:

Professor Clifford H. Wood, Chairman CISM Cartographic Committee, Department of Geography, Memorial University of Newfoundland, St. John's, Newfoundland A1B 3X9.

Intergraph Systems Limited presente annuellement le prix d'excellence Intergraph a un etudiant a temps plein en cartographie informatisee. Tout etudiant de premier ou deuxieme cycle inscrit a une universite canadienne est eligible au prix. Pour s'inscrire, les candidats doivent presenter la sortie graphique de leur travail accompagnee d'une description du projet et du travail accompli. Les soumissions doivent etre contresignees par un enseignant ou professeur assurant leur authenticite. La date limite pour la reception des documents par le president du Comite de cartographie de l'ACSGC est le 30 mars 1990.

Faites parvenir vos soumissions a:

Pour obtenir de plus amples renseignements, veuillez contacter:

M. Clifford H. Wood, President du Comite de cartographie de l'ACSGC, Departement de geographie, Memorial University of Newfoundland, St. Jean, (Terre-Neuve) A1B 3X9

Telephone: (709) 737-8988

#### **for GIS:**

- geographical information system (GIS) for microcomputers
- low-cost, easy-to-use, menu-driven software
- video digitizing and flat-bed scanning for creating digital images
- user-defined organization of raster digital images, alphanumeric data, and vectors
- modular software: MapDatabase, MapEdit, MapLayer, MapVideo, MapScan, MapTerrain
- library of C callable GIS functions (MapLib)

#### **for satellite imagery:**

- distributor of Canadian scenes from LANDSAT and SPOT
- on microcomputer diskettes

#### **for GIS-related services:**

- digitization and data conversion
- consulting and application development services
- digital elevation model creation

The logo for NUCOR, featuring the word "NUCOR" in a bold, stylized, sans-serif font. The letters are dark and have a slightly distressed or textured appearance.

**Nucor Computing Resources Inc.**

PO Box 13520

Kanata Ontario Canada

K2K 1X6

Tel: (613) 592-8666 Fax: (613) 592-5995

# Second Announcement

## 4th International Symposium on Spatial Data Handling

An application form will be shipped to all people who have indicated interest in the conference or submitted an abstract.

Theme: Advancing the Tools for Spatial Data Handling

As its predecessors the 4th International Symposium on Spatial Data Handling joins scientists from a variety of disciplines to present and discuss research topics relating to the manipulation and analysis of spatial data. Emphasis is given to basic research rather than applications. From a total of approximately 160 submitted abstracts, an international program committee has selected 76 papers for oral presentation, and some 50 for poster display. The technical presentations will be a mixture of short (20 minutes) and long (40 minutes) papers. Ample time will be available for discussion of all papers, and the long papers shall be discussed by a formal discussant. All presentations shall be published in proceedings to be ready for the conference. Overall the program will include 25-30 sessions. In addition full-day and half day workshops, software demonstration sessions, non-commercial and commercial poster exhibits and technical tours will be offered as part of the program. The official language is English.

Highlights from the conference program

Keynote Speech by Dr. Michael Goodchild, Co-director of the U.S. National Center for Geographical Information and Analysis (NCGIA): "Spatial Information Science"

Paper Session Topics: Spatial Relations and Natural Languages - Spatial Analysis - Visualization and Generalization Concepts - Visualization Techniques - User Interfaces - Information Management - Line Filtering and Intersection - Strategies and Methods for Polygon Overlay - Triangulation - Digital Terrain Modelling - Feature Recognition - Spatial Relations and Topological Data Models - Spatial Search Methods - Data Base Structures for Spatial Access - System Design and Integration etc.

Panel Sessions: GIS Technology Trends; Outlook for GIS research, education and technology transfer

Conference Organizers

Prof. Kurt Brassel, Univ. of Zurich, Switzerland, Director  
Prof. Atsumo Ohmura, ETH Zurich, Vice Director  
Merill Lyew, Universidad Nacional, Costa Rica, Chairman IGU Commission on GIS  
Doris Koller, Chair, Local Organizing Committee

Co-sponsoring Professional and Scientific Organizations

International Geographical Union, Commission on Geographic Information Systems  
International Cartographic Association ICA  
International Society of Photogrammetry and Remote Sensing ISPRS  
Spatially-Oriented Referencing Systems Association SORSA  
AM/FM European Division  
Swiss Academy of Sciences SANW  
Swiss Computer Graphics Association

Conference Location

University of Zurich (Irchel), Winterthurerstrasse 190, CH-8057 Zurich / Switzerland. Lectures, workshops, food service and exhibits in one building; easily accessible by public and private transportation.

Conference Address

Symposium Secretariat  
Geographisches Institut, Universitaet Zuerich Telephone: 0041-1-257 5151  
Winterthurerstrasse 190 Telephone: 0041-1-362 5227  
CH-8057 Zuerich, Switzerland  
e-mail: K505820@CZHRZU1A.bitnet

### ISPRS COMMISSION VII

### M I D - T E R M S Y M P O S I U M

### GLOBAL AND ENVIRONMENTAL MONITORING

### *T e c h n i q u e s a n d I m p a c t s*

Victoria Conference Centre, Victoria, B.C. September 17-21, 1990

#### WHO SHOULD ATTEND

Scientists, Technical Specialists, Resource Managers, Environmentalists

#### LEARN ABOUT

- changes likely to occur in our environment
- catastrophic impacts on natural resources
- major shifts in populations
- adverse effects on the quality of life

For more information contact:

*Frank Hegyi*  
*President, Commission VII*  
*1450 Government St.*  
*Victoria, B.C., Canada V8W 3E7*  
*(604) 387-6722*

#### MAIN TOPICS

- Interpretation of Photographic and Remote Sensing Data
- Physical Measurements and Signatures in Remote Sensing
- Spatial Information Extraction and Manipulation
- Renewable Resources in Rural Areas
- Non-Renewable Resources
- Water and Atmospheric Remote Sensing
- Applications to Surface Water, Oceanography, Coastal Zone, Ice and Snow
- Human Settlements
- Expert Systems for Remote Sensing
- Global Monitoring

DEMANDE DE PROPOSITIONS  
CONCOURS  
D'EXPOSES ETUDIANTS  
ASSOCIATION CANADIENNE  
DE CARTOGRAPHIE  
1990

L'Association canadienne de cartographie annonce la tenue de son quatrième concours d'exposés étudiants lors de sa rencontre annuelle à l'Université de Victoria en juin 90.

Nous invitons tous les étudiants impliqués dans une recherche reliée à la cartographie à venir partager leurs points de vue et mettre en commun leurs expériences.

Le résumé et l'exposé peuvent être soumis en français ou en anglais. Le temps alloué pour la présentation de l'exposé et la période de questions est de vingt minutes. Un étudiant désirant soumettre un exposé ne doit pas obligatoirement être membre de l'ACC; cependant tout étudiant membre de l'association sera éligible au programme de subvention pour les frais de transport reliés à la rencontre de Victoria.

Il n'y aura aucun frais d'inscription à la conférence pour les cinq premiers exposés retenus.

Veillez faire parvenir les résumés (200-300 mots) avec vos noms, adresse, le titre ainsi que le nom de votre professeur à:

Dr. Brian Klinkenberg,  
CCA Education Interest Group Chairperson,  
Department of Geography,  
University of British Columbia,  
1984 West Mall,  
Vancouver, BC, V6T 1W5

Date limite pour les résumés: 30 avril 1990

Date limite pour les exposés: 31 mai 1990

Call for Papers  
Student Paper Competition  
Canadian Cartographic  
Association

1990

The Canadian Cartographic Association is pleased to announce the fourth annual student paper competition to be held during the annual meeting at the University of Victoria, June 10-13 1990.

All students involved in research relating to cartography are invited to present their research in a formal paper session.

The abstract and paper may be submitted in either English or French. Each presentation, including a short question period, will be 20 minutes maximum.

Students who wish to present a paper need not be members of the CCA, however, all student members of the CCA who participate will be eligible to make a claim for possible subsidy of their fares to and from the Victoria meeting.

Registration fees will be waived for the first five papers received.

Please send your resume (200-300 words) with your name, address and the name of your professor/instructor to:

Dr. Brian Klinkenberg,  
CCA Education Interest Group Chairperson,  
Department of Geography,  
University of British Columbia,  
1984 West Mall,  
Vancouver, BC, V6T 1W5

Last date for receipt of abstract: 30 April 1990

Last date for receipt of paper: 31 May 1990

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## Call for nominations!

Elections for the following positions will be held in Spring 1990, with the results to be announced at the Annual Meeting in Victoria B.C., June 10-13, 1990

Vice president;  
Secretary / Newsletter Editor  
Chairperson of Interest Groups  
History of Cartography  
Map use / Design  
Computer-Assisted Mapping / GIS.

Members with suggestions for the above positions on the executive are invited to contact anyone on the nominating committee.

Nominating Committee

Chairman—  
Norman Drummond, Dept. Geography, McGill University,  
805 Sherbrooke St W Montreal, P.Q. H3A 2K6,

Anne Gibson,  
Graduate School of Geography, Clark University,  
950 Main St., Worcester, Mass., 01610 USA

or James Britton, School of Natural Resources,  
Sir Sanford Fleming College, Box 8000, Lindsay, Ont., K9V 5E6

## A New Name?

### Un nouveau titre?

Participate in the renaming of our Newsletter.

We are looking for a new name which will be reflective of our role as a publication for members of the cartographic community in Canada. The name you suggest should ideally be bilingual.

The CCA member submitting the winning name will receive a copy of the Historical Atlas of Canada V.1, recently published by U of T Press.

Send your suggestions to the Newsletter Editor by April 30 1990

Le comité exécutif cherche un nouveau titre pour le Newsletter de l'ACC, pour mieux représenter notre association.

Le gagnant de ce concours recevra une copie de l'Atlas Historique du Canada, publiée par U of T Press.

Envoyer vos suggestions au rédacteur du Newsletter avant le 30 avril 1990

## CHAIR IN OCEAN MAPPING

The Department of Surveying Engineering at the University of New Brunswick invites nominations and applications for an Industrial Research Chair in Ocean Mapping, to be filled by July 1990. The appointment will be a tenure-track position at a senior rank in the Department. Support for this Chair for the first five years will be in excess of \$2.5 million. Final funding approval is expected within the next few months.

Candidates with background and expertise not presently represented by the twelve existing faculty members in the Department will be given preference; for example a background in computer systems engineering, physical oceanography, marine geophysics, or marine geology would be an asset. Candidates must have a special interest and competence in Ocean Mapping research and development. Development of innovative methods for the management, processing and depiction of ocean mapping data, from the acquisition to the application stages, is the objective of the Chair, including not only bathymetry but mapping of the sea-surface, sub-seabed, and water column features as well. The successful candidate will have an internationally respected track record, will be expected to play a leadership role in the Ocean Mapping Group and contribute to the future direction, and will be committed to working with the Chair sponsors and other industrial partners in transferring ocean mapping technology to the private sector.

The University of New Brunswick is committed to the principle of employment equity. In accordance with Canadian immigration requirements, priority will be given to Canadian citizens or permanent residents.

The closing date for nominations and applications will be December 31, 1989, or until the position is filled. Nominations, applications and requests for information should be forwarded to:

Dr. John McLaughlin  
Chairman, Department of Surveying Engineering  
University of New Brunswick  
P.O. BOX 4400  
Fredericton, New Brunswick  
E3B 5A3  
FAX: (506) 453-4943

## Positions Available

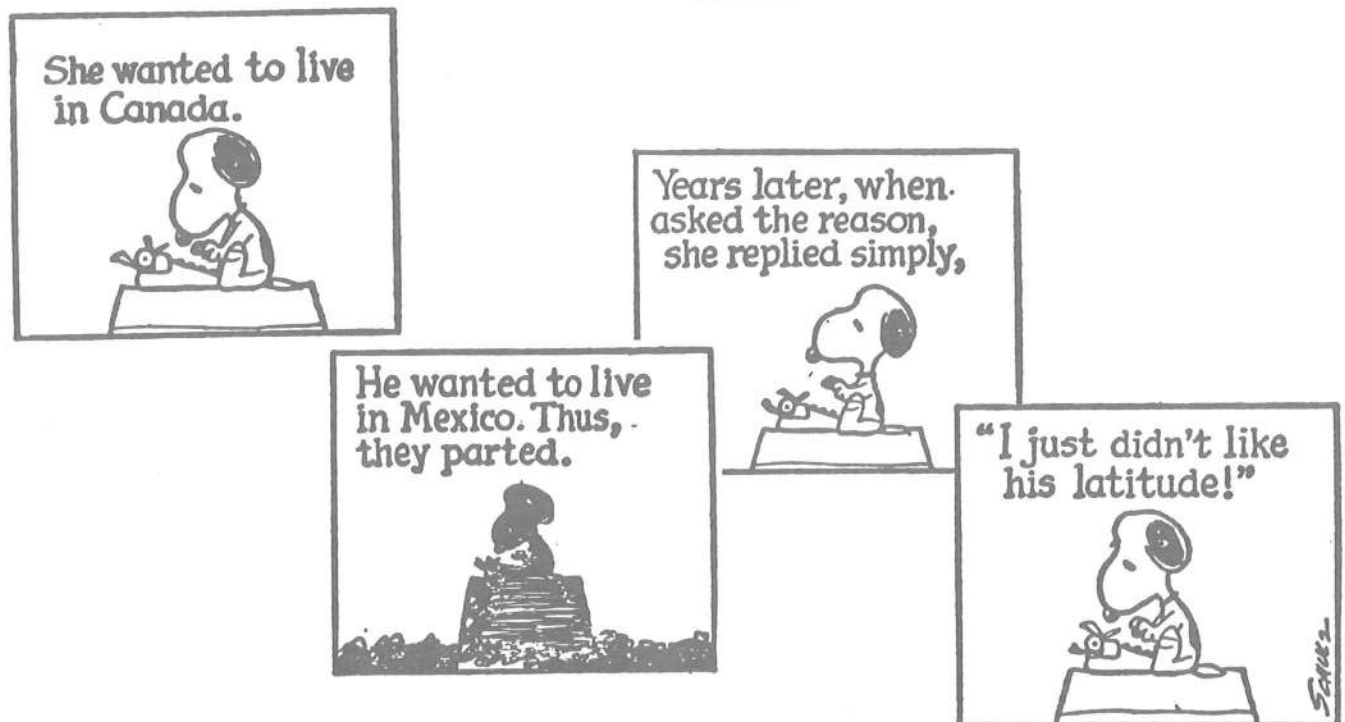
Iowa, Iowa City 52242. University of Iowa. ASSISTANT PROFESSOR. Tenure-Track position beginning August, 1990. Economic Geographer with background and interest necessary to apply techniques of GIS/GIA in research and teaching. The successful applicant will specialize in some aspect of economic geography, rather than in the methods and techniques of GIS/GIA; he or she will, however, be expected to keep up with developments in the GIS/GIA field and use them in research and teaching. Interests in the field of regional development, the Pacific Rim or the third world are desirable. Applicants should possess a Ph.D., be active in scholarship through publication, and be able to teach undergraduate and graduate students.

Please submit letter of application, curriculum vitae, and the names of three referees. Review of applicants begins February 10. Salary dependent on qualifications. The University of Iowa is an equal opportunity, affirmative action employer; women and minorities are encouraged to apply.

Apply to Chairman of Search Committee, Department of Geography.  
Phone 319/335-0162

Assistant or Associate Professor of Geography. Tenure track position to begin in August 1990. We seek a teacher-scholar with experience in GEOGRAPHIC INFORMATION SYSTEMS and DIGITAL CARTOGRAPHY to offer undergraduate and graduate courses, and to cooperate in the further development of the department's program in geographic information and analysis. Interest in human-environment relationships and the application of GIS to environmental policy analysis is highly desirable. Send letter of application, curriculum vitae, and three letters of reference. Closing date is 1 March 1990, or until position is filled. Syracuse University is an Affirmative Action/Equal Opportunity Employer.

Apply: Robert G. Jensen, Chair, Department of Geography,  
Syracuse University, Syracuse, NY 13244-1160.  
(315)443-2605



## New Brunswick Establishes a Geographic Information Corporation

On March 6th, 1989, New Brunswick Premier Frank McKenna announced the establishment of the Geographic Information Corporation (G.I.C.), a new agency which will consolidate the responsibility for all of the New Brunswick Government's basic geographic information activities.

The Premier also announced the adoption of a new land information policy for New Brunswick to be administered by the G.I.C. The new policy will allow for greater dissemination of government collected geographic information. Its objectives are to create new job opportunities within this high-technology field, encourage private sector initiatives, and improve the current level of geographic information services.

The G.I.C. will regroup basic geographic information functions previously administered by separate government departments and agencies. These functions are:

Coordinate Survey Control  
Base Mapping  
Property Mapping  
Legal Parcel Identification and Indexing  
County Registry Offices

Property Assessment  
Coastal Zone Mapping  
Remote Sensing  
Geographic Information Standards  
Geographic Information Services Industry  
Development  
Toponymy (geographic place names)  
Inter-agency Liaison (interdepartmental, interprovincial and federal-provincial)

These types of information are basic to the requirements of many users. They are frequently referred to as the foundation system. Examples of basic information are survey markers, property maps, ownership data and property values.

The following figure illustrates the concept of a foundation system. The G.I.C. will be responsible for this foundation system, providing the infrastructure upon which thematic information systems can be built.

The Corporation will work closely with geographic information users and managers throughout the government. As well, the Corporation will be the government's link with the federal government, the private sector and our educational institutions for the implementation of the land information policy.

R. Laurence Simpson, former Chief Executive Officer of the Land Registration and Information Service (an agency of the Council of Maritime Premiers) will head the Corporation.

## ATLANTIC CENTRE FOR REMOTE SENSING OF THE OCEANS

The Atlantic Centre for Remote Sensing of the Oceans will be established in the Halifax-Dartmouth area to provide the infrastructure and vehicle to realize technology transfer and advancement for oceanographic and ocean technology industry in Atlantic Canada.

The primary goal of the Centre is to assist and enhance the capabilities of ocean industry, thereby facilitating this industry to realize market opportunities worldwide. Specifically, this goal will be realized by the attainment of seven objectives:

- 1) provide access to essential hardware and software;
- 2) facilitate access to remotely sensed data;
- 3) provide access to technical advice;
- 4) provide a catalytic and synergistic nucleus for the ocean technology community in Atlantic Canada;
- 5) to realize technology transfer between academic and private sectors;
- 6) to encourage the retention of professionals trained locally;
- 7) to encourage the growth of ocean technology expertise in Atlantic Canada.

The Centre has been developed by the Atlantic Centre for Remote Sensing of the Oceans Association - a non-profit association of several representatives of the ocean technology, consulting and academic community in the province. It is being assisted by short-term funding from the Canada-Nova Scotia Technology Transfer and Industrial Innovation Subsidiary Agreement.

At present, it is anticipated that the Association will act as "shareholders" of the Centre, initially guiding the Centre Board and then annually reviewing Centre operations. All users of the Centre will be required to be members of the Association.

The Centre staff will consist of a Centre Director, two oceanographers at the post-doctorate level (probably joint appointments with Dalhousie University) and two technicians (probably Remote Sensing/GIS graduates of the College of Geographic Sciences). Centre equipment will include:

Image Analysis System - 6 work stations  
GIS System - 2 work stations  
Mini-computer, SUN/4 system or equivalent  
Disk Storage - 5 GBytes  
Optical disk system  
Inkjet colour plotter  
Electrostatic/pen plotter  
Laser printer  
Line printer

The day-to-day management of the Centre will be by the Director who will report to the Board on a quarterly basis. The Board will contain local industry members, drawn from the Association and from major national companies operating in an international environment, as well as representatives of government, academia and the research institutions.

The operational parameters of the Centre, e.g., the priorities and allocation of Centre equipment and staff, are currently being drafted by the Association members, for consideration by the Board following its appointment.

For further information about the proposed Atlantic Centre for Remote Sensing, please contact:

Mr. Steve Hurlbut or  
President  
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## Coming Events.....

**5-8 March 1990** Ottawa, Ontario

GIS For the '90's  
contact: Canadian Institute of Surveying and Mapping  
P.O. Box 5378, Station F,  
Ottawa, Canada K2C 3J1

**13-16 March 1990** Vancouver, B.C.

GIS '90  
Contact: GIS '90 Symposium Office  
134 Abbott St., Suite 303,  
Vancouver, B.C. V6B 2K4  
Tel: (604) 688-0188

**19-22 April 1990** Toronto, Ontario

Association of American Geographers Annual Mtg.  
Contact: Marie Truelove, School of Appl. Geography,  
Ryerson Polytechnical Institute,  
350 Victoria St., Toronto, Ont. M5B 2K3

**23-26 April 1990** Baltimore, Maryland

AM/FM International Conference  
Contact: AM/FM International,  
8775 Orchard Rd., Suite 820  
Englewood, CO 80111

**12-15 June 1990** Montréal, Quebec

Association of Canadian Map Libraries and Archives  
24th Annual Conference "Applied Cartography"  
Université de Montréal  
contact: Pierre Lépine,  
Secteur des cartes, Service des collections spéciales,  
Bibliothèque Nationale du Québec  
1700 rue St-Denis, Montreal, Quebec H2X 3K6

**23-27 July 1990** Zurich, Switzerland

4th International Symposium on Spatial Data Handling  
Contact: Dr Duane Marble,  
Department of Geography,  
103 Bricker Hall, The Ohio State University,  
Columbus, Ohio 43210

**August 1990** Edmonton, Alberta

URISA '90  
Annual Conference of the Urban and Regional  
Information Systems Association  
Contact: Hiske Gerding,  
Alberta Parks and Recreation,  
10405 Jasper Ave.,  
Edmonton, Alta. T5J 3N4 (403) 427-5989

**17-21 September 1990** Victoria, British Columbia

ISPRS Commission VII  
Mid-term Symposium,  
Global and Environmental Monitoring  
contact: Frank Hegyi,  
President, Commission VII,  
1450 Government St.,  
Victoria, B.C., Canada V8W 3E7  
tel: (604) 387-6722

**23-28 September 1990** Atlantic City, New Jersey

ASPRS/ ACSM Fall Meeting  
Contact: ACSM,  
210 Little Falls St, Falls Church, Va. 22046

**1-4 October 1990** Washington, D.C.

International Map Collector's Society (IMCOS)  
8th Annual Symposium  
"Mapping America"  
Contact: Eric Wolf,  
6300 Waterway Dr., Falls Church, VA. 22044

**9-16 August 1991** Washington, D.C.

27th International Geographical Congress  
Contact: Dr. Anthony de Sousa, 27th IGC,  
17th and M Sts. NW,  
Washington, D.C. 20036

**23 September - 1 October 1991** Bournemouth, U.K.

15th International Conference of the ICA  
Contact: (in Canada) Dr. Jean Carriere  
Département de géographie, (A-4175)  
Université du Québec à Montréal  
C.P. 8888, Succursale A,  
Montréal, PQ H3C 3P8  
tel: (514) 987-3063

**17-19 April 1992** Vancouver, B.C.

Vancouver Conference on Exploration and Discovery  
Contact: Conference Director,  
Department of History, Simon Fraser University,  
Burnaby, B.C. V5A 1S6

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**10-13 June 1990** Victoria, B.C.

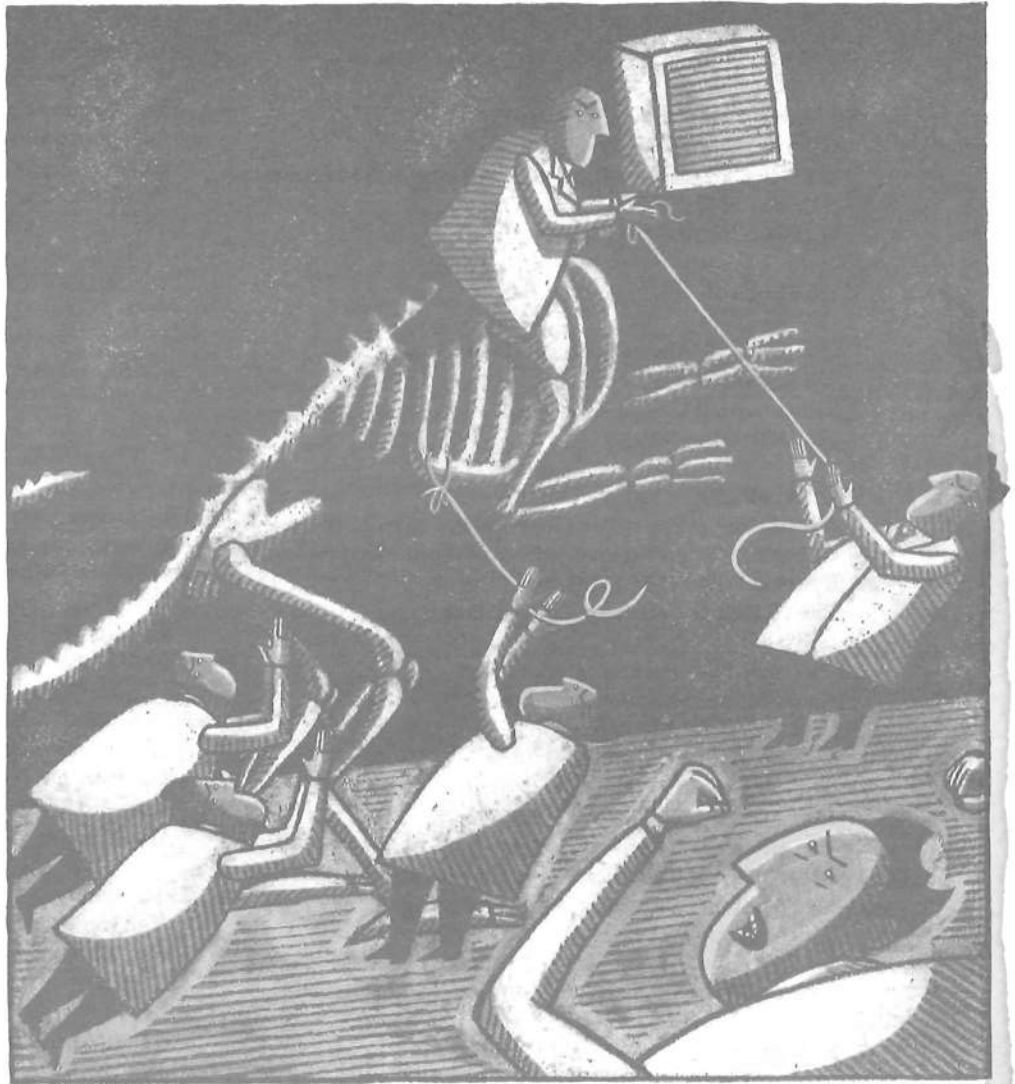
Annual Meeting of the  
Canadian Cartographic Association.

Contact: Dr. C. Peter Keller,  
Dept. of Geography,  
University of Victoria,  
PO Box 1700, Victoria B.C. V8W 2Y2  
tel: (604) 721-7333

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