CARTOUCHE

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CARTOUCHE

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In this issue/ Dans ce numéro .....

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Cartouche is produced quarterly by the Canadian Cartographic Association.
Content Deadlines are: January 31, April 30, July 30, October 31.(*see page 24*)
You are welcome (urged!) to submit items to be considered for publication. It is the current policy of the editor to provide dual language copy for editorial content and journal mechanics. All other articles appear in language of submission. While every effort is made to ensure accuracy of content, the editor (*like all cartographers!*) cannot be responsible for errors in compilation, or loss of any item submitted. Opinions expressed in the editorials and submitted articles and letters are not necessarily those of the Canadian Cartographic Association. For advertising policy, please contact the Manager, Roger Wheate.

Cartouche est publié trimestriellement par l'Asssociation canadienne de cartographie.
Les dates limites pour l'envoi d'articles ou de documents sont les suivantes: 31 janvier, 30 avril, 30 juillet, 31 octobre (*voir page 24*). N'hésitez pas à soumettre des articles (vous êtes même priés de le faire!) que vous désirez publier dans le bulletin. Présentement, selon la politique en vigueur, l'éditeur doit publier en français et en anglais, l'éditorial ainsi que la description du processus de publication du bulletin. Le reste des articles paraîtront dans la langue dans laquelle ils ont été écrits. Bien que beaucoup d'efforts sont déployés en vue d'éviter de tels problèmes, l'éditeur (*de même que les cartographes!*) ne seront pas tenus responsables des erreurs de compilation ou de la perte d'articles qui leur seront soumis. Les opinions exprimées dans le cadre des éditoriaux, des articles et des lettres publiées dans le bulletin ne reflètent pas nécessairement celles de l'A.C.C.. Pour ce qui est des tarifs publicitaires, veuillez contacter le responsable de la publicité, Roger Wheate.

The Manager's File

1: Welcome new members
Bienvenue aux membres nouveaux

Ken Hakes,	Edmonton, AB
Elaine Ikebuchi,	Victoria, BC

Thank you to our renewed and new corporate members!

Bell Canada,	Toronto, ON
J.M.Ellis Ltd.,	Metcalfe, ON
GeoVision Corporation,	Ottawa, ON
Idrisi,	Worcester, MA
Intergraph Canada,	Calgary, AB
Map Art,	Brampton, ON
Metric Mapping,	Calgary, AB
National Atlas Info. Services,	Ottawa, ON
Northern Micro Online Services,	Hay River, NWT
Projections Mapping Group,	Calgary, AB

2: Membership.

Each year, the CCA membership holds steady at about 400 members, but up to 20% fail to renew, balanced by an approximately equal number of new members joining. I ask the non-renewers for their reasons for this cartographic divorce, and the responses fall in three categories:

1. *I am no longer employed/active in the area of Cartography.* This seems unlikely of course: how could anyone forsake such a field. Are cartographers not blessed, for it is they who "draw the world closer together"? not to mention the rich remunerations we receive in our jobs (*managerial humor!*). But that topic introduces response #2.

2. *The cost of membership is too high (relative to the benefits received).* This is clearly a judgement call. We hate to part with our money, and the executive tries to prevent raising dues at all costs. However, dues for the CCA are comparable to those for like organisations. In terms of benefits, I belong to other associations that give more in journals etc., and others that give less. We continually attempt to extend the benefits that members receive beyond 4 journals and newsletters each year.

3. *The CCA does not offer practical information to working cartographers.* ("I deal with hands-on problems, NOT theoretical ones"). This is the one that cuts closest to the bone. The CCA, since its inception in 1975, has consisted of a fine collection of technicians, students of cartography, private and public sector, educators and researchers, and assorted cartophiliacs. However, the numbers have remained stable, suggesting that there may be a fairly finite potential for this kind of association, with the benefits it offers.

In the last few years, provincial organisations have plugged some local gaps, catering to the 'bench cartographer' or more recently the neophyte GIS'er. However, we seem to be part of a catch-22. Practical information, and 'hands-on' solutions are not made available because no-one presents them! The Association supports a journal and newsletter. If you have a formal article to present, the journal Cartographica is constantly seeking new material, particularly in the ever-expanding GIS sphere. If your comments are less formal, *Cartouche*, our operational publication, is your vehicle for communication. The editor can only work with what he has, and that may sometimes not be very much. It depends on you!

Remember that all the executive are volunteers with full-time jobs elsewhere. As newsletter editor for two years, and in the years since, I found that contributions by the membership at large have been very small via this medium (what a sentence!). One letter that I did receive, concluded with "*Please do not put this in the newsletter!*". This was rather unfortunate since the writer expressed views probably held by much of the membership.

It is a common human foible to feel that if one knows something, then everyone else must. This may discourage many from submitting - and that's too bad! Cartouche is waiting (complete with ISSN number) for your articles/practical tips/letters/production notes/questions etc.. Submissions to Cartouche can work both ways — in offering information for mutual gain. I have received calls from prospective employers seeking specialised skills. There may well be someone in Chicoutimi or Brandon with those skills, but I only know the ones in Calgary. Yes, the newsletter will print "Cartographer seeking employment". Similarly, corporate members with new products have been reluctant to take advantage of their free advertising option in the newsletter.

Cartouche is the informal mirror of the Association. If you don't see what you would like to see, then help change it! *EVERY* Issue of Cartouche will contain information that is your constant hook-up to the CCA: Executive List and Instructions for submissions to Cartouche. It only takes up a little space, and many people have asked for this feature as a continuum, and a easily located information source. No more "*I wanted to send stuff in, but didn't know how to do it.*", or "*I couldn't find the executive's address*". The CCA/ACC is right here, easily available; use it!

Roger Wheate

ANNOUNCING A NEW LIST FOR CARTOGRAPHY, INFO GRAPHICS, SCI-VIZ, AND RELATED AREAS:

-INGRAFX-

(Information Graphics)

Hello! *INGRAFX* is a new listserv devoted to the interdisciplinary areas of cartography, information graphics and scientific visualization. As owner of the list, I would like to invite all those who have an interest in the broad range of images known as "graphics" (maps, photographs, drawings and information or quantitative graphics) to consider signing up.

Please do not take these requirements too formally! Ideally, the discussion will be uninhibited and free-flowing.

Candidate topics for discussion might be; the relation of maps to graphics as a whole (are they different kinds of representation?); the philosophy of graphic representation (what theories are there of graphic representations, and how does a graphic "represent" segments of the world); how can we use graphics in education; to what extent does "graphicacy" matter in today's world; what is the relationship between academic or scientific graphics, and graphics in the popular media; can we or should we accrue rules for "good" graphics; are there graphic variables or elements that are basic to all graphics, and can these be used in animation?

In general our aim is for an *informal* discussion which is cross-disciplinary, and about graphics.

How to Join In.

Curious to see what's going on so far? Why not sign up now? To *sign up*, send a message to:

`LISTSERV@PSUVM` (bitnet) or
`LISTSERV@PSUVM.PSU.EDU` (internet)

and include the following:

SUB INGRAFX *your name*

where your name is your actual name, *not* your email address. *DO NOT* send this message to INGRAFX@PSUVM as this is where you send your messages. (You do not need to include the " around your name.) No other text is needed.

E.g., SUB INGRAFX j w crampton

On bitnet you can also sign up by using the TELL command, e.g.,

TELL LISTSERV AT PSUVM SUB INGRAFX j w crampton

Once you are a subscriber you can retrieve any files that have been archived on the listserv, including the monthly discussion logs, and other files of interest. To see what is there, either TELL or send a email note to LISTSERV AT PSUVM or LISTSERV AT PSUVM.PSU.EDU with the command INDEX INGRAFX. Once you have decided on a file you can retrieve it by using the GET command. E.g., TELL LISTSERV AT PSUVM GET 'File name', or GET 'Another file'. To *post a note*, send an email note to INGRAFX@PSUVM.

Future Discussions on the List

As a geographer/cartographer, I am particularly interested in getting fellow cartographers to join in the debate, especially students. However, one of the goals of the list is to broaden cartographic debate to include consideration of the many forms and roles of graphics in today's highly visual world.

To this end, the list will be interdisciplinary. It will seek to include people from the worlds of information graphics (see the work by Edward Tufte for one position on this), scientific visualization, and the media (_USA Today_ style graphics?...)

To my knowledge there does not yet exist such an interdisciplinary forum for the discussion of graphics as a whole.

I would also like to have people share their graphics. This can be done by compressing and converting a file to binary form. I do not encourage posting of these files to the list, but those people interested in swapping graphics should describe what they have, and what they'd like to see, on the INGRAFX list. Transactions could then take place over private email, with a list of available graphics being held in our archives.

Reviews, either of software, books or articles on graphics, are also especially encouraged. If you have been asked to write one and can't wait to see it in "print," send it to INGRAFX (retaining your copyright).

We aim to create an informal environment for the discussion of all issues related to graphics. This might also include discussion of ideas you are working on for future articles, or research projects announcements of job openings, interesting graphics you have discovered, or just general commentary with a graphic flavor.

Report on activities 1988-91

The Canadian Cartographic Association (CCA) has a stable membership of about 400 members. These are comprised of approximately equal proportions of professors or researchers, government employed, private sector employed, students and interested individuals (including retired cartographers). There are two honorary members: Bernard Gutsell and Lou Sebert who helped found the Association in 1975. Twenty five percent of the membership is based in the United States and the same percentage are female members. Membership is represented in fifteen other countries.

The CCA meets annually at a site, which rotates around the country. These were in Toronto, Ontario in 1988, Halifax, Novia Scotia in 1989, Victoria, British Columbia in 1990. Meetings are planned for St. Catharines, Ontario in 1991, Montréal, Québec in 1992, Winnipeg, Manitoba in 1993, and possibly Whitehorse, Yukon Territory in 1994. They contain up to 50 presented papers, which cover all aspects of cartography, and focusing on the Association's interest group structure, that is: GIS and automation, map use and design, education, history of cartography and map production technology. In addition, workshops are held by product vendors and researchers and map producers.

The geography of Canada, with a relatively small number of people located in a series of distanced communities over a large geographic area, has led to Canada being a leader in mapping technology. It also creates organisational problems which permeate almost every aspect of life, politically, socially and professionally. The CCA has set as a focus over the recent period, ways of overcoming these difficulties in the field of cartography, where we have two national associations and several provincial organisations connected through an undefined relationship. This has been achieved in perhaps four ways:

1: A continuing dialogue with all cartographic societies

2: Where possible, having joint annual meetings. This has been achieved for six consecutive years: in 1987 (Carto-Quebec), 1988 (Ontario Institute of Chartered Cartographers- OICC), 1989 (Canadian Institute of Surveying and Mapping), 1990 (Pacific Institute of Cartographers Society), 1991 (OICC) and 1992 (Carto-Quebec).

3: Pursuing a new class of membership in the association, for members of other societies to become associate members of the association. This would enable more cartographers across Canada to receive the CCA newsletter, and facilitate information transfer.

4: By establishing a central office with office manager, who is non-elected but hired to direct the executive, and handle or redirect national and international enquiries in cartography.

CCA members support the journal Cartographica, and the newsletter of the International Cartographic Asociation both founded and edited by Bernard Gutsell. A publications committee formed in 1990 is examining strategies for strengthening the link between the CCA and Cartographica. Members also receive four copies of the CCA Newsletter. In 1991 this will be renamed to 'Cartouche' and is expected to change in format to appeal to a wider range of cartographic practitioners in Canada, with the interest groups which correspond to those of the ICA, having a greater visibility.

The CCA also maintains a software disk library, started by Dr. J.Ronald Eastman, which has attracted enquiries worldwide. Currently other products involving planetary mapping, history of cartography, and journalistic cartography are being distributed, while a much needed update on a "*careers and opportunities in cartography in Canada*" should be completed in 1991, to reflect the significant and colossal changes and developments in the field over the last two decades.

Increasing student interest has been indicated in the third awarding of the Norman Nicholson scholarship in 1990, increased participation in the President's Prize, which since 1987 has included a 'journalistic' category, sponsored by Time Magazine, student paper sessions at the annual meeting, and interest in a student chapter.

The major growth areas of the association over 1988-91 has been in student membership and in corporate interest particularly from companies involved with computer mapping and GIS. These now number over 20 as sustaining corporate members.

Canada's geography makes regional and interest group meetings difficult to arrange, although these do occur occasionally, but CCA members are highly visible at other meetings. CCA members are also prominant internationally, such as Dr. Eva Siekierska as the chairperson of the ICA task force for women in Cartography, Dr. Clifford Wood as the chairman of the CISM cartographic committee, along with 11 of the 14 ICA Commission Representatives for Canada, and of course Dr. Fraser Taylor as the present ICA President.

The recent presidents of the Association have been Norman Drummond 1988, Jean Carriere 1989, Claudette LeBlanc 1990, and Peter Keller 1991.

THE INLAND WATERS, COASTAL AND OCEAN INFORMATION NETWORK (ICOIN)

RESEAU DUINFORMATION SUR LES EAUX INTERIEURES, COTIERES ET OCEANIQUES (RIEICO)

Paper presented at the
FIG XIX INTERNATIONAL CONGRESS
HELSINKI, FINLAND
JUNE, 1990

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SUMMARY/RESUME

The Inland Waters, Coastal and Ocean Information Network (ICOIN) is a concept to restructure the available data into an information infrastructure, based on common standards and designed for simple third party access. ICOIN is therefore more than a project or a program, it is a concept that will evolve and grow in scope and complexity over the next several years to meet the needs of a wide variety of users. The emerging new science and engineering discipline called Geomatics will play a key role in the development of this complex infrastructure. Finally, the underlying theme that will drive the development of ICOIN is the demand for improved access and use of this information for environmentally sound sustainable development.

Le Réseau d'information sur les eaux intérieures, côtières et océaniques (RIEICO) est un concept visant à réorganiser les données disponibles en une infrastructure d'information fondée sur des normes communes et d'accès facile par des tiers. Le RIEICO est donc plus qu'un projet ou un programme; c'est plutôt un concept dont la portée et la complexité évolueront et croîteront au cours des prochaines années pour satisfaire les besoins d'une vaste gamme d'utilisateurs. La géomatique, nouvelle discipline des science et du génie, jouera un rôle de premier plan dans l'élaboration de cette infrastructure complexe. Enfin, le thème sousjacent à l'essort du RIEICO est la demande d'un meilleur accès et d'une plus grande utilisation de l'information aux fins d'un développement soutenu qui respecte l'environnement.

"*Ninety percent of the data needed isn't available and ninety percent of the data available isn't usable*" - quote on the "rule of thumb" for data on environmental assessment.

1. CANADA'S OCEAN SECTOR

Canada's oceans sector provides a significant portion of our national wealth - $8 billion dollars of our annual national income and over 140,000 jobs. Our oceans industries are concentrated principally in the areas of fisheries, marine merchandise, oil and gas, ocean mining, marine shipping, shipbuilding and repair, and ocean manufacturing and services. Although these activities are not exclusive of each other, they are often in conflict with each other and some appear threatened under today's economic conditions.

Our oceans and freshwater areas are regulated and influenced by federal, provincial and local levels of government and yet are increasingly affected by issues that are international, even global, in nature - the greenhouse effect, the destruction of the ozone layer, acid rain, plastic pollution, overharvesting of fish stocks, population pressures, etc. Canada has recognized that decisions are required now to protect our marine and aquatic ecosystems and resources, both for ourselves and future generations. The need for "shared responsibility and integrated decision making" has been clearly identified by the National Task Force on Environment and the Economy.

Informed, integrated decision making requires access to and the correlation of all relevant data sets. In Canada, governments, the private sector and universities have developed many valuable data bases in support of focussed objectives, particularly in those areas supporting resource development. However, these data bases tend to be discipline specific, widely diverse in structure and location accuracy and are often unknown outside the proprietary agency. The data may be incomplete or of uncertain quality, and unavailable or unuseable by non-proprietary agencies. Data bases on environmental parameters are usually sparse at best, if in existence at all. Within governments these problems occur because most major survey departments are mandated only to collect data to support their specific disciplines or programs. Data is seldom collected, processed or managed with a view for use on other programs or by other agencies and is therefore often unable to meet new demands or priorities.

The available data is often inadequate for clear, undisputed decision making which is both environmentally and economically sound. It has been difficult for the public to obtain a clear picture of the issues and for politicians to support decisions that are costly to the taxpayer in the short term, but necessary to support long-term sustainable development. However, today there is a clear recognition by the public of the need to support environmentally sustainable development. Politicians now have the public support to commit resources to environmental programs.

Government departments can now restructure existing programs and create new ones designed not only for specific disciplines but as part of a multidisciplinary science designed to integrate environmental, resource and economic information. Multidisciplinary projects undertaken to date have revealed the inadequacy of existing data; many environmental parameters have yet to be surveyed at all and much of the existing data lacks the spatial component necessary to allow accurate correlation with other parameters.

To deal effectively with the issues facing our aquatic resources, Canada is nowJdeveloping the Inland Waters, Coastal and Ocean Information Network (ICOIN).

2. INLAND WATERS, COASTAL AND OCEAN INFORMATION NETWORK (ICOIN)

ICOIN is a concept to provide a framework for the long-term transformation of the relevant data bases into a common information infrastructure based on common standards, made available through an integrated network, and designed to facilitate simple third party access. ICOIN will evolve as standards are developed and resources are committed to develop the information systems necessary for the development and management of Canada's marine resources.

The support for ICOIN is derived from a general recognition from scientists, resource developers and managers that there is a collective need to organize all existing data bases and to integrate new data so that they can respond more effectively to environmental and renewable resource issues. In fact, a common theme throughout the discussions on "sustainable resource development" is the need for improved access to information and the need for inventories of data bases that may be required for environmental impact assessment. ICOIN infrastructure will begin with a network of directories and inventories and will lead to direct access to the data bases.

Multi-agency ICOIN Task Forces are being formed to promote and coordinate the development of comprehensive data base networks, not only for environmental assessment, but also for long-term monitoring and integrated resource planning and development.

3. THE ROLE OF SURVEYING AND MAPPING

The surveying and mapping community is leading the development of ICOIN. At sea, hydrography, oceanography, geophysics and biology all now require systematic data to develop an adequate data base network for integrated research. While all scientists collect data for their own research, it is the surveying and mapping industry that specializes in collecting, processing, managing and presenting geographic information for others to use.

While conventional survey engineering and cartography has provided an adequate theoretical base for field surveying, coordinate calculations and the preparation of maps, a new science called Geomatics is emerging to meet the growing needs of processing and managing many different digital, geo-referenced data bases which involve not only very large volumes of data, but also complex geo-relationships.

Today there are two key technologies that are revolutionizing the surveying and mapping industry - the Global Positioning System and Geographical Information Systems. These technologies will have a direct impact on the development of ICOIN and Geomatics.

3.1 Global Positioning Systems (GPS)

The Global Positioning System provides accurate worldwide positioning with simple to use, easily transportable receivers.

Traditional surveying was based on optical technology and triangulation. In the late fifties and early sixties the first electronic distance measuring and electronic positioning systems were introduced. Short-range distance measuring systems such as the Tellurometer probably represent the beginning of the use of electronic technology, although Decca Navigator for offshore positioning and Shoran were used for long baseline measurements. However, the Tellurometer was the first electronic device to be used in surveying by a large number of surveyors. As a result, special courses were required to train surveyors on the field operation and maintenance of Tellurometers. In the office, the calculation or processing of survey data shifted from triangulation to trilateration.

Medium-range positioning systems, such as Hi-fix, provided a quantum improvement in coastal hydrography. It allowed survey operations to continue in weather conditions that restricted optical positioning with sextants. Continuous positioning and improved accuracies became possible. It also required surveyors to learn more about the characteristics of electromagnetic wave propagation and the errors and accuracies of hyperbolic geometry.

Micro-wave positioning systems such as Motorola RPS and Del Norte Trisponder were next to be introduced and were used for line of sight inshore surveying. Although the field operations were relatively simple, microwave reflectivity caused unexpected results and once again the surveyor had to learn about the measurement characteristics of this new technology as well as the geometry of range-range positioning patterns.

With each of these developments in electronic positioning systems, continuous training programs were required for the practicing surveyor and new education courses had to be introduced in colleges and universities. The use of the new technologies remained with the surveyors.

Today, with its simple to use receivers, GPS and its sister technology Glonass provide accurate, continuous, worldwide positioning on land, water and in the air. This technology is revolutionary because it will be used by a whole new generation of users untrained in the profession of surveying, but with a need to position accurately the data they are collecting.

GPS is by far the most revolutionary survey positioning technology because it will put accurate positioning into the hands of non-specialist users.

In the context of ICOIN, and in all surveying fields, an increasingly large volume of accurately positioned data will be collected and will need to be integrated into comprehensive data base networks.

3.2 Geographic Information Systems (GIS)

GIS, the second revolutionary technology, is shifting cartography from the cartographer to the non-specialist user who needs simple access to geo-related data bases.

The introduction of computer technology was initially used to improve the calculation of survey data. The same technology was also applied in the field to the continuous or automated logging of survey data, particularly hydrographic and geophysical data. As a result, vastly increased amounts of data were recorded. This led to major changes in the computation process. New processing techniques were developed to filter, reduce and manage the data.

This technology is now being applied to process the even larger volumes of data collected with multi-beam sounding systems. In addition, electronic data processing is used to improve the value of the data through more complex processing, statistical analysis, network adjustments, etc.

The consequence of the use of computer technology was the capability to collect and process increasingly larger volumes of data. The paradox is that while there is a demand for more data, there is often a problem of organizing and managing the data and information. New methods and techniques are now needed to manage multiple data, from raw data through the various stages of filtering, reduction and processing. More comprehensive data base management software packages such as Oracle now improve the data management process itself, but significant improvements in the digital correlation of larger volume data sets are still needed.

GIS technology, specifically designed to process and manipulate digital geographic information, is now having a significant impact on the way we analyze and present geographic information. Prior to the introduction of GIS technology, the survey and mapping profession focussed on using computer software technologies for data acquisition, processing and management to produce some form of hard copy graphic documents, fairsheets, compilation drawings, maps or charts, or in numerical modeling without the benefit of map visualization. GIS technology allows users, from scientists analyzing geo-related data to navigators using electronic charts as part of sophisticated, integrated navigation systems, to create customized graphics. GIS provides the graphical interface to digital geographic data bases, just as hard copy maps and charts currently provide this interface.

By enabling users to create their own customized presentations GIS technology is putting cartography directly into the hands of the user.

The combined effects of GPS and GIS will be a dramatic increase in the amount of data to be entered into geo-referenced data bases. GIS users will increase the demand to have simple, reliable access to these data bases. To meet this new demand, surveyors, engineers and cartographers will have to change their perspective on what products and services they can and should be providing.

4. GEOMATICS: THE CHALLENGE OF THE INFORMATION SOCIETY FOR SURVEYORS

Geomatics is a subset of Informatics involving the processing and managing of computerized geographic information. It is the science of processing and managing diverse but geo-related data bases to form an information infrastructure. Just as Informatics evolved out of the need to develop a new discipline to deal with the complexities of processing and managing data with computer technology, Geomatics will develop the digital data base management and processing science based on GIS technology.

Geomatics is particularly relevant to today's emerging environmental issues. These issues will drastically increase the numbers and types of users of geo-related data. Environmental analysis, more than any other discipline, requires the understanding of the relationships of large numbers of different parameters, not only for ecosytems research, but also to integrate economic and social parameters.

Geomatics is a natural evolution of surveying and mapping. Throughout modern history, from the age of exploration and settlement to recent resource development, the surveying and mapping industry grew when it became necessary to systematically collect, organize and present geographical data to the decision- makers in government and industry. The industry has progressed from the early days of exploratory mapping, to the development of cadastre, through the science and technology of aerial photography and photogrammetry, and the development of resource mapping instruments such as aeromagnetics, gravity and multi-beam sonars.

Today's demand for systematic environmental mapping requires the presentation of a wide variety of information based on a common geographic framework with well defined accuracies and precision. The use of GIS technology requires an even greater understanding of the geographic relationships and a better defined structural basis for the manipulation of digital geographic data.

5. GEOMATICS INFRASTRUCTURE

The continued improvement of computer and GIS technology is making it easier for the non-specialized users to process and analyze geo-related data and to create customized maps and charts. It is also increasing the demand to improve the access to digital geographic data bases. In order to organize and structure data bases for simple access, the supporting infrastructure must necessarily become increasingly complex - this is the paradox of all infrastructure. This paradox is also the challenge of the science and engineering discipline of Geomatics.

Whether it is for the integration of hydrographic, geophysical, resource and environmental data in the coastal and offshore areas; or topographic, land use, property ownership and environmental data on land, the principal characteristics of Geomatics infrastructure are common standards, networking and simple third party access.

The development of standards is a complex process. Not only is it necessary to achieve standards within an agency, it is necessary to seek out standards nationally and internationally, as well as interdisciplinary standards. The standards include data classification, data base structure and data communication standards. Data format conversion software and the use of expert systems will also play an important role in correlating geo-coded data bases.

A considerable amount of work, both nationally and internationally, is currently underway to develop Geomatics standards which will be important to ICOIN. However, there is a considerable amount of work yet to be done. New classification standards to describe digital geographic data both within a particular discipline and also between disciplines is required. Data base management standards will also need to be developed independent of the software technology.

In Canada, the Canadian General Standards Board has created a Geomatics Standards Committee which has participation from several levels of government, universities and the private sector. Canadian experts are also participating on several international initiatives to develop common geographic standards.

The concept of operating in networked environments are familiar to most people. The airline reservation attendant accesses the reservation data base network to provide national and international travel connections. The telephone is part of the telecommunications network. We plug electrical appliances into the electrical network with little awareness as to the source of the electricity which is accessible in a standardized form. In each of these cases the user does not need to know how the network really works or its complexity, only how to access and use it.

Geographic data base networks are now technologically possible. The enabling technologies include standardized data base management systems and high speed telecommunication networks. However, in most cases the geographic data bases are not structured for this type of external access.

6. CONCLUSION

The map or chart has been the the traditional medium for the surveyor to organize and present geo-related data for other people to use. In fact, the principal function of the surveying and mapping industry has been to systematically collect, process and organize data for others to use. This is what makes this discipline different than that of the scientist who collects data for his/her specific use. The challenge of the information society for surveyors is to develop the science and technology of Geomatics and to build the information infrastructure to support environmentally sound resource development. The development of the Inland Waters, Coastal and Ocean Information Network is not only a practical application of Geomatics, but it will also contribute to the refinement of the principles and methodologies of this new science.

I'm never asked to be the designated navigator...

Maps intrigue me - I have a rather sophisticated map portfolio, local, regional, national and international - and I'm not one to pooh-pooh their intrinsic value. I have no compunction about refolding maps properly; rather than go gaga trying to refold them as received, I happily create new folds although I do strive to have the map name appear on the front fold but, if this cannot be easily achieved, I will resort to writing it on with a ball point pen. My maps grow mightily in size from incorrect folding. Woe is me!

Asking directions of people gives one an excellent insight into the character of the director - showing him/her (my first and last condensation to bisexual referencing) a map will oft times elicit a grab for said map - a knowing "Aha, here we are and you want to go where?" You repeat your original inquiry already losing faith in the director's ability to direct - when the map is thrust before your face and you are told to "follow the Trunk Highway #7 to Ecum Secum, I mean the Marine Drive, take the Collector Highway to Nancys Cellar and if you pass Lorne you have gone too far; however, if I were you I'd take the Trans Canada 102, it's much quicker," followed by the proverbial "You can't miss it."

Cities present an entirely different kettle of directors: again taking the map and jabbing a pudgy finger big enough to obliterate the whole city, you hear, "Go four blocks, go through three sets of lights then turn right, go one street east, turn right again, got that two right turns, take an unmarked short lane on your left and you will emerge exactly where you want to be." A listening companion gently demurs, "That's my bailiwick, let me tell her a much easier way to get there" - and off we go again. The fellow I like is the one who says, "Just a minute, I'll get my car and you follow me" - I like this fellow the more if he drives slowly and keeps me in his rear view mirror - I find it disconcerting to espy him in MY rear view mirror fifteen minutes later shaking his finger and looking slightly annoyed with me!

I recall the time that we crossed the English Channel from Harwich to the Hook of Holland, took a bus to Rotterdam and stowed our belongings aboard the M.V. St. Christopher for a tour the next day. It was a beautiful evening and a group of us decided to take a stroll. We walked and chatted and stopped for drinks and walked and chatted some more until we decided to return to our Cruiser for the night. Alas, whilst we knew the name of the small ship, we did not know where she was tied up - nor could any of us speak in any of the languages of the multilingual folk we then could find on the streets - finally a kind soul took us to the police station and a police paddy wagon took us to the various piers until we were finally reunited with our boat. Someone had a map of Rotterdam but in the light of street lamps it was not too much help.

Maps are of enormous value to people who puzzle over The New York Times Crossword every week. Let's face it, we all don't have a City in S.E. Turkey, a river in E. Texas, an Oder tributary right on the tip of our tongues - if we see a N.Y.C. river starting with H and having six letters we stick in Hudson, in ink, and it's only our map that later informs us that it is the Harlem.

I think it's well worth one's while when travelling long distances by motor car to have an Automobile Association send the relative maps with the simplest and shortest route outlined with a marker -but it is not nearly as much fun - nor does it lend itself to as much post trip conversation, as a do it yourself route, especially if you are short a map!

Maps are wonderful tools - needed at every turn with the world a veritable global village - did someone say that before? - sorry!

Ruth E.N. Smith
Athol, Nova Scotia

History of Cartography
Histoire de cartographie:

by
Jeff Murrray

The winter issue of Archives and Museum Informatics reports that a new line of barcode inks has been developed by Battelle Memorial Institute of Columbus Ohio. The inks are invisible under normal light but can be read by barcode scanners using infrared radiation. The new technology offers some interesting possibilities for map archives and libraries which, in the past, have been hesitant to adopt barcode technology. It may now be possible to use barcodes in all aspects of inventory control, material tracking, cataloguing, etc. without unsightly labels disfiguring the item coded. Archivists have always refrained from using barcodes because of the possibility of the label covering an important element of the document. Since the inks are invisible, this problem might now be a thing of the past. Unfortunately, the announcement in Archives and Museum Informatics does not mentionanything about the durability of the inks nor their effect on the long term preservation of archival documents. Further information can be obtained from John J. Garvey, Battelle, 505 King Avenue, Columbus, Ohio, 43201-2693; (614)424-7507.

The Planning Committee on Descriptive Standards of the Bureau of Canadian Archivists recently released the first three chapters of its Rules for Archival Description (RAD). The document now is being circulated for comment throughout the archival community. Once it is finalized later this year, the manual will enable archivists to produce uniform descriptions of their holdings, in all media, at the fonds, series, file, and item levels. At the moment, the manual contains chapters on general rules of description, multiple media fonds, and textual records. Future additions will include rules for the description of graphic materials, architectural records, moving images, sound records, computer files, microforms and, of course, cartographic materials. In terms of its organization, the looseleaf publication follows the format of the Anglo-American Cataloguing Rules, Part II.

For further information contact:

Bureau of Canadian Archivists,
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Implementation of GIS:

An Annotated Bibliography

by
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Introduction

The impetus to implement GIS stems from two trends: (1) the need to analyze large geo-referenced databases (particularly those created for governmental land-use planning), and (2) rapid technological developments in the handling of digital georeferenced data (Tomlinson, 1989). GIS is a combination of computer hardware and software which captures, displays, manipulates, and analyzes geographically referenced data (MacDonald, 1989). GIS provides land use planners with the ability to combine diverse information, and rapidly examine a broad range of alternatives (Beard, Chrisman, and Patterson, 1987). It replaces tedious manual techniques, and provides new modes of analysis. Technological advances in PC and workstation technology, accompanied by rapidly declining price/performance ratios has contributed to the popularity of GIS (Madill, 1990).

The benefits of GIS are readily apparent: efficient and rapid data handling, increased analytical possibilities, integration of data handling, analysis, and presentation, automated graphic output, increased rationality and objectivity of decision-making, increased accuracy, and many others. Perhaps most important, GIS provides a common framework for analysis that cuts laterally through hierarchical, information generating organizations (Dangermond and Smith, 1982).

MacDonald (1989) estimated that GIS is a $600 - 700 million a year industry which is growing at a rapid rate of 30 - 50% per annum. Rothfeder (1989) provides a more conservative estimate, predicting that GIS sales will not reach $600 million until 1992. GIS is used by an increasingly large range of organizations to improve decision support. Traditional users include forestry, and other land based resource applications. More recently, applications have developed in the retail and service sectors. Market researchers, for example, are examining complex market relationships and factors that are not revealed by traditional statistical procedures (Madill, 1990).

Discussion of GIS implementation issues has generally lagged behind that of technical issues, except in the trade journals of sectors where GIS is having the greatest impact. This annotate bibliography attempts to make this literature more accessible. In reviewing this literature, it became apparent that three non- technical issues are basic to most GIS implementations: costs, personnel availability, and data security/access. As these are not often the focus of attention in the academic literature on GIS, a brief introduction is provided for each issue.

GIS Implementation Problems

Hardware and Software Costs

A GIS requires a significant monetary investment. A complete GIS includes the hardware and software used to perform geographic analysis, as well as the database, and the people who use the system to meet a specific set of objectives (Brown, 1986). In 1981 approximate hardware costs for a GIS were $250,000, with software costing another $20,000 - $100,000 (Dangermond and Smith, 1982). These values do not reflect the costs of data acquisition, or personnel development. By 1989, the cost of GIS hardware and software had declined to $50,000 - $75,000 (Rowan, 1989). More recently, the development of 'desktop' GIS packages that have minimal hardware requirements have reduced entry level commercial systems to approximately $5,000. The range of costs for data acquisition is much greater, but in most implementations data costs are 60-70% of hardware/software acquisition costs (Dangermond and Smith, 1982; Rowan, 1989). In addition, the annual maintenance for hardware can be another 15 - 20% of total cost, and annual software maintenance fees can amount to 10 - 15% of the original purchase price (Brown, 1986). One common pitfall is that buyers are all too often attracted to the 'glitter and promises' while ignoring budget, human resources and time constraints (Brown, 1989). GIS implementations are typically major projects that require many years to complete. During this period an organization must plan for continuing expenditures, and shifting budget priorities (Forrest, 1990).

Another cost related dilemma facing those wishing to invest in a GIS is the time horizon for database development. In most cases, database development involves a lengthy and expensive commitment of resources. At the same time, the full benefits of a GIS can not be realised until a substantial database is in place (Bolland, 1986). The creation of an electronic database for one time use can rarely be justified on economic grounds. This is a problem for administrators and politicians who are used to thinking in terms of one-time expenditures of funds. They often fail to take into account that if the database is continually updated, and

used to support a range of activities, the system becomes a highly cost-effective tool (Curtis and Rowland, 1986).

Personnel

Another problem faced by potential implementors of a GIS is a shortage of trained personnel. Tomlinson (1989), for example, estimates that the GIS industry will require 1000 - 3000 newly trained individuals beginning in 1990. The human factor is likely to become the most significant constraint in the future, as the costs of hardware/software continue to fall, electronic sources of data become more widely available, and the number of GIS implementations grow. This will not be an easy constrain to overcome as there is a shortage of teachers and facilities, inadequate research funding, and a lack of understanding that shortages exist (Tomlinson, 1989).

Data Security/Access

The creation of large databases, brought together from a variety of sources, prompts the need for policies relating to security and control of access. Ethical standards, and corporate policies need to be developed for the use and sharing of information within GIS networks. These issues are not only important as they relate to confidentiality, but as they relate to the quality of GIS as a decision making tool. Problems are often inherent, for example, when access to a GIS is given to administrators and politicians who have strong motives for obtaining information but usually have a weak grasp both of the scientific principles involved and the characteristics of the data they are using (Briggs and Mounsey, 1989). Data misuse also presents another problem. Mistakes and misinterpretations of data may lead to either inappropriate policies being established, or discredit the whole information system (Briggs and Mounsey, 1989).

Bibliography

1. Concord Selects UGS For GIS Study, Computing Canada, July 19th, 1990, 16(15).

   A California city has decided to evaluate the possibility of implementing a GIS. Desired results are associated with record keeping, increased productivity, and work capacity.

2. Defence Department Acquires GIS, Computing Canada, 1990, 16(18).

   The Canadian department of defence has acquired a GIS. The GIS is used to help integrate all command and control related decision making.

3. DND Uses GIS to Study Flight Program, Computing Canada, November 23rd, 1989, 15(24).

   The department of national defence has purchased a GIS to be used for the management of the flying program at a base in Goose Bay, Labrador.

4. Forestry Industry Moves On GIS, Computing Canada, November 24th, 1988, 14(24).

   The timber companies of Canada have to report to the government yearly on how the tree mix is being handled. With the introduction of GIS, management is able to make more accurate predictions. The government is able to integrate all data bases to assess planting and deforestation patterns.

5. GeoVisions GIS Software Now Installed, Computing Canada, September 13th, 1990, 16(18).

   A GIS is now installed at the Department of Surveys, Mapping and Remote Sensing and the Department of Energy, Mines and Resources.

6. GIS for the Cable Industry, Cable Communications Magazine, May 15th, 1990, 56(5): 33-35.

   Focuses on a new application for GIS in the cable television industry. GIS provides a powerful tool to assist maintenance and customer service. Additional planned uses include financial management, and billing systems.

7. Intergraph GIS Installed in Brampton, Computing Canada, October 25th, 1990, 16(22).

   Describes Brampton's GIS. The system is used by the city, the outlying region, and Brampton Hydro.

8. Toronto To Use Digital Mapping, Computing Canada, January 18th, 1990, 16(2).

   The metropolitan area of Toronto is considering implementing a GIS to improve access to digital land-related data.

9. ALLAN J.A., The Role and Future of Remote Sensing, Satellite Remote Sensing: Review and Preview Proceedings of the 10th Anniversary International Conference, 18th - 21st September 1984, University of Reading, Reading, England: Remote Sensing Society, 1984.

   Explains that the data retrieved from satellites is more economical and efficient to use than previous methods of collecting data for resource planning and management. The article questions whether current GIS can handle the amount of information available from satellites.

10. ARONOFF, S., Geographic Information Systems: A Management Perspective. Ottawa, Canada: WDL Publications, 1989.

    A text book about GIS. Chapter Seven is devoted to implementation issues.

11. BANNISTER, C. Developing a Census Data-Mapping Package For Sirius. Computers and Geosciences, 1985 11(3): 301-303.

    Discusses the importance of developing computer graphics that are easily understood by non-computer users.

12. BEARD, M.K., CHRISMAN, N.R., AND PATTERSON, T.D., Integrating Data for Local Resource Planning: A Case Study of Sand and Gravel Resources, in W.J. Ripple, Geographic Information Systems for Resource Management: A Compendium, 1987. Falls Church, Virginia: American Society of Photogrammetry and Remote Sensing, 1987.

    Explains many of the diverse functions of a GIS and how they can be implemented to assist Resource Management. Problems with using the GIS in resource management are discussed.

13. BJERKLIE, D., The Electronic Transformation of Maps, Technology Review, April, 1989, 92.

    Conventional maps often fail to meet the needs of researchers and business. This article illustrates that a GIS greatly expands the capabilities of map making.

14. BLAKEMORE, M., AND NELSON, R., Data Compaction in NOMIS, a Geographic Information System for the Management of Employment, Unemployment and Population Data, University Computing, 1985, 7(3): 144-147.

    NOMIS (The National Online Manpower Information System) provides system users access to government data about population, employment, and unemployment. Data compression plays a vital role in maintaining the efficiency of the system. As the size of spatial data sets increase, data compression techniques will become increasingly important.

15. BOLLAND, J.D., Digital Mapping and Facilities Management in a UK Water Authority, in M. Blackmore, Auto Carto London: Proceedings of the International Conference on the Acquisition of Spatial Data, September 14th - 19th, 1986, London, England: Auto Carto London Ltd..

    Shows a GIS being used in the role of Facility Management. The article reviews the experience of the Wessex Water Authority with their GIS. The system has is very successful. Many sites are unmanned and control is carried out by a central operations room. Initial inquiries into the use of a GIS were made through a pilot project that proved successful.

16. BRACKEN, I., AND MARTIN D., The Generation of Spatial Population Distributions From Census Centroid Data, Environment and Planning A, 1989, 21: 537-543.

    Current methods of showing spatial data in maps can seriously misrepresent the underlying information. An example of this is census tract data. The article contains a small section upon the usefulness of a GIS because of its ability to overlay several maps at once. The GIS, it is suggested, may bring a wealth of socio-economic variables into the realm of everyday policy making.

17. BRENNEMAN, D., Canadian Technology Scores at GIS '89, Computing Canada, March 30th, 1989, 15(7).

    Description of GIS'89 in Vancouver. GIS is one of Canada's strong technological resources for export.

18. BRIGGS, D., AND MOUNSEY H., Integrating land resource data into a European geographical information system: practicalities and problems, Applied Geography, 1989, 9: 5-20.

    As part of the CORINE programme of the European Commission (EC) all land resource data are being incorporated into the EC's GIS. This article outlines many of the problems that have been encountered to date. The final expenditures, at time of writing, have yet to be approved. The methods that were used to determine the optimal system are examined. The GIS requirements are outlined, as are the expected problems that will occur with the final product such as data control and data maintenance.

19. BROADWITH, D., A Vision of the Future, Agri Marketing, March, 1990, 28.

    Applications of GIS are reviewed with respect to farming.

20. BROWN, C., Implementing a Geographic Information System, What Makes a New Site a Success?. Proceedings of the Geographic Information Systems Workshop, April 1st - 4th, 1986, Atlanta, Georgia, Falls Church, Virginia: American Society of Photogrammetry and Remote Sensing, 1986.

    This article gives an informative review of the necessary ingredients that would make a GIS implementation a success. Reviewed are the basic hardware, software, data, and personnel requirements. A 3-5 year time schedule is provided for implementation.

21. BROWN, J., Forestry Industry Turns to GIS for Management Help, Computing Canada, May 11th, 1989, 15(10).

    GIS is becoming more widely used in the forestry sector.

22. CARON, L.M. AND MERCHANT J.W., Geographic Information Systems for Non-Urban Local Level Jurisdictions: Existing Alternatives. Proceedings from the American Society of Photogrammetry and Remote Sensing GIS Workshop, Atlanta, Georgia, Falls Church, Virginia: American Society of Photogrammetry and Remote Sensing, 1986.

    This article reviews problems encountered by small non-urban jurisdictions when they acquire a GIS. Recommends the optimal GIS for small jurisdictions.

23. CARSTAIRS, V., AND LOWE, M., Small Area Analysis: Creating an Area Base For Environmental Monitoring and Epidemiological Analysis, Community Medicine, 1986, 8(1): 15-28.

    GIS has enabled medical researchers to correlate disease with geographical areas.

24. COCKS, K.D., WALKER P.A., AND PARVEY C.A., Using Information Technology to Examine the Location of a High Speed Ground Transport System For Eastern Australia, Civil Engineering, 1985, 27: 321-327.

    Reviews the possibilities of locating a high speed rail network in Eastern Australia using a GIS to determine optimal location.

25. COOPER, S., GIS System Used In Tracking Oil Spill and Environmental Impact, Oilweek, October 2nd, 1989, 40(34).

A GIS is being used by The Alaska Department of Environmental Conservation to help in the clean up of the Exxon Valdez oil spill.

26. COX, K., Mapping A New Industry, The Globe And Mail (Metro- Edition). Toronto, Canada, March 17th, 1989, B2.

The provincial government has asked the federal government for financial assistance in setting up a geographic information services industry in the province.

27. CURTIS, R.L., AND ROWLAND, E.B., Land Management Planning Applications of a Geographic Information System. Proceedings of Geographic Information Systems Workshop, April 1st- 4th, Colony Square Hotel, Atlanta, Georgia, Falls Church, Virginia: American Society of Photogrammetry and Remote Sensing, 1986.

This article describes how the Tennesee Valley Authority has uses its GIS. The article focuses on how the authority is using the equipment to aid in decision making.

28. DANGERMOND, J., AND SMITH, L.K., Concepts and Issues in Large Area Natural Resource Information Systems, in T.B. Brann, In- Place Resource Inventories, Principles and Practices: Proceedings of a National Workshop, August 9th-14th, 1981, University Of Maine, Bethesda, Maryland: American Society of Photogrammetry and Remote Sensing, 1982.

Benefits and functions of GIS are reviewed. System structure and costs are discussed. Problems with data acquisition and the transformation of data into computer readable forms are also reviewed.

29. DIAMOND, J.A., AND WRIGHT, J.T., Design of an integrated spatial information system for multi objective land-use planning, Environment and Planning B: Planning and Design, 1988, 15: 205- 214.

The GIS proposed in this paper is a combination of a GIS, a RBS, and a MPM. These systems will then be linked together to form an integrated spatial information system (ISIS). The expected result from such a system will be an effective tool for planning and managing of land resources.

30. HANIGAN, F.L., Metrocom: Houston's Geographic Information Municipal Management System. ACSM - ASP Fall Convention. Technical Papers: Pioneering new frontiers in surveying and mapping, Salt Lake City, Utah, Falls Church: ACSM - ASP, 1983.

Describes the facility data management system for Houston, Texas (Metrocom). The history of the Metrocom project is outlined along with many of the implementation problems incurred during and since start-up.

1. DUEKER, K.J., Multi-Purpose Land Information Systems: Technical, Economic and Institutional Issues, Proceedings of Auto Carto 8, 1987, Baltimore, Maryland. Falls Church, Virginia: American Society of Photogrammetry and Remote Sensing, 1987.

   Emphasizes that a GIS implemented by an institution should be a multi-purpose system instead of a single purpose system.

32. EBERLEE, J., GIS Aids In Valdez Clean Up, Computing Canada, August 17th, 1989, 15(17).

   A GIS is being used to aid in the clean up of the Exxon Valdez oil spill. The GIS will predict long term effects of the spill.

33. FORREST, D., AND LYSENKO, G., Geographic Information Systems are Finding a Place, The Globe And Mail (Metro Edition). Toronto, Canada, Monday, October 23rd, 1989.

   Over 1% of a nations GDP can be spent collecting and maintaining geographic data. These large amounts of data need to be managed efficiently. Even large corporations are using GIS to gain an edge in the marketplace.

34. FORREST, D., Looking for Exports, Computing Canada, March 15th, 1990, 16(6).

   The Geomatics Industry Association of Canada (GIAC) is providing assistance to Canadian firms looking to export. The introduction of GIS services are enabling GIAC to keep abreast of changes.

35. FORREST, D., The Municipal Market, Computing Canada, July 20th, 1989, 15(15).

   This article indicates that the municipal governments will become the largest users of GIS. It is estimated that 75 to 80% of municipal information is geographically based.

36. FORREST, D., The Organizational Challenge, Computing Canada, June 22nd, 1989, 15(13).

   This article mentions some of the problems that large organizations have with implementing a GIS. Coordination seems to be the biggest problem.

37. FORREST, D., StatsCan Has a Wealth of Info, Computing Canada, May 10th, 1990, 16(10).

   This article reviews the role of Statistics Canada in the collection of data for GIS. Some of the companies that use StatsCan information are also mentioned.

38. FOST, D., Using Maps to Tackle AIDS, American Demographics, April 1990, 12.

   Discusses the use of GIS to target groups that have a high AIDS risk. The operation pinpoints these people through surveys and then sends workers to these sites to hand out sterilized needles, condoms, etc.

39. FOUCAULT, N., Surveyors Increase Productivity With New Digital Mapping, Northern Ontario Business, April, 1989, 9(7).

   This article looks at a leading user of GIS in Northern Ontario. The company has just received some large contracts from the Ontario Government.

40. FRANGINI, M., GIS Charting New Course, Computing Canada, December 21st, 1989, 15(26).

   Small article on the expanding applications of GIS.

41. FRANGINI, M., Manager Fosters Technology, Computing Canada, January 4th, 1990, 16(1).

   Comments on GIS technology, how it enables people to ask more complex questions. Also general feeling amongst government staff that time is freed up for decision-making rather than trying to get the information together.

42. GRAETZ, R.D., GENTLE, M.R., PECH, R.P., AND O'CALLAGHAN, J.F., The Development of a Land Image-Based Resource Information System (LIBRIS) and its Application to the Assessment and Monitoring of Australian Arid Rangelands. Proceedings of the International Symposium on Remote Sensing of the Environment: First Thematic Conference, January, 1982, Cairo, Egypt. Ann Arbor, Michigan: Environmental Resource Institute of Michigan, 1982.

   Proposes a GIS to be used to support rangeland resource management in the arid areas of Australia. As almost all of the arid land in Australia is leased from state governments, the investment would serve sectors of the economy.

43. GRIFFITH, C., Geographic Information Systems and Environmental Impact Assessment, Environmental Management, 1980 4(1): 21-25.

   Reviews the possibility of using existing databases through use of GIS to analyze change in land distribution and use.

44. HILL, J., AND MEGIER J.,. Regional Land Cover and Agricultural Area Statistics and Mapping in The Department Ardeche, France, by Use of Thematic Mapper Data, International Journal of Remote Sensing, 1988, 9(10 and 11): 1573-1595.

   Remotely sensed data can have important applications in developing land use and crop area statistics. This information provides an important base to facilitate a rational use of land resources. The GIS plays an important role in the analysis of the data.

45. HOYLAND G., AND HOLDSWORTHY D., The Development of an Automated Mapping System for the Electricity Distribution System in the South Western Electricity Board, in M. Blackmore. Auto Carto London: International Conference on the Acquisition of Data, September 14 - 19th 1986. London, England: Auto Carto London Ltd., 1986.

British utility companies are required to keep records of all underground mains and services. The number of records that are kept is enormous. With use of an AM/FM system the records can be compiled onto a database. This article reviews many of the implementation problems that were experienced by SWEB in the construction of their system.

46. JOHNSON R., AND BURLEY J.B., Snowy Range Ski Resort - an illustration of GIS planning principles. Landscape Architectural Review, March 1990, 11(1).

    Shows the application of GIS to planning principles. The model used in this paper determines the best location for a ski resort with certain limitations placed on the location.

47. KNIGHT, P., Grid Project Can Predict Effect Of Changes In The Environment, Financial Post Daily, June 16th, 1989, 2(78).

    Reviews a United Nations project that is using GIS to predict changes in the environment.

48. LACKNER, H., Mines and Energy Computerizing Minerals Geography, Nova Scotia Business Journal, July, 1989, 4(2).

    The department of Mines and Energy has started to use GIS to model mineral deposits.

49. MacDONALD, G., Pushing Back Frontiers Of Map Making, Financial Post Daily, August 9th, 1989, 2(108).

    Computers are opening up new frontiers for the mapping industry. The article gives projected increases for the industry with the introduction of GIS.

50. MADILL, R., GIS at Home in Big Business, Computing Canada, April 26th, 1990, 16(8).

    Reviews how GIS has captured the attention of big business.

51. MARBLE, D.F., AND AMUNDSON, S.E., Microcomputer-based geographic information systems and their role in urban and regional planning, Environment and Planning B: Planning and Design, 1988, 15.

    Possible uses of GIS in urban and regional planning are reviewed.

52. McMASTER, R.B., AND JOHNSON, J.H. Assessing Community Vulnerability to Hazardous Materials With a Geographic Information System. Auto-Carto 8: Proceedings of the 8th International Symposium on Computer Assisted Cartography. 1987 Baltimore, Maryland. Falls Church, Virginia.

    Demonstrates how a risk management model can be integrated into a GIS.

53. PLANT, J., National GIS Conference Draws Large Audience, Canadian Consulting Engineer, March/April, 1989.

    Suggests a wide range of potential uses for GIS.

54. REGULY, E., Putting Canada On The Map,. Financial Post Daily, November 28th, 1989, 2(171).

    Suggests that Canada is a world leader in designing new GIS technology. Some of the government applications of GIS technology are also reviewed.

55. ROTHFEDER, J., These Maps Can Find Oil- Or Sell Burgers, Business Week, March 13th, 1989.

    Indicates how and why big business is using GIS. Some of the companies reviewed include Texaco, Arby's, and Budget Rent-a-Car.

56. ROWAN, G., Map Makers Are Charting A Lucrative New Field,The Globe And Mail, (Metro-Edition), Toronto, Canada, March 13th, 1989, C2.

    Map making and GIS in municipal governments.

57. TOMLINSON, R.F., Presidential Address: Geographic Information Systems and Geographers in the 1990's, The Canadian Geographer, 1989, 33(4): 290-298.

    Reviews the role of GIS in the upcoming decade. Suggests that GIS may help to improve the relationship between people and their environment. The article also indicates that geographers should play a greater role in improving GIS. Also mentioned is the lack of adequately trained personnel to work with GIS.

58. WEBER, B.R., Application of Geographic Information Systems to Real Estate Market Analysis and Appraisal, Appraisal Journal, January 1990, 56: 127-132.

    Use of a LIS to find a cause and effect relationship between economic trends and demand for real estate.

59. WINTROB, S., New GIS Applications Mean Info Consumption, Computing Canada, May 11th, 1989, 15(10).

    Use of GIS to determine the socio-economic variables that are important in developing a successful marketing strategy.

60. WOROBEC, A., Digital GIS: Something for Everyone? Computing Canada, August 17th, 1989, 15(17).

    The Government of Canada has numerous agencies which have accumulated a vast array of digital data that can be used in a GIS.

Mark Laver is a senior student in the Geography program at the University of Lethbridge. Rod McNaughton is an Assistant Professor of Geography at the U of L. This bibliography was completed as part of an independent study course on GIS implementation issues. Anyone wishing to have an electronic copy of the bibliography may request one by contacting MCNAUGHTON@HG.ULETH.CA,
or by sending a DOS formatted 3.5" or 5.25" diskette to Rod McNaughton, Department of Geography, The University of Lethbridge, 4401 University Drive, Lethbridge, Alberta, T1K 3M4. The bibliography is available in ASCII, Wordperfect, and Procite formats.

The C.C.A. Member and Cartographica
Le membre de l'ACC et Cartographica

The Association is blessed, in *Cartographica*, with a well established journal of international repute. To continue and improve this, Bernard Gutsell is always on the lookout for manuscripts of both paper and monograph length. Every C.C.A. member should consider themselves part of the process of seeking such manuscripts.

Many of us attend conferences and hear quality research presentations announcing technological developments and advances in understanding in map design, computer applications, G.I.S., and other aspects of geomatics. Why not seek out the author (or write) and suggest that he or she consider submitting a manuscript to *Cartographica*?

None of us, of course, can guarantee to the author that the manuscript will be published. All manuscripts pass through a refereeing process. Authors of research papers know this but often need (and deserve) to be made aware that their work has sparked interest and that *Cartographica* is a possible outlet. By your expression of interest, you can play an active role in ensuring quality issues of *cartographica* into the future.

On a more general note, the association's publications Committee of Claudette LeBlanc, Janet Mersey and Michael Coulson met with Bernard Gutsell and Ed Dahl before the recent executive meeting. The meeting was both beneficial and enjoyable. The general topic was, how can we, the C.C.A. members help to sustain the quality of *Cartographica*?

You have read one result in the preceding paragraphs. Among other topics discussed was the need for more aggressive marketing of the monograph issues by the University of Toronto Press (who, of course, own the journal). A meeting of the Editorial Advisory Board is planned during our up-coming conference at Brock University as also a meeting with Press representatives. One result of the latter meeting, we hope, will be improvements in journal distribution to our members, particularly new members.

Avec le revue *Cartographica*, l'Association jouit d'un excellent journal scientifique avec une renommée internationale. Afin de poursuivre et améliorer le travail amorçé, Bernard Gutsell est toujours à la recherche de manuscrits pour des articles ou des monographies. Chacun des memebres de l'ACC devrait se sentir impliqué dans cette démarche.

Plusieurs d'entre nous assistons à des conférences où sont donées des presentations de qualité traitant de développements technologiques, de conceptions cartographiques, d'applications de l'ordinateur, de SIG, et de d'autres aspects de la géomatique. Pourquoi ne pas recruter un auteur ou suggérer que son manuscrit soit retenu par *Cartographica*.

Nous ne pouvons assurer l'auteur que son manuscrit sera publié puisqu'il doit passer par un processus d'evaluation. Il est intéressant de rappeler aux auteur d'articles de recherches que leurs travaux représentent un intérêt pour la revue Cartographica et que cette dernière peut les publier. Votre implication peut assurer une garantie de qualité pour les futurs numéros de la revue.

Sur une note plus général, le Comité des publications de l'ACC composé de Claudette LeBlanc, Janet Mersey, et Michael Coulson a rencontré Bernard Gutsell et Ed Dahl avant dernière réunion de l'executif à Ottawa. La recontre fut agréable et profitable. Le sujet était essentiellement: comment les mebres de l'ACC peuvent- ils aider à soutenir les efforts de qualité de Cartographica

Vous avez déjà lu un des résultats dans les paragraphes précédents. Parmi les autres sujets discutés est ressorti le besion pour une mise en marché plus agressive de la part de University of Toronto Press (propriétaire de la revue) en ce qui concerne les numéros sur les monographies. Au cours de notre conférence à Brock University, une réunion du Bureau d'Editeur Conseil est prévue de même qu'une rencontre avec les représentants des Presses. Un des résultats escomptés dans ces rencontres est l'amélioration de la distribution de la revue à nos membres et plus particuliérement aux nouveaux.

Michael R.C. Coulson, Chair/Président
Publications Committee/Comité des publications.

CARTOGRAPHICA

If you would like to review papers or books for *Cartographica*, please take a moment to complete the following form. If you are already on our list of reviewers, completing the form will allow us to update our files on your current interests.

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CANADIAN INDUSTRY IN 1871 (CANIND71) PROJECT, 1982-1992

Information Bulletin #3

Summary

The Canadian Industry in 1871 (CANIND71) project, based at the University of Guelph since 1982, has made machine-readable all the uniquely valuable manuscript data for over 45,000 industrial establishments recorded for the four provinces of Ontario, Quebec, New Brunswick and Nova Scotia in the first Census in Canada in 1871. The methodology has been designed to make all this information accessible, in systematic, standardized and readily retrievable format, to support a wide range of academic and applied historical research. The CANIND71 database tape and manual (in English and French versions) are being released for use by other scholars and researchers from January 1991. Various aspects of the whole project have been described in a series of research reports.

In a new phase of the project, we are developing computer atlas methods of conceptualizing and representing the patterns and processes of Canadian industry in 1871. This involves the tasks of reconstructing and digitizing 1871 map bases; interfacing between the large SAS databases on the mainframe computer and the mapping and other software on the microcomputers; coding other statistical data from the 1871 census; experimenting with cartographic symbolization and with the production of maps in printed format. We expect to make available the digitized map bases and datasets in August 1992.

Dr Gerald Bloomfield (an economic and historical geographer) and Dr Elizabeth Bloomfield (an urban and business historian) are the principals of the CANIND71 project, which is based in the Department of Geography. Mr Peter McCaskell of Computing Services, University of Guelph, has assisted the project from the beginning with database management and programming. Dr Janet Mersey of the Department is closely associated with the current electronic atlas phase as an expert in cartographic design. Ten research assistants have worked full-time or part-time for the project at some time since 1982.

Dissemination of the CANIND71 database and manual

1. The database includes records for 45,070 industrial establishments counted in the first Census of Canada of April 1871. These were located in 206 census districts and 1701 census sub-districts in Ontario, Quebec, New Brunswick and Nova Scotia.

2. For each establishment, there are up to 125 variables. All information for all records in the 1871 manuscript schedules has been transcribed in the natural language used by the enumerator. Basic variables include name of proprietor, type of industrial business, geographical location, use of non-manual forms of power, numbers of workers (distinguished into men, women, boys and girls), number of working months in the year, and the dollar amounts of fixed and floating capital invested, wages, raw materials and products, as well as kinds, quantities, units of measurement and values of individual raw materials (inputs) or products (outputs) and additional remarks or comments.

3. Some further codes and derived variables have been added for convenience in analysis. Records have been coded according to clear systems of geographical and industrial classification so that users can retrieve details for individual establishments and also aggregate the data for places and industry types.

4. The CANIND71 database is quite large. If it were all copied in ASCII or flat files on diskettes, it would amount to 82 megabytes and require 226 regular floppy diskettes.

5. The final version of CANIND71 currently resides in SAS in the CMS environment on the University's IBM mainframe computer. But the database is not specific to any hardware or software and we are making it accessible to users in various hardware and software environments.

6. In its first release in January 1991, the database is being offered only in its full version on tapes in flat files with some choices as to labelling, mode (ASCII or EBCDIC) and control command files (SPSS.x or SAS). We offer basic documentation in the 200-page CANIND71 Manual in both French and English versions. This method of distribution will usually require that the user have access to central mainframe computers and some programmer expertise. It is expected that orders for this first release of the CANIND71 database will be placed by universities or other institutions where computer programmers are available to assist users who wish to bring datasets down to the microcomputer environment.

7. Users who lack access to a mainframe computer and/or wish to have only a select dataset may request the data on diskette. However, we cannot undertake to satisfy such requests before April 1991, and there will have to be special charges for handling the data and for materials. Such users should ask in advance for an estimate of the costs.

8. The CANIND71 database offers scope for varied research in several disciplines. A few of these have been probed in several of the CANIND71 research reports published to April 1990. Prospective users include economic historians, social historians, labour historians, economists, sociologists, political scientists, historical geographers, industrial geographers, heritage conservationists and industrial archaeologists. There are many potential thesis topics for graduate students while datasets for particular topics or localities may form the basis of undergraduate class projects. Biographers want details on particular entrepreneurs in relation to others in their line of business. Local historians and genealogists are interested in various businesses in specific localities and regions.

9. In view of these diverse interests in the CANIND71 database, we are exploring the ways and means of starting a CANIND71 NETWORK that would combine features of a user group with an electronic journal or magazine. Each registered user of the database would have her/his USERID code and electronic mail address filed at the base in Guelph and be able to send messages over BITNET/NETNORTH to all the other registered users. The electronic magazine might be supplemented by a print newsletter occasionally and form the basis for a CANIND71 colloquium.

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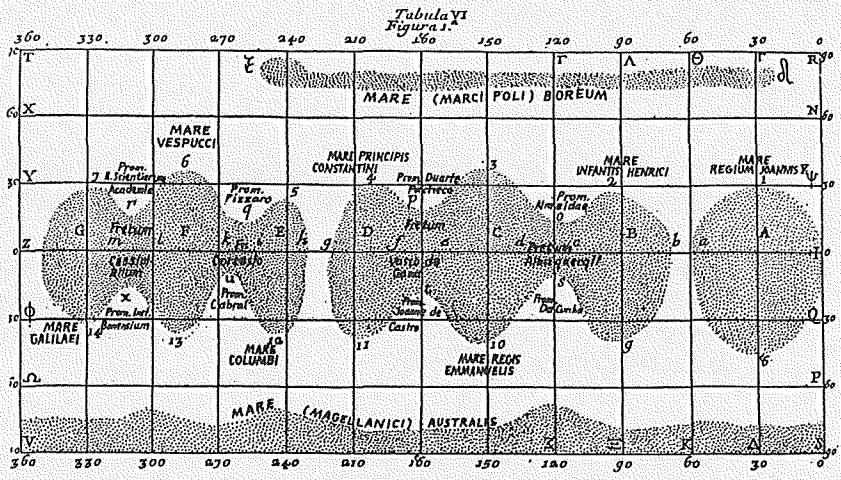
University of Guelph
GUELPH, ON, N1G 2W1
GEOCENS@VM.UoGUELPH.CA

"MAPPING THE PLANETS"

by P.J.Stooke and C.P.Keller

A new slide set, "Mapping the Planets", is now available from the CCA. In 40 slides and an explanatory booklet it gives an overview of the history and current status of efforts to map the Moon and planets. The booklet contains background information on astronomy and space exploration and a set of captions for the slides. The emphasis is on relatively recent cartographic work, undertaken in support of the solar system exploration programmes of the United States and the Soviet Union. A few maps drawn before the space age are included to give historical perspective. Information on obtaining copies of the maps themselves is included. The set was prepared by Philip Stooke of the University of Western Ontario and Peter Keller of the University of Victoria. Price: $50.00 (including postage and handling)



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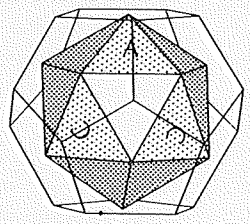

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Janet Mersey has "saved" a number of back issues of Cartographica and the Canadian Cartographer.

These are available throught the manager's office (address at left) for $6.00 single issue/$12.00 double issue. Add $2.00 per issue postage. Full listing of all issues can be found in Cartouche, number 1.

EXPLORATIONS IN THE HISTORY OF CANADIAN MAPPING
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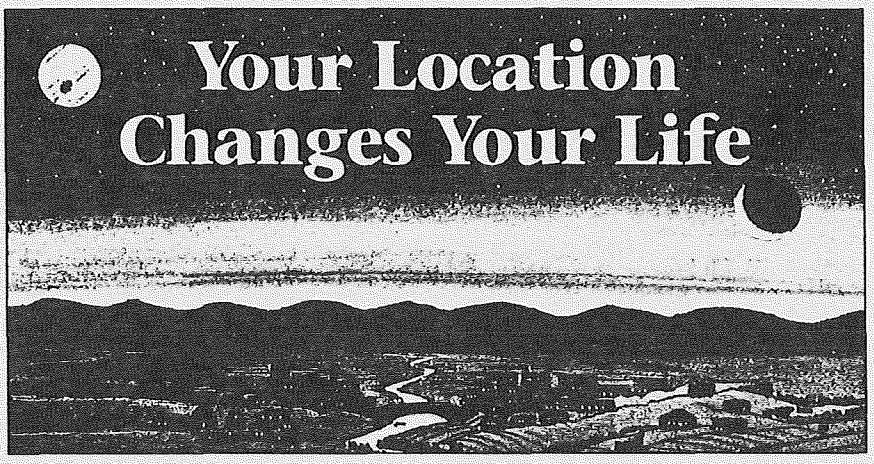

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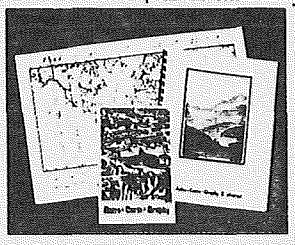

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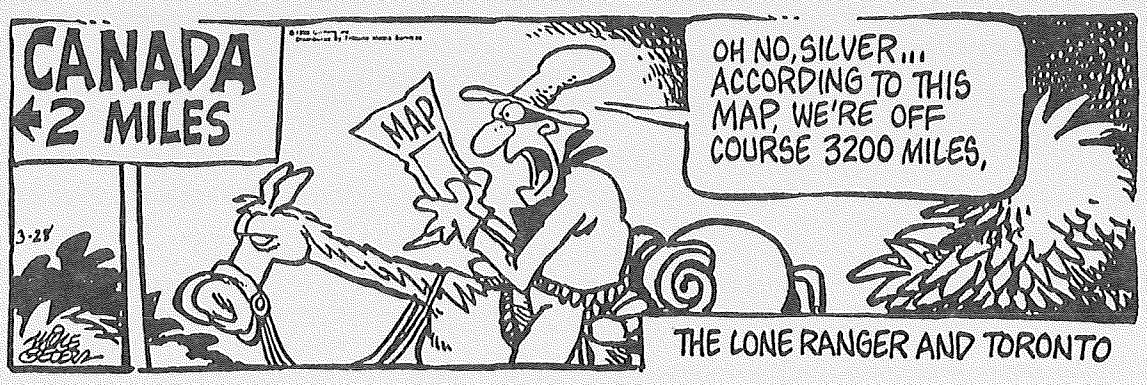

The *real* reason why some members never made it to St. Catharines!

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