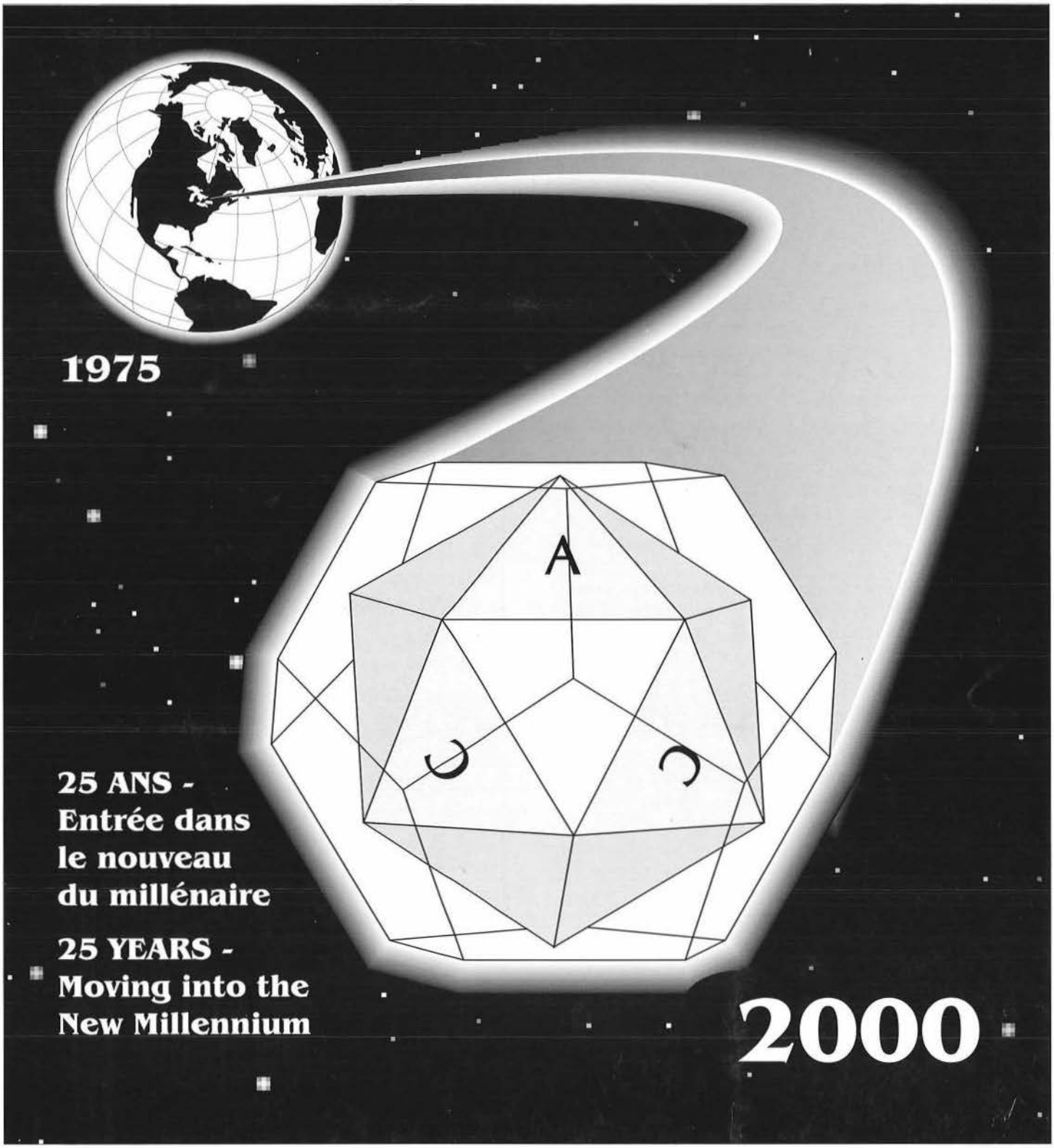
Cartouche

Newsletter of the Canadian Cartographic Association
Bulletin de l'Association canadienne de cartographie

Number 40, Winter, 2000
Numéro 40, hiver, 2000



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Cartouche est publié trimestriellement par l'association canadienne de cartographie. Tous les membres peuvent soumettre des articles à l'éditeur du bulletin (voir coordonnées ci-dessous). Les articles et annonces soumis sont sujets à l'approbation de la rédaction. L'éditeur du bulletin ne peut être tenu responsable pour des erreurs de compilation ou la perte d'article. Des efforts particuliers sont déployés pour éviter de tels problèmes. Les opinions exprimées dans le cadre des éditoriaux, des articles et des lettres publiés dans le bulletin, ne reflètent pas nécessairement celles de l'Association canadienne de cartographie. L'Association canadienne de cartographie remercie particulièrement le Conseil de recherches en sciences humaines du Canada pour son apport financier.

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ISSN 1183-2045

Deadline for the next issue
February 15 février, 2001
La date tombée pour la prochaine publication

Editor's Desktop

Happy Anniversary CCA! This issue of *Cartouche* was meant to mark the first twenty-five years of this Association's existence. It is also significant that the year 2000 signals the beginning of a new millennium. The fact that this issue comes out at the end of the year 2000 symbolizes the CCA's launch into the next 25 years.

When I first thought about putting this issue together I had the idea to write a history of the newsletter. It didn't take me long to realize that I really knew very little of the history of the CCA let alone its newsletter. I was aware that the first editor was Lou Sebert and that in the beginning the editor's job fell to the secretary. This continued until 1994 when the association revised its executive structure and combined the positions of secretary and treasurer. Since it would have been too much work for one person to do three tasks, Weldon Hiebert was to become the first appointed editor. There was one exception to this when David Douglas was editor in 1985-86. Ever since Clifford Wood became editor in 1981 the newsletter has tried to publish four times a year.

In order to gain more information about our Association's history I put out a plea to regular contributors and past editors for their historical perspective on the last twenty-five years. The first section of *Cartouche*, Number 40 is devoted to some of those reflections. We have articles from: Lou Sebert who was instrumental in the formation of the CCA, James Britton, who initiated changing the name of the Newsletter to *Cartouche*; Roger Wheate, certainly one of the Association's most exuberant supporters. Also Henry Stewart a long time member and now History IG Chair and Joe Piwowar, both wrote their columns with a historical perspective in mind. Both as the editor and as a member I am truly grateful for their contributions. Thank You.

Important: Election 2001 Ballots are enclosed. See page 22 for the 2001 Election Slate and candidate profiles. **Be sure to mail your Ballots.**

Inside this issue / *Sommaire....*

25 YEARS - SOME REFLECTIONS

Twenty Five Years Ago

L.M. Sebert*

It certainly doesn't seem 25 years ago since we gathered in Camsel Hall in the Department of Energy, Mines and Resources to found the CCA. We were about 200 in number, and I believe most were in attendance to see what were the aims of this new organisation. How would it fit in with similar cartographic institutions such as the Canadian Institute of Surveying (CIS), the Ontario Institute of Chartered Cartographers (OICC) and the Canadian Association of Geographers?

I was elected to chair the meeting with Bernard Gutsell supporting on the sidelines. The major items of business were to decide on the role of this new body, its goals and its methods of achieving them. Minor decisions such as fees, publications, programs, etc., were left to be worked out by the new executive. One rather important decision, the place of the Canadian Cartographer (now Cartographica) was left to be decided at a future date.

I was working at the time in the Surveys and Mapping Branch (S&MB) of the Department of Energy, Mines and Resources (EMR). I knew that the director, Dr. Sam Gamble was not in favour of this new organisation. He was against anything that would disturb the health and well-being of the CIS. The journal of the CIS, the Canadian Surveyor, was virtually a house organ of the branch. Any competition should be stifled as quickly as possible.

There was another concern: the OICC which had been formed in Toronto some years previously, was considered a draughtman's union with the goal of raising their salaries. The new CCA was seen as a group with similar aims and therefore not to be encouraged.

Cartography in EMR was almost entirely limited to topographic and geologic mapping, although on the dissolution of the Geographical Branch in 1966, the Atlas Section had been inherited by the S&MB, but they were isolated in another building and were not looked upon as a major player in the Department activities.

The attendance at the inaugural meeting was rather peculiar. As the S&MB was across the street, there was a good turnout from that source. The provincial survey organisations were represented by observers who had come on the understanding that this might be a new S&MB sponsored group. A few university geographers were also there, while provincial groups other than surveyors were absent. There was no list of those in attendance so many in the hall were not identified. All were given registration forms and encouraged to join.

There was little firm support for the Canadian Cartographer. The journal relied on subscription fees for its survival, and these were barely enough to cover immediate publication costs. If this new organisation were to thrive and if all new members would become subscribers, Bernard's life would be much easier. Of course the new CCA had its own financial problems and could not at that time, shoulder any responsibility.

In the years that followed, a series of strong and dedicated executives worked hard to keep the CCA going and growing. It is to them we must look today for the present health of the Association. My congratulations on a job well done.

**Lou Sebert was the first secretary/newsletter editor of the CCA from 1975-77. He and Bernard Gutsell, founder, editor and publisher of the journal, Canadian Cartographer, later to become Cartographica, are the only honorary lifetime members of the CCA.*

Cartouche Revisited

*James Britton**

Sometime in 1990, when I was told I had been given the position of Newsletter Editor, I was both elated and apprehensive. Elated in that I had received a vote of confidence from the CCA executive, yet apprehensive in that I knew people had high expectations of the new editor. At the time, the members had decided that they wanted the newsletter to become something more robust than the existing Newsletter. How, exactly they were not sure, but it was clear that people wanted something more. Ideas at the time included more content, more structure, a sense of formality perhaps, more in-depth and feature level articles—yet all done in way that retained the somewhat informal and friendly nature of the CCA. This was all the more worrisome in that the previous editor, Gordon Shields had done an excellent job in producing the Newsletter. I was also worried in that my handiwork was going out to a group of people known for...well, their attention to detail and graphic acumen. As the vernacular saying went, "talk about feeling vulnerable".

As a cartographer immersed in computer technology it should have been second nature to assume that all things are much more complicated than they first appear. Somehow, I seemed to forget all of this in the rush to face my new job. I was surprised at the

number of small, yet (to various individuals and groups in the membership) important issues that were involved in putting out the newsletter. The "new format" newsletter began with the adoption of a new name, *Cartouche*. After a furious round of politicking this name was selected from a slate of possibilities put forward by the members. I had assumed that the newsletter would come out under the *Cartouche* name right away, but it was pointed out that it would be irresponsible to end the Newsletter mid volume (Vol 16) and we dutifully ended the year with the usual four issues.

Then the issue of how to number the new journal was raised. Did we stay on with the old numbering system and continue with volume 17 or did we start over from zero? With so many other publications (learned and otherwise) changing their names to deal with the emergent importance (some suggested hysteria) of computers and GIS, it did not seem such a big deal to just change the name of our newsletter and continue on. A fresh start, it was pointed out, would underscore the desire to shift the "image" and intent of the newsletter. It was left to Ed Dahl to make an impressive and convincing case for the need to start fresh and dispense with the volume-number system and move to the sequential number system we have now.

These issues were clearly important to the librarians, archivists and others who rightly keep these points under control, but for me, numbering and names seemed to pale into comparison compared to issues of content and design. There was a push to increase and intensify the content, and beating the bushes to find grist for the mill soon proved to be problematic. I danced the line between the brow-beating demagogue and the benevolent cajoler in an effort to squeeze content out of people in time for each issue's deadline. This was a problem that plagued nearly every issue and is one that, I am sure, affected all the other editors both before and after me.

Anyone who has taken on the position of newsletter editor, or any other kind of public office, soon learns the fallacy the old adage, "you can't please all of the people all the time". In truth, it should go, "you can't please all of the people ANY of the time". This happened at a variety of levels. While I am generally an optimist and assume people are, by-and-large, a reasonable lot, I was often shocked how upset people got over the smallest of things.

As I expected, the design I settled on for the new Cartouche was not to everyone's liking. I settled for something quite low key with structured column settings throughout the issue. The minimalist design reflected my own personal tastes and was also, I am sure, a reaction to the then burgeoning explosion in digitally inspired design overload. The newer, more powerful software and such maladies as clip art gave anyone the ability to easily produce all manner of strange graphic content. This had a profound impact on my student's work and that of many in the professional arena. In their graphic design decisions, people were doing things merely because they could. It was (and perhaps continues to be) a low point in visual design. While subsequent editors of Cartouche have gone to a less formal style (which in retrospect is more suitable for the publication), it is nice to see that this has been accomplished without the overall feel of the thing becoming disjointed, unstudied, or tacky. Well done!

I also instituted a policy that every issue would include information on how to reach the executive and how to contribute to Cartouche. I wanted *every* issue to be a potential connection to the CCA. Just photocopy the back page and give it to a friend to get them connected. No more looking for the right issue that had the right content. Some saw this as a sound decision, others saw it as filler. While we left the link to the membership secretary and Cartouche in every issue, the executive list was not always featured.

The constant worry was content, or more specifically, the lack of content. While the executive and interest group heads dutifully submitted material, finding other contributions proved difficult. As stated, this was, is and always will be the cross the volunteer editor bears. At particularly bleak times, it seemed the volume of comments pointing out errors was greater than the actual material I was sent to work with.

At the time, we were only just beginning to take advantage of the new technologies to produce the Newsletter. E-mail allowed content to zip across the world to me rapidly. Unfortunately the era of acrobat attachments was far off and proofs had to go by Fax (if there was time). Swallowing my Mac envy, I produced Cartouche using an early version of Ventura Publisher—at the time a proprietary graphics/GUI kludge running under MSDOS. Despite my deadlines, which were set-up to coincide with quieter times of the year, it always seemed that the content would finally arrive just in time for final exams of holidays!

But working on Cartouche was not just frustrating experiences. It was a job I would not have missed for the world. The opportunity to interact with all the people on the executive and some of the truly amazing people in our profession was a unique and wonderful experience. I recall fondly the insights I gained through correspondence and discussions with different people. It was astonishing how talented and diverse our community was...and is. Executive meetings were an opportunity to get away and interact with the executives over busy weekends; a chance to be invigorated in what was often an overbearing part of the semester. Too often these meetings meant a drive up to Ottawa on the snowiest weekend of the year, but the time spent together was well worth it. Today, when I am geographically, but not spiritually, far, far away from Canada, it is often these people I miss.

That said, if I had to pick one low point in my time as Editor, it would be in assembling Cartouche 5. In this issue we reported on the death of Malcolm Brown. His death came as such a shock and seemed such a loss to those of us in the CCA in general and the executive, who had worked with him at length, in particular. He had been tireless in promoting the CCA and cartography in the Winnipeg and Manitoba area and he was always a presence at the national level. Suddenly, he was gone. It was then that the minimalist cover of Cartouche seemed somehow quite fitting as we remembered Malcolm.

The early nineties were interesting years for Cartography. We continued to grapple with the basic changes in the technology of cartography and with the challenges, promises and hyperbole of

GIS. We wondered where we were going as a profession and how we would fit in to the new order of the geoinformation sciences. The various debates around all of this found their way into the content of the newsletter. It was gratifying to see that other issues were not lost. The history of Cartography, design, education and other interesting subjects all continued to have their place amidst the on-going debate over the new technologies. I believed then as I do now, that it is this breadth of vision about Cartography that keeps us somehow worthwhile in the ongoing story that is Cartography.

The position of Cartouche Editor for an organization like ours is tough work. The audience is talented, critical and well cultured (even Roger!). They expect a lot. Yet on the other hand, the CCA is noted for its friendliness and informality. The members are also a very busy group of people who too often do not have the time to gather or write material for the newsletter. Without going into the peccadilloes of current political events (I hear it upsets people on the CCA-list), it is said that the people get the government they deserve. To paraphrase that observation, I suggest the people get the newsletter they create. You get out what you put in. As cartographers, we should know the effect rushing work to press has on the quality of our work. Time spent harassing people for content is time not spent on design, correction and refinement. So, if I look back to my time as editor I would wish for one thing—more material to work with. I guess I wish that for the current editor, too.

**James Britton was Secretary and Cartouche editor from 1990 to 1995.*

HAS IT REALLY BEEN 25 YEARS?

Roger Wheate*

It was September 1975; I didn't realise at the time, but I arrived at Queen's University in Canada just as the CCA was being formed. I didn't even know one could study cartography since my wee university (St. Andrews, Scotland) had no courses in cartography, GIS or remote sensing (and it still doesn't!). However I quickly switched from historical geography to cartography and shared an office with the other cartography graduate student, Ron Eastman.

At that time Queen's ruled the university waves with three professors: Henry Castner (map design), Gerald McGrath (surveying) and Dick Ruggles (historical cartography). This leadership mantle would pass on to the Memorial University of Newfoundland (MUN) in the next decade as all three retired or left. Our supervisor (Henry) involved us in the CCA and the first annual meetings at Queen's and Ottawa.

In 1984 I joined the executive as an interest group chair, benefiting from the splitting of the 'extreme east vote' as my opponent was at MUN, and they already had two on the executive. I carried on as newsletter editor to make up for not doing much as IG chair. These were the 'threshold' years of the GIS boom: although some 20 years after Roger Tomlinson and his pioneers had started GIS in Ottawa, it had been inaccessible except to a few. At Calgary, we started with Dana Tomlin's 'AMAP' with its impressive 25 x 64 pixel screen resolution. On the east coast and across the border, my ex-office mate spent a year writing the first version of a GIS to be named after a 12th century arabic cartographer, one of its many outstanding features.

Shortening the name of 'Abu Abdullah Muammed Ibn Muhammed Ibn Abdullah Ibn Idris Ash-Sharif' to Idrisi is a rare example of simplification in the world of Cartography over the years since the CCA formed. The digital revolution has created many more opportunities for 'GIS mappers' but also many more headaches and areas in which we are supposed to be experts. Regional cartographic groups such as the OICC have passed away, but have been replaced by a bevy of national and regional GIS and geomatics conference organisations.

After 25 years, this would be the 100th version of the newsletter (renamed Cartouche in 1990), if there had been regular quarterly issues. However, this only commenced under the editorship of Cliff Wood in 1981. Previously newsletters consisted of a stapled set of typewritten letters and notices usually on issues such as how to best organise Canada's cartographic groups. We have progressed, although the mutual interests and integration of Cartography, Map/data libraries, GIS, geography and geomatics remain a considerable challenge. I look forward to the annual meeting in 2001, and further collaboration with both the ACMLA and CAG, but most of all meeting with CCA members, new and old and discussing that love of maps which brought together a cluster of cartographers in Ottawa in October 1975.

**Roger Wheate has been a member of this association since 1975. He was newsletter editor from 1986 to 1988.*

CARTOGRAPHY: SOME LATE NIGHT REFLECTIONS

Harry Steward

One of the small pleasures of having been a member of the CCA for so many years, is the stability of its name. In particular, the term "Cartographic". And thereby hangs a tale and some thoughts...

Some 30-odd years ago when I joined the American Geographic Society as a Research Associate, there was much interest in the idea of a U.S. National Cartographic Institute.

The, then, Director of the A.G.S., Shannon McCune, was much intrigued by the many possibilities of such a project, but espe-

cially its pedagogical aspects. So much so, that he decided that a good task for his new recruit, would be the compilation of a bibliography on education and training in cartography. This I duly did, with an over-thoroughness that only a new employee anxious to prove his worth could do: assembling some 1,000 plus references in a little over a month.

This was all well and good but, having garnered an approving pat on the head, I was stuck with one small problem: what to call the compilation. For, having come out of the Derek Maling school of eclectic map-making at Swansea, I had naturally dumped into the bibliography hopper, references to land-surveying, hydrographic surveying, geodesy, photogrammetry and air-photo interpretation, plus a few on a new subject called remote sensing. Thus, it covered more than the, then current, conception of cartography and seemed to deserve an appropriately expanded title.

The one that I came up with, after much chewing of my pencil, and which seemed both logical and comprehensive, was "Education and Training in the Mapping Sciences". Task complete, the A.G.S. sold it for the munificent sum of $1 and except for a couple of testy calls from somebody who couldn't track down the Hungarian references, it would have been assigned a place on my permanent backburner, but for the AAG Conference which followed shortly afterwards.

There, the late Dick Dahlberg, in giving an address to the cartography interest group, used the term "mapping sciences". This prompted a response from an annoyed audience member, who complained about the exclusivity in this new term. Why didn't he acknowledge that cartography was both an *art* and a science? A somewhat bemused Dahlberg defended himself by pointing out that he was blameless, and that some unknown, called Harry Steward had invented the term.

This caused me quite a thrill at the time. Had I really made an original contribution to the English language? How proud my mother would be! Alas, a little digging around soon disabused me of any thoughts of future etymological fame. What had seemed a logical construction to me, had also seemed that way to others: among them, the United States Air Force. The consolation was that, at the time, it was a rare expression.

But the objector in the audience had a valid point. One only had to look in the standard (indeed, only) academic text-book of the time; namely Arthur Robinson's *The Elements of Cartography*. Here, Chapter 1 was entitled, "The Art and Science of Cartography" and this phrasing was maintained through three editions (1953, 1959, and 1969). "Art", however it was understood, was a mainline ingredient in the definition of cartography.

However, by the 4th edition of Robinson, in 1978, this had changed. Reference to the Art element had been dropped; or subsumed, is perhaps a better way of putting it. Moreover, the change was not just a case of simple editorial tinkering. It echoed a rapid evolutionary change in the discipline itself, as it changed, particularly under the influence of "computer cartography" and improved satellite imagery, to a predominantly "scientific" viewpoint.

At this point, a long discussion of the nature and impact of these changes could take place. The perspectives ranging, perhaps, from John Wolter's, "emergence of a discipline" thesis, to Bob Karrow's recent intellectual overview, and pass through numberless diagnosises of the health, ill-health, death, resurrection and transcendence of cartography. Here, perhaps, two points can be made.

Firstly, to emphasise the obvious: how quickly these changes have taken place. I can claim to have written one of the early doctoral dissertations on theoretical cartography for computer use, and yet own a much-loved and much-used crow-quill pen. (And, no, I'm not *that* old). And, secondly, in concert with the first, efforts to summarise these rapid changes, define new intellectual "critical masses" (and, thus, new disciplines) and, en route, create neologisms to typify them, often seem over-hasty to me, albeit inevitable.

As an example, in my university department: a re-christening decision was recently taken. The concentrations within our geography degree which, when I arrived here, was "Cartography", having been expanded to "Cartography/Remote Sensing", then to "Mapping Sciences" (yes!), then to Mapping Sciences/GIS (a curious opposition), and, most recently, to "Mapping Sciences/Spatial Analysis" would, in the future, be changed to "Geographic Information Science". The latter already, in many locales, now seen as the ultimate absorber of all things map-like. Could it be, that having just arrived, poor old GIS has its hat on and is leaving us to join the other pensioned-off terms"? (And, perhaps that recent book, "The History of Geographical Information Systems", was not prematurely/inaptly titled after all?)

The answer is, of course, "no". Or, perhaps, a qualified no. Changes are taking place but they are not all equal. In Orwellian terms, some are more equal than others. Momentarily, cosmetology is ascendant rather than plastic surgery. A little more time, a few more changes, and so on, incrementally, are needed before radical reassessments are necessary.

As somebody who started his professional life by believing that all map-making and, more significantly, map-understanding, was ultimately reducible to mathematical equations, I have come to believe that not only is cartography worthy of a distinct identity, it still has an art element – a *strong* art element - in it. I'll leave the three-beer explanation to another time but, when I hear from colleagues that Geographic Information Science *and* Geography itself, are going to be absorbed into to Spatial Information Science, anyway, I think again, that these tumultuous, (and, yes, wonderful) changes that redefining the mapping world, also need some stable notions that lend continuity, perspective and the magic (that's right, *magic*, albeit, non-Harry Potter kind) of graphic integration to it all.

Three cheers, in the 21st century for the Canadian **Cartographic** Association!

Joe Piwowar
Spatial Information Systems

Twenty-Five Years of Remote Sensing in Canada: A Cartographic Perspective

Nineteen hundred and seventy-five. Remote sensing twenty-five years ago meant only one thing: ERTS. ... ERTS? It was in January of 1975 that the Earth Resources Technology Satellite (ERTS) program was officially renamed to Landsat. The Landsat program was turning out to be an overwhelmingly successful experiment.

By the end of the 70s, three Landsat satellites had been launched and remote sensing degree programs were springing up at colleges and universities across the land. To do any sort of mapping of the Landsat imagery, you needed a digital image analysis system running on a mini-computer costing in excess of $50,000 (remember Dipix?). Except for a few privileged government agencies that had even more expensive large-format plotters, "cartographic" output was restricted to crude photographic screen dumps. Consequently, remote sensing images were used for their "gee whiz" value; there were only a few serious attempts at production cartography during this period.

The 1980s ushered in a new generation of remote sensing systems. Landsat 4, the first to carry the Thematic Mapper (TM), was launched in 1982. The Thematic Mapper quickly became the sensor of choice, largely because of its 30 m resolution and 7 spectral bands. The data weren't cheap, though, in 1984 a full TM digital scene cost $3,465; a TM Quadrant would set you back $1,050. To the credit of the original designers of this instrument, TM data continue to be in big demand even into the new century.

A more concerted effort was made to try and produce acceptable maps from remotely sensed data. In 1983 a pilot program was initiated at the Manitoba Remote Sensing Centre, in conjuction with the Canada Centre for Remote Sensing (CCRS), Manitoba Agriculture, and Statistics Canada, to provide cartographic and tabular crop area estimates in a timely, accurate and reliable fashion. This highly successful program has undergone many iterations but continues to this day as the Canadian Crop Information System.

In 1984, Energy, Mines & Resources Canada (EMR) initiated a program to focus its aerial photograph acquisitions to the areas of greatest change. Gregory Geoscience Ltd. was given a 5-year contract to provide revision information for topographic maps at a scales of 1:250,000 and 1:50,000 using the company's own PROCOM-2 optical image comparitor, at a cost of 21¢ / km^2. The program was so successful that after just one year EMR asked Gregory Geoscience to analyze an additional 1,000 maps.

In 1986, the launch of SPOT-1 changed things again. Not only did the SPOT program demonstrate that commercial remote sensing was possible, but it also introduced several innovative sensor technologies that are still being built into new systems today. SPOT was the first program to have a dual imaging mode where higher resolution panchromatic imagery could be acquired in place of multispectral data. While the resolution of the TM restricted its use to mapping in ex-urban environments, SPOT panchromatic data allowed us to look at the urban-rural fringe with confidence. SPOT also pioneered pointable optics for off-nadir viewing which was used for the creation of fairly accurate digital elevation models of even the remotest regions of the Earth.

The Canada Centre for Geomatics in Sherbrooke, Québec was officially opened on September 21st, 1988. The Centre's mandate is to conduct research in digital mapping, topographic data management, and the use of remote sensing for cartographic purposes. Also in 1988, the Canadian Association of Aerial Surveyors changes its name to the Geomatics Industry Association of Canada and elects Mr. Ed Kennedy as its new President.

The first National Conference on GIS was held in Ottawa in March 1989 with over 1200 delegates in attendance. In that same year, Stan Aronoff published the first edition of his successful book, *Geographic Information Systems: A Management Perspective.*

Computing changed dramatically during the 80s. Mini-computers were quickly being replaced by micro-computers. No longer did you need a specialized computing environment to work with remote sensing imagery; you could do a lot of analysis on a desktop system. Canadian spatial analysis expertise was growing too, with PCI, Tydac, PAMAP, and others developing desktop GIS/Mapping systems.

The 1990s in Canada can be labelled as the "Radar Decade". Considerable research effort was put into establishing the feasibility of using SAR imagery for a wide spectrum of applications, from soil moisture measurements to land-cover mapping. Everywhere you turned, RADARSAT pilot projects were springing up. At the end of the decade, however, it seems as if SAR data can only be really used operationally in selected cases: sea ice mapping and oil spill detection, for example. For most other applications, there are generally better data sources (e.g. optical remote sensors), although radar can be invaluable in times of darkness and/or cloud cover.

The international BOREAS (BOREAL Ecosystem-Atmosphere Study) program reached its climax in 1994. BOREAS was established to examine the sensitivity of the boreal forest to climate

*See **Piwowar** - page 19*

Professions et perspectives de la cartographie
Cartography, Professions and Perspectives

Montréal, 30 mai au 2 juin 2001 / May 30 to June 2, 2001

CARTO 2001

Rappel pour l'invitation aux conférenciers et aux exposants
Second Call for Papers and Exhibitors
CARTO 2001

Canadian Cartographic Association / Association canadienne de cartographie

Association des cartothèques et des archives cartographiques du Canada
Association of Canadian Map Librairies and Archives

Un siècle vient tout juste de s'écouler, siècle au cours duquel nous avons été les témoins privilégiés de nombreux bouleversements. Dans une multitude de domaines, nos habitudes de vie, de travail ont changé et ce particulièrement dans les dernières décennies. De même, les différentes facettes de la cartographie ont fait l'objet de mutations majeures, dues à l'essor des technologies dont la saisie, la gestion, le traitement et la diffusion des données numériques ainsi qu'analogiques.

L'accessibilité accrue aux données et aux logiciels combinée à l'intégration de multiples champs tels la télédétection, les SPG, la photogrammétrie, les SIG, l'Internet, favorise un plus grand usage de la cartographie, notamment dans des sphères d'activités non conventionnelles.

Sous le thème "Professions et perspectives de la cartographie" l'Association canadienne de cartographie (ACC), conjointement avec l'Association des cartothèques et des archives cartographiques du Canada (ACACC), sollicite vos propositions de conférence abordant l'un des sous-thèmes suivants :

- Histoire et évolution de la cartographie
- Acquisition et diffusion des données
- Aspects légaux
- Recherche et applications
- Technologie et le futur
- Enjeux de la cartographie

Vous avez des produits ou des services à offrir! Nous vous invitons à nous contacter pour obtenir plus d'informations sur les conditions de réservation d'espace à l'exposition commerciale.

Ce congrès se tiendra à l'Université du Québec à Montréal avec la collaboration de l'Université de Montréal. Il s'agit là d'une excellente occasion, tant pour les conférenciers que pour les entreprises, de faire connaître leurs travaux ou produits.

Veuillez faire parvenir vos résumés de conférence (maximum 1 page) d'ici le 27 janvier 2001 ou vos demandes d'information pour l'exposition commerciale à :

The last century witnessed profound changes. In many fields these changes have influenced the way we live and work, particularly over the past few decades. Cartography has in turn been effected due to the development of new technologies in different domains, such as the capture, processing, management and dissemination of both digital and analogue data.

The increase in data and software accessibility, in conjunction with the integration of many specialities like remote sensing, photogrammetry, GPS, GIS and the Internet has favored an increase in the use of cartography especially in non conventional areas.

Under the theme " Cartography, Professions and Perspectives " the Canadian Cartographic Association (CCA) in collaboration with the Association of Canadian Map Libraries and Archives (ACMLA) are calling for conference proposals within the following subjects:

- History and evolution of cartography
- Data acquisition and dissemination
- Legal aspects
- Research and applications
- Technology and the future
- Risks and futures in cartography

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Patricia Chalk
University of Western Ontario

Nine Ways to Warm Your Graphic Editor's Heart

Are you one of those cartographers who torment graphic editors? For people experienced in publication cartography, the answer will be a resounding "No!" Those among us who are not aware that problematic cartographic creations torment graphic editors, should likely respond "Yes" to the question and *please* read on. I have prepared the following column to provide guidelines for members who haven't had experience in publication cartography. These guidelines may assist in making themselves more popular with editors, and help to ensure that the cartographic piece that leaves their desk has received the appropriate polish and endures the journey successfully to the printed page. For the purposes of this article, I am addressing publication cartography destined for professional academic journals or books.

I have been the graphic editor for a number of publications over the past decade or so. In that role I have had the sometimes-dubious pleasure of reviewing graphics accompanying submitted chapters or papers. In all cases, said submissions have passed successfully through the double-blind review process, so the content is deemed worthy of publication. I have discovered over the years however that an increasing number of graphics submitted with the articles or chapters are in need of major reconstructive surgery to be worthy of publication. I don't expect non-cartographers to be able to appreciate the intricacies of developing thoughtfully prepared maps that communicate the message simply, effectively and with clarity, so I won't launch into a rant about their cartographic endeavours. As professional cartographers however, we must never be among that group who torment graphic editors in the way that I've been tormented from time to time.

You may be curious how someone gains experience and training in this area. In my case, I had the fortune of working closely with chief cartographer Derry Graves, when I began at Western. Under his tutelage I began my lifelong (well, from age 25 until now) learning of how to design for publication. Later on in my career I was hired to the senior position and began cartographic editing as well as continuing cartographic production. Any lessons Derry didn't have time to share with me before he left, I learned (and continue to learn) from being a cartographic editor. It is an incredible educational experience editing the work of others, and I hope that the following points will be beneficial to some of the readership.

What is the figure about, why is it included?

Know what the author's paper is about, and know exactly why the author is including each of the illustrations. If you are merely tracing what the author has provided without any further insight from them, you run the risk of reproducing errors and you certainly can't do a good job on design.

What are the graphic specifications?

Find out where the figures are being published and then determine the appropriate file formats and image size specifications for the particular publication. Generally the specifications for journals and books are poorly written. In addition, they are frequently inconsistent between what is printed on the Instructions to Authors and what is spelled out on the publisher's website (if they have one). Often it is necessary to contact the graphic editor directly to confirm the specifications; most are accessible by email.

Be concise.

Don't make the figure one millimetre larger than it needs to be - be concise. It is remarkable how an anemic, sprawling graphic, lacking much content can be enhanced by substantially reducing the dimensions.

Don't design in problems.

This issue is not a new one, but it is becoming more prevalent as people creating graphics receive less and less education about the printing process. If you submit an oversized figure on hard copy that has both 6 point and 20 point type on it in conjunction with fine screens and/or very dark screens, it will not be possible for the desktop publisher to reduce it at a smaller size and retain its legibility. If the figure is reduced to 50% of original for example, the 6 point type will become too small (3 point), the fine 15% screen may disappear and become a white fill instead, and the dark screens will fill in and become a black fill instead. If your graphic happens to come across my desk, I'll let you know that you need to revise some of the choices you've made on the graphic; other graphic editors may not! You'll be embarrassed and the author will be annoyed with the result.

Design graphics at final size.

As a follow-up to the previous item, design your graphics for final size. Determine what a 1 column or 2-column width is for the particular publication and design the graphic so that it will fit concisely within that format. The specifications for many refereed journals still have remnants of the past in their Instructions to Authors including submitting graphics at double size. Most of the time the request for oversized figures is a

See **Chalk** - page 19

David Broscoe
Algonquin College

The Internet and Web-Based Education

The Internet has revolutionised the way we distribute information. In terms of cartography, vast collections of maps are now available for viewing online through sites such as Oddens' Bookmarks (*http://oddens.geog.uu.nl/index.html*). Online data suitable for mapping is available through sites such as E-stat (*http://estat.statcan.ca/*). Digital base mapping is widely available, especially for countries other than Canada with reasonable data distribution policies (*http://www.usgs.gov*). Web-enabled GISs and smart maps are widely used throughout the Internet. My students are using the Internet every day as a resource and a research tool.

As a formal teaching tool, however, the Internet has been less widely embraced. On one hand there is a push on the part of educational administrators to use the Internet as a replacement for conventional classroom teaching. The main rationale for this push is economic: putting a teacher in a conventional classroom is an expensive proposition. Faculty and students, on the other hand, have some reservations.

The first reservation is pedagogical. Does the use of the Internet mean that students will learn material at least as well as they did using other approaches? Conventional wisdom is that since the Internet is interactive, the student should be able to customise her education to meet her learning styles and level of sophistication. No longer do we need to present a uniform package of content which is delivered to every student regardless of their abilities and interests. In theory such customisation is possible; in practice it rarely occurs.

There is great potential in the Internet for demonstrating research that has developed through and because of advances in computer technology. The obvious example in our discipline is Cartographic Visualisation. But the tendency on the part of some educators is to do what they know, to translate written lecture or reference material directly to the Internet without considering the possibilities of the new technology. Although pedagogically sound and innovative use of the Internet is possible, the reality in many cases is just as rigid as conventional approaches to education.

A related problem is the time it takes in creating the course material, especially if the curriculum developer wants to truly accommodate the different abilities and learning styles of individual learners. One could argue that the material is out there on some site already, so why reinvent the wheel; all the student needs is a good set of links. My experience is that with the links approach, information is fragmented, often duplicated or even contradicted, and the lack of a consistent interface is distracting. A set of links is great for students who want to explore, not for those who simply want to get through the basics.

It would seem that not all students want to have the bulk of their education online. In the article *Digital Education Mills: The Automation of Higher Education*, found in the online journal First Monday (*http://www.firstmonday.dk*), David Noble writes that 'the few times students have been given a voice, they rejected [web-based] initiatives hands down'. Without a weekly course schedule, some students find it more difficult to budget their time on a given course. A great teacher can inspire students. I don't see this happening so easily in a web-delivered course. At issue here is the age, maturity and motivation level of a student. The adoption of the Internet within the distance learning paradigm has been successful because students who choose this delivery mode tend to be mature and highly motivated. To expect the same student success level when the distance education model is translated to the general student population is a mistake.

The other major reservation is the issue of curriculum ownership. If you as an educator spend many hours developing a web site as a formal teaching tool, what compensation do you / should you receive? Most academic collective agreements do not cover these situations. Noble suggests that:

Once faculty and courses go online, administrators gain much greater direct control over faculty performance and course content than ever before and the potential for administrative scrutiny, supervision, regimentation, discipline and even censorship increase dramatically.

As a teacher, one is still expected to be accessible to students. Noble continues:

> At the same time, the use of the technology entails an inevitable extension of working time and an intensification of work as faculty struggle at all hours of the day and night to stay on top of the technology and respond, via chat rooms, virtual office hours, and e-mail, to both students and administrators to whom they have now become instantly and continuously accessible.

Once the material is online, it is more easily treated as a commodity. Noble again:

> Once faculty put their course material online, moreover, the knowledge and course design skill embodied in that material is taken out of their possession, transferred to the machinery and placed in the hands of the administration. It allows the administration, which claims ownership of this commodity, to peddle the course elsewhere without the original designer's involvement.

see: ***Broscoe*** *page 13*

Web Mapping: optimizing colour fidelity

Ken Lightfoot
National Atlas of Canada, GeoAccess Division,
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Introduction

To assist designers of Web-based cartography for The National Atlas of Canada Online, information on typography, symbology, and colour was compiled for the ***GeoAccess*** Intranet site. The ideas were subsequently posted on the *Carto Corner* (*http://atlas.gc.ca/english/carto/* and *http://atlas.gc.ca/francais/carto/index.html* in French). As it is thought that some technical details and tips on colour fidelity would be of wider interest, material has been extracted from the *Carto Corner* for this article.

Colour management is a major concern in the distribution of digital imagery including maps, and the description of colour is subjective and based on the perception of the human visual system.

On a computer monitor, colours are created by the combination of additive primary colours, which are red, green, and blue (RGB). These three colours, when projected together as beams of coloured light, as used on a computer monitor, mix or overlap to produce other colours. Device-dependent models (or display-based models), such as RGB, are used to create the appearance of millions of colours on a computer monitor by combining different values of red, green, and blue. RGB is an example of a device-dependent colour model because the appearance of the colour produced depends on the settings of the display device and the Web browser. In fact, each screen emits a slightly different shade and intensity of red, green and blue light. These differences can be due to the age of the monitor and the settings being used. Also, different platforms have somewhat different system colour palettes. We have no control over what monitor, operating system, platform, or Web browser the Internet audience is using, or what monitor settings are selected. The challenge is to minimize the effects of monitor inadequacies, platform differences and network access speed, on the display of graphics. Therefore, colour management on the Web must be a compromise. One approach to improve colour fidelity and optimize the appearance of cartographic images on the Web, is to limit the selection of colours used in image design.

Computer monitors and cross-platform issues

Four components work together to create the colours we see in images downloaded from the World Wide Web: computer hardware platform, video card, monitor, and browser. The hardware components and their settings determine the accuracy of colour display. The Web browser software has an overall influence on the appearance of colour.

The three main computer operating systems that are involved in accessing the Web are: Windows, MacOS, and UNIX. These operating systems run on a PC, Mac, or Workstation hardware platform respectively. The operating system and/or hardware platform that is in use has a direct influence on how Web graphics display on a computer monitor. In fact, the monitor itself and its settings greatly affect the appearance of graphics on the Web.

The majority of Internet users and those creating graphics for Web sites are using either PC or Macintosh computers. In regard to screen resolution, there are differences between PC and Mac monitors. First, screen resolution is measured and expressed as PPI (Pixels Per linear Inch). The Macintosh display system uses 72 PPI. On a Mac screen each pixel is one point square and each square inch of a graphic contains 72 x 72 (5 184) pixels. The PC display system operates on the basis that an inch is represented by 96 pixels. An inch on a ruler displayed in a PC drawing, or paint application (possibly used to create Web graphics and maps), will measure 1.3 inches on the screen. This difference between the PC and Mac display systems has a direct effect on the design of Web maps in the desktop environment. If a Web page or maps has been designed on a PC it will appear wider and higher on a Mac screen. In regard to typography, for example, text with a point size of 9 produced on a PC, will look like 12 point type on a Mac screen. However, when graphics created on a PC are sent to a printer, the printout is the correct size. (The term "resolution" is also used to describe the size of a monitor).

A monitor's gamma setting is an important factor in the creation and appearance of Web graphics. Gamma is a measurement that describes the relationship between the computer monitor's voltage input and the brightness of a displayed image. The gamma setting will primarily affect the degree of contrast between mid-level grey values of an image. If gamma is left uncorrected the design of colour images and how they look to the Web audience will be totally unpredictable. Graphics that look fine on a PC, may look pale on a Mac screen and what looks good on a Mac will be too dark on a PC. Gamma settings range between 1.0 and 3.0. Macs do have built-in gamma correction; the default is 1.8. Standard PCs do not provide gamma correction; uncorrected PC gamma is 2.5. To overcome this problem of cross-platform differences a compromise gamma setting of 2.2 is recommended.

Web Browsers And System Palettes

In the design of Web graphics it is important to understand how browsers display colour.

Ideally, all computers would have 24-bit Truecolour display capability. If this were the case, Web browsers could display GIF or JPEG images looking very similar to their original design. This would be true even if the originals were designed using custom colour palettes containing any of the 16.7 million possible colours. In other words, a Web browser running on a 24-bit colour depth computer system can correctly display all 16.7 million possible colours. However, many Web users have computer systems with 8-bit colour depth and, therefore, can only display a total of 256 different colours on their monitors.

What happens when a Web browser running on a computer system with 8-bit (256 colour) video resolution encounters an inline GIF or JPEG image containing more than 256 colours? The browser solves this problem by using its own CLUT (colour look-up table) and the 256 colour palette of the computer's operating system (Mac, Windows, or Unix). The browser forces, or re-maps, the range of colours in the adaptive palette of the image to conform to one of the colours in the system palette. The browser does this either by matching to the nearest colour, or by dithering. However, the situation is complicated by the fact that the system colour palettes for Mac, Windows and UNIX are not the same. As a result, there are actually only 216 different colours available that are common to the Mac and Windows systems and Unix has only 125. Dithering can reduce the quality and legibility of images on the Web and should be avoided. To avoid dithering, colours used in the design of Web graphics should conform to the browser-safe 216 colour palette that incorporates the colours common to both Mac and Windows systems.

Graphic File Formats: GIF vs JPEG

The two main graphic file formats supported by all current Web browsers are GIF and JPEG. Both of these graphic file formats can store bitmap (raster) images for transfer and display on the World Wide Web. Both formats use the device-dependent RGB colour model and both carry their own built-in adaptive colour palette, also referred to as a colour look-up table (CLUT). These graphic file formats store digital images of maps, photos, etc., as an array or grid of pixels (picture elements). Each pixel has an x,y coordinate defining its position on a display surface (computer monitor). Values describing its colour, based on the RGB colour model are also stored at each pixel. The number of bits of data contained in a single pixel colour value determines the number of different colours a pixel can display. This is known as pixel depth, or image depth. For example, a one bit image contains two colours, black and white, because there are two variables in a data bit, "0" or "1". A 2-bit image contains four colours because there are four different combinations of zeros and ones in 2-bit data (00 01 10 11). The mathematical relationship is exponential, the more bits of data per pixel, the greater the number of different colours available for the image.

The GIF graphic file format is used to store images containing 8 bits of data (2^8), or less, for each of the three colours (Red, Green, Blue) at each pixel. In other words, there are 24 bits of data to describe the colour of each pixel in a graphic for a possible total of 256 colours. The GIF format includes an adaptive palette, which can store a maximum of 256 colours. Pixel colour values are indexed, or mapped to this colour palette.

GIF is capable of storing multiple images in the same file, allowing for the creation of animated GIFs. Also, GIFs can store data in an interlaced order. Conventional (non-interlaced) GIFs download images one row of pixels at a time, starting from the top of the image and working down to the bottom. When 50 percent of the download is complete still only half the image is visible. When the file is stored as interlaced, the entire image appears to download all at once, creating a fuzzy-to-sharp rendering of the image, or animated effect. However, interlaced GIFs do not download faster than conventional GIFs, they only seem to. A more recent version of this format, GIF89a allows the designer to select one colour from the adaptive palette and have it appear transparent or invisible. Normally the colour made transparent is the background of the image. This function is performed in a graphic editing software (paint application). Recent versions of Web browsers now support animated, interlaced, and transparent GIF formats.

The GIF graphic file format is always compressed using the LZW (Lempel-Ziv-Welch) algorithm. LZW is a lossless compression method that removes inefficiencies in data storage without causing a loss of data. This compression method is most efficient in compressing graphic images with large areas of homogeneous colour. It is not very good at compressing complex photographic type images.

The JPEG graphic file format is used to store images containing 24 bits of data (2^24), for a total of 16,777,216 possible colours, also known as Truecolour. The JPEG file format also contains an adaptive palette. As with GIF, the JPEG format can store data in an interlaced order, this is called a progressive JPEG. JPEG uses a sophisticated mathematical technique of graphic compression. The designer can choose the level of compression applied to a graphic; huge compression ratios are possible. However, the more JPEG compression is applied, the more image quality deteriorates and image data is actually lost. It is important always to save an uncompressed original image when working with JPEG compression, because data will be lost. This compression process is called "lossy". When too much compression is applied, strange dots or blotches that were not visible on the original start to appear, called artefacts. JPEG compression does not work well with hard-edged graphics or bright colours. Patterns of noise develop around the edges of objects and transition areas between strong colours. It is possible to produce smaller and faster downloading files with JPEG than with GIF, if one is prepared to accept the reduction in image quality.

In general, the GIF file format should be used for graphic images such as maps, icons, logo, etc., or any image that has long horizontal runs of the same colour. The JPEG format should only be used for photographic quality (continuous tone) images where nearly every pixel carries a different colour. If a client is viewing a JPEG graphic on a computer monitor that has a video card that can support 24-bit Truecolour images then the image will look very similar to the original. On an 8-bit colour depth monitor, the same image will not look as good due to dithering. Dithering is the process of simulating the dis-

play of colours that are not available on the computer monitor. Patterns are created to simulate the missing colours by mixing grey scale pixel values with colour pixels. A GIF image will look the same on an 8-bit or a 24-bit monitor, if the image was created using colours from the browser-safe 216 colour palette.

Conclusion : Tips For Designing Maps And Graphics For Web Display

Based on the issues discussed above, the following tips should help to improve the colour fidelity and quality of maps created for the Web.

1) Use the 216 colour browser-safe palette for colour selection. This will maximize the chances of having Web graphics look the same on different computer platforms and monitors and avoid unwanted dithering in your images. Dithering can reduce the quality and legibility of an image.

2) If possible create maps and graphics in an environment with a gamma setting of 2.2.

3) Set your computer's colour depth for either 256 (8-bit) or millions of colours (24-bit), and not thousands of colours (16-bit). It is better not to save browser-safe colours in 16-bit. For some technical reason, browser-safe colours are not represented by 16-bit colour systems. Graphics created on a 16-bit system when viewed in a 256 colour environment will be dithered.

4) Keep image resolution low, to about 72 PPI. Web browsers display graphics at 72 PPI, consequently, there is no advantage to designing, creating, or scanning a graphic at a higher resolution. You are only increasing the file size.

5) Use the GIF graphic file format for maps, diagrams, and any graphic that contains text. Use JPEG (and its more efficient compression capabilities) for complex graphics and photographic images without text.

6) Use HTML height and width tags with your graphics. This information tells the browser how much page space to allocate for the graphic. This does not speed up the downloading of graphics. However, it does allow the audience to see the basic page layout sooner and start reading while graphics are downloading.

7) Use anti-aliasing. Aliasing is the undesirable effect produced when graphics and type are displayed on a monitor at a low resolution. Straight lines when drawn on a computer screen horizontally, vertically, or at 45 degrees pose no problem, however, at any other angle, lines appear jagged or like stairsteps. This occurs when straight lines or straight edges conflict with the rectangular grid of the computer screen. Computer programs such as Adobe Photoshop or Paint Shop Pro can apply anti-aliasing automatically to graphics and type to create the illusion of smoothness. This process adds pixels of an intermediate tone and colour to fill in the steps along the edge or line.

These tips are not the only answers to the colour challenges met by designers of maps for the Web, but they should contribute to a better product from a user's perspective.

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Broscoe *(continued from page 10)*

Clearly these are difficult issues. The pressure to produce more Web-based curriculum will continue. My concern is that the pedagogical and ownership issues are addressed. In terms of pedagogy, more research is required. Ownership issues require lots of negotiation. The solutions are going to come with considerable restructuring of the educational map. Perhaps in the development of cartographic web resources (not necessarily curriculum) we should consider greater national and international dialog at the faculty level.

More Canadian Institute of Geomatics (CIG) Geomatics Certification News:

The CIG Geomatics Certification process continues. The concept was approved at a CIG meeting in March in Vancouver. The draft document, which I discussed at the last, CCA AGM is basically unchanged but is likely to be amended further. Some individuals have suggested that the CIG initiative should be 'harmonised' with the Geographic Information / Geomatics ISO/TC211 document which is slated to become effective in 2001. The ISO document breaks down the Geomatics job classifications into four: Technologists, Scientists, Engineers and Managers. It suggests that actual certification could be handled by national and international organisations such as the ICA, the CIG and the ACSM. The CCA is not in the list. If you wish digital copies of the CIG or ISO documents, please e-mail me at broscod@algonquincollege.com.

Stochastic Screening in Cartographic Applications

Jeff Hyatt, Intergraph Corporation

Introduction

When preparing cartographic artwork for offset printing, cartographers are presented with some special challenges rendering certain types of map features effectively. For many years cartographers have applied creative techniques in halftone screening and offset lithography to overcome some of these problems. Beginning around 1994 and continuing through the present, some new "stochastic" screening techniques have received special attention in the field of the graphic arts. A discussion is taking place in the general graphic arts trade literature regarding the merits and problems of these new screening techniques in different applications

Does stochastic screening provide some benefit in cartographic applications? As a leading supplier of digital production systems to the cartographic community, Intergraph is asked this question by some of our customers. During our years of providing high quality digital map publishing systems, Intergraph has worked with many customers to provide solutions to special problems in the field of cartography. In this article we attempt to share some of this experience with the cartographic community and provide some recommendations based on practical experience with special screening solutions in cartographic situations.

In many cases it seems there is not much to be gained by using stochastic screens in place of traditional cartographic screening techniques. However there are a few particular situations where stochastic screens can provide an improvement, e.g. rendering of fine linear features such as elevation contour lines, and digital reproduction of existing lithographic map prints.

This article begins with an introduction to the topic of stochastic screening, followed by a description of some of the classical problems and solutions, which have evolved in the field of cartography. Next we describe some applications of stochastic and FM screens in these areas, finally offering some ideas for practical application and experimentation with these halftone techniques.

Terminology of Lithographic Printing

There are some differences between the terminology used in the United States and in other parts of the world to describe halftone screening. And perhaps in the computer world some of the terms are used differently than in the general graphic arts community. So a brief summary of some terms to be used in this article is probably useful:

Halftone means that an image is rendered using only two densities of a given printing color, i.e. the color is either ON or OFF at any particular location in the image. In this sense, halftone is synonymous with the term *binary*. Standard lithographic printing is limited to halftone rendering. But there are many images that are not ON or OFF by nature, such as continuously shaded photographs or shaded maps. Such multi-shaded images are usually reproduced by transforming the shaded densities of the original into a series of halftone dots that are printed on paper. Traditionally, these dots have been arranged into a two-dimensional dot matrix, with the dot centers separated in each direction by a fixed distance. The dot spacing is typically specified in terms of dots/cm or dots/inch, called the screen *ruling*, and the dot matrix is typically arranged along an angle relative to the horizontal or vertical edge of the page. Hence, we describe a halftone dot screen in terms of its ruling and angle.

In the general graphic arts, halftone printing screens consist of dots which are either round or elliptical in shape. Examples of these dot screens are shown in Figure 1 (a) and (b). Cartographers sometimes use other techniques for screening certain types of maps and particular features. For example lines are sometimes used rather than dots, and also there are some cases where combinations of dot patterns may be used for a given feature, a technique known as biangle printing. An example of a biangle screen is shown in Figure 1 (c).

Maps typically contain many polygonal area features that are shaded with different colors or densities. When an area is filled with a constant shade of color it is referred to as a *flat tint*.

In the general graphic arts, most modern color printing is achieved using four primary colors of ink: cyan, magenta, yellow, and black, referred to as *process printing*. In process printing all the colors of the image are created from overprinted combination of various halftone shades of these four process colors. In many cases, maps are also printed using process color. Though it is more expensive, cartographers sometimes use additional colors of ink to print some features on a map; when these special inks are used they are referred to as *spot colors*. Thus, most traditional maps consist of line features and flat tinted areas which are printed using process color

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combinations or additional spot printing colors.

In contrast to the flat tint techniques discussed above, some maps include hill shading, a varying tint that is printed behind the map feature to represent elevations in the map. And in modern times it is becoming popular to print an aerial image as a backdrop for the map features. Hill shading is often printed using only black ink, though in some cases the shading may be printed using as many as five different inks. An aerial image would typically be printed either as black and white using the black ink, or as a color image printed with process color.

A Background for Digital Plotting and Stochastic Screening

Most digital halftone plots are created on *raster* plotters; these plot devices are capable of locating image points within an X-Y coordinate system known as a *raster* grid. When a halftone dot screen is generated on a digital plotter, each screen dot is typically constructed from a cluster of device *pixels*, where a pixel represents the smallest addressable *picture element* the plot device is capable of drawing. Most modern laser imagesetters are halftone raster plotters, meaning they can plot black or white pixels arranged in an X-Y raster matrix on the film or plate. Most modern high-resolution laser imagesetters include an internal facility for arranging pixels into the clusters necessary to create a halftone screen at a desired ruling and angle. Intergraph offers a line of high-resolution scanner/plotters for cartographic applications, known collectively by the name MapSetters.

The term "dithering" was adopted many years ago in the field of digital imaging to describe a general technique for displaying images of many shades or colors on an output device that is inherently not capable of displaying so many colors. From this perspective, traditional halftone dot screening may be considered as a case of dithering: grayscale images are plotted or printed with a device, in our case the device is a halftone imagesetter or a lithographic printing press. In the case of traditional dot screening, the dithering characteristics are selected to meet the requirements of the lithographic printing process. For example, ink spreads slightly when it is applied to paper during lithographic printing (a phenomenon known as *dot gain*). Because of this, the dots may not be placed too close together; if they are too close then one dot may spread into the next, causing undesired effects in the printed result. In a different printing or display application where dot spread is not a concern, a different dot pattern might be used to gain some other benefits. Dithering techniques have been used for years by Intergraph and many other vendors in the computer graphics world to present shaded and colored images with the best possible detail on CRT displays and digital plotters which are not inherently capable of producing all the colors contained in the image data.

For several years plotter vendors have also provided dithering solutions for users whose plotting applications do not involve lithographic printing. For example, some users expose orthophotos onto film for engineering applications. In this case the original plotted film may serve as the end product for visual analysis, or a few copies may be printed using a blue-line or diazo machine to provide a small number of reproductions to be used by engineers for field work.

In recent years a strong interest has developed within the graphic arts

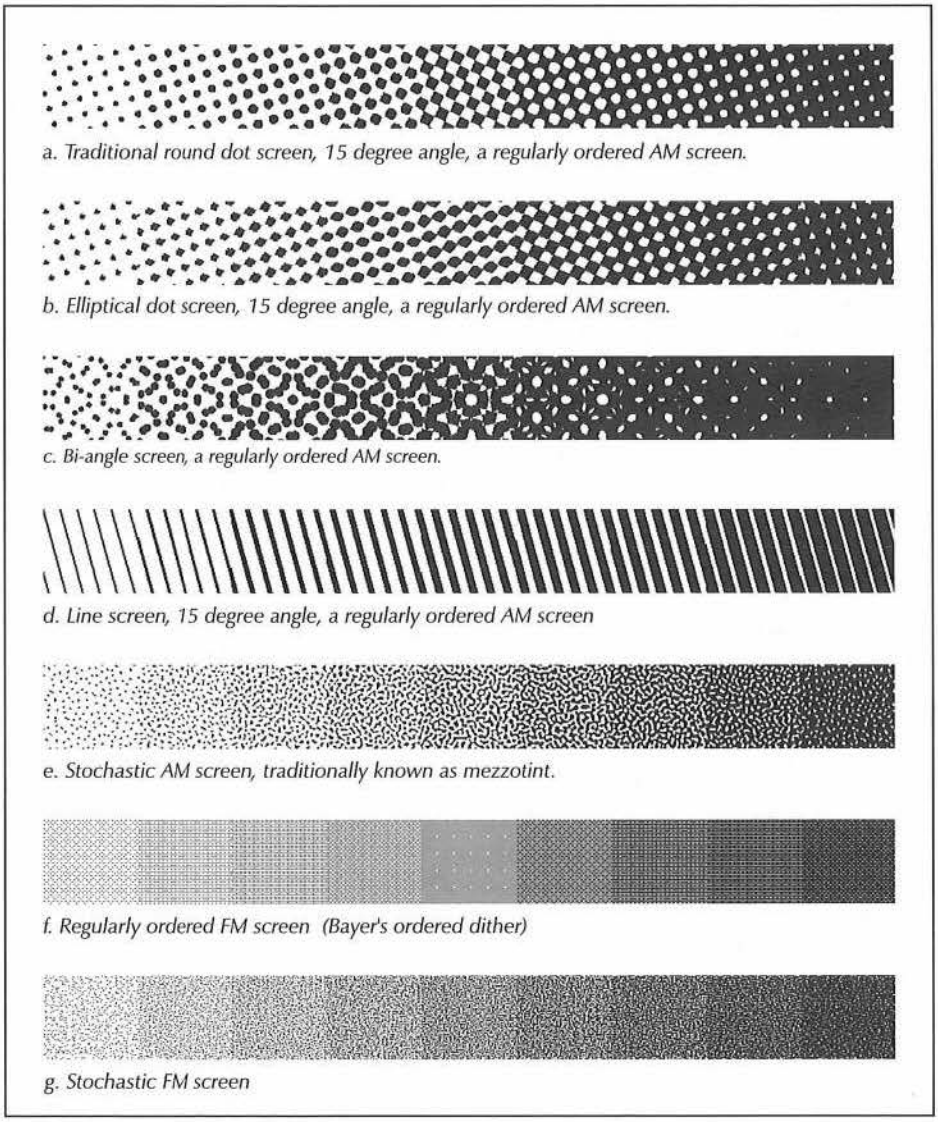


Figure 1: Examples of various halftone screening techniques.

community regarding alternative halftoning techniques for lithographic printing. The emphasis has been on algorithms which randomize the shape and/or positioning halftone elements, as opposed to the traditional technique of placing them in an ordered matrix. These techniques have been referred to within the graphic arts community as "stochastic", "random", or "frequency-modulated" screens, and many vendors of graphic arts imagesetters are aggressively advertising different techniques.

What are Stochastic FM Screens?

The literature coming from the graphic arts community regarding the new "stochastic" screening techniques sometimes uses different interpretations or inconsistent terminology. To avoid confusion in this article we will take the liberty of defining some terms to use in our discussion:

Stochastic - the word "stochastic" essentially means "random", and is used to describe processes which are subject to the influence of random conditions.

FM screen - probably borrowed from the field of radio, FM stands for Frequency Modulation. The best way to describe an FM halftone screen is to contrast it with a traditional halftone screen, which in the recent literature has now acquired the name AM screen. In a traditional (AM) screen, the printing elements (screen dots) are arranged on a grid of fixed spacing, described by the line ruling and angle of the grid. To print more ink on the page the screen dots are made larger, to print less ink they are made smaller, thereby revealing more or less of the white paper to the viewer. In the new screening terminology we could say the print tone for an AM screen is varied by modulating the amplitude (size or area) of the screen dot, while the frequency (spacing) of the dots is held constant. In an FM screen the size of each dot is relatively constant, while the number of dots printed in a given area (and therefore their spacing and frequency) is varied to change the ink tint. When you want to print more ink on the page you fit more dots into the same area. When you want to print less ink you include fewer dots. The size of each dot is essentially constant in the FM case.

A comparison of AM vs FM screens is shown in Figure 1. The standard dot screens in Figure 1(a) and (b) are AM screens, where ink coverage is increased by making the dots larger, and the number of dots is constant. Figures 1(f) and (g) illustrate FM screens, in which ink coverage is increased by increasing the number of dots, which is printed.

The concepts of randomized screens and FM screening may be considered separately or together: a stochastic AM screen is one where the traditional technique of growing a fixed number of dots is used to increase ink coverage, but the placement and/or shape of the "dots" may be random in nature. That is, rather than using round dots or simple lines as printing elements, the elements are random in shape. Also, rather than positioning these elements on a regular grid, they may be placed in a random fashion on the paper. But what links them to the traditional AM concept is the fact that their number is essentially constant within an area, and their size is varied to determine ink coverage. A traditional example of a stochastic AM screen which has been used for years by cartographers and graphic artists is the mezzotint screen; a number of Intergraph's Map Publisher users are employing mezzotints on their output maps. Figure 1(e) is an illustration of a mezzotint screen - an AM screen in which the placement and shape of the printing elements (dots) is random.

FM screening is practically a necessity on low-resolution plotters such as are used in the CAD industry, since the device pixels are too large to effectively aggregate into an effective AM dot structure. Dither patterns have been used for years to print images on low-resolution halftone raster plotters. Most of these dither patterns represent a classic case of FM screening: the individual pixels of the display device represent "halftone dots" of a fixed size, and when more ink is desired on the plotted page, more of the pixels are turned on in an area.

Traditionally, those in the computer plotting and display business have placed their pixels in a regular grid when dithering them. There are problems with this technique which you've probably noticed if you've done much plotting: normal mechanical flaws in the plotter mechanism may slightly alter the regular spacing of the pixels in their grid, and when this happens a visible streak appears in the plotted image. When the pixels are arranged in a regular X-Y matrix, a very small error in that matrix produces a noticeable flaw. This same problem can occur in high-resolution laser imagesetters and will continue to occur until the day such mechanisms achieve perfection (in other words, forever). In most cases when a regularly ordered grid is used for dithered display or plot, a particular ordering of the pixels is used. This ordering is referred to as "Bayer's dither", named for B.E. Bayer, who published a now-famous mathematical proof in 1973 demonstrating that a particular ordering of the pixels is optimal in certain respects. Bayer's dither pattern is illustrated in Figure 1.e.

One way to avoid this problem of small mechanical errors producing very noticeable flaws in plotted images is to randomize the placement of the pixels so they don't fall in a regular pattern. This technique has been considered for years in the field of computer imaging, but while such random effects may seem easy to accomplish, in fact they are quite expensive in terms of digital computer resources. Until recently, random effects have been considered more expensive than their benefits warrant, i.e. the plots would take too long to be practical. But in the past few years computers have become fast enough and cheap enough to make these computations feasible. The most popular implementation of such an idea is usually known as "error diffusion", and may be found as an option in many low-resolution (around 300-400 dpi) computer plotting systems today.

The evolution of stochastic screening techniques into graphic arts imaging systems has taken longer, probably due in part to the traditional constraints of lithographic printing, discussed earlier, but also because the high plotting resolution of these systems means that proportionately more random calculations must be made,

and this can be very compute-expensive in some implementations. (We might note that the MapSetter systems use pre-computed pseudo-random tiles so our stochastic screens are not truly random, and there is no additional compute burden at plot time associated with the stochastic screens. So FM screening on the MapSetter takes no longer than traditional screening, while providing the benefits of random screening.)

Are There Cartographic Applications for Stochastic Screens?

There has been much recent activity in the graphic arts community regarding "Stochastic" and "FM" screening for lithographic printing. Many vendors are now advertising these techniques for high resolution imagesetter systems. But the graphic arts user is concerned with printing screens on a lithographic printing press rather than a typical CAD computer plotter, therefore much of the discussion has involved the special problems of printing these new screens on press. As mentioned previously, there are two fundamental concerns associated with printing FM and stochastic screens:

(1) When printing elements (dots) are inked and printed on a press, the dots grow larger - an effect that is known in the printing industry as "dot gain". As the ink is pressed onto paper during printing, the ink spreads beyond the area it occupied on the printing plate. If two dots are placed too close together the ink from each dot will spread to fill in the space between the dots, and this corrupts the tone of the print.

(2) Lithographic printing is normally done from aluminum plates, which are subject to high pressures and friction during a print run. Very small dots are likely to wear off the plate due to mechanical friction during a long print run. This is one reason that very light tints (less than 5%) have always been problematic for printers.

It is for these two reasons (and a few more, perhaps) that the lithographic printing industry has traditionally settled on a certain range of dot rulings; halftone screens are typically produced at resolutions ranging from 120 dpi to perhaps 300 dpi at the very high end, with 130 dpi screens the most common. Since humans normally do not perceive dots that are spaced at frequencies above about 125 dpi, this has worked fine for years in most lithographic printing applications. Stochastic and FM screens can present special challenges to the fundamental constraints of lithographic printing, so they must provide tangible benefits to justify the extra work required during printing.

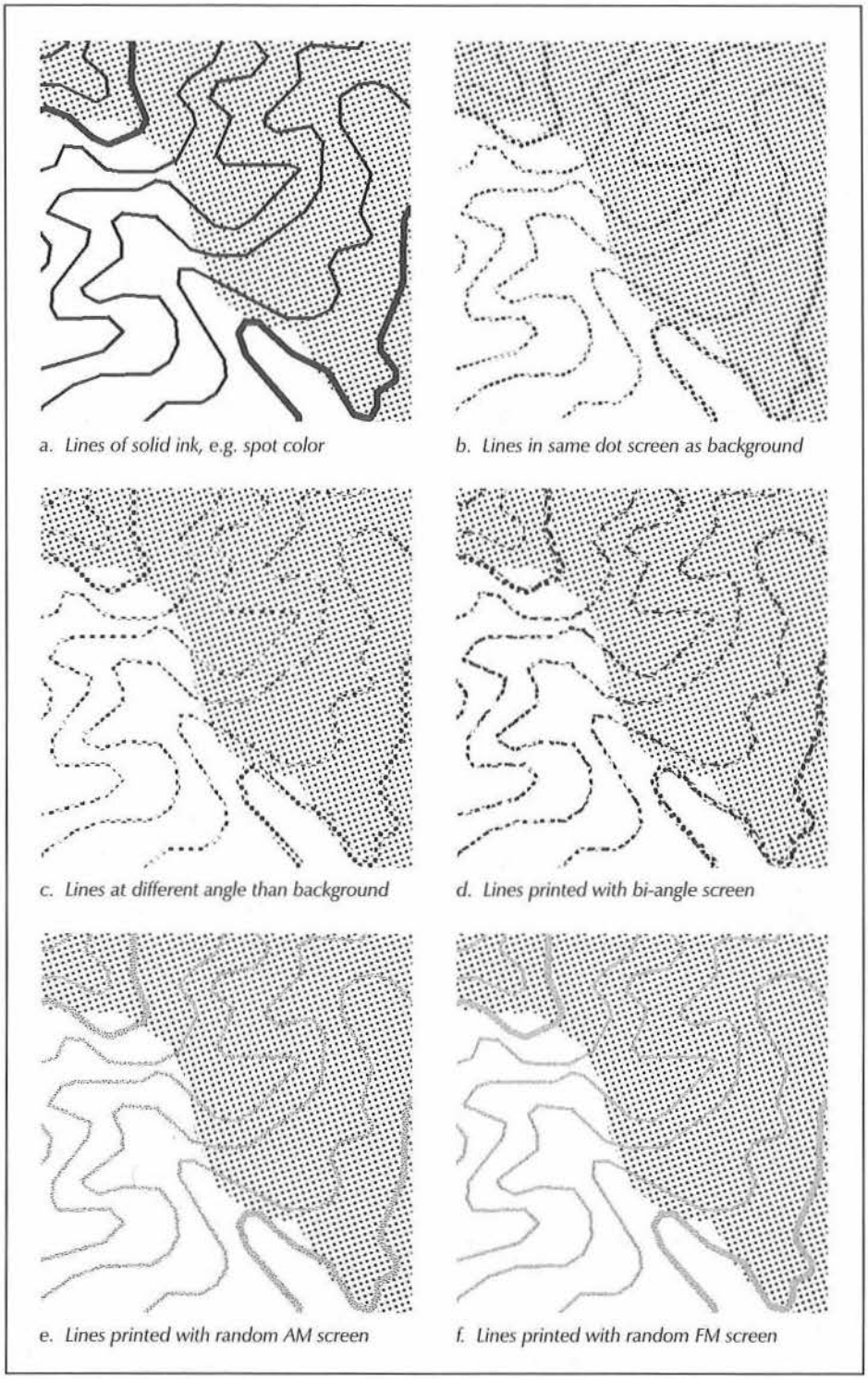


Figure 2: Illustrates various screen types applied to cartographic linework (contours) overprinted on an area tint.

We expect that some users are motivated to use stochastic screening or dither patterns simply out of curiosity prompted by articles from the graphic arts literature. There are a number of articles explaining the benefits and also some of the disadvantages of using FM or Stochastic screening.

In our experience with digital cartographic production at Intergraph, we have seen some clearly useful applications for stochastic or FM screens:

- For rendering fine shaded linework in a map. In this case the FM and/or AM stochastic screen provides a similar benefit to the traditional biangle screen, and could be considered as a practical substitute for a biangle screen. Some Intergraph customers are now using AM stochastic screens to print shaded road casings and/or elevation contours. In the past they would print some road casings using gray ink, but now they are able to produce gray road casings using black ink, eliminating the cost of an extra impression during printing.
- For plotting or printing continuous-tone (CT) image data with halftone techniques. FM and stochastic screens can provide better image definition than is achieved with a regular ordered dot screen. Particularly useful for orthophotos, etc.
- When many ink colors must be screened and overprinted. This is sometimes done in cartography to print shaded relief under a map, or to achieve a large number of symbologies and colors in a geological map. When different inks are overprinted with traditional dot screens, the angle of each screen must be carefully selected to avoid moiré patterns. In principal, an unlimited number of stochastic screens could be overprinted without moiré effects.
- We hear from a number of MapSetter users who want to scan a paper map they have printed previously, then make some edits to the map data and plot it again. We normally recommend against this practice, but sometimes is cannot be avoided. In this situation the use of stochastic screens during re-printing of the scanned image can significantly reduce moiré patterns which otherwise occur.

As an example of printing fine linework, Figure 2 illustrates various screen types applied to cartographic linework (in this case elevation contours). The illustrations include areas where the linework is overprinted on an area tinted with a typical dot screen. The ideal solution is to print the linework in dedicated solid spot ink – in that case no screen would be required for the linework. In fact this is a traditional solution for high-quality map printing, and many would still consider it the only good solution. But with improvements in modern printing presses and digital film- and plate-imagesetters, some cartographic publishers are substantially reducing printing costs by rendering such linework with screened process colors.

A significant practical benefit of using stochastic screening techniques is to avoid the cross-moiré that occurs when regular ordered dot screens are overprinted during color printing. Of course these moiré patterns are normally avoided by proper selection of angles for the different dot screens, but this works only for a limited number of screen angles. When random screens are used, the geometric interference that causes this moiré should not occur; in principal an unlimited number of random screens could be printed without moiré effects. Therefore, if you have a special printing application where you are overprinting areas with more than four inks, consider printing one or more of the inks with stochastic screens to avoid moiré patterns. If you choose to use FM screens then you must have a good relationship with your printer, because he or she will encounter the dot gain problems that were mentioned above for FM screening. Alternatively you could choose to print the additional colors using a mezzotint screen (stochastic AM screen) to avoid cross-moiré; in this case the printer will not have so bad a problem.

For many years now, Intergraph has been providing dithering techniques on the MapSetter systems for use by customers who have special imaging applications that don't require lithographic reproduction. These are applications where the image on film is the final product. Or perhaps only a few reproductions are required, in which case photographic techniques might be used to produce duplicate copies. Or finally, in cases where the low resolution of traditional halftone printing cannot be tolerated (e.g. image inspection under high magnification, perhaps for land use analysis or military intelligence). In most of these cases, the optimal technique is to plot the image using a true continuous-tone technique such that each raster pixel in the image data is rendered with a proportional shade of gray in the plot. This technique provides the maximum resolvable detail from the plot. But in some cases true continuous-tone exposure is not appropriate or available. For example, of the four MapSetter systems which have been sold by Intergraph, only the MapSetter 4000 is technically capable of true continuous-tone exposure; the other three MapSetters (and most other imagesetters) are only capable of producing black or white pixels, not grey pixels. In this case dithering the black pixels is the preferred technique for achieving maximum image resolution, and among MapSetter customers this has been the traditional application where dithering is used.

Intergraph delivers several FM screens with our Map Publisher and MapSetter products. As mentioned earlier, the pure Bayer dither has been proven optimal in the sense of rendering maximum spatial detail in a general image. But the regular geometry of the Bayer dither pattern is also very good at revealing flaws in the plotter mechanism. Bayer's dither was commonly used in electrostatic and inkjet raster plotting systems until about 1996 – you will probably remember the streaks that commonly appeared in plots from those systems. Today most raster plotters use a stochastic dither pattern, which masks the mechanical flaws in the plotter.

Are There any Special Concerns When Using FM Screens?

If you use FM screens for lithographic printing you should expect your printer to complain about his problems with terrible dot gain and plate wear, etc, as discussed above. But that is the printer's problem! We can only wish you good luck in convincing him to print your films.

On the other hand, you can also expect to see some of the same effects to a lesser degree when you write films in the pre-press shop. What you will find is there is some "dot gain" which occurs when the laser imagesetter exposes pixels onto photographic film or plate. For normal dot screens this effect is minimal, and is compensated by calibration tables during plotting. When you use FM screens you will find that this "dot gain" during exposure is much more exaggerated, and you will need a much stronger correction to create the same tones you see in a normal dot screen. In other words, you will find that the calibration curves you have developed for dot screening do not work very well for FM screening and you will need to make new tc tables for the fm screens. The technique for making these tc tables is the same as for any other tc table.

Also, you can minimize this "dot gain" on the MapSetter to some degree by reducing the exposure you use for FM screening. When you reduce the exposure for a plot, the size of each exposed pixel actually shrinks by a small amount. This allows more pixels to be fit into an area without the film becoming completely black. The tradeoff with this technique is that the Dmax (maximum blackness) of the plot will be reduced also. If you will be duplicating the plotted film onto a printing plate for lithographic printing the lower Dmax may not be acceptable. But if you are producing the film as a final end-product you may want to consider about a 20% reduction in exposure for FM plots.

Chalk (continued from page 9)

leftover from when illustrations were photographed onto negative film prior to publication. Strive to send digital copy at final size - you will not encounter any surprises (most of the time) with this approach. By the way, publishers also require paper copy of the images so that they can determine whether the digital file has been received intact; it is also used as a crosscheck that they've placed the figures with the correct figure number and caption.

Don't take the whole page unless you absolutely need it.

Most figures don't require a full page, again, be concise. Strive to make figures portrait style and don't run the figure in landscape mode unless absolutely necessary.

Have you heard of figure-ground?

If not, stop right now and read an introductory cartography book (*e.g.* Arthur H. Robinson *et al.*). You'll be amazed at how much more easily design decisions are made. You will never be a professional publication cartographer if you don't understand this concept. Some of you may shake your heads that I'm raising this point, but believe me, there are plenty of people making maps out there who's work doesn't show any hint of a figure-ground distinction.

Hey, it needs a scale usually.

You need a scale, but it doesn't need to be one of the most dominant graphic elements on the page. So many maps that cross my desk either have NO scale bar, or have the biggest, boldest scale bar you could imagine (perhaps spanning 1/4 of the page width). The scale is a critical piece of the map but it is best left as a background element in most instances.

I can't see the difference; can you see the difference?

A 5% difference in screen percentages is not a discernable difference for the user and in many cases for the outputting device. Many outputting devices don't have the resolution to discern differences in screen percentages 15% or lower and at the upper end, above 65%. If you design within the 18% to 60% range in screens, you can generally be assured that the figure will reproduce well.

Adherence to these nine points would improve 75% of the problematic graphics that cross my desk when I am wearing my graphics editor hat. Be kind to your graphics editor and give some thought to these points if you are new to the field of publication cartography - be a professional cartographer.

Do Not Forget to VOTE !

Piwowar (continued from page 7)

change. Five extensive field campaigns were conducted, with up to 60 researcher teams collecting data on a given day, at two locations in Central Canada: near Prince Albert, SK. and west of Thompson, MN.

At the end of the 90s, we are entering a new era in remote sensing. We can get high spatial resolution (1 metre IKONOS) and high spectral resolution (36 band MODIS) imagery from space. We can analyze these new data sets on desktop super-computers with robust analysis software previously reserved for higher-priced UNIX systems. The boundaries between traditional GISs and image analysis systems are becoming increasingly fuzzy.

What does the future look like? A dozen new satellites are poised to be put into orbit in the next few years. We are reaching the point where we can peruse the variety of imagery available and select the type of remote sensing data that best meets our needs, rather than having to make do with what is available.

Looking back at those early Landsat images, they are pretty pale in comparison to the data streaming down from space today. With these new images we are learning more about our planet than ever imagined. We can see, in vivid detail, the pollution, the urban sprawl, the clear cuts. We have the ability to map our planet and the changes occurring on its surface in ever increasing clarity. Change studies are meaningless, however, unless you have something to compare current conditions to. In many respects, then, those old Landsat data sets are far more important than the new high-resolution images because they provide the critical baseline of how our planet looked 25 years ago.

Now that you know what I think, let me know what YOU think! E-mail me at piwowar@uwaterloo.ca.

Been there, Mapped that

Tom Barrett, The Vancouver Sun[1]

In a cramped second-floor office near Broadway and Main [Vancouver, BC], the farthest corners of the world are laid out in attractive, easy-to-use pieces. The office, which looks over a block dominated by a car lot and a locksmith, has second-hand furniture and rec-room paneling on the walls. From powerful Macintosh computers in the back come maps of places that are, even in this age of globalization, obscure and exotic.

If you want to go to the ends of the Earth — Tierra del Fuego, say — your map will probably come from this little office. If you're touring Vietnam's Mekong Delta, the Caspian coast of Azerbaijan or the Rue de Swahili in downtown Bujumbura, Burundi, your map will almost certainly come from Vancouver's International Travel Maps.

That's because Jack Joyce, the owner of International Travel Maps (http://www.itmb.com/), specializes in maps of countries that other commercial mapmakers ignore. Antarctica and Armenia, Eritrea and Ethiopia, Ghana and Guyana, Malawi and Mongolia, Zambia and Zimbabwe — Jack Joyce maps them all.

Despite a lack of any obvious demand, Joyce began in the early 1980s to make travellers' maps of countries that hardly anyone visits. He has overcome rejection, insults and the sudden death of his cartographic soulmate to become an internationally respected publisher of maps that take you where travel is still an adventure.

Joyce has channeled his lifelong wanderlust into a passion for putting out-of-the way places on the map, literally. He tries to tap the same passion in his mapmakers, looking for cartographers who will pour heart and soul into their maps.

"A map should be informative, interesting, attractive," Joyce says. "It shouldn't be something you use in desperation because you can't find Disneyland. "It should be a work of art.

"The largest selling map at Tucson's Map and Flag Center in Tucson, Ariz., is a Baja California map drawn by Kevin Healey and published by Jack Joyce.

Store owner Charles Smith says he sells between 200 and 300 a year; "for one title, that is excellent."

"There are other maps of Baja," says Smith. "There are quite a few maps of Baja. But people see this one and they love it. It's the detail and the cartography. I have a master's degree in geography and I appreciate a good map. I like this map."

Smith and others in the map business say Joyce excels at something called "ground truthing." "Ground truthing means when you put something on a map, you actually send someone out there to make sure it's there," says Smith.

"Many times this can get shoved off to the side to get the map released and that's one of the problems that people have had in South America. A map will show a road and you get there and there's not really a road there."

Joyce's Baja map includes towns that might have 600 people in them, Smith says. If it has a gas station and a guest house, it's going to be on the map.

Parasitic Attacks

Jack Joyce is 56, a talkative guy who likes to wear hiking boots to the office. He learned the importance of ground truthing during the 1970s, roaming the hippie trail to places such as Morocco and Katmandu in a Volkswagen van. He's been to more than 125 countries.

The wanderlust started when he was a teenager in Toronto, he says. "I got tired of sitting in the back seat of my parents' car as they drove through northern Ontario looking at trees, which is what people tended to do in the Toronto area before they had money to travel internationally."

At age 17 he decided to go to St-Pierre and Miquelon, French islands south of Newfoundland. Without telling his parents, he obtained a passport, plotted a way to get to the remote islands and booked room and board with a French family for two weeks. Four days before he was ready to leave, his parents found out. "Somehow or other, they let me go," he says. "I've been travelling ever since."

After becoming an urban planner at the beginning of the 1970s, he decided to drive from London, England, to Cape Town, South Africa. From Cape Town he planned to cross the Atlantic to Brazil and drive back to Toronto. The whole trip should have taken about six months, he figured. It took him three years to get to Cape Town. He never made it to South America.

In all, it would be seven years before Joyce returned to Toronto and he may not have come back at all if he hadn't been mugged by some microscopic parasites. Joyce was teaching planning in Zimbabwe, known at the time as Rhodesia, when he was felled by a swarm of tropical diseases: malaria and tapeworm and a couple of other bugs with exotic names like bilharzia and whipworm.

"The whipworm pretty much ate away my intestines," he says. "I didn't have much in the way of any intestines left by the time they diagnosed what I had. "Joyce, who stands over six feet tall, dropped to a lethargic 125 pounds. He flew to Toronto to recover, a process that took years. While he was recovering, he was offered a six-month job running a store in Vancouver that specialized in maps and books.

[1] First published in The Vancouver Sun, April 22, 2000. Printed by Permission of The Vancouver Sun.

A few years later he had bought the store and was ready to use it as the launching pad for a business that made maps of exotic lands.

Rejection and Tragedy

Joyce says when he met Kevin Healey, it was like Gilbert meeting Sullivan, or Abbott meeting Costello. Healey was an Australian cartographer. In 1983 he walked into Joyce's Vancouver store and "it was like two lost souls finding each other." Healey stayed in Joyce's spare room for two weeks.

Healey loved South America but was frustrated by the scarcity of reliable maps of that continent. One night, as he talked to Joyce about the problem, Healey dropped to the floor and began drafting a traveller's map of South America.

For the next two weeks, Healey and Joyce stayed up until two or three each morning, working on the map. At the end of the visit, Healey went back to Australia and worked on a series of South American maps, driving taxi at night to support himself. "Am I going to get paid for this?" he asked Joyce at one point. It didn't look like it.

Healey was making about $1,000 a month driving cab in Melbourne; Joyce was living on $6,000 a year. "No bank would give me money because everybody was saying we were going to be out of business at any minute," Joyce says.

The mapmaking business in the 1980s was dominated by Europeans. Joyce flew over and knocked on publishers' doors but had little luck convincing anyone to issue maps of countries that few Europeans visited.

Joyce recalls trying to show one publisher Healey's artwork. "He took one look at the cover and said, 'Colonials don't know how to do maps.' Then he turned his back. That was probably the worst snub."

Joyce and Healey published the maps themselves. They didn't sell many, but they continued to map the southern hemisphere, hoping that global distribution would be the key to success. "In Vancouver, a map of Antarctica is going to be obscure," Joyce says. "In New York, it's not going to be so obscure."

In 1990 they got lucky. They put out a map of Costa Rica just as North Americans began spending holidays in that country. Things snowballed: the availability of a reliable Costa Rican map encouraged tourism, which increased the market for maps, says Joyce.

As Latin American tourism boomed, Joyce and Healey mapped more countries and regions — Belize, Baja, Jamaica, the Yucatan, Ecuador, Guatemala, Panama. Just to keep from being stereotyped as Latin American specialists, they issued a map of Japan.

Joyce notes — a map that bears the cartographer's heart and soul is going to sell well.

When Vietnam began to open up to western business Joyce negotiated a joint venture to make maps with the Vietnamese government — and met his wife, Lan, who now works in the West Broadway office. Other Asian and African titles followed.

Healey didn't make all of these maps, but he was, in Joyce's words, the artistic soul of the company, the "Michelangelo." "They literally had to pull him off the table as he was drawing maps and say 'Okay, it's done, we can't add anything more to it,' " says the Tucson Map Center's Charles Smith. "The guy was a perfectionist."

In an era when maps were put together by teams of specialists, Healey performed every step of the process himself. Joyce recalls his partner "sitting at the linotype machine, making the type that would go on the map. He'd spend weeks actually sitting there at a machine like a giant typewriter making the type."

In 1994, Healey finished a map of Venezuela and flew to Vancouver for a rest. Healey, who had a weak heart, got off the plane looking and feeling terrible. He stayed at Joyce's house for a month, but didn't seem to be getting any better.

Finally, Joyce talked him into going to see a doctor, who discovered Healey had pneumonia. He gave him medication to clear his lungs. But the medication also accelerated — and overloaded — Healey's weak heart. At the age of 48, Kevin Healey died.

"It was devastating," says Joyce. "As much of a shock as having your right arm suddenly torn off."

Screaming to Come Out

Carrying on wasn't easy, given Healey's importance to the operation. Joyce had other cartographers — including two European-trained cartographers from Fiji, who had produced a series of recreational maps of B.C. — but Healey's maps were the core of the business. They set the tone for the other mapmakers.

Over the years, Joyce built up an international network of cartographers that grew to 25 mapmakers in a dozen different countries. When cartographers come to him, "I say there's a map inside you that's screaming to come out. There's something you want to do and only you can tell me what it is. "They leave thinking 'this guy's nuts.' But they put their heart and soul into a map." And art has its rewards, Joyce notes — a map that bears the cartographer's heart and soul is going to sell well.

Their maps follow the detailed Healey style. Unlike most roadmaps, they show railways because a lot of people travel on railpasses and, says Joyce, when you're driving in the middle of nowhere and you cross a railway track, you want to know where you are.They tell you how tall mountains are because "people have a fascination" with the question. "They don't want to climb them, they just want to know how high they are."

Today, Joyce has 160 titles covering about 140 countries. He's got a map of Kosovo due out in a couple of weeks; Russia, Estonia and France are on their way. He's looking for someone to map Lebanon.

"Right now Kazakhstan is probably the most important area for us to complete," Joyce says. "Do you know there isn't a map of the Sahara Desert?"

There is a public drinking fountain on the north side of the Franciscan Garden in

*See **Been There** - page 25*

Candidates for Election to the 2001/2002 CCA Executive

The CCA Nominating Committee is pleased to present the following slate of candidates:

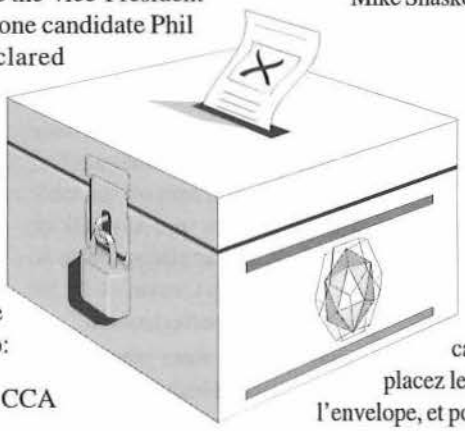
Vice-President:
Phil Dodds, Intergraph Corporation

Chair, Analytical Cartography & GIS Interest Group:
David Broscoe, Algonquin College
Rick Gray, University of Guelph

Chair, Education Interest Group:
Ka-iu Fung, University of Saskatchewan

Chair, Map Technology and Production Interest Group
Weldon Hiebert, University of Winnipeg
Mike Shasko, Clover Point Cartographics Ltd.

Nominations are now closed. Since the Vice-President and Education IG chair only have one candidate Phil Dodds and Ka-iu Fung are declared elected by acclamation. An Election will be held for the other positions, and a ballot form is enclosed with this issue of *Cartouche*. Vote for the candidate of your choice, seal the ballot form in the enclosed brown envelope and mail inside another envelope with your name clearly marked to:



Michel Fournier, Past President CCA
Cartologique
1853 boulevard Pie IX
Montréal, Quebec H1V 2C7

Important: The constitution states that ballots must be counted 8 weeks prior to the AGM.
BALLOTS MUST BE MAILED so that they can be received on or before April 1, 2001.

Personal profiles supplied by the candidates follow.

Candidats aux élections au Comité exécutif de l'ACC 2001/2002

Le Comité de nomination de l'ACC a le plaisir de soumettre la liste de candidats suivante aux élections au Comité exécutif de l'ACC 2001/2002.

Vice-président:
Phil Dodds, Intergraph Corporation

Président, Groupe d'intérêt sur l'Cartographié analytique et SIG:
David Broscoe, Algonquin College
Rick Gray, University of Guelph

Président, Groupe d'intérêt sur l'Éducation de la cartographie:
Ka-iu Fung, University of Saskatchewan

Président, Groupe d'intérêt sur l'Technologie de productiion cartographique:
Weldon Hiebert, University of Winnipeg
Mike Shasko, Clover Point Cartographics Ltd.

L'appel pour les mises en candidature est maintenant terminé. Puisqu'il y a seulement un candidats au poste l'Vice-presidnet et l'groupe d'intérêt sur l'Éducation, Phil Dodds et Ka-iu Fung sont élu par acclamation. Des élections auront lieu pour les autres postes. Le bulletin de scrutin est inclus dans ce numéro de *Cartouche*. Votez pour le candidats de votre choix dans chaque catégorie, placez le bulletin dans l'enveloppe brune et cachetez l'envelope, et postez le tout dans l'enveloppe blanche à:

Michel Fournier, Past President CCA
Cartologique
1853 boulevard Pie IX
Montréal, Quebec H1V 2C7

La date limite pour réception des bulletins par la poste est le 1 avril 2001.

Une courte biographie pour chacun des candidats suit.

Candidate for Vice President / *candidate pour la vice présidence*

Philip M. Dodds

Professional affiliation

Intergraph Corporation 1989 - Present, Technical Consultant in GIS and Mapping

Education

BS Geography – University of South Alabama, MS Geography – University of Alabama

Previous Service to the CCA

Chair of the GIS and Analytical Cartography for the Canadian Cartographic Association 1999 – Present. Active member of the CCA for the past 10 years.

Goals as Vice President

As Vice President of the CCA I would assist the President in the overall goals of the CCA. I would also help continue the recruitment drive started by Patricia to increase membership numbers. I would also try and follow past Presidents and Vice Presidents in trying to do the right thing for the CCA.

Candidates for Analytical Cartography and GIS IG Chair / *candidates pour la Présidence du groupe d'intérêt sur l'Cartographié analytique et SIG:*

David Broscoe

Professional Affiliation

Professor, GIS Technology Program, Algonquin College, Ottawa

Education/Experience

M.A. Geography (1993) Carleton University, Cartography Technician Diploma (1977), Algonquin College. Twelve years experience as a cartographer in private industry, in Canada and abroad. Ten years experience teaching and training in Cartography, GIS and Programming. Currently sitting on the executive of the Ottawa Branch of the Canadian Institute of Geomatics

Previous Service to the CCA

Chair, Cartographic Education Interest Group, 1998-2000

Goals as Interest Group Chair

One of the realities of Cartography today is its blending of the boundaries between Cartography and GIS. It is important to retain the cartographic component in GIS, even as GIS itself loses its unique identity and morphs into more mainstream IT applications.

Some research examples : How does cartographic Visualization relate to more advanced interactive capabilities of today's GISs? Is geographic analysis losing ground to Web- based PZI (Point, Zoom Identify) GIS applications as we attempt to deal with the exponential increase in digital data? How does cartographic perception research relate to interactive GIS GUIs? These are some of the issues I would like to explore through Cartouche articles, conference sessions and the CCA web site. It is important that cartographic research is recognized as an essential component of portraying spatial information.

Rick Gray

Background

After 20 years in the "real world" running my own businesses, I returned to school in 1993 to obtain a B.Sc. in Natural Resources Management at the University of Guelph. It was at that time I discovered and became hooked on GIS. This past summer I successfully defended my M.Sc. in which I used GIS to map tree root distribution in the soil profile. For the past four years, I have supplemented my graduate student income with a GIS consulting business providing digitizing and other GIS related services to faculty, students, private companies and municipalities.

CCA Affiliation

I was introduced to the CCA at the 1995 Calgary conference where I presented a poster on the use of GIS to develop a soil-drying index for my farm. In St. John's, in 1997, I was honoured to receive the Best Student Paper award for my talk entitled "Agroforestry and GIS: the development of a spatial database". In 1998, in London, I organized the successful GIS software challenge in which I brought together various software vendors and made them strut their stuff with a common data set, thus giving the conference attendees an opportunity, for the first time, to compare apples to apples. A semester abroad meant that I had to miss the Ottawa conference, but I made sure to attend the 2000 conference in Edmonton even though I was busy putting the finishing touches on my thesis.

My Role as Chair of the Analytical Cartography and GIS Interest Group

I see my role as chair of the ACG-IG as an opportunity to bring together the CCA GIS community as a cohesive and active lobby for the advancement of cartographic excellence in the world of GIS. As users of GIS in academia and beyond, CCA members can direct the development of GIS software through a focussed and energetic interest group. I would like to work towards that possibility.

Candidate for Cartographic Education IG Chair / *candidate pour la Présidence du groupe d'intérêt sur l'Éducation de la cartographie:*

Ka-iu Fung

Education

B.A. (Hons.); Dip.Ed.; M.Sc.; and Ph.D. All the degrees are in Geography.

Academic rank: Professor

Work Experience

Involved in cartographic education since 1965, at the Department of Geography, University of Saskatchewan, Saskatoon; taught undergraduate and graduate classes

in Cartography, and supervised graduate students at both M.Sc. and Ph.D. levels.

Major publications in Cartography:
Cartographic editor, Atlas of Saskatchewan, 1st ed., 1969 (scribing and photomechanical techniques used); Director and Editor, Atlas of Saskatchewan, Millennium edition, 1999 (digital mapping technique used).

Committee work
I have served in committees at departmental, college, and university levels at the University of Saskatchewan. I am looking forward to serving the CCA, in the capacity as Chair of the Education Group.

Brief plan for the Education Group
In recent years technological advances have made a significant impact on map design and production, which has effectively shortened the time for map production and removed much of the tediousness in map making. However, I strongly believe that the computer is only a tool. In cartography classes, the students should be taught how to use that new tool, as increasingly advanced hardware and sophisticated software have been continuously developed. At the same time, they should also learn the important cartographic principles concerning map communication, map design, selection of map projections, colour use, symbolism, and mapping methods. Fine quality maps can be designed and produced by those cartographers who have received a balanced education on the technology of digital mapping and important concepts and principles in cartography.

My main goal is to seek ways to improve the curriculum and teaching of Cartography by consulting with colleagues holding CCA membership and non-members. I propose the establishment of a special section on cartographic education in our Association's newsletter, Cartouche, as a forum for discussion on the basic and advanced training of cartographers, among teaching faculty and professionals in the mapping field. Other means proposed for exchanging ideas, insights and views on the subject of teaching cartography include the use of electronic mail. I would like to hold two meetings per year (one at the CCA Annual Meeting) dealing specifically with providing a sound education to our Cartography students.

Candidates for Map Production Technology IG Chair / *candidates pour la Présidence du groupe d'intérêt sur l'Technologie de productiion cartographique:*

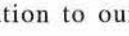
Weldon Hiebert

Professional Affiliation:
Cartographer, University of Winnipeg

Education and Work Experience:
B.Sc.,Physical Geography, Univ. of Winnipeg
Cartographer at the University of Winnipeg since 1981.

Previous Involvement in the CCA:
Member since 1985.
Editor of Cartouche 1994-1999.
Member of CCA Nominating Committee, 1999.

Position Statement:
The evolution in the production of the map has gone through three phases: manual, mechanical and digital. Despite the changing methods of map production, the result remains the same, an effective visually pleasing map. Though the digital phase is relatively young, its impact in cartography has been significant. Today's mapping software is highly advanced and easy to use. Cartographers have taken advantage of the software's special effects tools and filters to produce maps second to none. As chair of the Map Production Technology Interest Group it will be my duty to keep the membership informed on the latest technological advancements in map production through columns published in Cartouche and organizing workshops and paper sessions at the Annual General Meeting. I would also like to pursue the idea of a cartography newsgroup on the Internet, possibly through the Association web site, where members can exchange ideas on map production technology with each other.



Mike Shasko

Education and Work Experience:
MSc., MBA
Mike draws upon formal training in project management and design, and has a wealth of experience in computer programming and GIS. He has accumulated significant expertise in the geomatics industry since the late 1980's.

Supporting private and public sectors through the development of cartographic applications, Mike has gained invaluable experience with the complexities of GIS programming that form the technical infrastructure of today's projects. Mike can identify data needs according to creative, client-focused strategies. He can adapt data to those needs to develop the highest quality product by the most efficient means.

As Clover Point's president and one of its directors, Mike continues to keep himself and the company on the cutting edge of the fast paced geomatics environment.

Skills and Accomplishments
As a GIS and resource consultant:
- developed new and innovative solutions to meet client needs
- analyzed project data requirements and regularly reviewed evolving data needs

As a GIS programmer:
- constructed GIS programming scripts to facilitate plotting, production, and database functions
- created standard production and plot routines
- developedspecialized documentation packages to address complex programming issues.

As director of Clover Point Cartographics Ltd.:
- supervised Clover Point's role in joint project submissions

- coordinated company activities with fellow directors
- developed and maintained office systems and procedures to support client needs.

CCA Role

Mike started Clover Point in 1991 as a mapping/GIS services company. Focusing on production and spatial programming, the company has grown to 15 people experienced in data compilation, cartographic output, and resource analysis.

Mike brings to the CCA Map Production and Technology Interest Group an avid interest in current and future mapping technologies that provide mechanisms to enhance spatial processing and analysis. He is keen to work with individuals and organisations to define, collect, produce, and disseminate ideas and scripts that people in the industry can hopefully integrate in their daily operations.

SEND YOUR BALLOT NOW!

Been There (continued from page 9)

downtown Prague. It and half a dozen other drinking fountains are marked on Jack Joyce's map of Prague. They are there because Joyce walked around Prague with a notebook and recorded their locations. "We had to have something different, so we put in the drinking fountains," he says.

Joyce's maps also include "capsule comments" on history and points of interest. You can learn, for example, that the town of Santa Rosalia in Baja California, Mexico, has a prefabricated church that was designed and built by Gustave Eiffel ("of Tower fame"). Originally destined for Africa, the church was shipped around Cape Horn and assembled in Santa Rosalia when the deal with the Africans fell through.

"We believe a map should not just be used to get from A to B." Joyce says. "It should educate, it should illuminate for somebody a part of the world they probably don't know very well."

Joyce hears about it if his maps miss a piece of "fascinating but not very important" information. After Joyce published a map of Ghana, he received a note asking why he didn't mention that country's rock paintings. He replied that he didn't know there were any rock paintings in Ghana.

Joyce says he asked where could he learn more: "'Well,' he says, 'I'm a professor of archeology at such-and-such a university and I've spent a lifetime studying these and I'd be happy to contribute to the map if you think it would be useful.' "You know how long you would think before you say yes," Joyce says. "So we now have a map which shows archeological sites in Ghana."

GIS Day - A BIG HIT!

UBC, November 15, 2000

BRIAN KLINKENBERG, COORDINATOR,
DEPARTMENT OF GEOGRAPHY, UBC

This special event, sponsored by University of British Columbia, Department of Geography, was a big success. More than 300 participants attended from all over the Vancouver region to view demonstrations of GIS in action. Graduate students from Forestry, Geography, Zoology, Medicine and Independent Studies, along with government researchers and private consultants, presented the results of diverse projects. These included avalanche studies, mountain goat research, Serenghetti lion research, the Vancouver Atlas, epidemiology research from the BC Centre for Disease Control, windthrow analysis, artificial intelligence and property assessment, and Fraser River fluvial geomorphology.

Representatives from the municipalities of Richmond, Vancouver, Surrey, and New Westminster, attended along with reps from several corporations and government departments, including BC Hydro, Statistics Canada and Parks Canada. Researchers from a wide variety of departments across UBC also attended, including botany, planning, education, forestry, fisheries, and UBC library services. They all spent several hours listening to researchers explain their work and demonstrating their GIS skills.

This is the first time that the GIS researchers at UBC have come together to showcase their work, and all found that the exchange of information and knowledge among them was well worth the time and effort it took to prepare their demonstrations. More than a few GIS/ArcView problems were solved over the course of the day! To top things off, two participants at GIS day received job offers from a large corporation.

The big comment received at the end of the day was: more, more, more!

The event was such a success that plans are already underway for next year's GIS Day. For details on further developments, and on the participants of GIS Day 2000, check out the GIS web page (*www.geog.ubc.ca/gisday/*).

JUST RELEASED

CD-ROM version of the ***Atlas of Saskatchewan***. Available from the University of Saskatchewan Bookstore. $32.95 plus applicable taxes and shipping.

For more information and printable order form see: *http://adminsrv.usask.ca/cds/cdrom_version_of _atlas.htm*

ANNOUNCING

First reprint of the **Historical Victoria (Ontario) County Atlas, 1881**. Hand sewn and bound in hard cover. One of the most informative county atlases ever published in Canada. ($139.10 including shipping and taxes) To order contact: Alexander Publishing, P.O. Box 81186, Fiddler's Green P.O., Ancaster, Ontario, L9G 4X1. Fax: 905.648.0205, email: alexander@interlynx.net

Yes David Broscoe You Should Teach Theory [1]

Gerry Fremlin

Many many many years ago I was on a tour in Ottawa of the Surveys and Mapping Branch which was the agency then responsible for, amongst other things, the maps of the National Topographical System. I was at the back end of the touring gaggle, and got interested in the manual compilation for a topographical map of the Lake of the Woods area in Northern Ontario which is about 50 percent land and 50 percent water. The compiler's supervisor came along just at that time, took a look at the compilation and said: "Take out some of them lakes." I've been wondering about it ever since. Did the supervisor have a preference for land? Would the map reader get a reliable picture of that peculiar country?

I was reminded of the event when I read Rupert Brooks' article on automated generalization for **The National Atlas of Canada** in *Cartouche*, No 39, Autumn 2000. The generalization shown in the article seems to convert an area of many lakes and rivers in southern Baffin Island into mostly dry land. Achievement of a "highly accurate result" is declared, and the generalization procedures are claimed "to have been a success in practice." But what is the criterion for accuracy and success in generalization?

In *Maps as Mediated Seeing*[2] it is argued that the purpose of generalization is to maintain equal legibility from scale to scale, while retaining as much detail as is consistent with legibility at the smaller scale. So what is the criterion for legibility? There is a rule or convention in topographical mapping to the effect that every represented object must have in-situ identification. Identity is conveyed in part by mimesis (mimetic signatures and symbols) and otherwise by a semiotic system of modifier-labels in the form of colours, symbols and typography. There is no easily stated criterion for legibility of topographical signage when there are so many contributors to identification. There is, however, an easy test for illegibility. If identity is ambiguous, the feature is functionally illegible. In the words of Bertin "... the very presence of ambiguity is the witness of a mistake." (p.119)[3] When an ambiguity is detected the cause or causes of the functional illegibility can be easily assessed. Examples of ambiguity: 'it is either green or blue'; 'it is unreadable typography'; 'it is either an island or a peninsula'; 'it is obscured by typography'; 'it is either a building or some kind of yard'; 'it is some kind of object'; 'it is either a hill or a hollow'; 'it is either a lake or a river'. The problem with Rupert Brooks' example of automated generalization is not illegibility or ambiguity. The problem is one of goal. In my judgment the generalized map better serves the purpose of showing where the major drainage of the area goes, rather than giving the best representation of the water and island features at the given scale. Showing where the drainage goes is a thematic rather than a topographic purpose. Preference for land over small inland waters may well be a widespread bias amongst cartographers. For automated generalization to succeed, according to arguments developed in *Maps as Mediated Seeing*, an algorithm would be required in the system capable of recognizing potential ambiguity and avoiding it, or alternatively, recognizing ambiguity after compilation, and correcting it. There can be no reliable criterion for what is successful generalization until there is an acceptable theory for cartographical topography: you cannot **objectively** rate a map until you have a theory that tells what the map should be. With a theory, rules can be deduced rather than being merely dictates of opinion, convention, tradition, or land-preferring supervisors.

The map "Lakes, Rivers and Glaciers" in the *National Atlas of Canada*, shows more drainage at 1:15,000,000 for southern Baffin Island than Rupert Brooks' proposed map shows at 1:4,000,000. It would seem that one of the maps is misleading. Could they both be? Any cogent discussion of the question would require reference to theory.

So yes, David Broscoe you should teach them theory of cartography. Cartography has long been a fully evolved system of projectional semiotics: the identities for the signs used on topographical maps are projected from precise origin-locations on the Earth (or other such body) to precise homologous locations on the map-as-a-representation.

Notes:

1. The title alludes to David Broscoe' article "Maps, Fire and Other Dangerous Things" in *Cartouche*, No. 39, Autumn 2000.

2. Fremlin, G. with Arthur H. Robinson, 1999. "Maps as Mediated Seeing" *Cartographica* Monograph 51.

3. Bertin, J. 1978. "Theory of Communication and Theory of The Graphic." *International Yearbook of Cartography*, 18, pp 118-126.

Canadian Cartographic Exhibit Committee
Comité de l'exposition cartographique canadienne

The Canadian Cartographic Exhibit Committee is organising the map and atlas exhibit for the Canadian contribution to the 20th International Cartographic Conference of the International Cartographic Association (ICA). The ICA conference will be held in Beijing in August 2001. In addition, we will like to take this opportunity to prepare an exhibit of Canadian maps for the forthcoming conferences of the Canadian Cartographic Association (CCA) and the Association of Canadian Map Libraries and Archives June 2001 in Montreal. There, we will have the opportunity to view and judge the Canadian submissions to China and award our own prizes for the best maps at the conference.

Your assistance is now being sought to identify and provide copies of significant maps and atlases, produced in Canada since 1998 that would be appropriate for both of the Canadian display. All types of cartographic products – including experimental and student work – will be considered. We are requesting maps in the following themes; topographic maps; nautical and bathymetric charts; geological maps; *urban* maps; satellite images and satellite image maps; recreational and orienteering maps; globes and atlases; other cartographic examples

Cartographic materials to be exhibited in China and Montreal must have been published **after January 1, 1998,** and must not have been exhibited in either the International Exhibition in Stockholm in 1997 or Ottawa in 1999. **Submissions must be received no later than February 1, 2001.** For additional information please contact Claire Gosson by e-mail.

Send the materials to:
Canadian Cartographic Exhibit Committee
c/o Claire Gosson,
GeoAccess Division,
Canada Centre for Remote Sensing
615 Booth St., Room 650,
Ottawa, Ontario. K1A OE9
e-mail: *claire.gosson@geocan.nrcan.gc.ca*

Le Comité de l'exposition cartographique canadienne est responsable d'organiser la portion canadienne de l'exposition cartographique internationale à la vingtième conférence de l'Association cartographique internationale (ACI) , qui aura lieu à Beijing, en août 2001. De plus, nous aimerions profiter de l'opportunité pour préparer une exposition de cartes canadiennes qui sera présentée lors de la prochaine conférence conjointe de l'Association canadienne de cartographie et l'Association canadienne des cartothéques et archives cartographiques qui aura lieu à Montréal en Juin 2001. À cette occasion, nous pourrons voir et juger les soumisions canadiennes pour l'exposition de Beijing ainsi qu'attribuer nos propres prix aux meilleures cartes.

Afin de mettre sur pied cette exposition, les membres du Comité canadien vous demandent d'identifier et fournir des cartes et des atlas d'importance particulière, produits au Canada depuis 1998 et qui conviendraient aux deux expositions. Tous les types de produits cartographiques, dont les travaux expérimentaux et les travaux d'étudiants, devraient être envisagés.

L'exposition sera divisée en thèmes suivants: Cartes topographiques; Cartes marines et bathymétriques ; Cartes géologiques ;Cartes urbaines ; Image-satellites et spaciocartes; Cartes de loisirs et de courses d'orientation; Globes et atlas ; Autres produits cartographiques.

Le matériel cartographique qui doit être présenté à Beijing et Montréal doit avoir été publié **après le 1er janvier 1998** et ne pas avoir été exposé lors de l'Exposition internationale d'Ottawa en 1999. **Les documents doivent être livrés au plus tard le 1re février 2001.** Contactez :

Comité de l'exposition cartographique canadienne
A/s Claire Gosson,
Division GéoAccès,
615, rue Booth, pièce 650,
Ottawa, Ontario, K1A OE9.
Téléphone (613) 992-4134
Télécopieur (613) 947-2410
Courierélectronique:*claire.gosson@geocan.nrcan.gc.ca*

Canadian Cartographic Association

Minutes of the Annual General Meeting

Edmonton Alberta

June 03, 2000 (9:00 a.m.)

Recorded by Charles M. Conway (secretary/tresurer)

President Michel Fournier welcomed everyone to this annual general meeting.

1. Approval of Agenda and Minutes of Annual General Meeting (Ottawa)

One addition to the agenda - item #4: "Appointees Reports", add 'Student report'.

Moved by Clifford Wood to approve the agenda. Seconded by Monika Reiger. Carried.

Moved by Clifford Wood to accept the minutes of the last annual General Meeting. Seconded by Ute Dymon. Carried.

2. Executive Reports

President's Report (Michel Fournier)

Michel reported that it was a good year went very well. The executive meeting in March, 2000 saw the beginning of a new strategy to increase membership and improve the Association. Also work has begun updating the website.

Work is also underway on translating the website to French, a new poster, ans a promotional package for the Association.

Michel thanked Anita Muller for her work on revising the C.C.A. website.

Vice President's Report (Trish Chalk)

A written report was submitted by Trish but she provided an overview of the report. The main responsibility of the vice president is promotion of the membership. Trish sent out personal letters to those who left business cards at the meeting last year in Ottawa to promote the benefits of membership in the C.C.A and to remind them of this meeting here in Edmonton. This is in addition to the work that Monika does regarding membership.

Members also provided names of people that they thought might be interested in the Association. Trish also sent them letters asking them to attend this meeting and indicating possible corporate possibilities. Trish felt that personal contact with potential members, those already in the field and students, is important.

Past President's Report (Roger Wheate)

A written report was also submitted by Roger for this meeting. He commented on a few points in the report. The program for this meeting was easy to put together for this meeting because of the numbers of members who wanted to present papers at this meeting. Roger hoped that some of the papers could be reproduced in a special issue of Cartographic to commemorate this conference and others could be prepared for other media such as Cartouche.

Roger thanked other past presidents of the Association who have contributed to this meeting, Ray Boyle, Henry Castner, Cliff Wood, and Lou Skoda who is a past vice president. Roger also thanked Henry and Cliff for their displays/posters on the history of the C.C.A.

One of the main duties of the past president is to act as chair of the nominating committee and Roger thanked also those who agreed to stand for office and congratulate those who were elected, Harry, Diane and Ute. He also thanked the members of the previous committee which he chaired, Weldon Hiebert and Lee Thompson.

At this point Roger dealt with the nominations for those members to serve on the next Nominations Committee to be chaired by Michel Fournier. Claire Gosson, Clifford Wood and Carolyn Weiss were nominated. Clifford Wood moved to close nominations, seconded by Monika Reiger.

Some discussion followed on Roger's comments regarding publishing of papers from the conference. There was discussion about posting some papers to the C.C.A. website.

Secretary/ Treasurer's Report (Charles Conway)

Charles presented a financial statement up to December 31,1999. A financial report was also presented at the meeting. The Association is in good financial shape but membership levels will have to remain stable and hopefully increase to sustain this financial stability.

Charles thanked Monika for all her work and time with regard to collections and renewals of the memberships.

Michel at this point thanked Roger Wheate and Jeff Murray who are stepping down from the executive. They had put a lot of effort and time into their respective positions.

3. Interest Group Chair Reports

Interest Group chairs have submitted written reports with the exception of Map Use and Design as well as Map Production and Technology.

Phil Dodds (Analytical Cartography and GIS) added that his workshop was well attended and the participants enjoyed the event. David Broscoe (Education)commented on the CIG report on certification. He will circulate a copy of the report to those who are interested. Jeff Murray (History of Cartography) had nothing further to add to his written report.

4. Appointee Reports

Appointees have supplied written reports to this meeting.

Cartographica (Brian Klinkenberg)

Brian highlighted portions of his report. The first two issues of Cartographic under his editorship have recently been published (vol. 36, No. 1 and 2)

The inventory of manuscripts shows that there is one high quality monograph in hand. Four monographs are in progress and eight articles have been accepted and have been sent back to the authors for revisions. Three articles are in hand and ready to go to the Press. Things are looking up and if all goes as planned Cartographic will get back to a more regular publishing schedule. Brian thanked all those who have helped with the publishing of the journal.

Brian also requested that members visit the U. of T. Press website and if so inclined send a message commenting on the Cartographic site. It can be accessed from Brian's's homepage or searching Cartographic or U. of T. Press.

Cartouche (Gary McManus)

Gary spoke of trying to improve the content of the newsletter. He has been approaching people at this meeting to submit articles and thanked people who have submitted articles and thanked the previous editor of Cartouche, Weldon Hiebert.

Membership (Monika Reiger)

Monika gave a summary of the numbers regarding the membership of the association. There has been a slight increase in the number of members.

Student Membership (Andrew Millward)

Andrew stated that another batch of the C.C.A. t-shirts are available. They are the same design as the previous edition. The cost is $25.00 with proceeds going to the Nicholson Scholarship fund. C.C.A. cloth patches are also available at a cost of $8.00. Please contact Andrew if you are interested in obtaining one of these shirts.

Membership in the C.C.A. as it pertains to the student is a very important issue. He stated that it is great that the C.C.A. encourages student to participate in meeting but it is critical that financial support must follow.

The addition of the student corner to Cartouche and the website are exciting new developments. Contributions could be archived on the site. Submissions by students must be encouraged with perhaps some monetary reward.

Some discussion followed on points of Andrew's presentation.

5. Annual Meeting, 2001

This meeting will take place in Montreal at the end of May. Information will follow in coming issues of Cartouche. The meeting will be co-hosted by the University of Quebec at Montreal and the University of Montreal. Discussions followed on the timing of the meeting and possible connections with ACLMA and CAG.

Discussion followed on the likely sites and joint meeting possibilities for 2002.

6. Next Executive Meeting

Michel announced the place and time of the next executive meeting.

7. Other Business

No items were presented under this heading.

David Broscoe moved to adjourn. Seconded by Christine Earl. Carried.

Book Reviewers Needed!

I have received copies of the following books for review in *Cartographica*. If you are interested in writing a review of one of these books for publication, please contact me. Reviews should be completed within three months of receiving the book, and although there is no fixed length, 600 words can be considered a guideline. Reviews may be written in either French or English, and the reviewer may keep the book they review. First time reviewers are welcome! Contact Jan Mersey, Book Review Editor for *Cartographica*, Department of Geography, University of Guelph, Guelph, Ontario, Canada N1G 2W1; FAX 519-837-2940; email jmersey@uoguelph.ca.

Books available for review:

The American Cities & Technology Reader: Wilderness to the Wired City. Edited by Gerrylynn K. Roberts, 1999. Softcover, 309 pp.

Innovations in GIS 4: Selected Papers from the Fourth National Conference on GIS Research UK. Edited by Zarine Kemp, 1997. Softcover, 285 pp.

The Geography of Tourism and Recreation. By C.M. Hall and S.J. Page, 1999. Softcover, 309 pp.

Map Semiotics Around the World. Edited by Hansgeorg Schlichtmann, 1999. Softcover, 179 pp.

Land Use, Land-Use Change, and Forestry. Edited by R.T. Watson, I.R. Noble, B.Bolin, N.H. Ravindranath, D.J. Verardo and D.J. Dokken, 2000. Softcover, 377 pp.

Looking into the Earth: An Introduction to Geological Processes. By A.E. Mussett and M.A. Khan. Softcover, 470 pp.

Calendar / *calendrier*

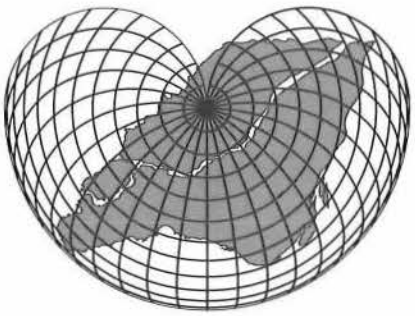
February 19 - 21 février, 2001
GIS 2001
Vancouver, BC
For information /*pour renseignements:*
www.GIS2001.com
(includes CCA sponsored Education Session - contact: Peter Keller, Roger Wheate)

May 29 mai - June 2 juin, 2001
Canadian Association of Geographers
Montreal, QC
(McGill, Concordia, UQAM)
Contact cag@felix.geog.mcgill.ca

May 30 mai - June 2 juin, 2001
Conference l'ACC/CCA 2001 Joint with the ACMLA
Montreal, QC
For information /*pour renseignements:*
MichealFournier,acsg_mtl@mlink.net
or any executive member.

August 6 - 10 août, 2001
ICA BEIJING 2001
For information /*pour renseignements:*
www.sbsm.gov.cn/ica2001

October 3 - 6 octobre 2001
NACIS XXI
North American Cartographic Information Society
Portland, Oregon
Doubletree Hotel
contact: jcrampto@gmu.edu



CARTO 2001

Addendum to:
EDUCATIONAL WEB SITES OF CCA MEMBERS AND COMPANIES
(see *Cartouche 39*, p.20 for original list)

Carleton University (Christine Earl): *www.carleton.ca/geography* Minor in Geographic Information Processing.

University of British Columbia Map Library (Francis Woodward): *www.library.ubc.ca/spcoll* Specialty: Cartography of British Columbia

Welcome New Members
Bienvenue aux nouveaux membres !

Monika Rieger
CCA Membership Coordinator
Coordonnatrice de l'adhésion des membres de l'ACC

Je prévoie poster les formulaires de renouvellement d'adhésion au début de janvier 2001. Les frais seront les mêmes que l'an dernier. Ceux qui ne veulent pas recevoir un rappel annuel pourront se servir du rappel bi-annuel qui est encore disponible. Veuillez, s'il vous plaît, nous faire parvenir votre renouvellement le plus tôt possible, afin de faciliter notre travail. Merci de votre collaboration.

I plan to mail out the renewal forms for 2001 in early January. The fees will be the same as they were last year and, for those of you who don't want a yearly reminder, the two-year renewal option is still available. Please watch for yours and send it in early to make our jobs much easier. Thanks.

The CCA would like to welcome the following new members to our organization.
L'Association canadienne de cartographie voudrait souhaiter la bienvenue àses nouveaux membres.

Chad Amirault	Bedford, NS	Dan Magee	Edmonton, AB
Margaret Atkins	Edmonton, AB	Tim Martin	Edmonton, AB
Charles Barton	Edmonton, AB	Lawrence Martz	Saskatoon, SK
Ian Basford	Edmonton, AB	JoAnna McIntyre	Enfield, NS
Keith Bigelow	Saskatoon, SK	Longin Pawlowski	Edmonton, AB
Julia Blackstock	Lubbock, TX	Donna Porter	Ottawa, ON
AndrÄanne Boisvert	Ottawa, ON	Pierre Rochon	Ottawa, ON
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The CCA was founded in 1975 to promote interest and education in maps and cartographic data, and to provide for the exchange of ideas and information, at the regional, national, and international levels, via meetings and publications. Membership in the Canadian Cartographic Association is open to all individuals, and public and private institutions which have an interest in maps and the aims and objectives of the Association. Membership is available in the following categories at the annual rates listed below ($CND):

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Members receive the quarterly journal *Cartographica*, published by the University of Toronto Press and endorsed as the journal of the CCA; four issues of *Cartouche*, the CCA newsletter and the International Cartographic Association Newsletter. The Association also provides an annual conference to promote discourse and access to a range of expertise through the interest groups and regional contacts.

For further information about membership qualifications and benefits contact the membership coordinator or any executive member or visit www.geog.ubc.ca/cca

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Pour plus d'information concernant l'adhésion et les bénéfices de l'association, contactez le coordonnateur des adhésions ou l'un des membres de l'exécutif ou encore, visitez notre site Internet *www.geog.ubc.ca/cca.*