

ADDRESSING THE VALUE OF ART IN CARTOGRAPHIC COMMUNICATION

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ABSTRACT:

Contemporary methods for depicting the earth and its cultural and natural attributes use graphic and non-graphic formats, maps and map-related artefacts, for visualizing geography and for building virtual landscapes and environments. The discipline area of Cartography, traditionally, has applied Art (Design), Science and Technology to map-making to design and realise these products. Prior to the mid 1950s cartographic artefacts were built under the theoretical and practical 'umbrella' of this partnership of Art, Science and Technology. However, since then it is argued, the theory and methodology associated with visualizing geography has focused on Science and Technology, and away from Art. This 'move' away from Art was accelerated by: 1. Computing, computers and complete automated systems; and 2. A 'quest' to gain 'scientific legitimacy' by using Scientific Visualization as a lodestone for gauging the 'quality' of theories and applications.

Science and Technology has been embraced by cartography as a means to ensure that what is presented is scientifically 'correct' – products are considered to 'work' if they are scientifically 'elegant', technologically 'buildable' and 'deliverable' using contemporary communications systems. But, it is argued, Science or Technology, need not always take on primary roles, and there now is a need to address the role that Design needs to take to facilitate the further development of contemporary cartography, especially in the areas where New Media has been applied to facilitate the building of Geographical Visualization tools.

This paper will address how, by incorporating ART elements into the design criteria of geographical visualization artefacts, 'different' visualization tools might be provided, by considering all three elements of cartography: Art, Science and Technology.

1. INTRODUCTION

Understanding how technology works is important, but the partnership between art and science, and their contributions to the discipline, are as important. ART provides the 'public face' of cartography (and if we include the cartographer's passion when designing particular products, perhaps the soul as well) and science complements this by ensuring that what is presented is scientifically correct, and what could be called 'scientifically elegant' as well. Science or technology, it is argued, needs not always to take on the primary roles in cartography. However, technology is needed to ensure that the designed product can be produced and delivered and science is necessary to ensure 'correct' and rigorous products. However, the resulting artefact, designed and produced by balancing the art, science and technology attributes, as a street artist juggler might balance a chainsaw, a watermelon and a table tennis ball, has recently been biased towards science and technology, with art being relegated to the position of 'afterthought' (thinking about the art elements after the product's specifications are 'locked' within a science foundation and technology-driven production and delivery 'envelope'). Cartography is different from other contemporary disciplines insofar as it can design, develop and deliver products with an art or a technology or a science 'flavour'. But we need to address how to make ART-biased cartography as relevant as science or technology-biased cartography.

To illustrate this, take the simple process of recording spatial information by an expert recorder using a pencil and a piece of paper. If a very hard pencil is used a very precise product results. The definition between one feature and another must be precisely determined and depicted and accuracy usually would reign over artistic input. The resultant map, whilst showing precise positions and clearly demarked divisions between different classes of information, cannot depict the vagaries and overlaps that are characteristic of real-world geographical information. The depiction can only show clearly defined edges of natural and cultural phenomena. The map user can only interpret what is depicted by lines, points and polygons and is unable to 'read between the lines' to comfortably interpret what may lie in the zones between discrete classes of depicted data. If a very soft pencil were used, a more flowing and interpretive map, or a more artistic approach to information recording would result. The drawer of the map, not restrained by the imposed need for accuracy and precision of a sharp, hard, thin pencil point, can render the paper with a different type of portrayal of the real world. Areas of vagueness can be illustrated as such, interpretations can be made and impressionistic drawings produced instead of planimetric map-type drawings produced using the soft pencil's precision-demanding counterpart. A different portrayal of the same information would result. Different users of these maps might prefer one information depiction device to another, and some might prefer to use both maps, in different ways, to gain a better understanding of the part of the real world being depicted.

An example of this is using a number of artefacts to gain visual information about a city. It is argued; if different media are used, then a different viewpoint is provided, and perhaps a different interpretation of the city is had. The three following figures illustrate this. Figure 1 shows New York depicted as a painting and in figure 2 as planimetric map. The painting (one medium) provides one viewpoint, the map another. Compared to 'standard' maps, like street directories and topographic maps, artistic interpretations can provide completely different viewpoints of a city. Users are provided with different platforms from which to view 'reality'.

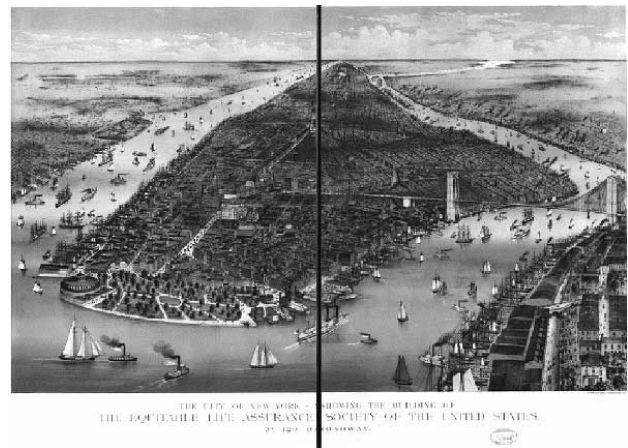


Figure 1. New York – a 'birds-eye view'.



Figure 2. Sheet 1 of 2 sheets of Map of Lower and Upper Manhattan

With the current provision of 'conventional' maps (including conventional maps delivered on mobile devices and the World Wide Web (Web) the question arises as to whether the users of conventional artefacts for depicting geographical information only being allowed to view information using one particular type of hard/sharp 'pencil' drawing? Would a better understanding of the real world be had if many different methods for its depiction were made available? It is argued that the present devices for viewing the complex relationships that comprise the real world, even with the application of new technology, still only allow users to see that information in one manner - the hard, precise, sharp pencil manner that is a legacy of paper mapping. It is further argued that there is a need to investigate how the use of other, 'softer' presentation methods that complement today's generally 'hard map'- biased devices portray geography and the mental images of reality constructed.

2. SCIENCE AND TECHNOLOGY AND RESTRICTIONS IMPOSED ON 'ART' IN CARTOGRAPHY

Science and technology has provided cartography with the means for providing accurate maps in a timely and efficient manner. However, at a cost – the loss of control over part of the design process. In order to apply technology to map production and replication cartographers were required to amend their documents so that they accorded with the technology used to produce them or to communicate the geographical 'message'. This section of the paper looks at some of the technologies adopted by cartography and how they affected the actual design of the map.

Printing

Aligned to paper map production, printers became part of the map production team and in many ways they dictated the 'look' of maps for many years due to their technologically-imposed specifications on the map production process. Map design had to follow function and Cartographers had to adapt design and production to take into account the particular restrictions which printing placed on maps. Printing 'formalised' map design and the actual 'look' of maps reflected this. Take for example the map shown in figure 3, produced by the 'Typonimie' map production process, where the typesetter's formal grid of letters and standardised symbols forced the map design to accord with this structure. This was somewhat similar to how maps need to adhere to grid cells with raster image computer maps.

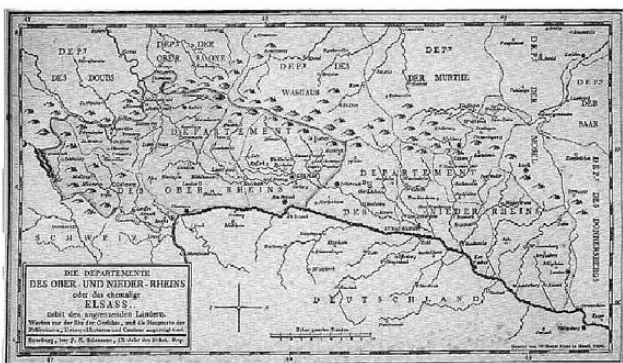


Figure 3. Example of strict grid map layout associated with maps produced by 'Typonimie'

However, it must be noted that many maps produced via the printing press do have a certain quality that can be termed 'elegant cartography'. Here, the precise replication of detail

provides a map that, whilst still designed to conform to the demands of the printing press, were completed to a high standard which can be admired as excellent examples of the cartographers work and the engraver's skill.

Introduction of computers

With the 'invention' of the computer everything changed in the scientific world, including cartography. Cartography applied computer graphics for artwork production and output. Unfortunately many early inferior map products produced with these early computer systems were readily accepted as substitutes for the precise and elegant scribed and printed alternatives only because they were produced quickly and by new computer systems. Just because the results of many calculations could be displayed using the newly-adopted computer drawing packages, users were sometimes willing to accept the initial crude outputs only because they were produced quickly and from data which resided on a massive database.

Examples of these maps were ASCII (American Standard Code for Information Interchange) maps, maps produced by the output of simple maps, with variations in greytone density achieved by overprinting characters on a black and white printer. The demands of this method of map production, made the map design accord with the replication technique. The resultant maps were 'chunky' and almost illegible when more detailed information was needed. A sample of such a map is shown in figure 4.

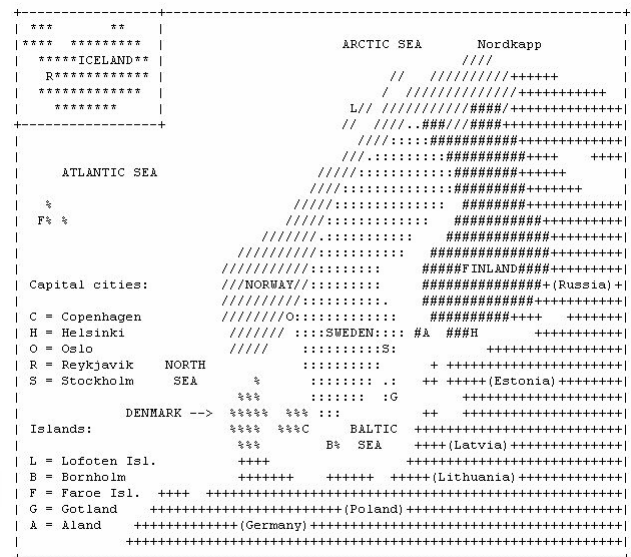


Figure 4. ASCII map of Scandinavia. Source: University of Utrecht, 1998.

As long as the products were not exposed to too much critical analysis all appeared to be well with the cartographics. But, still, some below standard map products that resulted from the attempts to portray spatial information using early computer graphics systems were foisted onto the user. However, once mastered, the technology can provide beautiful maps.

Discrete media

The introduction of discrete media saw maps being produced on CD-ROM. Initially, the potential of the large storage capacity of CD-ROMs for the distribution of geographical information fostered interest in publishing digital maps using a new medium (Rystedt 1987). Products like the Digital Chart of the World

(DCW) and the World Vector Shoreline (Lauer 1991) were some of the first products to exploit this storage medium. The initial products mimicked their paper cousins, but later products on this medium added interaction and user tools. In the street directory genre, British company, Nextbase produced a street directory of London. Whilst this product provided innovative inclusions like layers of information that could be turned on and off, enabling information to be made available when required, enhancing what could be immediately viewed - an apparent electronic version of a paper street directory (see figure 5). However, what was produced was still a 'standard' street map - with interactivity added. The media was not fully exploited and the maps were only electronic reproductions of paper products.

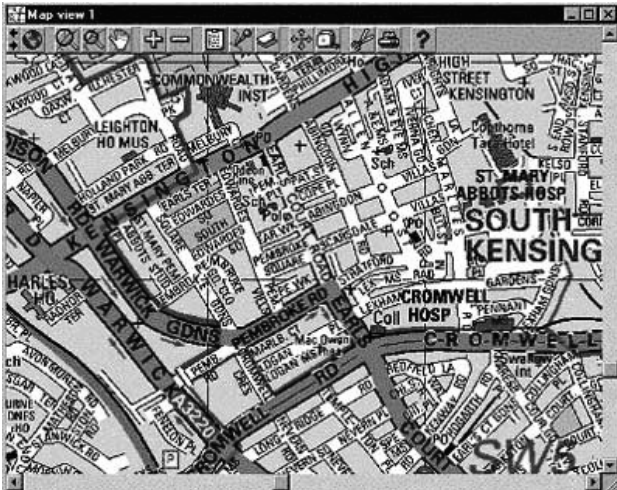


Figure 5. Nextbase London Street Directory. (Source: Sargent, 1994)

Later, the appearance of Desktop Publishing packages made every graphic artist a cartographer. A flood of 'crude' (from a design and consumption perspective) computer generated maps depicted everything about everywhere. This relatively recent transition of mapping from large electronic purpose-built systems housed in a map production company to individual desktop has also been a revolution for small map producers. Individual cartographers were able to produce maps as sophisticated as their corporate counterparts. Equipped with a powerful microcomputer plus a scanner, plotter/printer and modem the individual becomes part of the distributed digital electronic mapping community.

The Web

The arrival of Web publishing initially mimicked somewhat the maps produced in the early applications of CD-ROM. Paper maps were scanned and collections provided on this optical media. Maps weren't designed specifically for the medium and 'compromise' products resulted. Early Web mapping sites provided access to map collections. These were initially scanned maps, like those in the CIA World Fact Book (<https://www.cia.gov/cia/publications/factbook/docs/refmaps.html>) and the PCL Map Collection (<http://www.lib.utexas.edu/maps/>). Whilst delivered immediately, these maps provided low resolution replications of maps that were printed on paper in higher resolution than the 72 dpi computer screens on which they were displayed. A typical map availability query and resultant map from the PCL collection is shown in figure 6.

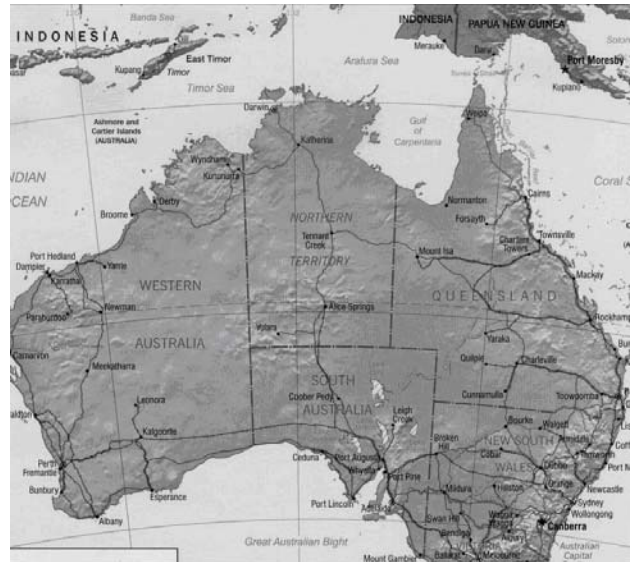


Figure 6. Access interface and map of Australia from the PCL map collection. Source: http://www.lib.utexas.edu/maps/australia/australia_rel_1999.jpg

Later, as bandwidth improved and map designers addressed the Web as a real publishing media products did improve from a design viewpoint. Maps were designed to 'work' with the restrictions imposed by the communications medium. This can be seen to parallel somewhat the printer-cartographer relationship that evolved with printed maps. Map design and production methods were altered to fall into place with Web publishing. Maps like those from the National Geographic Society's *Map Machine* (figure 7) developed excellent products that worked with the foibles of the Web.



Figure 7. National Geographic Society Map Machine. Source: <http://plasma.nationalgeographic.com/mapmachine/>

Most recently maps have been published on the Web by producer-users using a process called 'mash-ups' with Web 2.0 and Social Software. Web 2.0 is the use of the Web by individuals and groups of individuals to provide and share information, including geographical information. It provides a new model for collaborating and publishing.

Crawford (2006) wrote that computers are being used differently illustrates a shift from the conventional publishing model. She writes: "But what has changed over the past 15 years is that they (the users) no longer represent the only way to produce and distribute creative work. As computing power has

become more affordable and software has become more powerful, the creative potential of what can be done at home – and at relatively low cost – has soared. And there has been an explosion of creative production as a response. It has been described as “mass amateurisation”: the masses now have greater access to the means of cultural production. We are witnessing a crucial shift as the gap narrows between what can be done at home and what is professionally produced; amateur productions take on professional approaches and professional productions make use of the amateur aesthetic.” (Crawford, 2006, p. 23). She goes on to say: Everyone is making something, collaborating on something or distributing something. It doesn’t matter if it’s a zine, a new media installation, a piece of software, an album, a short film or a photo blog” (Crawford, 2006, p. 23).

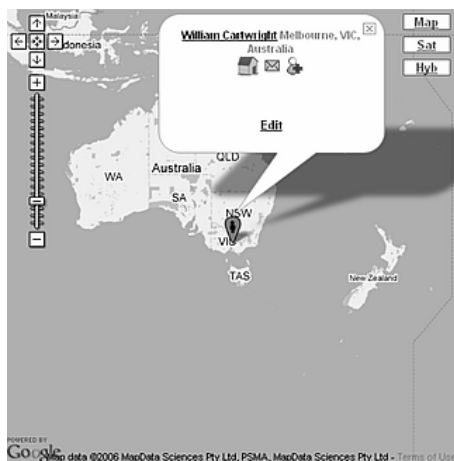


Figure 8. Google Maps© and user-produced maps.

But – the maps are still conventional mapping products, from a design perspective. In many cases the innovative use of social software and the Web has not produced innovative products, just conventional maps. And, in many cases these maps are naive design outputs, like the example shown in figure 8 from the Google Maps©API.

Even with the innovation of contemporary media, in most cases, conventional maps are being produced. Science and Technology has been harnessed to produce maps quickly, efficiently and collaboratively. Good design has been applied to mapping, but Art has been overlooked.

Maps show one ‘view’ of geography – that composed and provided by cartographers. However, according to Peters (2007), a postmodern account of geography would not consider any one representation of a place as any more valid than any other representation. So, are maps and map-related artifacts produced by cartography enough? The following section of this paper explores where Art has been used to communicate about geography. The section is unashamedly pictorial rather than wordy, as the figures provided illustrate the richness of art produced to depict place.

3. ART AND REPRESENTING GEOGRAPHY

Words

The power of the narrative can be used to paint ‘word pictures’ of the world and give the user/viewer a sense of geographical place. Authors like Michener used words to put the reader into

a “time cell” of reality. The extract, below, from Michener’s Alaska (1989, p. 14) allows the reader to enter a virtual world described in prose.

“During one of the endless twists and turns, about half a billion years ago, the nucleus rested temporarily about where Alaska does today, that is, not far from the North Pole, and it would be instructive to visualize it as it then was. The land, in a period of subsidence after eons of violent uprising, lay not far above the surface of the surrounding seas, which had even yet not separated themselves into the oceans we know. No vast mountains broke the low profile, and since trees and ferns had not yet developed, Alaska, which amounted only to a minor promontory, was unwooded. In winter, even at these high latitudes, a phenomenon which would always characterize northern Alaska pertained: it did not receive much snow. The surrounding seas, often frozen, brought in so little precipitation that the great blizzards which swept other parts of the then world did not eventuate, and what little snow did fall was driven here and there by howling winds which swept the earth clear in many parts or left it lightly drifted in others”.

A ‘view’ of Alaska from millennium past would also be possible through contemporary computer graphics visualisation packages, but does the viewer/reader get enough visual triggers from the wordsmith to paint their own picture?

For geography, stories can just provide statements of facts, where no embellishment is required and the user only wants to know ‘the facts’. These facts can be stand-alone, or supported by ‘on-line’ experts who are able to give expert opinions on the geographical space being explored. It may be a narrative, where a documentary-type video, supported by a comprehensive, and interactive, narrative can ‘walk’ a user through ‘unknown territory’. Users may construct their own story, or be ‘talked’ through an area, where they construct a story using programme support materials and aural navigation aids. Finally they may decide that they wish to experience a landscape by investigating a ‘literate landscape’ by being told a story.

Paintings

Artists have produced wonderful depictions of geography. For example, Tyrolean landscape artist H. C. Berann (Troyer, 2007) (figure 9) provided beautiful paintings of alpine terrain that allowed the grandeur of such landscapes to be appreciated. He did not produce maps, but his paintings of alpine landscapes provide rich interpretations of geography.



Figure 9. Berann’s painting of part of Yellowstone National park. Source: http://www.berann.com/panorama/yellowstone_1.jpg

As well, there are numerous contemporary landscape artists who, according to Peters (2007, p.1) "... represent an infinite subject in a finite space". One of the contemporary artists assessed by Peters (op cit.) is Benjamin Edwards, who is exploring the "architecture of suburbia" (op cit., p. 2), developing pieces that depict landscapes that are created by the American Interstate highway. One of his paintings, *Immersion*, which is his depiction of part of New York, the result of the ultimate American consumer environment. This is shown in figure 10.



Figure 10. Benjamin Edwards – *Immersion*, 2004 oil on canvas
Source:

http://mocoloco.com/boston/archives/edwards_immersion_dec_05.jpg

Installations

Installations provide 'other' interpretations of places and space. They use various means and techniques to achieve this. For example, *URBAN LEGENDS: The City in Maps* was an exhibition conducted by CITY|SPACE, "a cultural organization dedicated to exploring the built environment through events and exhibitions in a wide range of disciplines, including design, visual art, cultural landscape research, and film (www.city-space.org). This was a juried exhibition that took place over two weeks in the summer of 2004 at the Oaklandish Gallery in, Oakland, California.

From the site:www.city-space.org/Pages/past3_legends.htm:
"Urban Legends: The City in Maps," an upcoming exhibition of maps in all their forms and meanings. The show will explore the idiosyncratic ways in which we seek to understand the world around us, and in particular the urban environment, with a visual record of our paths and patterns, both literal and figurative.

For this exhibition, we seek submissions of finished original work in all media that address the urban landscape through maps. We encourage the broadest possible interpretation of this theme in a range of media and disciplines. Artists, scientists, geographers, planners, designers, activists, or anyone interested in the theme may apply. Works may be two- or three-dimensional. Time-based media (film, video, digital) may be submitted, but all work must be suitable for display in a gallery setting".

Another installation is Worldprocessor (<http://worldprocessor.com>), described as "An attempt to do justice to the term 'political' and 'geo-political' globe. ... Trying to tell the lie (of abstraction and visualization) that tells the truth." There are more than 200 different globes that can be

viewed on the Web site. Detail of a globe visualizing international data availability is provided in figure 11.



Figure 11. Globe 33 - international data availability. Image copyright Ingo Günther. Used with permission. Source: http://worldprocessor.com/index_vis.htm

A selection of 36 globes was shown in 1996 as part of the exhibition "Global Change" in the Museum of Natural History in Madrid, Spain.

Furnishings

A 'Woolen Map Carpet' was produced by Seyed Alavi, and installed as public art at the Sacramento Int'l Airport. The carpet, shown in figure 12, was installed in one of the public walkways at the airport.



Figure 12. Woolen Map Carpet by Seyed Alavi.http://research.techkwondo.com/project_idiom/cartography/collaborative_cartography

Pavement - an installation at Cartography 2000 by John Wood and Paul Harrison)

'Pavement' was installed at the Worcester City Art Gallery and Museum in May 2000. It consisted of 24 TV monitors set into a false gallery floor, each playing a different sequence of human feet. The concept of 'flood' was alluded to by showing rising water levels on the monitors, where one of the artists was engulfed by water.



Figure 13. Pavement - John Wood and Paul Harrison
<http://www.fvumbrella.com/projectdetail/venue/W/27/Cartography>

The artist as cartographer Cartography as art



Figure 14. The ATLAS MAPPING exhibition. Source:
http://www.kunsthhaus-bregenz.at/ehtml/aus_atlasmap.htm

The ATLAS MAPPING exhibition (1998) (http://www.kunsthhaus-bregenz.at/ehtml/aus_atlasmap.htm) was a co-production with the O.K Centre for Contemporary Art, Linz. It presented an artists' view of cartography. The artists illustrate the world from a different perspective. Figure 14 shows one of the illustrations from the exhibition catalogue.

Human movement

Burningman is a one-week event in Black Rock Desert, held each year, and attended by up to 25,000 people. It invites artists and attendees to participate in events that include installations and dance (Stenson, 200?). *Burningman 2000* focussed on the a seven day ritual focussed on the 7 chakras of the body. Each day the Body Cartography dance company performed movements that were related to the space in which dancers performed. Also, each day was a different 'colour' day. Their 'white day' performance is shown in figure 15.



Figure 15. Dance at *Burningman 2000*. Source:
<http://www.moonski.net/burningman/burningman/burning05.html>

About their work the Body Cartography dance company (2007) notes:

"We investigate the bodies' relationship to the physical, architectural, climatic, technological and social landscapes that we inhabit in urban/wilderness and private/public contexts is the material of our work.

We activate space and challenge social and perceptual limitations of physical freedom.

We engage and provoke audiences in diverse contexts through collaborative processes with independent artists, and national and international companies and communities. Our ventures include dance performances, installation works, film/video projects and educational workshops."

As well as these visual interpretations of geography, sound, touch and smell has also been explored.

Sound and 'soundscapes'

Soundscapes are described as "the overall sonic environment of an area, from a room to a region" (Porteous and Mastin, 1985, p. 169). The theory of using soundscapes is generally attributed to Granö (1927). His pioneering work produced an agricultural soundscape, which illustrated cartographic representations with acoustic sensations of human activity, birdsong and grazing cattle on the Finnish island of Valosaari (Porteous and Mastin, 1985).

Work was undertaken by the Spatial Information Architecture Laboratory (SIAL) at RMIT, Australia. Sounds of the Central Business District of Melbourne, Australia were recorded – at each street intersection. Then a soundscape of the city was built using interactive media. The installation interface is shown in figure 16.

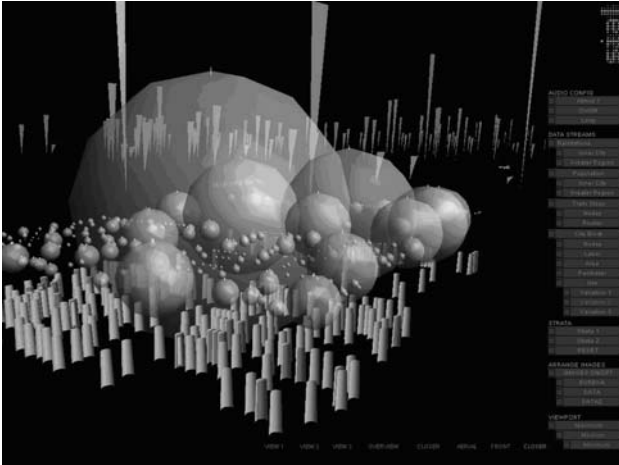


Figure 16. Soundscape of the Melbourne's Central Business District. Source: Pettit et al., 2003

Touch

Tactual or tactile mapping has been produced to assist blind and visually impaired people better understand geography. The tactile relief map of South America, from the Sonnenberg, school for visually handicapped children and adolescents (ETH Department of Cartography, 2007) (figure 17) is a typical example.



Figure 17. Tactile map of South America. <http://www.terrainmodels.com/tactile.html>

Smell

In 2003 the University of Minnesota Design Institute undertook a project called the Twin Cities Odorama: A Smell Map of Minneapolis and St. Paul. They described this as an "Olfactory experiences emanating from the intersections of people, enterprise and physical environments" (University of Minnesota Design Institute, 2007a). This was undertaken under a larger 'umbrella' project – the Twin Cities Knowledge Maps, part of the Design Institute's Twin Cities Design Celebration 2003 (University of Minnesota Design Institute, 2007b). The product was a map/poster illustrated smells and odours in the twin cities of Minneapolis and St. Paul. The poster is shown in figure 18.

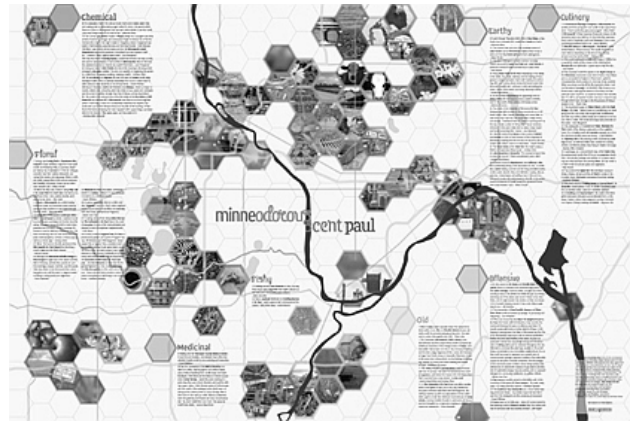


Figure 18. Twin Cities Odorama: A Smell Map of Minneapolis and St. Paul. (<http://design.umn.edu/go/person/SMELLMAP>)

4. THE CASE FOR MAPS

It has been argued by geographer/cartographers like Castner (1981) that the map model works best, that users have to appreciate the 'grammar' of cartography in order to fully understand the 'language' of maps and how it depicts geography (including the associated 'lies' that maps have to tell to illustrate the 'truth' about what the map reader needs to see on the map in order to have the best 'view' of reality. Using the defined geographical 'picture' that is used in the corridor provided by the tour or itinerary only a small view of what reality really is provided and therefore a true appreciation of what constitutes the 'real world', and where the user 'fits' into that world, cannot be had.

5. THE CASE FOR 'MORE THAN 'JUST' MAPS

Calvino's "Invisible Cities" (1979) gives some insight into what an articulated map reader/interpreter may wish to read into media that shows interpretations of geography:-

"...relationships between the measurements of its space and the events of its past: the height of a lamp-post and the distance from the ground of a hanged usurper's swaying feet; the line strung from the lamp-post to the railing opposite and the festoons that decorate the course of the queen's nuptial procession; the height of that railing and the leap of the adulterer who climbed over it at dawn; the tilt of a guttering cat's progress along it as he slips into the same window; the firing range of a gunboat which has suddenly appeared beyond the cape and the bomb that destroys the guttering; the rips in the fishnet and the three old men seated on the dock mending nets and telling each other for the hundredth time the story of the gunboat of the usurper, who some say was the queen's illegitimate son, abandoned in his swaddling clothes there on the dock."

Considering that Cartography has been described in terms of science, art and technology, it is perhaps necessary to re-visit the description in the light of the application of computer technologies. Is cartography any different when delivered using computer-driven devices? Does cartography need to be re-defined because of the revolution that has taken place with both the way in which information is now communicated and the type of information that can be transferred, almost instantaneously, globally?

An argument could be put that cartographers become involved in the elements of cartography that they have both mastered (either academically or technically, or both) and that they also enjoy doing. Personal satisfaction in producing an elegant and aesthetically-pleasing design or mastering some scientific problem - both resulting in an as-near perfect a solution that is possible - can be a major part of what provides cartographers with motivational input that encourages further refinement of skills and better mastering of particular scientific problem-solving strategies that are unique to cartography. From the producer/consumer perspective, the need to produce a map that would serve a purpose, as well as mastering a technological skill, provides the motivation to complete a product that works (for them), but they could be uninterested in producing maps for anyone but themselves).

In the current situation, where maps are no longer the focus for every interpretation of geography, should cartographers view what they do differently, and do consumers of cartographic products influence the art/science/technology balance? Seeing that contemporary cartography could be seen to have as much to do with making a movie as producing a scientific document (although the scientific integrity of all cartographic products is as important now as ever (perhaps more important because of the 'casual' appearance given by the immediate facade of contemporary mapping, before the 'shell of innocent art' is broken by further exploration)) the art components need to be considered as equal partners to the scientific counterparts. Science and technology may only be something that 'gets in the way' of best depicting geography.

6. CONCLUSION

Understanding science and harnessing technology is important, but the partnership between art, science and technology, and their contributions to the discipline, are as important. In my opinion art provides the 'public face' of cartography (and the cartographer's passion when designing particular products perhaps the soul) and science complements this by ensuring that what is presented is scientifically correct, and what could be called 'scientifically elegant' as well. Science and technology, it is argued, is not the only way to address geographical depiction. It is most necessary to ensure that the designed interpretation product can be realised. However, the resulting artifact, cannot always be the result of only science or technology interpretations of geography.

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