1. Cartography: the development and critique of maps and mapmaking

> Maps 'are once again in the thick of it' for critical social theorists, artists, literary critics and cultural geographers, but also in a very different way for planners, GIS researchers and scientists. Art and science offer different cartographic explanations. There are profound differences between those who research mapping as a practical form of applied knowledge, and those who seek to critique the map and the mapping process. (Perkins 2003: 341-342)

Cartography is the study of maps and map-making. Classically, it focused on the art of the map-maker; today it includes the history of maps and their use in society. A map, as defined by the International Cartographic Association (2009), is 'a symbolised image of geographical reality, representing selected features or characteristics, resulting from the creative effort of its author's execution of choices, and is designed for use when spatial relationships are of primary relevance'. While this definition eloquently indicates the varying constructions of maps, leading to the different ways maps are conceptualised and produced within society, its basic premise -- that a map is first and foremost 'a symbolised image of a geographical reality' -- has been challenged with the rise of a critical cartography/geography. Taking this definition as a starting premise, this chapter will seek to illustrate the 'creativity' and 'selectivity' of maps through a brief history of cartography, before embarking in later sections on a more critical analysis of the debates that surround the subject. The primary goal here is to understand the lessons that can be drawn from the historical development of cartography in a bid to assist contemporary criminologists in the development of more appropriate questions about maps and ultimately the process of crime mapping itself. (The lessons will be applied in Chapters 3, 4 and 5).

The history of maps is a history of society. The dynamic potential of maps to communicate perceptions, ideologies, and legends, offers a visual history of societies and cultures. Although much can be gained by viewing the figurative depictions on maps, to truly understand them one must be cognisant of the cultural context in which they were generated. If you like, the creativity in the way the map is displayed tells one part of society's history while the map's function provides another.

Alongside each major period in map development one can identify a number of key shifts in ideology which serve to provoke a number of very specific questions about the world and the way it is spatially and conceptually configured. Some of

these questions have been limited to problems of technique and perspective, namely the difficult task of illustrating a large spherical shape onto a flat surface. However, it would be misguided to view technique as purely neutral and separate from the questions of cultural meaning or social power. Other questions, such as what to depict on a map and what message to convey, have been challenged in the theoretical development of cartography, and held a mirror to the development of human society. Twentieth and twenty-first century cartographers engage with new technologies that advance the mapmaking process and link it to understanding the power and influence maps have on society. This reflective turn within the discipline carries with it a critical cartographic school (for an overview see Crampton and Krygier, 2006) posing key questions about map creation and map interpretation. This 'school' does not speak with one voice for there are a number of approaches. Yet all are critical of the naïve representationalist view that 'maps...are statements of geographical fact; they are produced by neutral technologies; they just are' (Edney, 1996:187).

The course of this chapter will therefore provide both a brief history of cartography and an introduction to the debates that surround this critical cartographic discourse. Like a map, the literature reported in this chapter covers large areas with relatively few details, highlighting the core features (arguments) pertinent to the terrain (my overall thesis). Finally, the chapter will conclude with some key cartographic lessons that set the stage for subsequent chapters; the ultimate goal being the development of a more thoroughgoing and reflexive cartographic criminology.

1.1 A brief history of cartography

> Maps are central to the human experience and mapmaking is a major social achievement. In many ways, the history of maps and mapmaking is the history of human society. (Short, 2003:8)

> Historians of cartography have … defined and judged maps by the information they hold. This is an empiricist perspective. Empiricism is a philosophy which asserts that an observed fact can be declared true or false by direct reference to the world itself and without reference to the truth or falsity of any theoretical statements. (Edney, 1996:187)

A map may be any number of drawings or depictions. A map may be a drawing that shows geographical space, expressing the location of places or people. A map may display physical and biological features for any portrayed area. A map may illustrate various cultural or religious features about a society and its way of life.

However, no matter what a map exhibits, it reveals a snapshot of a place in time - real or imaginary. One may think about maps in a geographic sense as a flat surface representation of the actual world or some part of it, generalising and interpreting geographic conditions. Maps, however, are not always concerned with geographic representations and are used in many fields of knowledge, including literature, iconography, sociology and theology. Thus – by contrast to the ISA definition cited at the start of this chapter -- a map is more likely to be seen by contemporary geographers as a 'graphic representation that facilitates a spatial understanding of things, concepts, conditions, processes, or events in the human world' (Harley and Woodward, 1987: xvi). While the history of cartography spans thousands of years and has generated countless volumes dedicated to tracing the various relationships between maps and human society, it is still possible to discern significant and identifiable periods of map development, and it is these periods that I will attempt to summarise here.

Cartography is traditionally defined as the art and science of constructing and drawing maps. Cartographers, those who draw maps, decide what information the map communicates through its scale, symbolism(s), and purpose. The role of a cartographer and the importance of cartography extend beyond the simple drawing and artistic creation of a map. In a much broader sense, cartography is the long and rich history of maps and mapmaking, and cartographers are the conceptual storytellers of human society.

The first recorded cartographer – in the sense of producing systematic discussion *about* the making of maps -- is Claudius Ptolemaeus, better known as Ptolemy, who lived circa 85-165AD in Alexandria during the Roman Empire. His book '*Geography*' offered detailed discussions of how maps should be drawn to accurately represent a spherical Earth on a flat surface. He introduced a grid system to detect and record places, including coordinates of hundreds of locations. Ptolemy's work was lost to Western civilisation for nearly a thousand years after the fall of the Roman Empire in 400AD. His work resurfaced in the Arab-East and returned to Europe in the 1400s and the rediscovery of his work in Western civilisation greatly influenced the mapping processes and conceptualisations. The extensive theories and philosophies involved in the creation of maps, as well as their use, formed cartography proper.

The oldest known *map* is a Babylonian clay tablet dated back to

approximately 2300BC[1] (Clark and Black, 2005: 18; see also Johnson, 1999; Stefoff, 1995). It is a cadastral map[2] unearthed in Nuzi (or modern-day Iraq), depicting land marked with property lines. Early maps typically fall within one of two categories. The first category of maps depicts local geographical space based on first-hand observation, originally used for practical purposes such as tax collection and land-ownership, as in the Babylonian cadastral maps. The second category of early maps covers larger geographical areas and is represent world views and ideas visibly framed in terms of cultural or religious legends to promote and maintain powerful regimes (of church and state). Many of these maps take on the ambitious task of drawing the entire world from observable features or from theological writings. Yet, both types of early map – the one 'practical' and local, the other 'symbolic' and larger in scope -- reflects existing core beliefs of society during their time.

Medieval maps are perhaps the most visibly ideologically-framed maps in the history of cartography. Most of the 'world' maps, or *mappae mundi*, created during this period were powerfully influenced by Christian doctrine. These maps communicated biblical messages to a large illiterate parishioner population, often depicting biblical scenes and mythical creatures. A key development was the archetypal T-O Isidorean Map, representing a round world with a 'T' shaped division depicting the three then-known continents of Europe, Asia, and Africa. Europe and Africa are divided by the Mediterranean Sea on the bottom, with Asia on top divided by the Aegean Sea, the Nile River, and the Red Sea. At the centre of the map lies Jerusalem with East situated towards the top. The East was of great symbolic importance in Christian doctrine since it is the direction in which the sun rises and, as described in the Bible, the direction to paradise, beyond the Garden of Eden. The Psalter Map, circa 1250, is one example signifying the powerful influence of Christianity in England on the coherent image of the world, with Jerusalem at the centre and the Garden of Eden at the top (see Map 1-1). The Hereford Mappa Mundi, circa 1300, is another surviving example of a medieval map that contains medieval

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[1] There are many debates and arguments over what is the oldest known map and this reflects issues of what should count as a map. Newer discoveries of various artefacts claim to be maps that are even older than the Babylonian clay tablet. Furthermore, much attention has been given to what constitutes as a 'map'. As Crampton and Krygier argue, Harley and Woodward redefined map as 'graphic representations that facilitate a spatial understanding of things, concepts, conditions, processes, or events in the human world' (1987:xvi, as cited in Crampton and Krygier, 2006:17). This, in turn, 'opened the door to many non-traditional and non-western mapping traditions' (*ibid*. 17). Although these newer discoveries and arguments are fascinating, the intended point here is that maps are nearly as old as civilisation itself.
[2] Cadastral maps are typically used for keeping track of tax payers and taxes owed through land ownership.

and theological information (see Map 1-2). Again, this map communicates the Christian perspective of the world, placing Jerusalem at the centre, with nearly 2,000 biblical inscriptions and figures displayed (Westrem, 2001). The inscription around the map reads, 'The measurement of the world was begun by Julius Caesar' (Wilford, 2000: 55). This inscription testifies to the continued legacy of the Roman Empire in Medieval mapmaking and the authoritarian remains of the fallen empire in Western civilisation.

Map 1 –1: The Psalter Map, c. 1250. Only approximately 4 inches in width, this mappa mundi resides at the British Library in London. Source: Map can be viewed on the British Library website bl.uk

Map 1-2: The Hereford Mappa Mundi, c. 1300. One of the largest surviving mappae mundi, measuring over 5 feet high and 4 feet long. This map hangs in the Hereford Cathedral, England. Source: Map can be viewed on the Hereford Cathedral website.

Both the Psalter map and the Hereford map were criticised, on their discovery in the 19th century and later, for reinforcing Christian ideology as opposed to geographic reality. Beazley notoriously describes the latter as 'a highly developed but scientifically debased example of semi-mythical Geography, an elaborate exposition of strictly medieval habits of thought, applied to Geography' (Beazley, 1901: a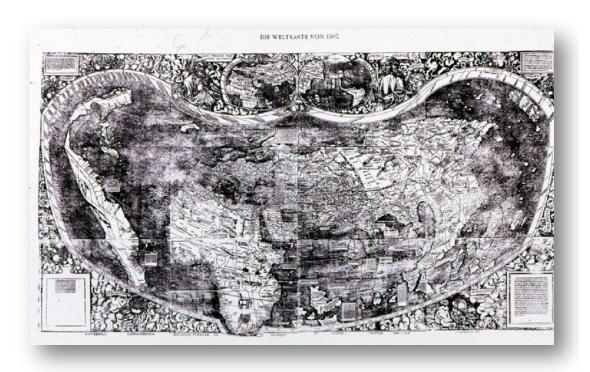s cited in http://cartographic-images.net/Cartographic_Images/223_The_Psalter_Map.html). However, in the contemporary climate of critical geography, such dismissive comments are regarded as misguided. As Westrem (2001: p. xvii) points out, *mappae mundi* were not intended to be a precise representation of geographical reality – although this was the

aim of the newly emerging Medieval navigational charts (Portolan maps, the earliest of which is estimated to be 1275).

However, it was not until the 15th and 16th century Renaissance period that cartography developed into a larger practice determined to produce maps, including world maps, more representative of geographic reality[3]. It must be emphasised that it is not so much that maps 'became' more accurate but, rather, that accuracy became a central aim of map making. During this 'Age of Discovery', the return of Ptolemy's work to Europe greatly contributed to these developments of world maps. Ptolemy's method of global projection - a technique for representing a sphere on a flat surface with North placed at the top of the map - changed the image of the world as earlier depicted in *mappae mundi*. The map was secularised, developing a new social context and purpose. World maps produced during the Renaissance period, as Whitfield (1994: 36-39) suggests, remained unscientific in the sense that they were neither based on mathematical calculations, nor a part of a greater scientific movement. Instead, cartographic development took a more 'artistic' turn (including the incorporation of references drawn from literature and philosophy) in an effort to present a more dramatic mirror image of the world. Moreover, these "whole world" maps were greatly altered by the voyages across the Atlantic to the Americas, a process that expanded maps beyond the previous three continent representation. One of the most significant maps of this era was Martin Waldseemüller's 1507 World Map (see Map 1-3), which attempted to present an entirely new vision of the world[4]. It was an historic map that marked a new direction in the field of cartography. However, like its predecessors, Waldseemüller's map would soon be superseded, as map making would further radical transformation in both the sixteenth and seventeenth centuries.

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[3] The rest of this section is only about world maps. The availability of documented records and cartographic representations from this time period onward is too vast for this section to undertake. The continued focus on world maps is merely to abridge cartographic history for the purpose of this thesis.
[4] Waldseemüller's Ptolemaic world-view was the first to present the new world, *America*. It was produced after reading the published accounts of Amerigo Vespucci in 1503. This is further elaborated later in this chapter.

Map 1-3: **Walseemüller's Universalis *Cosmographia*, c. 1507.** A rather large map, constructed from 12 woodblocks and spanning 2.5 metres broad. Source: The only remaining copy of the map is held in the Library of Congress in Washington D.C., United States, available on the Library of Congress website.

The 'Golden Age of Cartography', spanning 1570 to 1670, marked an era of successful navigation and empire expansion by the major European nation states. Much of the cartographic development during this period is attributed to the vast empire expansions to the new world and the subsequent need for more accurate navigational charts and maritime maps. Gerardus Mercator became the leading 16th century cartographer with his 1569 published world map, *Terrae Descriptio ad Usum Navigatium Emendate* (see Map 1-4). The circulation of his maps among the Portuguese, Spanish, and English was seen as one of the primary reasons for the successful navigation between Europe and the new world by prominent figures such as English privateer, Sir Francis Drake (Hampden, 1972).

Mercator emerged as a leading cartographer with his system of depicting the world map as a cylindrical projection that set the standard for (and greatly assisted in) maritime navigation. Along with Mercator, Flemish cartographic bibliographer, Abraham Ortelius, became a commercially successful European mapmaker when he created the first uniform atlas, which necessitated four reprints by 1570 (Cachina, 2006; Hampden, 1972). His *Theatrum Orbis Terrarum* (*Atlas of the World*, see Map 1-5 for his world map illustration) contained a compilation of reproduced maps from the most skilled cartographers, accompanied by individual map commentary. There
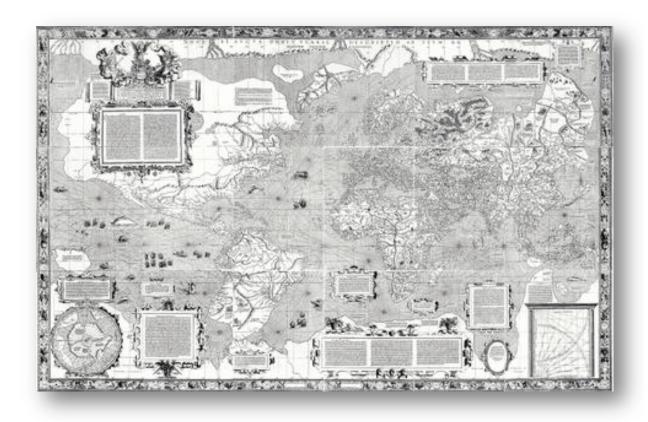
were many other prominent cartographers during this era, including the Blaeu publications, founded by Willem Jansz Blaeu (1571-1638) and later succeeded by son Joan (1596-1673). The publication of Britain's first world atlas in 1627, *The Prospect of the Most Famous Parts of the World*, made John Speed an influential man (Cachina, 2006)[5].

Although there were attempts to complete a whole world map, these efforts were often inaccurate, largely because cartographers still did not explore for themselves the spaces they were attempting to map. While navigational skills in cartography were improved with the use of tools such as the compass, astrolabe, and the quarter-staff, spatial inaccuracies persisted.[6] In other words, while the maps and charts produced during this period aided, for example, the navigation of trading passages, they remained extremely limited, as Hampden notes:

> there were no means of measuring longitude, and, once out of sight of known land, ship's position had to be estimated by more or less inspired guess-work, based on the navigator's experience. Maps and charts were often lacking or inadequate, but these, too, steadily improved as explorers added their quotas of knowledge. (1972:16)

[5] See Appendix 2: Alternative Representations in Crime Mapping for further discussion of cartographic development during the 16th and 17th centuries.
[6] The additional information added to the cartographic charts allowed for explorers to personalise their maps. Lines of longitude and latitude were used artfully, relying on the compass to accurately (as much as possible) plot the intended journeys of travel.

Map 1-4: Mercator's Nova et Aucta Orbis Terrae Descriptio ad Usum Navigatium Emendate, c. 1569. It measures approximately 80in. by 49in.Source: According to the Library of Congress (U.S.) copies of the map are located in Rotterdam, Holland and Hamburg, Germany. Available on the Library of Congress website.

Map 1-5: Ortelius's Theatrum Orbis Terrarumm, Map No.1. It is approximately 13in. by 19in. His maps are still widely available today, especially from specialty venues such as Cartographica Neerlandica

The story is familiar: discovery and exploration of the new world during the seventeenth and eighteenth centuries continued to contribute to a more accurate

portrayal of the world, finally articulated in Enlightenment ideals of science. Cartographers and map developers were kept busy for centuries filling in the many unexplored territories in the world, ridding modern world maps of spaces of *terra incognita*. Map development became increasingly accurate as well, relying more on scientific methods. However, the true revolution was that, more than ever before in the history of cartography, scientific accuracy in the map-making process was now valued as of the utmost importance. This fundamental shift to valuing the scientific accuracy of a map transformed the field of cartography. In particular, it marked the move towards measurable and verifiable characteristics of space by contrast to which earlier maps were seen as 'embellished' by artistic or theological features. In other words, accuracy of representation became the core of a map; other features became merely decorative or incidental. At the same, with the rise of the discourse of science in which maps now spoke scientific, mathematical truth, Mediaeval and Renaissance maps could be dismissed as serving non-scientific aims, visibly the servants of theology, empire or competing nation states.[7]

In the Enlightenment spirit of science, no longer were maps intended to communicate blunt messages of power or religion. Their value grew from how well the cartographer constructed a visual plan from travelling from one point to another. Nation state borders, city coordinates, features of the physical landscape, and precise distance emerged as the most significant features of the maps of this period. Map expectations and requirements were no longer based on legendary tales, explicit celebration of state regimes, or Christian philosophies. Instead, regardless of place of origin, maps were expected to abide by objective principles and to clearly illustrate geographic features and related facts about the physical environment.

It was not until the late nineteenth and early twentieth century that cartography 'came to fruition' (Crampton and Krygier, 2006: 19). Cartography experienced a disciplinary growth, introducing academic formality and rigour in the development of spatial knowledge. During periods of war, maps played crucial roles in the strategies of battles as well as the political strategies of propaganda (cf. Chapter 4: The Political Geography of State Crime and Violence). For example, propaganda mapping has played a significant role in attracting, promoting, and influencing opinions 'in such a way as to prey upon fears and feed hostility' (Harvey 2001:112; see relatedly Muehrcke, 1996:288). In the post-war period, cartography experienced an even stronger initiative to solidification as science, to work even

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[7] Shedding meaning in favor of "truth".

harder towards map design and map accuracy (Robinson, 1979; Robinson et al., 1977)[8].

The scientific aspirations of cartography pushed the discipline to develop new, technologically advanced ways of mapping space. With the use of aerial photography and later satellite imaging in the 20th century (such as Landsat), a new approach to mapping using a combination of ground observations and remote sensing emerged. The ability to create maps from the air, space, and sonar (as with ocean maps) further progressed the cartographic principle of mapping factual representations of the earth. Society revelled in cartographic progression by mapping all things functional to the social order. Atlases, road maps, and maps of traffic patterns now assist drivers in their everyday commute. Meteorological maps of weather patterns likewise help forecast the anticipated climate days in advance. There are maps of pipes, electrical lines, tunnels, and cables illustrating the smallest intricacies of cities and towns. Even fairly complex social phenomena such as routine patterns, actions and movements can now be "mapped" with varying degrees of accuracy. There are maps of DNA and the human genome. Indeed, one might say that a "mapping fetishism" overwhelms the cartographic history of the past century.

This quest to map all aspect of our lives shows no sign of abating. The rapid evolution of computer and digital technology continues to change the role of cartographers and the various processes of contemporary mapmaking. With the popular emergence of programmes such as Google Earth, where a specific location anywhere in the world is quickly accessed and viewed via the internet, it is reasonable assumption that the future of GIS will also employ the technology of Global Positioning Systems (GPS). The course of any contemporary human life is now depicted through the abstraction of maps.

Likewise, imagined, experiential, and mental maps are also fast emerging as an important element of late modern social life. A reader's knowledge is built from literary and fictitious maps which complements popular culture story-telling. Tourist maps of walks featuring haunted spaces alter spatial experience through psycho-geographies, as first developed in the mid-twentieth century (cf. Chapter 5: The Cultural Geography of Crime Tourism: Psychogeographies and Spectacles of

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[8] Elsewhere, psychogeographies emerged from the French avant-garde art movement during the post-war period as a response to the rise of the consumer society. Psychogeography is explored and critiqued in Chapter 5 of this thesis. It is omitted in this section because it was not oft included in the popular cartographic narrative. The force behind *Internationale Situationniste* (SI) was to engage in political resistance by subverting cartography.

Transgression). The cognitive and mental maps (cf. Appendix1: Mental Structures of Space and Cognitive Mapping) embedded in the minds of every individual guides daily manoeuvres through one's neighbourhood. The rising awareness of how individuals conceptually map exposes subjective and human positionality according to demography and preference. The mapping of the mind, of the imaginary, of the virtual, and of the psyche reveals cultural and temporal geographical knowledge of various populations. Understanding the literature on reflective mapping links and strengthens geographical knowledge of how life is experienced and practiced with the formation of mental maps[9]. Though this is a newer approach to mapmaking, most notably emerging in the mid-20th century, its increasing influence is gaining momentum in the development of mapmaking.

This selected history of cartography, primarily focused on world maps, has attempted to summarise some of the core shifts in mapmaking. Each turn in the process - from ancient cadastral maps to Christian Isidorian maps, from artistically embellished maps to scientifically measured maps – demonstrates that all civilisations demonstrate an innate need to create spatial knowledge in their societies. Reflecting on this history of maps as mirrors and gauges of societies over time orders space accordingly, presenting multiple opportunities to examine the deeper meanings and messages presented with maps. Mindful of this general history of maps and the development of society incites questions about civilisation and power. If society is truly experiencing a zenith of mapping fetishism, asking *why* maps are created and for what purpose becomes paramount. For that reason, this chapter will now turn its attention to the critical approaches to cartographic discourse.

1.2 Critical approaches to cartographic discourses

> As images of the world, maps are never neutral or value free or ever completely scientific. (Harley, 1990: 5)

> Like all systems of communication we can identify different elements: the producer, the medium, the message, and the consumer. (Short, 2003: 8)

> Maps have been thoroughly naturalised within our society; they are [treated as] natural objects. (Edney, 1996: 187)

The (albeit brief) history of maps in the previous section depicted cartography as a process/discipline characterised by substantive and ongoing transformation. It

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[9] See Appendix 1: Mental Structures of Space and Cognitive Mapping for a thorough description and discussion on mental maps.

also charted how maps and map making techniques are very often the product of particular ideological goals or cultural intentions. This being the case, it is important that one reads maps not only as simple or complex (depending on the type of map) forms of geographic/spatial/physical (or even psychological) communication/knowledge, but as constructed phenomena that must be approached critically and subjected to conceptual scrutiny. This section will undertake such a task by introducing and assessing the basic critical debates surrounding cartographic theory.

Maps, as argued by Jacob (1996: 193), display a view of space whilst also providing the viewer with a point of view. The views of space and place that maps represent are always fluid and contested. Even – and especially -- with claims of scientific accuracy and neutrality, no map can claim the status of pure objectivity (Harvey, 2001: 231). Thus, it is important to understand the primary construction of maps.

In the mid-20th century, cartographic discourse began to challenge and debate several taxing issues raised in the history of its field. It demonstrated how the fundamental questions of mapmaking[10] provoked questions about the authenticity, intentions, and interpretations of maps. Yet it was not until the emergence of highly technological advances in the creation and development of maps, such as aerial photography and satellite imaging that more attention was paid to the analysis and judicious readings of maps. An unspecified correlation appears between the fetishism of mapping in society and the emergence of critical cartographic practices and theories. Perhaps the map saturation of modern society provided the opportunity to reflect on mapmaking and its associated processes. Maps can be deconstructed in primarily three ways, as (1) representation, (2) communication, and (3) the as a process.

1.2a Maps as Representation

Throughout cartographic history, maps have usually been treated as geographic truth. A good map is one that displays an accurate mirror of some aspect of the real world (Harley, 1990:3-4). The construction of maps as accurate mirrors of

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[10] As listed in the Introduction chapter, the questions of mapmaking are: Who is making the maps? Who are they making maps for? What are the contexts of the map? What are its functions? And what are its consequences?

landscapes, technological layers to depict themes or spatial cognitions are subject to methodological examinations and theoretical analysis. The orthodox perspective of maps as 'mirrors of the world', objective and scientific representations of reality, permeate popular atheoretical views of cartography (Edney, 1999; Harley, 1990; Perkins, 2003). Such perspectives of maps as neutral cartographic communicators emerged during the Enlightenment, when geographical knowledge-power relationships were afforded high scientific status. Only in the past several decades have these conventional perspectives been challenged and alternative perspectives offered. Harley's work challenged the unquestioned claim of 'objectivity' in cartographic development. His stance was made very clear when he asserted '[a]s images of the world, maps are never neutral or value free or ever completely scientific' (1990: 5). Instead, it treats the map as a passive visual communicator of verifiable facts to convey information to its viewer. Viewing a map in this way does not incite questions of truth or power on the surface. It is passively accepted and taken for granted.

1.2b The Communication Model

The 'epistemic break' from viewing maps as objective communication models to development of the power relations of maps is perhaps the most profound shift in cartographic discourse. Crampton speaks of the epistemic break:

> as an "epistemic break" between a model of cartography as a communication system, and one in which it is seen in a field of power relations, between maps as presentation of stable, known information, and exploratory mapping environments in which knowledge is constructed. (2001:235-236)

The efforts of critical theorists such as J.B. Harley and Denis Wood suggest that maps are products and forms of power and knowledge. The knowledge constructed by maps creates a political skewed history, where conditions through which particular knowledge is disseminated and normalised whilst other knowledge is concealed (Crampton, 2004a). The information communicated through maps is filled with subjective realities and privileged knowledge of those with the power to create maps. Subsequently, the literature demonstrates a tendency to equate the power of maps with apparatuses of governance and control (e.g. Alexander, 2007; Crampton, 2001, 2004a, 2004b; Harvey, 2001).

At first sight, it is perhaps more difficult to understand why the so called 'map communication model' has also been the subject of attack by critical

cartography. After all, at least some of them adopted the idea of map as text or discourse. Further, the communication model developed by Robinson and Petchenik (1976) set out to focus on the audience, the reader albeit in the service of effective communication.

In attacking the realist presumptions of cartography, Harley thus attacked the arbitrary dualism of objective and subjective, science and art that sustain it.

> …we ought to dismantle the arbitrary dualism between 'propaganda' and 'true' and between modes of 'artistic' and 'scientific' representation as they are found in maps. *All* maps strive to frame their message in the context of an audience. *All* maps state an argument about the world and they are propositional in nature. *All* maps employ the common devices of rhetoric such as invocations of authority (especially in 'scientific' maps) and appeals to a potential readership through the use of colors, decoration, typography, dedications, or written justifications of their method. Rhetoric may be concealed but it is always present, for there is no description without performance. (Harley 1989 p 11, emphasis added)

In other words, critical cartographic literature insists that there is no such thing as a purely scientific objective map – because the idea of a perfect map is 'illusory' (as Harley (1990:36) put it in a different essay). It is the discipline's contention that maps become a historical object of knowledge and reality and not just as visual and material artefacts. The construction of maps rests on assumptions about the social and cultural world, assumptions held by the mapmakers, the map procurers (patrons), and the map audience.

The arbitrary dualism between scientific versus artistic maps, objective and subjective methods, and 'true' maps versus propaganda maps are in turn analysed by Harley as the 'result of a discourse of power-knowledge' (Harley's position, as summarised by Crampton, 2001: 240). A discourse of power-knowledge cannot be traced back to an absolute subject or origin. Rather, it becomes a series of socially constructed texts drawn from the interpretation of maps.

1.2c The Map-Making Process

Let us consider conventional guidance on map making. The selected traits, or agenda, featured on a map define the view of reality the map intends. The agenda of a map demonstrates the preferences and priorities of the mapmakers and map procurers. The selected traits used to represent information that is relevant to the function and context of the map inevitably skews the perspective from which it is viewed. Since a map only provides a limited representation of a geographical space, generalisations are also required to transform an otherwise complex construction into a simple design for its reader. Generalisations determine which information is

considered relevant and which is excluded. The process of generalising social space, institutions, and networks to fit cleanly on a map provokes discussions about social perspectives. As Harley (1990:4) argues, the fascination of maps 'lies in their inherent ambivalence and in our ability to tease out new meanings, hidden agenda, and contrasting world views from between the lines on the image'. Basic cartographical enquiry, then, considers what is emphasised and de-emphasised in the orchestration of map elements.

From a certain ideal perspective, all maps, regardless of their construction or intended contexts and functions, contain inherent deficiencies. No one map truly embodies all perspectives and facts of a specific location. The nature of maps, like any text or other form of media, tells a particular story from a particular point of view. Maps must rest upon certain conceptions of space and an organizing imperative to represent geographical knowledge (Harvey, 2001: 219-222). The context of the map includes not only its creator but also where and how it is used. For a map to be comprehensible to its reader, it is created with particular agendas, generalisations, and simplifications of complex constructions. Yet these very conventions of comprehensibility are at the same time the source of confusion.

This ability to link spatial representations to the apparent depiction of natural order becomes an important skill to locate and challenge the sources and sites of resistance found in the map (Turnbull, 1996: 7). Challenging modes of social and cultural representations on a map reveals the power that maps possess and raises important questions about its supposed 'objective' inception.

Other scholars, such as Denis Wood (1992), wrote about the map as a social construction and its power to influence social knowledge. The process of mapmaking and the reading of maps are ways of spatially assembling particular forms of social and cultural knowledge. Mapmaking therefore becomes a dominant narrative of history cast in a geographical framework.

Prior to cartographic changes and commitment to 'objective and scientific' spatial representations during post-Enlightenment[11], artistic components were prominent key features on maps. The de-emphasis of map artistry during this revolution marked the changing concerns for cartographic aesthetics to more functional map designs (Crampton, 2001: 235). This shift from artistic designs in cartographic productions to more functional scientific approaches has meant that
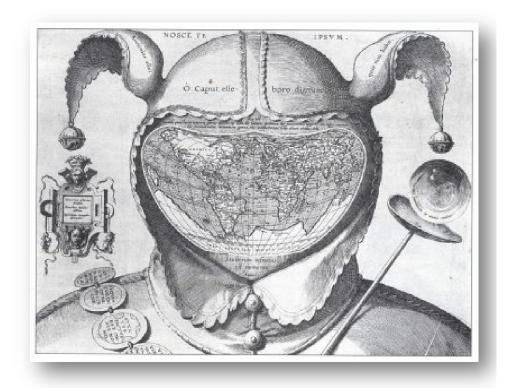
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[11] The post-Enlightenment revolution brought about scientific accuracy in the map-making process, making it of the utmost importance.

artistic designs have never regained status in contemporary cartographic constructions. Even by contemporary criteria within institutions utilizing maps, there is little room for aesthetics and maps themselves find their power in being accurate and functional. On a more optimistic note, Cosgrove (2005) argues that modern-art movements are beginning to demonstrate the potential of maps as sites for artistic expression and subversive activities.

The bizarre image of the satirical Fool's Cap World, circa 1590, should be revisited here (see Map 1-6). The depiction of a jester, one who's traditional role was to mock authority and instigate disorder through transgression, displays a world map as a face. A pastiche of Ortelius' celebrated 1580 world map, the visual metaphor is one of human folly. The various writings on the map reinforce this metaphor. In his deconstruction of this legendary map, Whitfield (1995:78) writes:

> … [the] frame of reference would have been quite familiar to the audience for this engraving in the 1590s, and they would have recognized in this map a radical visual interpretation of the Fool's role: it is now the whole world which takes on the Fool's costume, thus forcing the viewer to confront the possibility that the whole created order is irrational, alien and threatening.

There is a legacy of literature from varying disciplines that grapple with the meaning and origin of this vision of the world. The general visual metaphor is of the human element in cartography: the component of human folly in attempting to create a single, ordered, and honest view of the world. As such, one should not necessarily view maps as 'factual statements written in the language of mathematics' but more as 'metaphors or symbols of the world' (Harley 1990: 5). This attitude towards maps has become the essential position of critical cartographic discourse.

Map 1-6: Fool's Cap World, c. 1590. Maker, place of origin, and creation date is
unknown. Generally understood as a metaphor that maps are human representations
of the world and are thus subject to folly. Source: (Whitfield, 1994: 144).

If mapmakers and map procurers (patrons) wish to convey an intended
message to their readers, then the elements selected and emphasised in the
cartographic creation are as important as the elements that are de-emphasised or
altogether concealed or ignored. However, though the map may have been
constructed to present a certain view of reality, it is not guaranteed that the map's
readers interpret the map according to its intended message and emphasised features.
Since maps are read according to their function and context, the information
presented expands knowledge of the spatial location. In equal amounts, the personal
knowledge of geographical location or social contexts skews the perspectives from
which the map is read. These muddled issues, along with the other questions
surrounding the construction of maps, begin to take form in areas of critical
cartographic theory.

Along with examining the intentions of the mapmaker, close consideration is
needed when examining the context of a map in relationship to society and culture.
The map is a product of society, and interpreting the map requires an

interdisciplinary approach[12] to appreciate the maps reflection of its time. Understanding the prominent ideologies, technologies, practices and the social order of the period in which the map is created allows its reader to decipher the map's implicit meanings. Deciphering the map's spatial representations in the social and cultural context enables the reader to distinguish patterns of the social order, knowing not only who and what are included, but also who and what are excluded – a key point mentioned earlier.

This provides a frame from which richer accounts and information is attained via an analysis of the wider cultural context. Maps are inherently cultural representations; they offer a way of making sense of things within a particular culture and time. Conversely, maps are also seen as cultural artefacts, historical documents that can be studied to discover the social life of the place implicitly represented and the time in which the map was created. The cultural representation in the text of the map becomes an important factor in understanding maps. Harley (1990: 10) contends that '[e]very map is cultural because it manifests intellectual processes defined as artistic or scientific and they work to produce a distinctive type of knowledge'. The production of maps offers a way of displaying the artistic and scientific knowledge of the historical circumstances and conditions (Harley, 1990; Jacob, 1996). For example, Jacob (1996: 193) argues that medieval *mappae mundi* are not understood unless one is familiar with the particular culture of the clerks and monks that produced those artefacts.

Kitchin and Dodge argue that maps are processual, and thus have with no ontological security; rather they are ontogenetic:

> …maps emerge in process through a diverse set of practices. Given that practices are an ongoing series of events, it follows that maps are constantly in a state of becoming; they are ontogenetic (emergent) in nature. Maps have no ontological security; they are of-the-moment; transitory, fleeting, are 'contingent, relational, and context-dependent. (2007:340)

In other words, the information provided by a map forces us to question the process of mapmaking and the map as a product. Examining the process means first focusing on the context of the mapmaker. J.K. Wright (1942:527-528, as cited by Cosgrove, 2007: 206) broached the nature of map makers as human and their cartographic creations as being naturally affected by human subjectivity. Human subjectivity in the map-making process is unavoidable even if there is a strong commitment to

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[12] As Harvey argues, 'the history of cartography is now also being written from a broad-based comparative perspective, revealing much about cultural and temporal difference in understandings of human positionality in the world. The evaluation and historiography of cartographic forms is well underway by geographers, historians, anthropologists and a wide range of scholars from other disciplines' (2001:219-222).

accuracy and scientific authenticity. In addition to the unavoidable nature of human subjectivity, there is also the potential for what Harley termed 'internal power', or the power of cartographers to intentionally embed their own slants and styles to the maps text (Crampton, 2001: 241). Acknowledging the context of the mapmakers and the intentional or unintentional human subjectivity embedded in maps during their production helps us in our understanding and examination of maps.

This in turn as epistemological implications for both the science of cartography (how maps are produced) and critical analysis of cartography (the history and politics of cartography): *both* are 'positioned as processual in nature' (Kitchin and Dodge, 2007:342). Their radically processual account insists that maps are 'remade every time they are engaged with' and (drawing on Deleuze and Guatarri) that each re-engagement is also a re-territorialisation. The most obvious difference between their approach and conventional naturalistic approaches is that maps, for them, are events not things, not objects fixed and finalised by their graphic form. Referring to key figures in cartography, including critical cartography, they specify that a particular set of points, lines and colours 'is not unquestioningly a map an objective, scientific representation (Robinson) or an ideologically laden representation (Harley), or an inscription that does work in the world (Pickles)' (*ibid.:* 335). Maps are always mapp*ings*. The concept of a practice is also a key part of their approach, since 'maps emerge in process through a diverse set of practices', specifically 'spatial practices enacted to solve relational problems (e.g., how best to create a spatial representation or how to understand a spatial distribution).' (*ibid.: 340*) Practices thus in a sense act to stabilise by being pragmatic and problem-oriented – and also because they are embedded in contexts: and individual, collective and institutional frameworks, within standards, conventions, received wisdom, and so on (see *ibid.:* 341-342).

The production or creation of a map is a point of debate in critical cartographic discourse. Again, as Kitchin and Dodge contend, quoting McKenzie:

> "Maps thus should be understood 'processually ...as events rather than objects, as contingent the whole way down', 'as networks of social- material interactions rather than simply reflections of human capacities or innately alien objects'(Mackenzie, 2003: 4, 8 as cited in Kitchin and Dodge, 2007:342).

A map's spatial categories and constructions, as well as inscribed boundaries and embedded territories, determined during the mapmaking authorship have profound effects on the reading of the map as visual communicators and text. One example, as presented earlier in this chapter, is the significant impact

Waldseemüller's label of the new world as *America*, in honour of Amerigo Vespucci, in his 1507 world map. His decision to honour Vespucci after being inspired by his 1503 publication evidently inspired proceeding mapmakers to continue in like, inevitably contributing to the official naming. Regardless of scholarly debate, most maps appear as communicators that stand alone. For example, visitors and residents in London view the Underground Tube map without any additional explanation than the image presented and the maps legend. By contrast, within formal reports for various institutions, descriptive text accompanies maps that tend to carry most of the communication load (Robinson, 1979: 98). However, the 'text' that critical cartographic discourse refers to is, as Harley terms it, the 'second text within the map' (1989: 9), the hidden political and cultural agendas of the map. As such, there is a layering process already inherent in map readership, critically assessing the surface visual communication of the map and the underlying context of its creation (Crampton, 2001: 238).

Challenging the basic foundations of the mapmaking process and the use of the map as a product unearths further questions and problems of text-interpretation and authorship (Smith, 1996: 198-200). The critical cartographic discourse presents new challenges and debates about the production, use, and implications of mapping. An implicit awareness of map typologies, selected and emphasised features, and omitted features is apparent when viewing the history of maps in society.

Critical cartographic discourse does not answer questions about map authorship or interpretation. Rather, it raises more questions about the ways in which the social process of mapmaking representing space and the audience's interpretation of the spatial representations emerge and effect social and cultural understandings of the world. It moves beyond investigating what a map is and what a map does to how the maps becomes a 'context-embedded practice to solve problems' (Kitchin and Dodge, 2007:342). Context-embedded practices infer and reflect institutional power relations by tracing the information presented on a map and the information that is subjugated and concealed. Cartography provides a discourse about social, political, and cultural subjectivities that challenge social orders and power structures.

Cartography as the foundation of geographical knowledge transforms thoughts about social reality and spatial behaviour. Even something as abstract as a globe of the earth, from the perspective of outer space, modifies the ways in which we think about global problems and our general views of the social world (Harvey, 2001: 219-222). As technology advances and contemporary cartographic practices

progress, views about social reality are sure to alter.

1.3 Lessons from Cartography

This chapter provides a fundamental background in cartography. Exploring the basic foundations of the discipline raises critical questions and critiques about mapping as a process, and the map as a product. Posing the five simple questions to ask about maps - *who is making the map? who is commissioning the map? what is the context of the map? what is the function of the map? and what are the consequences of the map?* – offers a starting point in the critique of why maps are made. Moreover, these five basic questions, with the guidance from critical cartographic perspectives, approach larger issues of social and cultural representations and power. Unearthing the contexts embedded in the production of the map, the agendas and generalisations, and the emphasised and concealed traits of geographical knowledge all contribute to a larger story about society. These themes and issues are becoming progressively more important as 'the spatial turn' (Perkins 2003: 346) brings about an increased use of maps in social science research and policy decision-making.

Through reading the cartographic literature, a three-fold typology emerges for understanding mapping agendas; maps as communicators and instruments of power, maps as cultural representations, and maps of perceptions and cognitions. Though not fully explored in this chapter, following chapters (cf. Chapter 4 on 'The Political Geography of State Crime and Violence: Reviewing Genocide and Resistance' and Chapter 6 on 'Reflections on a Cartographic Criminology and Ethical Considerations and Consequences to Crime Mapping') explore the critiques of panoptic authority imposed on space, colonial and imperial geography, and the possibility of resistance and subversion to spatial governance.

As highlighted throughout the chapter, there are problems that beset cartography that transcend mapping agendas. Maps are multiple texts expressed on one image. As such, there is no singular truth to any map, it is all subjective. The subjectivity of any map is determined by its creator with intended messages and audiences in mind. They are strong communicators but their stories do not represent the entire truth. They are also communicators of power and ideology with an ability to greatly influence social, political and cultural factors. Finally, it is important to remember that maps are snapshots, suspended in a single time and place.

Mindful of the problems beset to cartography, disciplines utilising maps need

to be attentive in their construction and interpretation of maps. Criminology with its use of "crime maps" (constructions used to visualise and analyse patterns of deviant and criminal incidences), has not learnt from the lessons of critical cartography. Just as in cartography, criminology needs to develop a sensibility about the maps it uses. Criminology must view their maps as subjective narratives, woven with multiple stories about society, politics, and culture. Criminology's maps are indicators and communicators of power and ideology. These narratives may be very influential communicators but their messages are not the whole or complete truth. Finally, criminology needs to be aware that maps cannot tell the future, but only represent snapshots of the past.

Direction is needed in the development of a cartographic criminology. It must be sensitive to the many possibilities of maps as well as capable of healthy scepticism and critical reflexivity. Is criminology aware of the differing ways in which social phenomena can be mapped? Is criminology aware of the problems in cartography? Can criminology easily incorporate mapping techniques without detailed skill and knowledge of cartography? If so, how can that cause further misunderstandings? Criminology's engagement with the mapping process has surfaced periodically. Criminology has never fully engaged with cartography in developing a mapping process to innovatively track, analyse, and evaluate crime. However, these moments have come in four waves, as developed in the next chapter.

1.4 Conclusion

This chapter makes no claims to offer a comprehensive history of cartography. Rather, its function is to provide and inform proceeding chapters with some critical questions and positions about maps and mapping. Perkins (2008) is absolutely correct when he contends that critical cartography is necessary in examining and analysing the increasing use of maps within the social sciences. Studying cartography, however, is not just about learning from past map constructions and consequences. Rather, it equips scholars with the critical knowledge necessary to understand what is happening in the present time. As Harley observes, 'those who raise questions about… how maps act as a power-knowledge in society… are not merely trying to rewrite history. They are also alerting us to the present' (as cited in Crampton, 2001: 243). Applied in proceeding chapters are the lessons learnt from this review of cartography's history and critical discourses. The problems that inundate cartography are considered in analysing criminology's

engagement with cartography (as explored in Chapter 2), working towards a cartographic criminology.