ABSTRACT: This paper examines the prevalence of geosurveillance and cartographic rationality today by situating it in the age-old practice of governmental surveillance. I approach this question in a broadly Foucauldian historical framework. Foucault outlined a historical transition between a strictly disciplinary society that surveys and disciplines individuals and a “governmental” or biopolitical society that works at the level of a population and its distribution across territory. I argue that this governmental surveillance includes mapping and GIS, which, although they have taken different forms over time, have long been governmental technologies of control. I further argue that surveillance and security operate by establishing norms and statistical averages that allow assessments to be made about risk and threat. In order to illustrate the deployment of these cartographies of surveillance, and to examine their particular effects, I use a case study of crime mapping. I conclude that any assessment of mapping and GIS for surveillance and security uses must consider the genesis of cartographic rationality.

KEYWORDS: Geosurveillance, security, GIS, crime mapping

Introduction

“After September 11 the doctrine of containment just doesn’t hold any water as far as I’m concerned”—President George W. Bush, joint press conference with Prime Minister Tony Blair, January 31, 2003.

Security is now the dominant framework for understanding the modern world in the United States. It is enshrined as both law (e.g., the USA Patriot Act, 2001) and official policy (i.e., the National Security Strategy of the USA, 2002). Significant resources are being dedicated to maintaining and increasing security, as well as the deployment of technologies to identify and preempt possible threats to security. Many of these developments represent important shifts in policy and mark a new political era that abandons the policy of containment and deterrence of the Cold War for one of threat assessment and unilateral action. Threat assessment requires successful surveillance in order to achieve security. While security and surveillance have never been unimportant to nations, what is new is the limited political discussion. Today it is politically undesirable, if not impossible, to have a political debate about security issues (the United States Senate voted in favor of the USA Patriot Act 96–1 and in favor of a Homeland Security Department 90-9).

Legislation establishing the Department of Homeland Security (DHS) in November 2002 is the largest reorganization of the American government since the 1940s. The DHS is tasked with increasing security, preventing the invasion of our “homeland” (i.e., the United States, its territories and waters) by terrorists or terrorist devices, and more swiftly recovering from attacks that do occur (U.S. DHS 2002). These developments, important as they are, had their origin prior to September 11, 2001. Already by 1999, for example, the Clinton administration had appointed a bi-partisan committee to study national security. The committee issued three reports, called for the establishment of a Homeland Security Agency, and, in February 2001, warned of the likelihood of terrorist attacks on American soil “in the next quarter century” (U.S. Commission on National Security 2001, p. viii).

My purpose in this paper is to critically examine the role played by mapping and GIS in the production of security and surveillance, along with its historical genesis. An increasingly significant component of security discourse comes from a spatial or geographic standpoint, and in particular from cartography and GIS. Indeed, the relevance of mapping and GIS was demonstrated soon after the terrorist attacks on September 11 when the New York Times and NBC published several powerful LIDAR (light detection and ranging) images by The Center for the Analysis and Research of Spatial Information (CARS1) at Hunter College. The LIDAR images showed a “before” and
“after” view of the World Trade Centers in 3D (Clarke 2003). In that first week, LIDAR images were one of the few ways to penetrate the smoke and dust, and they were collected on a daily basis by airplane. The CARSI lab had previously produced a 3D map of the city, called the “NYCmap,” based on building heights integrated into high-resolution orthophotos. When placed side to side, the jagged hole around “ground zero” became eloquently visible. An Emergency Mapping and Data Center (EMDC) was established on Pier 92 on the Hudson River that “enabled inspectors to access NYCMap wirelessly from a handheld iPAQ, click on a building... fill out a new inspection, and then send it to the database” (Ahearn 2003, p. 249).

Additionally, in the following months, ESRI offered a series of seminars around the country on how GIS could assist in emergency prevention and response, published white papers, produced a CD–ROM on security, and established a website for GIS and security. The company also awarded $2.3 million in “Homeland Security Grants” to cities and agencies across the USA. The Association of American Geographers (AAG) meanwhile launched a workshop funded by the National Sciences Foundation (NSF) on “geographical dimensions to terrorism” and established a list of priority action and research items. The first priority action item listed is to “[e]stablish a distributed national geospatial infrastructure as a foundation for homeland security” (Cutter et al. 2002, p. 2), which would include geospatial databases and GIS analysis. This effort is based on the DHS “Information Analysis and Infrastructure Protection” (IAIP) Directorate’s budget request for “development and maintenance of a complete and accurate mapping of the Nation’s critical infrastructure and key assets” (U.S. Government 2003, p. 472, emphasis added). The lead author of the book version of the AAG project (Cutter et al. 2003) has also performed an initial assessment of the use of GIS, GPS, and mapping following September 11 (Cutter et al. 2001). It is significant that these three efforts devote only a little space to the geo–political causes of terrorism, largely confining themselves to an assessment of risk, emergency preparedness, and hazard. In this view, terrorism is not a political problem, but one of environmental hazard and risk.

In recent years, the increase of surveillance (particularly electronic surveillance) has given rise to the sobriquet “surveillance society” (Pickles 1991; Lyon 1994), to capture the idea that surveillance has become an “institutionally central and pervasive feature of social life” (Lyon 1994, p. 24). Although surveillance can be dated to classical times, writers on surveillance associate modern industrial society with its institutionalization. Karl Marx and Max Weber both highlighted workplace surveillance and state’s increasing bureaucratization. Michel Foucault extended these analyses by investigating how power historically reached the “capillary” level of society in order to discipline and observe individuals (Foucault 1977), a level supplemented in the 19th century by monitoring the population through demographics, censuses, surveys, and polls (Foucault 1978; 1991; 2003). As we shall see, one way in which surveillance operates is by establishing norms and profiles, for example the “geoprofiles” of crime mapping. Most recently, attention has been given to the role of mapping and GIS in establishing security and surveillance by a wide range of authors (Pickles 1991; Smith 1992; Harley 1988; Curry 1998; Monmonier 2002; Crampton 2002a; Weiner et al. 2002; Cutter et al. 2003).

In an early paper Pickles warned of the potential for GIS to be used for surveillance (Pickles 1991), and during the early 1990s, Pickles and Brian Harley worked on a book about the ideology of maps. Harley’s death in 1991 cut this project short, but the legacy appeared as the book Ground Truth (Pickles 1995). Smith went even further by equating GIS with military conquest in the Gulf War (Smith 1992). Following these early critiques, GIS users and their critics entered a long period of rapprochement (see Schuurman 2000 for a full account), which included the National Center for Geographic Information and Analysis (NCGIA) meeting at Friday Harbor, Washington State in 1993, and an Initiative on “GIS and Society,” known as I19. Most recently a number of authors have attempted re-appropriations of GIS, such as Kwan’s feminist “re-envisioning” of GIS (Kwan 2002).

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1 See http://www.esri.com/industries/homelandsecurity.

2 The IAIP Directorate is charged with “Analyzing law enforcement, intelligence, and other information to evaluate terrorist threats to the homeland; Assessing the vulnerabilities of key U.S. resources and critical infrastructures; Mapping threat information against our current vulnerabilities; and, Working with federal, state, local, and private stakeholders to issue timely warnings and take or effect appropriate preventive and protective action” (U.S. Government 2003, p. 471). For example, the 2004 budget requests $200 million to update flood mapping technology. These flood maps are used to determine flood risk liability for the insurance industry (U.S. Government 2003, p. 467).
This paper discusses how mapping and GIS technologies are involved in security and surveillance in the United States today. I argue that the renewed emphasis on security and surveillance is part of a long-standing series of historical linkages between government, knowledge, and technologies of power. These historical linkages were forged during the rise of modern industrial societies in the eighteenth century. Although technologies change over time and the relationship between public and private life has become increasingly more problematized by technological developments (Alderman and Kennedy 1997; Curry 1997; Lyon 1994) there are important historical continuities that can still be traced. I argue that these continuities are constituted as governmental rationalities (motivating discourses) that inform practices of government.

The perspective adopted here is a broadly Foucauldian one, utilizing work on “governmentality,” or how people have governed themselves and others (Foucault 1991). Governmentality is the exercise of government “beyond the state” (Rose and Miller 1992), including government of the family, of the economy, and techniques of self government (or “ethics,” Foucault 1997). Foucault’s analysis of government was concerned with how individuals and populations were divided and grouped according to norms. This occurred at either the individual level (what he called “discipline,” see Foucault 1977) or at the group or population level (an aspect of government he called “biopower,” Foucault 1978). Although Foucault looked at particular practices in their time and place, he understood them as constitutive of larger ways of thinking, or rationalities. These rationalities are historically bound, that is, they come into being and reach dominance at certain moments, but they do not exist by necessity or in the same way over time. In fact, for Foucault there is a small number of “epistemic breaks” when thinking changed quite markedly (e.g., around 1800 with the birth of the modern human sciences). Foucault’s goal was to trace these rationalities and to seek out the counter-acting tendencies that may be in a position to resist them.

It would be a mistake to locate such resistance in the form of an alternative GIS (Curry 1998). Governmental reason has the effect of both increasing capacities (power) and establishing increased control (knowledge) about subjects. It would not be possible to retain new capacities if GIS or surveillance are rejected (not least because they can be manifested in any number of ways ranging from neighborhood activism against anti-gay hate crimes to defense mapping for war). It is therefore better to work from within to improve our relationship to technology. “Where there is power, there is resistance, and yet, or consequently, this resistance is never in a position of exteriority in relation to power” (Foucault 1978, p. 95). Resistance and power exist as a productive dialectic.

As part of the effort to enrich our understanding of mapping and GIS, we can use Foucault’s historical method to study how mapping and GIS are used in contemporary surveillance and security. In particular, two parallels from early 19th century cartography are informative as they cast light on our shared problems of threat and risk. First, security and risk were used to think of space and people as resources that required management and protection. Second, space and individuals were understood through normalizing surveillance. Surveillance (including “geosurveillance” specifically concerned with locations and distributions across spatial territories) was therefore an important technology of control tied to discourses of resource management and normalization. We can conclude from this historical comparison that it is not technologies of surveillance—mapping or GIS per se—that are problematic, but rather the underlying political rationality of normalization which constituted people and the environment as threatened resources under risk of hazard.

In the remainder of this paper I shall do three things. First, I examine the origin of maps and governmentality in early 19th century Europe. At that time, a completely new form of mapping was devised—thematic or statistical mapping. Thematic maps were invented precisely when population management and counting became problematic; and they are critical to censuses, census mapping, and distributions of populations across territories. Second, I discuss how one important practice of mapping—crime mapping—established a cartographic rationality. Crime mapping offers an entry way into the final part of the paper, in which contemporary practices of surveillance and security are described as manifestations of this cartographic governmental rationality.

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3 Following Curry (1998) I do not adopt a hard and fast distinction between mapping and GIS. Mapping can be understood as the cartographic impulse to provide a spatial understanding of our world and ourselves as being in that world (an impulse recorded from most times and places, see Harley and Woodward 1987) while GIS is a more recent technology—specific ability to import, display and analyze data in spatial form. GIS is therefore a form of mapping.
Maps as Government: Moral Statistics in Early 19th Century Europe

In early nineteenth century France, fear over the threat of crime had reached such heights that when a map was published that appeared to deny a relationship between crime rates and educational levels there was an immediate outcry. Education was commonly thought to be an effective preventative measure against crime. Areas with higher educational levels would have lower crime rates. Crime was an activity of the uneducated lower classes; they had a "penchant au crime" was a famous phrase of the time (Robinson 1982, p. 161). However, the 1829 maps, which employed the latest techniques of "comparative statistics," showed the precise opposite—areas with high education levels had high crime levels. As one commentator described it:

Such a conclusion was sensational. Paris saw itself as being in the grip of a terrible crime wave. Ask a New Yorker of today [i.e., 1990] about muggings, then double the fear: that was how Parisians felt. The [illustrated] police gazettes, rich in reports of crimes, were taken in weekly ... naturally one supposed that the degeneracy and ignorance of the working classes was the source of their criminal propensity (Hacking 1990, p. 78).

If education was not the cause of crime, then what was? The startling possibility arose that crime could occur anywhere. These crime maps were published by Italian and French statisticians Adriano Balbi and André-Michel Guerry, who had deep interest in "moral statistics" or social problems (e.g., crime, education, birth rates, suicide). The maps were remarkable for another reason too; they were one of the first examples of the choropleth technique which had been invented by Charles Dupin just three years earlier (Robinson 1982; Crampton 2003). Dupin's choropleth maps were exceptionally popular methods for revealing the moral statistics of his day, and they were extensively emulated. After Balbi and Guerry (who was awarded a special prize in 1864 by the Academy of Sciences for his work) came D'Angeville with health and wealth choropleths in 1836, Charles Joseph Minard, who popularized proportional symbol maps in the mid-19th century, and many others. So once social problems could be grasped in their distribution across territories, policies could be implemented to address them.

Policies are needed to govern and regulate (the word shares the same origin as "politics" and "police"). Gordon (2000) argued that the 17th century developed "a program of exhaustive, detailed knowledge and regularization" (p. xxvii) that assessed threat or "dangerousness" of individuals, and produced technologies that would help maintain social order through surveillance (Foucault 2000a).

Maps have long been associated with this effort because they provide a picture of where things are so that there can be a "right disposition" of resources and people and over the territory (Foucault 1991, p. 93). This idea of a rightful distribution is important because it requires comparison to some norm. Territorial mapping has occurred for thousands of years to assist in inventories and taxation, and it is perhaps surprising that it was only in the early 19th century that thematic maps were invented. Why were they not deployed previously? In fact, it turns out that thematic or statistical maps were part of a more general effort to govern by means of statistical analysis. It was only with the development of descriptive and probabilistic statistics, and the formulation of society in terms of likelihoods and norms, that thematic maps could emerge. Thematic statistical maps appeared at precisely the same moment that society came to understand itself in statistical terms for purposes of regulation (policing in the larger sense) and management. A few examples will illustrate how this occurred.

In the 1820s the Belgian statistician Adolphe Quetelet derived the new analytics of probability theory and the normal distribution curve. These advances were key to societal problems that were thought to be amenable to governmental intervention. Quetelet was concerned about the social upheavals in Europe during the 1830s and centered his analysis of social variation around l'homme moyen, or the average man (his needs and typical actions and the nature of error or deviation away from this norm). Total human variation could thus be justifiably reduced to divergence around a norm. If these norms could be properly and reliably determined, then this would be extremely useful in dealing with the "great masses of registered facts" about populations (Sir John Herschel (1857), quoted in Atkins and Jarrett (1979)). The positivist conception of science that emerged at the end of the seventeenth century gave epistemological primacy to observable data that was value-free, a primacy that is underpinned by statistics. As Atkins and Jarrett show, statistical inference and significance tests on samples also permitted populations to be compared and known (how much they vary around a mean, for example, in their susceptibility to infant mortality). In sum, the sciences were founded around the governmental concerns of knowledge, statistics, and population.

During the nineteenth century great strides were made in the sciences of statistics, probability, and
statistical mapping. These did not occur in isolation from one another, nor more interestingly, from the question of politics—indeed, they were stimulated and put into the service of “political” problems. Thematic mapping was part and parcel of this political problematic. Godlewksa, for example, documents Alexander von Humboldt’s recognition in 1811 that “natural geography, by virtue of its ability to convey natural history’s data to number and statistic, could substantially contribute to forming an exact idea of the territorial wealth of a state” (Godlewksa 1999, p. 247). The ability to identify one’s resources and thus to exploit them was necessary for the secure governing of the state.

Perhaps the most visible and influential practice of using statistics to help govern the state occurs during the great decennial censuses of many European countries (from 1790 in the United States). Although in Europe these censuses were depicted in maps in the early 19th century, in the USA it was not until the ninth census in 1870 that results were shown cartographically. These maps appeared in 1874 in America’s first statistical atlas (Walker 1874; Hannah 2000).

Hannah’s excellent analysis of the 1870 census atlas using Foucault’s work on governmentality sheds considerable light on the spatial politics of knowledge at this time. The atlas had a tremendous impact on cartographic representations of space in the following decades. In particular, it introduced thematic mapping to the United States in a concerted manner (although several maps from the 1860 census had appeared, see Schwartz and Ehrenberg 2001, plate 177). Maps from the census were first presented at the American Geographical Society (AGS) in 1871, where, according to J.B. Jackson, they received so much attention that the Secretary of the Interior “was persuaded to authorize a special atlas... Walker was the first American to try to show the spatial dimension of social and economic facts, to relate social problems to their physical setting and thereby throw new light on them” (Jackson 1972, p. 15). As stated in its Foreword, the atlas was designed to promote political education, and many of its 5,000 copies were sent to schools and colleges (Jackson 1972, p. 14). The 1874 atlas gave a framework for how to think about space and human occupation and led to the more sophisticated 1883 Scribner’s Statistical Atlas of the United States by Fletcher W. Hewes and Henry Gannett (based on the tenth census) as well as Paullin’s mighty 1932 Atlas of the Historical Geography of the United States.4

Paullin’s atlas was published jointly by the Carnegie Institution of Washington and the AGS. More importantly, the AGS itself was founded with at least as much attention on statistics as on geography. Initial issues of its Journal published encomiums to “moral statistics” such as this from Joseph Kennedy (Superintendent of the 1850 and 1860 censuses): “The amelioration of man’s condition by the exhibition of facts whereby the administrative powers are guided and controlled by the light of reason” (quoted in Wright 1952, p. 47).

The atlas was a profound statement on the relationship between politics and space, and the necessary relationship between the two. It is an exemplary document that illustrates the development of strategies of spatial surveillance for purposes of government. The contemporary role of GIS in geosurveillance and security is situated in the same age-old practice of governmental surveillance established by the first atlases.

Security: Discipline and Biopower

“One of the Enlightenment’s tasks was to multiply reason’s political powers” (Foucault 2000a, p. 298)

In this section I shall outline how security is predicated on two governmental rationalities—that of discipline and that of biopower. As I mentioned previously, both discipline and biopower are ways of dividing and grouping either individuals or populations according to norms (biopower is so-called because it deals with biological factors of birth and death rates, fecundity, issues affecting the health of a population, and so on). In order to understand how governmentality arose we can examine discipline and biopower in the context of historical changes in juridicality and criminality. Prior to the legal reforms of the 18th and early 19th centuries, Foucault argued the law focused on the nature of the crime committed, the evidence of guilt or innocence, and the system of penalties to be applied. In other words: crime and punishment. The person of the criminal was important only insofar as he or she was the individual to which the crime would be attributed. With the reforms, this hierarchy was reversed, the crime was merely an indicator of something more significant—the “dangerous individual” (Foucault 1977, p. 252). The law was now interested in the potential danger of the individual: “The idea of dangerousness meant that the individual must be considered by society

4 The influence of the 1870 census atlas is evident in Paulin’s population maps (see especially his Plates 67B–70B on the “Colored Population” and Plates 71–76A on the “Foreign–Born Population”, and Hannah 2000, pp. 152–153) and it is directly acknowledged on p. 48 (Paulin 1932).
at the level of his potentialities, and not at the level of his actions; not at the level of the actual violations of an actual law, but at the level of the behavioral potentialities they represented” (Foucault 2000b, p. 57, original emphasis). Punitive responses thus had to be appropriately tailored to perceived threat.

Policies are built to deal with dangerousness and threat and may include changing the way data are categorized. For example, knowledge about deaths from terrorism was recently given its own statistical categories following September 11. Deaths and injuries from terrorism were previously counted as homicides. The National Center for Health Statistics (NCHS) will now use several new categories divided by the type of attack, such as “destruction of an airplane, firearms, a biological weapon or a nuclear bomb,” and has introduced a new death category for suicide terrorists (Anon 2002).

We can understand the emergence of thematic mapping in the early nineteenth century as a similar preventative measure; to get a better description of where potential threats to the health of a population such as crime, poor education, and high birth rates were occurring. From this knowledge it became possible to differentiate neighborhoods of the city and to classify space in terms of dangerousness. These maps produced a picture of normality and abnormality. It also became paramount to identify and locate dangerous people or places, based on the risk they posed.

How was this dangerousness determined and how was it prevented? Dangerousness and security threats are measured against a set of norms. Only by establishing normal behavior as a baseline could deviations from that behavior be detected. It was through mapping that a society understood the spatial disposition of its resources, where the healthy areas of the country were, which places had “abnormally” high rates of infant mortality or early marriages or where crimes against property were above average (all these were the subject of early nineteenth century choropleth maps). In other words, politics was becoming more and more concerned with the problems of normalizing space and territory.

Then as today, security is achieved through surveillance, supervision, and management. The national censuses were not carried out from mere curiosity but, rather, to assist the state to take measure of the population, to provide numbers for the emerging discipline of moral statistics, and to lay out what could be considered normal and abnormal (Hannah 2000). Foucault’s reference to the “panopticon,” the all-seeing architectural device of Jeremy Bentham (1748–1832), philosopher of law and sometime prison reformer, is well known (Foucault 1977; Hannah 1997). Bentham’s prison design (discussed by Foucault in only a few pages but much seized upon by his commentators), provided a central vantage point or “rotunda” from which the prison cells could be seen in several spoke-like arms. Although Bentham’s own plans for building such a prison fell through there are many examples around the world of the general design. The importance of the panopticon is that it provided multiple orderings of space which permitted and encouraged observation (e.g., in the schoolroom, the army, the monastery, or the factory; see also Philo 1992; Elden 2001, pp. 133–150) and embedded people in a structure of power, knowledge, and normalization.

Foucault pointed out that to administer an individual’s dangerousness required a new field of expertise. In crime mapping, for instance, these experts are usually part of the judicial system itself (typically, GIS researchers or staff in police departments across the United States), but there are also extra-judicial experts. The latter include purveyors of criminal statistical GIS software such as “Crimestat,” organizers of crime mapping conferences, academics, providers of monitoring anklets and security systems for surveillance, websites of parolee maps, listservs discussing problems of crime mapping, and neighborhood associations agitating for offenders to be registered. These extra-judicial experts are an important part of power–knowledge relations for assessing spatial dangerousness, indicating that the state is not always the source of governing rationalities. This is why concepts of politics are kept deliberately broad—the strategies of governing go far beyond the state.

Experts need new techniques. Here too, crime mapping plays an important role, by providing the ability to perform “geoprofiling.” Geoprofiling is a disciplinary technique for determining the typical spatial patterns of an individual with the goal of predicting that person’s behavior or targeting them for surveillance. Graham (1998) discussed implications of regulating space by what he calls “surveillant simulation” (i.e., digital surveillance or “control at a distance” such as electronic tagging; Bloomfield 2001) which acts in this disciplinary manner. Graham highlighted four cases of surveillance; as social control especially of criminality; in and around consumption; differential deployment over space (transport informatics); and the utility industry. To this list we could add others, such as surveillance in the workplace (a practice established in the nineteenth century), or in the pursuit of leisure activities (e.g., the Visionics face recognition software and CCTVs at stadium sporting events), or walking down the street (one estimate is that there are over
2.5 million surveillance cameras in Britain, see Rosen 2001). Graham argues that CCTV is used to target individuals who do not “belong” or are abnormal in their behaviors and thus are more dangerous and likely to commit criminal offenses.

Graham’s discussion is very useful in identifying some concerns with surveillance technology. However, we might register a point of caution concerning social control. As far as Foucault’s work is concerned, “social control” should not be interpreted as a condition of total domination over life. Rather, Foucault emphasized discipline and the governmental management of a problem. Historically, since the late eighteenth and early nineteenth centuries, with the demographic expansion of the populace and increasing industrialization, governments have realized that crime, poverty, and madness cannot be eliminated. With this realization, societies emerged from sovereignty into discipline. Whereas under sovereignty the ruler or sovereign exercised a system of total control based in violence, in disciplinary societies power relations are distributed “without recourse, in principle at least, to excess, force, or violence” (Foucault 1977, p. 177). Thus, “[o]ne might say that the ancient right to take life or let live was replaced by a power to foster life or disallow it to the point of death [in capital punishment]” (Foucault 1978, p. 138, original emphasis).

Discipline is a question of “correcting” toward a norm, of “reducing gaps” between actual and normal behavior (Foucault 1977, p. 179). In a disciplinary society we are complicit in our acquiescence to technologies of power because we exist in a relation of freedom. Management and discipline of a problem give rise to normalization and technologies of government, but also leave space, in Foucault’s well known phrase, for resistance and the “insurrection of subjugated knowledges” (Foucault 2003, p. 7). Local knowledges are not anti-science or anti-GIS, but rather are “an insurrection against the centralizing power effects that are bound up with the institutionalization and workings of any scientific discourse organized in a society such as ours” (2003, p. 9). The target to be analyzed is not science, its methods or techniques, but the rationality which informs it and gives it its truth status. Reason has a history, in this case the cartographic reason in which people are subjectified as calculable, at-risk resources to be managed. This constant attitude of enquiry into the present in order to overcome it is a positive process. It is one in which we examine, through a kind of radical journalism or even political philosophy, the current set of possibilities in which we have our lives.

There are two levels in which Foucault argues we can understand normalizing rationalities. One of these is at the level of the individual and is characterized by discipline (Foucault 1977, see also the course summaries of his lectures from 1971–2 and 1972–3 in Rabinow 1997). For example, bodies are trained and regularized (e.g., drilling the troops), fixed into appropriate places (e.g., children in the classroom or patients in the hospital), observed or surveilled (e.g., offenders in prison), and recorded via bookkeeping, inspections, and reports. This “disciplinary” society emerged at the end of the seventeenth and early eighteenth centuries. Foucault argued that a second system of power emerged in the early eighteenth century that regulated, counted, and surveilled the mass of people as a population. Foucault called this “biopolitics of the population” (Foucault 1978, p. 139) or, more simply, “biopower,” and that is why the census, thematic mapping, and statistics were used to measure and record birth and death rates, crime, disease, and so on. The target of surveillance in the disciplinary society is the individual, whereas it is the distribution (“disposition”) of the population over its territory that constitutes biopower.

Discipline of the individual and regulation of the population are characteristic functions of power in modernity. First, at both the individual and population levels, surveillance is critical to ensure the optimization of the capabilities of the individual and to measure the health of the population. Once measured, the results constitute a set of norms against which further behavior can be evaluated and corrective mechanisms applied (such as birth control incentives).

Second, norms are almost inevitably understood in a calculative, statistical manner. Foucault points to the emergence of demography and “the evaluation of the relationship between resources and inhabitants, the constructing of tables analyzing wealth and its circulation” (1978, p. 140). Demographers, geographers, and cartographers began to observe and quantitatively investigate birth and death rates, hygiene, and the need “to medicalize the population” (Foucault 2003, p. 244), accidents and various anomalies that might need to be addressed through such things as “insurance, individual and collective savings, safety measures” (Foucault 2003, p. 244), and the establishment of actuary tables and life expectancies. In sum then, norms can address the questions: How are people and things to be rightfully distributed? Where are the areas of concern, whose birth rates are too high or whose productivity is too 5 There is a well-known illustration of this in Foucault’s book: it shows a small tree tied to a post with rope, and was used as a metaphor for the orthopedic correction of children’s bodies. The picture was originally devised by Nicolas Andry in the eighteenth century to illustrate the first orthopedics text (Foucault 1977, p. 169).
Figure 1. Crime map of guns and drugs in Atlanta. [Source: Chris Gundry, Georgia Data Center (GADC). Used with permission.]
low? What and where is the population healthy, how well is it educated and, above all, where is it strong or weak and susceptible to threat?

Third, population and territories across which they are distributed are understood as resources. This is a political issue in the sense that the population that occupies it must be governed, managed, and harbored from harm (Hannah 2000). Politics addresses the question of what relationship exists between the population and the environment or territory in which the people live. Especially acute in the early nineteenth century is the “urban problem.” The movement of people to the cities and the growth of the city required spatial surveillance and intervention: How and where are sewers to be built? What are the insurance risk zones across the city? Although Foucault does not use the word geo-surveillance, the necessity for it is firmly built into his descriptions of modern society.

In sum, although it is only possible to indicate some of these details quite schematically, Foucault’s historical discussion of power contains several avenues of analysis relevant to contemporary mapping and GIS. Both the disciplinary society and the biopolitical society of regulation require technologies of surveillance. Further, the target of this surveillance occurs at both the level of the individual (discipline) and more collectively (biopower). Power functions quite differently at these two levels; at the micro–level, i.e., at the local and individual level, and at the level where individual unpredictability can be ironed out and averages established and maintained in a sort of homeostasis. To do this, abnormalities have to be identified: “Security mechanisms have to be installed around the random element inherent in a population of living beings so as to optimize a state of life” (Foucault 2003, p. 246, emphasis added). In the following section I look in more detail at one such set of practices that seek to provide security in this manner—contemporary crime mapping.

Geosurveillance Expertise and Techniques in Contemporary Crime Mapping

It was argued above that dangerousness, risk, and norms were established through specific techniques and expertise. The crime map is an important means of constructing knowledge about the city and its inhabitants and for implementing policies to manage a crime situation. Crime maps are tied to the rise of social statistics such as the FBI Uniform Crime Report or UCR (collected since the 1930s), but also local police reports, victim reports, and corporate loss reports. These maps help to construct a discourse of risk. A typical crime map is depicted in Figure 1. It shows the distribution of gun crime densities in Atlanta, with drug incidents mapped on top. The higher the drug crime, the darker the shade. Each drug incident is symbolized with a point symbol in an attempt to understand whether the two distributions are spatially correlated.

Today we see a hyper–extension of these developments in the surveillant systems deployed by the police to monitor and check residents as they go about their daily business. These include closed circuit TVs (CCTV; digital face-matching, such as the one in Tampa, Florida (Canedy 2001), and the FBI’s new DNA database, the Combined DNA Index System (CODIS), which, since 2000, has been authorized to collect DNA data from persons convicted of violent crimes (FBI 2001, p. 1). In 2001, the KlaasKids Foundation advocated a similar act for the state of California for burglary, robbery, carjacking, and arson. The discourse surrounding this call was situated as one of “public safety” (KlaasKids 2001).

Crime mapping employs many techniques of geosurveillance. One set of techniques revolves around those who have already offended and are in the criminal system. There are about 6.5 million people classified as offenders in the USA; incarcerated offenders numbered 1.96 million at the end of 2001. However, there are also about 4.66 million people on probation or parole, which usually involves some degree of self-reporting (Bureau of Justice Statistics 2002). In addition, a small number of people not in local or state jails are supervised by other techniques, including community service, work release, weekend reporting, electronic monitoring, and other programs. Jail populations have steadily increased during the 1990s (by about 30 percent between 1995 and 2001), prompting increased efforts to supervise this population outside the facility (Aungles and Cook 1994). During the same period the percent of people supervised outside jail rose from 6.4 to 10.0 percent (34,869 to 70,804). The number of people supervised by electronic monitoring has, however, remained the same for several years, at

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6 The Foundation also offers advice on how to sample your child’s DNA in case they are abducted.
7 Jails are temporary holding facilities for people awaiting trial or sentencing, as opposed to prisons themselves, which house offenders serving their sentences. At year-end 2001, federal prisons were operating at over 30 percent of capacity, according to the Bureau of Justice Statistics (2002).
about 10,000. This number is less than 15 percent of those monitored outside jails, and a tiny 1.4 percent of the total jail population.\(^8\)

Several technologies have been developed to monitor out-of-jail offenders. A common technology is an ankle bracelet or tag which emits an RF radio signal that can be detected by a device in the home linked to the phone system. A more advanced approach is to use GPS. It, too, is often based on an anklet worn by the offender which can receive GPS signals and transmit its location (through the cell phone system) to the company’s monitoring center. In Iowa, for example, the police have required some offenders to wear a device from a company called iSecure’Trac which tracks individuals by GPS and transmits the location to the web. This monitoring is geographically flexible: “Each map is tailored for a specific parolee. A map can show, for instance, areas where a paroled pedophile must remain clear of—such as a school—when going to and from an off-site counseling session” (Chabrow 2002). Monnomier discusses more sophisticated proposals, such as that of Digital Angel (Crampton 2002b; see also Monnomier 2002, pp. 136–139). Digital Angel is a Minnesota-based company that provides various monitoring devices that can be tracked by GPS. Monnomier cites one such device that can be inserted under the skin of children or pets and can deliver an electric shock or “e-pinchoch the person transgresses certain predetermined borders (e.g., a parole zone). Reports of this technology caused extreme concern among senior figures in the GIS field who equated it with “geoslavery” (Dobson 2000; Dobson and Fisher forthcoming; Ball 2003). Digital Angel estimates the potential size of the “personal safeguard technology” market at $70 billion (Wireless NewsFactor 2001). This estimate covers commercial fleet management, agriculture (cattle) surveillance, medical observations of “cognitively impaired seniors,” monitoring children and pets, and offender monitoring. Electronic monitoring practices are not new and can be traced to similar proposals from the early 1970s (see Ingraham and Smith 1972 for an early proposal for electronic parolee tagging). Proposals for offender marking, for example with indelible ink, date back to the nineteenth century.

In addition to tracking known offenders there are efforts by the crime mapping community to develop geoprofiling. The theory of geoprofiling was developed by Kim Rossmo in 1995 and has since been implemented in software that can make a predictive surface of a criminal’s location.\(^9\) Geoprofiling is “an investigative methodology that uses the locations of a connected series of crime to determine the most probable area of offender residence” (Rossmo 2000, p. 1). Geoprofiling is based on the concept of offender behavioral profiling of the offender’s characteristics; in this case, his or her home location. Rossmo uses well known principles of geography to show that crime is committed by people near (but not too near) their own homes. Rossmo claims that with 5 to 6 incidents traceable to one person, his software can reduce the search area by up to 90 percent.

Crime maps enable geoprofiling to isolate behavior which does not conform to the norm. But profiling can be controversial. After a series of high-profile incidents on the New Jersey turnpike in which African American drivers were disproportionately stopped by the highway patrol, it was charged that the police were stopping blacks because of who they were, not because of their actual behavior.\(^10\) That is, criminality judgments were made on the basis of potential dangerousness, rather than actual offenses being committed (the searches were made without probable cause). In a similar case, the FBI has begun constructing geo-demographic profiles of localities that includes a count of the number of mosques in an area (Issikoff 2003). As these examples show, crime is understood as a departure from the normative.

The need for blanket monitoring and surveillance arises because of the perceived ubiquity of the threat. Often we do not know in advance where the risk or the danger will be. As the Fire Chief of the Livermore/Pleasanton Fire Department put it on the “Homeland Security” CD-ROM distributed by ESRI: “I think now that everyone’s reminded that anytime, anywhere, a significant catastrophic event can occur. An industrial accident, internal sabotage, external terrorism, a bad weather that has not come in a hundred years, and that our citizens expect everybody to be prepared for that” (ESRI 2002). In other words when places such as the World Trade Center are attacked it confirms that we are already “inside” the threat zone and therefore must constantly map

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\(^8\) Figures for the U.K. are similar: between January 1999 and December 2001 a total of 44,082 people were electronically tagged and placed in Home Detention Curfew (HDC), according to figures from the Home Office. The UK also permits children as young as 12 years old to be tagged while on bail (pre–trial). Tagging was first trialed in the UK in 1995 using devices from Premier Geografi.

\(^9\) The software is known as “Rigel” and is distributed by Rossmo’s company ECRI—Environmental Criminology Research Inc.

\(^10\) The grim joke was that they were pulled over for “DWB”—driving while black (Colb 2001).
everything. Thus the new reality of the threat: it is everywhere and so must be the surveillance.\textsuperscript{11}

The same reasoning applies to the Bush administration’s controversial plans for TIPS (Terrorism Information and Prevention System), which was proposed in early 2002 but has since been dropped from Homeland Security. In this plan, citizens and workers who often go into residential neighborhoods (postal workers, cable TV installers, truck drivers) would be recruited to call a government hotline if they saw suspicious activity. The idea was to benefit from as many as a million sources of surveillance in ten pilot cities (these cities were never specified).

Other terrorist information hotlines, such as FBI’s Terrorist Tipline, remain in operation (as well as Amber Alerts about child abductions, Coast Watch, Highway Watch and River Watch, for reporting chemical or biological spills, the ATF Hotline for reporting suspicious firearm activity, and even the Treasury Department’s FinCEN for reporting financial crimes). The “Uniting and Strengthening America by Providing Appropriate Tools Required to Intercept and Obstruct Terrorism” Act of 2001 (the USA Patriot Act or USAPA) also widely broadened existing statutes permitting electronic surveillance. According to an analysis by the Electronic Freedom Foundation (EFF), USAPA “expands all four traditional tools of surveillance—wiretaps, search warrants, pen/trap orders and subpoenas” (EFF 2001)—and made it legal to search homes without a warrant or install surveillance devices in people’s homes without notification until long afterwards (see HR 3162, §§202, 210, 213).\textsuperscript{12} We have thus reached an analogous situation to that faced by the citizens of Paris in 1829 when they were presented with the Balbi and Guerry crime maps: we fear crime and threats to our security from everywhere, and it is no surprise that normative governmental rationality gives rise to widespread geosurveillance in order to manage these threats.

**Conclusion: The Risks of Security**

The events of September 11, 2001, have caused many people to ask whether there has been a fundamental shift in the balance between surveillance and privacy. While mapping and GIS offered critical assistance in the immediate aftermath of the attacks, the more general role of geographic technologies in constituting geosurveillance and security has yet to be determined. I have argued in this paper that a fruitful understanding of mapping and GIS in the context of security can be gained by tracing the underlying motivations and rationalities of geosurveillance to its origins at the beginning of the nineteenth century. These rationalities were directly concerned with governing (e.g., counting, measuring, and establishing norms) individuals and populations in their distributions across territories. Working within a broadly Foucauldian perspective, I have especially highlighted how a *rationality of security* is constructed in which geosurveillance is deployed as a response to dangerousness, and in which the environment and people are constructed as *at-risk resources* subject to normalization and management.

The issue of security is often contrasted against issues of privacy or civil rights. The two are seen in balance, sometimes moving more toward one side (more surveillance in times of threat) and sometimes to the other (reassertion of civil rights in times of peace). As Curry has argued however, while privacy has long been a phenomenon, its coding as a right is new, and the nature of that right has changed alongside changes in technology (Curry 1997). The fact is, the battle has largely been won in favor of a surveillant rationality even before September 11, 2001. Foucault’s insight is that we should understand the rationality *itself* “behind” security, geosurveillance, and rights; that is to say what justifies it and gives it its status as truth. Opposing surveillance by appealing to civil liberties is problematic because the latter are easily constructed in different ways. As Attorney General John Ashcroft argued on the anniversary of September 11, “we’re not sacrificing civil liberties. We’re *securing* civil liberties. That’s what our defense is. The assault on civil liberties is one by the terrorists—they are the ones who don’t believe in freedom” (Williams 2002). Ashcroft is right to make this point—what he omits is that civil liberties are increased for that set of people who are “normal” in their behaviors. For other people or types of places, surveillance is increased (e.g., the FBI’s increased attention to mosque densities). Rights are always

\textsuperscript{11} Christopher Priest’s short story “The Watched” is an expression of such surveillance. It features tiny surveillance cameras known as scintillars that are as small and common as glitter and can penetrate everywhere in a spectacle of mutually assured observation (Priest 1999). Also compare Philip K. Dick’s tiny flying insect bots in his 1969 novel *The Galactic Pot-Healer* (Dick 1969): the AP wire service reported during summer 2002 on research at UC Berkeley on Micromechanical Flying Insects which could be used for surveillance in this manner. This research is funded by the Pentagon’s Defense Advanced Research Projects Agency (DARPA) (Bridges 2002).

\textsuperscript{12} For example, it approved $36.8 million to build a computer system to track foreign students at US universities and colleges known as SEVIS (Student Exchange and Visitor Information System).
partial and limited. By pinpointing the rationalities at stake we can more effectively broaden possible ways of understanding and resisting the normalizing impulses of governmental rationalities.

In this paper I discussed crime mapping as an example of a cartographic rationality that has become more pronounced with the development of new technologies and expertise but which still adheres to its founding principles of assessing dangerousness and risk. Foucault’s notion of biopower (or control) over populations (as opposed to individual bodies or discipline) provides an interpretive framework for understanding government crime mapping activities. The object of these government activities is not to impose an all-powerful system of domination, but rather one in which problems are managed by establishing spatial norms. Analyzing the choice of problems at any given time reveals what is at issue for that society. Likewise the strategies adopted to address these problems, such as a discourse of hazard, threat, or dangerousness, guide our interpretation of the underlying rationality.

I argue that intervention can occur by those subject to normalization. It is not a question of being “anti-GIS” or anti–geosurveillance, but rather one of critically understanding the relationship between technology and rationalities, and how rationalities are integral to policing, policy-making, and politics. This is for two reasons; first, GIS and cartography are important technologies in the production of knowledge for governmental (i.e., geosurveillance, discipline, and biopower), and second, that knowledge is subject to normalization that casts people and space as at-risk resources. As I have tried to show in this paper, an understanding of the contemporary concern with surveillance and security can best be achieved by looking at the historical emergence of geosurveillance and cartographic rationality.

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REFERENCES


