Network-centric violence, critical Infrastructure and the urbanisation of security

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Abstract

This paper addresses the question of whether contemporary global urbanisation is characterised by a distinctive relationship between the city and warfare. In particular it examines the specific way in which two particular forms of warfare – so-called 'al-Qaeda' terrorism and American tactics in Iraq – target urban infrastructure. I argue that infrastructure is targeted because it is a constitutive feature of contemporary urban life. Metropolitan life is marked by its constitutive relation to urban infrastructure. The paper thus suggests that this targeting of infrastructure provides a lens through which to investigate some of the central questions posed by the contemporary urbanisation of security.

Keywords

Urbanisation, security, war, terrorism, critical infrastructure

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The Urbanisation of Security

Whilst violence and conflict are substantial themes in discussions of contemporary urbanisation (e.g., UN-HABITAT, 2007: 3-110), thinking about the manner in which the latter inflects global security is at an embryonic stage. Contemporary urbanisation induces insecurities and vulnerabilities that range from criminal threats to person and property, through organised 'formations of [political] violence' (Feldman, 1991), to problems of access to utilities and/or shelter. In response discourses have emerged seeking to understand and respond to such insecurities, vulnerabilities and violence (e.g., humansecurity-cities.org, 2006). One might thus say that a reciprocal dynamic of urban securitisation is underway in which the security agenda is urbanised and urbanity is – insofar as it induces insecurity and vulnerability – securitised. One could refer to this reciprocal dynamic as the _urbanisation of security_.[1]

Two interrelated questions are central to understanding this urbanisation of security. On the one hand both the multiple forms of insecurity and vulnerability that characterise life in contemporary cities and the discourses that seek to understand and respond to them raise the question of the way in which (in)security is being urbanised. That is to say, how are the experiences

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[1] A phrase that captures both the urbanisation of the security agenda as well as the diffusion of (in)security and securitisations into and across the urban environment

and discourses of (in)security being distinctively inflected by the dynamics of contemporary urbanisation? What is specifically _urban_ about these experiences and discourses of (in)security? On the other hand, the urbanisation of security throws the spotlight of enquiry back onto the processes of contemporary urbanisation posing the question of what is particular to such patterns of urbanity that they are constitutive of particular experiences and discourses of (in)security, vulnerability and violence. In other words, by noting a distinctively urban inflection of the experiences and discourses of (in)security we pose the correlative question of what is specific to the urbanity perceived to be responsible for their emergence. It should be stressed that these two questions comprise a reciprocal dynamic: contemporary urbanity gives rise to changes in the experiences and discourses of (in)security and vice versa. One should not, therefore, take one or other of these questions to have causal primacy.

This paper represents a preliminary attempt to investigate the reciprocal dynamics of the urbanisation of security. The urbanisation of security is, however, a wide-ranging, complex phenomenon. In order to narrow the scope of enquiry, therefore, this paper will focus on one aspect of the contemporary relationship between the city and warfare (cf. Graham, 2004a: 3-6; Graham, 2005): the targeting of critical infrastructure (CI) by both 'effects based' warfare (exemplified by the initial, 'Shock and Awe' phase of the American invasion of Iraq in 2003) and so-called 'al-Qaeda' or 'transnational' terrorism (exemplified by the destruction of the World Trade Centre in New York in 2001 and the suicide bombing of the London transport system in 2005). This

narrowing, whilst making the field of inquiry manageable, means that my argument comprises an investigation into a specific aspect of the urbanisation of security rather than a general theory of its reciprocal dynamics. That said, such an inquiry will offer preliminary insights that should, in principle, be extendable to the wider phenomenon of the urbanisation of security.

It is, of course, not possible to reduce industrialised warfare and terrorism to one another. Indeed, despite vigorous debates about the legitimacy of both forms of violence, Shock and Awe is a state sanctioned practice requiring the mobilisation of vast resources while the New York and London attacks remain a form of asymmetric warfare staged by small cells with resources that are limited by comparison. It is important to note, however, that, insofar as they share the targeting of CI, both Shock and Awe and so-called 'al-Qaeda' or 'transnational' terrorism expose a deeper logic at work in the urbanisation of warfare and associated experiences and discourses of (in)security. Directing violence against CI represents the inflection of each form of violence by contemporary urbanity (as both theatre and target of contemporary war, violence and (in)security). Understanding this deeper logic implicit in the targeting of CI will thus expose precisely what is distinctive about the urbanisation of security and thus, by implication, what is characteristic of global urbanisation in the contemporary era.

Critical Infrastructure and the Contemporary Urbanisation Of War

As Campbell, Graham & Monk (2004) note, the nexus between the city and war is of renewed significance in the light of contemporary dynamics of urbanisation. On the one hand the contemporary city has become both target of, and theatre for, distinctive forms of warfare that are shaping its spatial, political and economic forms (Coward, 2007). As a consequence cities are securitised in response to actual or imagined threats that are perceived to derive from such forms of war and the distinctive way they exploit or endanger the urban fabric. On the other hand, war has increasingly become urbanised, insofar as its doctrine and practices are adapted to (or by) the demands of the urban environment as both theatre and/or target (Graham 2004; Rosenau, 1997). It should be noted, therefore, that this nexus is one in which a mutual constitution is underway: contemporary war is (re)constituted by urbanisation and the city is (re)constituted by contemporary warfare. As such then this nexus allows investigation of both the specifically urban inflection of organised violence (which is implied in a variety of insecurities) as well as the properties of global urbanity that are productive of (and influenced by) these contemporary, urban dynamics of warfare.

At the heart of the posited relationship between the city and warfare is the propensity for forms of organised violence to target CI. Generally speaking CI comprises the technical systems that underpin the ways of life specific to the contemporary metropolis (cf Graham & Marvin, 2001). Three technical systems are particularly prominent in CI discourses: those that underpin information and communication networks; those that both ensure mobility and perform logistical functions; and those that generate, store and deliver power

as well as remove waste (i.e., those systems that circulate energy and its by-products). More specifically these systems comprise the information technology, transport, food, water, power and waste systems that are 'the connective tissue' (Muschamp cited in Graham & Marvin, 2001: 43) essential to a functioning urban environment.

Targeting infrastructures is not, of course, a novel phenomenon. Industrialisation and urbanisation in the nineteenth and twentieth centuries led to the increased concentration of infrastructures such as railways, roads, and telegraph/telephone lines in urban areas.[2] As such, the city became a target precisely because it hosted the technical systems that were necessary for the enemy to continue to wage war. Undermining an enemy's capacity to deliver communications, intelligence, personnel, munitions and other supplies to the battlefield became an important tactical means for realising strategic aims in modern warfare.[3] It was precisely this rationale that was responsible for the

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[2] See, for example, Mumford's comment that among '[t]he main elements in the…[industrial] urban complex were the factory [and] the railroad' (1961:458).

[3] For example, William Mitchell - credited with playing a central role in the initial formulation of American doctrines of air-power (Gat, 2001: 590; Watts, 1984: 7-12) - argued that "[t]he advent of air power which can go straight to the vital centers and entirely neutralize or destroy them has put a completely new complexion on the old system of war. It is now realized that the hostile main army in the field is a false objective and the real objectives are the vital centers" (quoted in Craven & Cate, 1948: 42). Mitchell clarified that these "vital areas [are] cities where the people live, areas where their food and supplies are produced and the transport lines that carry these supplies from place to place" (quoted in Craven & Cate, 1948: 42)

emergence (if not final form) of strategic bombing (Gat, 2001: 593). By the end of World war II strategic bombing had evolved from targeting the infrastructural components of opposing war machines to attacking cities in general as a means of demoralising enemy populations. This strategy culminated in the fire-bombing of German and Japanese cities, the detonation of atomic bombs over Hiroshima and Nagasiaki (Markusen & Kopf, 1995) and the perception that Cold War plans for mutually assured destruction 'raised…the question of the survival of urban culture itself' (SSRC quoted in Farish, 2004: 94).

In light of this historical targeting of the city and its infrastructures in war, to what extent can we say that the contemporary relation between war and CI is a historically specific – and thus novel – phenomenon? In other words, to what extent can we say that an investigation of the way that contemporary forms of war target CI reveals something that is specific to contemporary trends in urbanisation and (in)security? In this regard I think it is worth noting two particular points. On the one hand, it should be noted that all forms of violence are embedded in trajectories of historical continuity. It would thus be wrong to claim that, for example, contemporary terrorism has no links to its historical predecessors. In this sense historical specificity should be seen as a matter of inflection of trajectories rather than one of radical discontinuity. That said, on the other hand, it is possible to see in contemporary urbanisation a distinctive inflection of the role of CI that might lead us to think that the relation between war and infrastructure might be similarly historically specific.

Historically the targeting of urban infrastructures might be seen as independent of the relation between those infrastructures and urbanity itself. On the one hand, cities were targeted as sites where the enemy population was concentrated in an effort of demoralise the enemy and bring about their defeat. In this sense the urban centre was targeted because of its inhabitants, not its infrastructures.[4] On the other hand, infrastructures such as railways and factories were targeted because of their role in the logistics chains of enemy armies typically fighting outside the city. As such the targeting of these infrastructures within the city was a result of their historical agglomeration in urban areas, but independent of their relation to urbanity itself. In other words these infrastructures were targeted because they were an element in a war machine that happened to be concentrated in cities rather than because their destruction would critically disrupt urban life. Obviously, both dynamics coincide in a tactic such as area bombing.

In contrast I would contend that the form of urban war I will investigate below represents a distinctive attempt to disrupt urbanity through the destruction of that substrate which is central to contemporary cities: critical infrastructure. Contemporary urbanisation is, as UN-HABITAT (2004: 49-75) has noted, a process of metropolitanisation in which existing urban centres are expanding by virtue of the technical structures that make meaningful interconnection over longer distances possible. These infrastructures give rise to the phenomenon

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[4] An argument that Shaw (2004: 148-9) makes with regard to the genocidal destruction of urban populations. Shaw argues that where urban fabric is destroyed it is as a means to the end of the destruction of specific populations, not as an end in itself.

of falling density in cities even while the populations of the same cities rise (UNFPA, 2007: 47). Such a phenomenon, previously referred to as sprawl or suburbanisation, is referred to by the UNFPA as 'peri-urbanisation' (2007: 48). Peri-urbanisation leads to the emergence of 'metacities' – massive, multi-centric urban conglomerations in which the fringes of a number of previously distinct urban concentrations meet to create a greater urbanised area (Anas, Arnott & Small, 1998:1439-1444; UN-HABITAT, 2006: viii).[5]

Infrastructures are constitutive of metropolitanisation. Road, rail and air transport systems, information technology and communication systems, retail/food supply logistical chains, water and power systems and waste removal systems are precisely that which makes possible the dynamic of peri-urbanisation. Of course one cannot say that such infrastructures are universally, or evenly, distributed in contemporary urbanisation. Indeed, attendant to such urbanisation is the emergence of what Davis (2006) has referred to as the 'planet of slums', home to 1 billion people (UN-HABITAT, 2006: x). However despite a distinct lack of CI, slums do not disprove the centrality of such technical systems for contemporary urbanisation.[6] Such informal urbanisation is precisely defined by the normative expectation that

[5] While Los Angeles is often invoked as the model for multi-centric urban sprawl (cf. Davis, 1992), a similar process can be seen in the emergence of 'multi-nuclear entities' such as Tokyo, Mumbai, New York and Lagos (UN-HABITAT, 2006: 6) as well as in the emergence of regional urban agglomerations such as the Hong Kong-Zhujiang delta region (cf., Shen 2002: 92).

[6] Lack of CI (e.g., water, sanitation) is central to the definition of what comprises a slum. Lack of security (particularly tenure) follows from lack of such CI (UNHABITAT, 2006: 19)

both the existing state of deprivation and a possibility of positive future development rest on the extension (or lack thereof) of CI systems. In other words, CI is constitutive of what is considered to be normal urban life and slum life is taken to deviate from that norm.

As such CI can be said to comprise that which is constitutive of, not simply located in proximity to, contemporary, metropolitan urbanity. This is reinforced by the manner in which targeting CI seeks to disrupt urban life (through generating fear, impeding circulation and imposing unacceptable economic and human costs). Targeting CI in order to disrupt urbanity thus comprises a historically specific form of violence. It is in this sense, that investigating this form of violence represents an opportunity to delineate the dynamics of both the contemporary urbanisation of security and the urbanity it is embedded within. In order to further this investigation it worth briefly describing the two principal forms of violence against CI: effects based warfare waged by advanced industrial states and the spectacular urban attacks attributed to so-called 'al-Qaeda' or 'transnational' terrorism.

Shock and Awe

The first form of violence against CI is best represented by the American assault on Baghdad in the opening phase of the 2003 invasion of Iraq. Referred, to as 'Shock and Awe' the bombing of the city began on March 20th 2003 but was particularly intense between March 21st and April 3rd (Human Rights Watch 2003: 18). During this period government ministries and

elements of CI such as the telecommunications grid were specifically targeted (Fisk, 2003:5; Jaulmes, 2003). The bombing campaign had significant impact on CI. For example on April 3rd/4th electrical power to the city was cut as a consequence of US military actions (New York Times, 2003; Shadid, 2003: A1). The damage to the electrical grid was lasting, leaving those without access to generators without power even after the 'liberation' of the city (di Giovanni, 2003). Similarly, on 29th March a 'Cisco switch that connected Baghdad residents to the internet stopped responding' (McWilliams, 2003) severely interrupting the information technology and communications networks of the city. This campaign was intended to have a dual function. On the one hand, the targets attacked were selected as having high command and control and/or logistical value to the Iraqi regime. On the other, the symbolic effect of such bombing was designed to affect the morale of Iraqis serving as a visible demonstration of the capabilities of the American war machine. As such targets were not only functional but also symbolic.

Shock and Awe represents both the culmination and evolution of the historical trajectory of military doctrine in advanced industrial states such as America. The roots of this doctrine can be seen in two interrelated strategies that emerged from the total war of 1939-45. On the one hand the roots of Shock and Awe lie in the strategic bombing employed in the early stages of World War II.[7] By targeting industrial facilities in European cities, strategic bombing

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[7] I will here simplify strategic bombing into two phases: that in which industrial facilities were the ostensible target; and that in which enemy morale was targeted through the explicit bombing of civilian concentrations. I take it that the former tends toward the latter insofar as the targeting of industry gives rise to the idea that enemy civilians (e.g., factory workers) are as responsible for their war effort as their military forces and, hence, are a legitimate target.

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initially sought to disrupt lines of production, logistics and communication. Whilst the disruption of lines of supply, communication and intelligence has always been a primary objective of warfare, the bombing of 'industrial targeting sets' (Ullman & Wade, 1996: 33) represents the evolution of a form of total war in which objects that are staffed by, and often central to the continued existence of, civilians are taken to be legitimate targets of war. In such warfare entire societies are mobilised to support military operations and thus, it is reasoned, society in its entirety – including the industrial and transport infrastructure that assures its continued functioning – comprises a target (Shaw, 2003: 24-5; Markusen & Kopf, 1995: 151-82). On the other hand the roots of Shock and Awe lie in the firebombing of German and Japanese cities and, ultimately the detonation of atomic bombs over Hiroshima and Nagasaki. These attacks could be interpreted as rudimentary 'effects based operations' (Smith, 2002; Ho, 2005) intended to stun and demoralise an enemy (conceived of as an enemy population in its entirety) into conceding victory.

In the book regarded as seminal in the formation of the doctrine of Shock and Awe, Ullman and Wade note that the first task in 'achieving rapid dominance' is attacking the command and control, supply/logistics and transport system of the enemy's political-military machine (Ullman & Wade, 1996: 13). The enhanced accuracy of contemporary military technology helps to achieve superiority in accomplishing such a task. However, Shock and Awe is

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Such an idea legitimates the destruction of civilians resulting in the second phase – epitomised by the destruction of Hamburg and Dresden – in which civilians are attacked as a target in their own right (i.e., not simply as elements of the war machine). See Shaw (2003: 126-7).

extended to a wider set of targets including public buildings and infrastructures. This extension is justified as a means to achieve an effects-based impact on the population to stun and demoralise them and thus enable 'rapid dominance' by American forces.

Shock and Awe thus represents both a continuation and evolution of the trajectories established under conditions of total war. On the one hand it represents a continuation of the perception that targets essential to the functioning of civilian life can be regarded as legitimate targets if they are also central to military operations. In other words it represents a continuation of the doctrine that targeting the city in order to disrupt enemy logistics is a legitimate tactic of modern warfare. Furthermore, Shock and Awe represents a continuation of the logic of massive bombardment, perceiving one of the core rationales for targeting the city to lie in the potential such destruction has for demoralising the enemy and hastening a declaration of defeat.

On the other hand, however, Shock and Awe also represents a radicalisation of the trajectory of western warfare through the deployment of accurate munitions to achieve direct targeting of a select set of infrastructure objectives. This selective targeting is a product of the confluence a number of technological, doctrinal and socio-legal trends. More specifically, it is a consequence of the refinement of the accuracy of guided munitions, the emergence of doctrines of 'network centric' and 'effects based' warfare, and the exposure of military operations to legal and ethical discourses (Shaw, 2005; Smith, 2002). These trends both restrict the targets that might be

deemed legitimate in military action as well as encourage the development of increasingly accurate munitions to attack those targets without causing 'collateral' damage. In one sense this means a decrease in massive bombardment, and yet in another it means greater destructive potential as targeting becomes more efficient through precision. If the aim is no longer to carpet bomb the city, it is rather, as Graham notes, to 'switch the city off' (Graham, 2005). Such a 'switching off' is an effects based strategy designed not only to disrupt the enemy political-military machine (by disrupting supply, logistics, intelligence and so on) but also to demonstrate to the wider population the consequences of continued resistance. Shock and Awe thus seeks 'rapid dominance' through a carefully targeted, but nonetheless devastating, assault on the technical structures that ensure the continued functioning of metropolitan life.

Stephen Graham (2005: 181-5) notes that the assault on Baghdad has important precursors in the degradation of Iraqi infrastructure during the sanctions and sporadic bombing that followed the 1991 Gulf War as well as the attacks on targets such as electricity stations and bridges that were central to the air campaign over Kosovo in 1999 (see also Coward, 2008: 19-24). While the sanctions regime did not target infrastructure per se, it prevented the reconstruction, repair or maintenance of a number of infrastructural sites on the basis that they comprised 'dual use' facilities of potential importance to the Iraqi military. As a significant amount of Iraqi infrastructure had been destroyed during the 1991 gulf war, such an embargo ensured the further degradation of technical structures. This degradation

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through disruption of essential services thus had a serious impact on the urbanity of Iraq.

The Kosovo campaign actively selected civilian infrastructure as a target, destroying electricity stations, bridges and oil refineries as well as symbolic buildings central to the Serbia's political-military efforts. Such targets were selected both as a means to degrade the operating capacity of the Serbian Police and military as well as to achieve effects aimed at the wider Serbian population. Leaving Belgrade in the dark thus served both the purpose of disrupting the Serbian political-military operations as well as indicating to the wider Serbian population that they were being held responsible for the actions of their leaders (and thus, presumably that they could play a role in the resolution of the crisis). This targeting of Belgrade and other Serbian cities was not just a destruction of military and political command, control and supply lines, it was also a deliberate degradation of the technologies essential to urban life in order to demonstrate the vulnerabilities of such life to NATO military dominance.

Terrorism and Critical Infrastructure

The second example of the deliberate targeting of metropolitan infrastructure is that of the attacks on the cities of New York and London attributed to so-called 'al-Qaeda' or 'transnational' terrorism. Discussion of these attacks in the academic literature has tended to focus on the causes of, and response

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to, such attacks. As this paper is concerned with the destruction effected by each attack it is worth briefly restating the events on which I want to focus.

As is well-known, the New York attacks on September 11th 2001 deployed hijacked airliners against the World Trade Centre (WTC). The impact, explosion of jet-fuel, and subsequent fires created by flying airliners into the twin towers of the WTC resulted in massive loss of life (2750 as of December 2007 (Bureau of Vital Statistics, 2007: 75)), destruction of buildings and disruption of the technical systems clustered in that area of Manhattan. Both of the twin towers collapsed in addition to another building in the WTC complex (WTC 7) while a number of buildings beneath, or adjacent to, the WTC were damaged. A total of '30 million square feet of commercial office space' (Bram, Orr & Rapaport, 2002: 7) was destroyed with reports indicating rebuilding and repair costs of $11.2 billion. Estimates immediately following the attacks indicated that '11 percent of Manhattan Class A [office] space and 44 percent of Downtown Class A [office] space' (Hevesi, 2001: 5) had been destroyed – equivalent to the destruction of the 'entire office-space inventory of Atlanta or Miami' (Hevesi, 2001: 4).

The loss of these buildings does not, however, simply represent the loss of empty space or simple walls, floors and ceilings. The loss of office space also represents the loss of dense infrastructures of information technology. The cost of 'replacing the contents of the destroyed buildings, including the technology and fixtures, has been estimated to be $5.2 billion' (Bram, Orr & Rapaport, 2002: 7). In addition to the loss of this commercial serviced space

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two subway lines and a Port Authority station were damaged and parts of the telecommunications and electricity network were destroyed. Estimates indicate the costs of repair (including the repair of 200,000 damaged phone lines and 5 telecoms switching stations as well as the replacement of 2 electricity substations and 33 miles of power cable (Hevesi, 2001: 6)) to be $3.7 billion (Bram, Orr & Rapaport, 2002: 11).

The London bombings wrought destruction on a smaller scale directed at a specific form of CI. The attacks targeted the transport infrastructure at a busy period of the day. On 7th July in London, suicide bombings on three trains and a bus killed 52.[8] The attacks closed stations and damaged power and signalling cables disrupting the functioning of the underground for several weeks.[9] There was an immediate, though temporary, impact on the number of commuters using the underground, and the London Chamber of commerce noticed a downturn in economic activity (London Chamber of Commerce and Industry, 2005: 14). These impacts demonstrate the centrality of transport infrastructure to metropolitan life.

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[8] It should be noted that the UK government implies that the number 30 bus did not represent the original planned target of Hasib Hussain's bomb (UK Government, 2006: 6). Whether this is the case or not, it should be noted that Hussain chose a form of transport rather than any other target (e.g., shop, restaurant or office) for his bomb.

[9] For example, Aldgate station reopened on 25th July (Metronet, 2005a) while Edgware Road reopened on 29th July (Metronet, 2005b). The Piccadilly Line did not reopen until August 4th (Transport for London, 2005).

It is not possible to claim that CI was the only target of these attacks. Indeed, these attacks (and others like them) have both symbolic (cf. Closs Stephens, 2007) and instrumental/pragmatic dimensions (cf. Jordan, 2008). On the one hand the attacks are targeted at buildings, institutions and sites that have significant symbolic value as icons of particular socio-cultural values. On the other attacking these buildings and transport infrastructure is calculated to maximise casualties (insofar as both represent enclosed spaces in which the effects of a detonation will be amplified) whilst also having ongoing effects in terms of the fear created and a concomitant reduction in travel (and thus economic activity). That said, these dimensions of terrorist activity remain inseparable from the targeting of CI. That is to say, symbolic and instrumental logics of destruction are only achieved through targeting CI. It is CI that expresses symbolic value (for example the iconic status of the London Underground in the symbolic representation of London to itself and the wider world) and provides the material conditions that underpin the instrumental calculation of how to achieve maximum casualty rates and impact (for example, by enclosing numbers of workers/commuters or networking key nodes in communication). CI is thus not a simple backdrop for other logics of destruction, it is integral to them. Perhaps this is why it has been attacked so many times in the history of terrorist activity.[10]

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[10] For example a United States Government Audit Office report notes that 'one-third of terrorist attacks worldwide target transportation systems' and 'surface transportation systems were the target of more than 195 terrorist attacks from 1997 through 2000' (United States General Accounting Office, 2003: 1 & 7, respectively).

The Urbanisation of Security: Networks and Battlespace

Insofar as they represent a specifically urban inflection of forms of contemporary war, what do these attacks on infrastructure tell us about the contemporary urbanisation of security? I would contend that they demonstrate three interlinked dynamics. Firstly, that the primary motif inflecting urbanised violence is that of the network. Secondly, that networking gives rise to a radical extension of the battlespace in which violence and (in)security are experienced. And finally that this extension of battlespace gives rise to troubling questions of legitimacy.

The targeting of CI conforms to the basic tenets of the doctrine of 'network-centric' war (Alberts, Garstka & Stein, 2000). 'Network-centric' warfare was conceived in the post-Cod War period as an element of the so-called Revolution in Military Affairs (RMA). It refers to a doctrine based on domination of the information spectrum supported by the use of precision munitions, mobile forces and accurate real-time modelling of enemy forces and infrastructures. As a doctrine it aims, like Shock and Awe, to decapitate and disrupt an enemy force through the application of precise but overwhelming force at key points in the structures of opposing forces.

Despite an association with 'risk transfer militarism' (Shaw, 2005), the idiom of network centricity resonates with the dynamics of contemporary

urbanisation.[11] Metropolitanisation comprises the emergence of multi-centred assemblages predicated on interconnective technical systems (or CI). Metropolitanisation thus represents the emergence of network structures that interlink nodal hubs through various connective technologies. The material form of urbanisation thus resonates with the conceptual horizons of military planners. Moreover, the network has become a common conceptual horizon in the era of global urbanisation. The globalisation of the economy and transportation as well as the virtualisation of knowledge and communications has led to an unprecedented perception of contemporary urban existence as a form of 'network society' (Castells, 2000). Such a trend has led to the perception that all identities are exposed to, and thus constituted by, relations with wider communities through transnational networks of supply, exchange, mobility and communication. This conceptualisation of contemporary urbanisation as a network (which is defined by relationality and connectivity) revolves around a representation of the technical systems of CI as a distinctive feature of contemporary existence.

It is precisely the network as both material substrate of urbanisation and conceptual motif representing urbanity that both western warfare and transnational terrorism have converged upon. It is in orienting their violence towards such networks (whether real or conceptual) that we might say they become inflected in a distinctively urban manner. That is to say orientation towards networks constituted by CI comprises one aspect of the urbanisation of war and, by extension, the urbanisation of security.

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[11] For a further critique of the motif of network centric war see Monk (2007).

However, there is a second characteristic of this urbanisation of war (and associated experiences and discourses of (in)security): a transformation of conceptions of battlespace that has important consequences for urban (in)security more broadly. This re-conceptualisation of the arenas and targets of violence corresponds to a transformation of the conception of battlespace from one in which forces meet each other at a notional frontline, to one in which destructive force is applied at nodes (cf. Latham, 1999: 213). Such a transformation is posited as a move from notions of organised violence that are oriented towards controlling territory and massing force behind a rolling line of engagement to one where territoriality is less important and force is not massed but directed at key nodes in a network.

This transformation of the doctrines guiding warfighting from one based on planar movement to one based on application of force to points (cf. Graham, 2003; Weizman, 2002) has a troubling consequence, however. Specifically, it is posited as being responsible for the extension of battlespace and the exposure of increasing numbers of civilians to the insecurities such organised violence entails. Where military action is guided by the idea of movement across a plane, areas on that planar surface may be proscribed. Where force is applied to nodes, no such proscription applies: any node becomes a target regardless of its wider location. In the network centric imaginary there is a lack of the proscriptions attendant to territorial tropes. That is, each and every node could be a target while the entirety of the network is an arena of violence, whereas more territorially organised tropes can proscribe islands of

civilian life such as cities. Networked urbanity is thus radically exposed to violence, vulnerability and (in)security. In response discourses of securitisation suffuse the networked lineaments of the city in the era of global urbanisation and are manifest in the hardening of its nodes and surveillance of the interconnections.

It is thus possible to argue that targeting CI provides a lens for understanding the urbanisation of security. Violence, vulnerability and (in)security can be said to be *urbanised* insofar as they are organised around the technical systems and conceptual tropes of networked infrastructure. That is to say, insofar as this violence, vulnerability and (in)security pertains to the targeting of networks either in the sense of the physical lineaments of the infrastructural underpinnings of contemporary urban form or in terms of the sense of interconnection and relationality that is constitutive of urbanity in an era of global urbanisation. As such urbanised violence exploits and develops the potential of the linkages that characterises contemporary urbanity from the mobile phone to transport infrastructure. However, the urbanisation of security is not simply a matter of the selection of a specifically urban target. Such attacks provoke (and ultimately respond to) the pre-emptive securitisation of urban networks epitomised by hardening of buildings and surveillance and control of mobility (Coaffee, 2003).

Noting one characteristic that might be said to give violence, vulnerability and (in)security a specifically urban inflection is, however, only part of the story. The cycle of violence and securitisation that revolves around the network

(both as technical infrastructure and conceptual trope) does not simply reveal how practices of violence and security are being urbanised. It also sheds light on the wider nature of the urbanity that is inflecting practices of violence and security. In other words, it is that which characterises urbanity in general in the contemporary period which inflects the narrower phenomena of violence and (in)security in a specifically urban manner. If we can identify the latter inflection, we can extrapolate about the wider urbanity that has given rise to the narrower urbanisation of security. It should be noted that this is not a causal relationship – global urbanity does not cause urbanisation of security – but it is a relationship in which the core characteristics of urbanity and the specifically urban inflection of practices of violence and security mutually constitute each other.

Insofar as it is the *network* – both as technical infrastructure and discursive trope – that is the specially *urban* characteristic of the urbanisation of security, we should investigate what the centrality of such a trope tells us about urbanity in an era of global urbanisation. Although the network has multiple dimensions in contemporary urbanity, I want to focus on two in particular: the effects that the underpinning of urbanity by technical infrastructures has on both the spatial form of the contemporary city and the complex ecology of subjectivity characteristic of global urbanisation.

Networking And The Spatial Form Of Metropolitanisation

The network underpins the spatial forms that are distinctive of the metropolitanisation which characterises global urbanisation. As I have noted metropolitanisation is characterised by a sprawl constitutively underpinned by networked infrastructure. As I have noted, the UN characterise metropolitanisation as a process in which peri-urbanisation gives rise to metacities. Peri-urbanisation and metacities are a consequence of the nodal structure emerging from the infrastructures and tropes of the network. Network infrastructures make spatial dispersion possible and thus lead to declining density as remote working and social networks supplant commuting and face-to-face contact. However, networks do not lead to simple dispersion, but rather entail the formation of a number of new nodal points at which interconnection occurs. While the suburb simply decentres the city, the peri-urban network creates a number of nodes at which interconnection is realised. This is a product of the interconnective structure of the technology and trope of the network.

Networks are not, however, without their socially divisive qualities. As Graham and Marvin (2001) have noted, the interconnection of the network occurs simultaneously with a 'splintering' dynamic. While the network may give rise to new nodes of interconnectivity, it also acts as a new form of exclusion. The metropolis faces three splintering dynamics. Firstly, it faces the challenge of providing networked infrastructures on a widespread basis. As UNHABITAT note one of the most obvious characteristics of emerging metropolises is their infrastructural poverty. Lagos, for example faces 'the logistical nightmare of clearing over 10,000 tonnes of refuse generated daily in an urban area that

enjoys only 40 per cent sanitation…[e]ndless traffic snarls…[and] a 40 per cent access rate to potable water' (UN-HABITAT, 2004: 56). Infrastructures are thus splintering insofar as those left without their connective technologies and dynamics clearly suffer from a vastly reduced quality of life.

Secondly, infrastructures may be connective, but are simultaneously exclusionary insofar as their connection of points enables the bypassing of entire regions and populations. The connective technologies of CI can thus arrange point-to-point interconnections that connect across vast distances and yet at the same time pass over entire areas and populations. As CI is securitised access to such connective infrastructures is further restricted, thus introducing an exclusionary dynamic as the flipside of the re-centring, connective dynamic of the network (Graham & Marvin, 2001: 170-1; Moss, 2008: 445). Finally, as Graham and Marvin (2001: 100) note the CI that underpins such networks is increasing unbundled and privatised. Whereas the metropolitanisation of the west was largely accomplished through the provision of publicly owned CI, networks of communication, transport, logistics, nutrition and waste removal are increasingly separated from one another and privatised. This introduces a second dynamic of exclusion to metropolitanisation. It is not simply that spaces and populations can be passed over by interconnective networks, but that even where access is possible it is frequently priced in a way that is exclusionary. Metropolitanisation thus has a interconnected, sprawling, splintered spatial form that is a direct consequence of the centrality of networked infrastructure

to its development. It is this spatial form that is the characteristic dynamic of global urbanisation.

The Complex Ecology Of The Metropolitan Political Subject

Networked infrastructure is also constitutive of another dynamic in contemporary urbanisation: the complex ecology of political subjectivity that can be referred to as 'metropolitan life'. CI is more than an enabler for the urbanity that characterises contemporary metropolitanisation. Network infrastructures are constitutive of distinctive forms of subjectivity (cf. Bennett, 2004, 2005). Thus the subjectivity of metropolitan urbanites is inextricable from the infrastructures that ensure their communications, transport, logistics, provision of food and power as well as removal of waste. We should not see such technologies as simply a backdrop without which quality of life would be diminished. Rather these technologies are constitutive of novel forms (or, since they comprise a complex and holistic interaction of material and human elements, ecologies) of subjectivity. The driver of the car, for instance should not be regarded as separate to their transport. Rather car-driver-road-satnav constitutes a novel ecology of subjectivity. Similarly, the metropolitan life constituted by the distribution of water, power, and access to information conduits is an entirely different form of subjectivity to that constituted in the infrastructure 'cold spots' (Moss, 2008) of the world's slums (though the forms of subjectivity constituted by the latter might aspire to the complex ecology of subjectivity found in infrastructure rich metropolitan life).

Both Tim Luke and Stephen Graham have referred to the ecology of subjectivity characteristic of metropolitan life as 'cyborg' (Graham 2005: 170-2). For both Graham and Luke, 'cyborg urbanisation' is intended to capture the manner in which, as urban life is increasingly constituted through technological networks, the boundary of the human and the machine becomes blurred. That is to say, as urban forms of life are increasingly constituted by technical systems, it is harder to separate the human and the technological since both are part of holistic ensembles which lose their meaning and function if disaggregated. This description captures the nature of metropolitan life well, a complex subjectivity composed of an holistic ensemble of material and human elements that have a singular meaning which cannot be disaggregated. To see the technological as a simple tool or mere backdrop, fails to grasp the manner in which it is an integral part of the subjectivities constituted in and by metropolitan life. While I would prefer the trope of a network constituting a complex ecology of subjectivity (insofar as it captures better the spatially dispersed, CI based, form of life characteristic of global urbanisation) to that of the cyborg, the latter captures the sense of a holistic ensemble of material and human factors in the constitution of metropolitan life.

It is this complex ecology of subjectivity that is at stake in the urbanisation of security. It is a form of subjectivity with novel vulnerabilities that will be central to the evolving agenda of security studies. Those vulnerabilities are in part a function of the technological systems that are a constitutive element of such subjectivity. This is part of the reason why the securitisation of infrastructure

has played such a prominent role in the ongoing urbanisation of security. The hardening and protection of such infrastructure represents an obvious securitisation of the material elements of such subjectivity. However, such securitisation will not eliminate the violences, insecurities and vulnerabilities experienced by metropolitan subjectivities. Securitisation may protect material technologies, but it also disrupts the networked interconnectivity that is also central to metropolitan life. The complex subjectivity of metropolitan life is thus not simply the imbrications of material and human, it is also the interconnectivity that such a process gives rise to. The securitisation that is reciprocal to the vulnerability of CI cannot thus fully mitigate the vulnerabilities of metropolitan life. It can protect the material substrate of that life, but not the networked interconnectivity that is its proper characteristic. Moreover, the threats to such subjectivity come not from war alone, but also from the splintering morphology of global urbanisation. Metropolitan life is not only vulnerable to the destruction of its material infrastructure, but also to loss of access to its circuits.

Drawing Conclusions

The targeting of CI by urbanised forms of organised violence thus provides an important lens through which to discern the wider processes at work in the urbanisation of security in the contemporary period. By seeing the targeting of CI as a distinctively urban inflection of warfare, we can cast reciprocal illumination on the nature of contemporary urbanity. In so doing it is possible to note the nature of both the urbanity and (in)security that characterises

global urbanisation. The dynamic relation between metropolitan life and the vulnerabilities, violences and insecurities it experiences can thus be sketched out.

Two consequences of global urbanisation might be highlighted by way of conclusion: the war-city nexus and the changing referent object of security and securitisation. In the first place global urbanisation will give rise to a particularly strong nexus between the city and war (see in this regard the essays gathered in Graham, 2004a). On the one hand this appears to be self-evident insofar as sprawl will lead to a greater probability that warfare will occur in urban spaces. However, the trend towards the urbanisation of war is deeper than such simple probability. Urbanised warfare does not simply take place within the urban environment, it strikes at that which is specifically *urban*: CI and the ecology of subjectivity it constitutes. This is why such war must be thought of as properly urbanised. As metropolitanisation gathers pace (witness the attempt to reduce slums by extending metropolitan infrastructures) such war will expose metropolitan urbanity to an increasing range of vulnerabilities, violences and insecurities.

The response to the urbanisation of war will be a securitisation of the urban – already seen in the hardening of high-profile buildings and technologies and the emergence of complex regimes of surveillance (Coaffee, 2003). Such a securitisation is, ultimately, designed to secure the complex ecology of subjectivity that characterises metropolitan urbanity in the era of global urbanisation. As such, then, the referent object of security will be transformed,

as will the agenda of security studies. In an era of interconnection and transnational flows it has been noted that the primacy of the nation-state as the referent that defines the agenda of security studies is decreasing. The emergence of metropolitan life as a referent of security will further this trend. As the networks on which such subjectivity is predicated are transversal and ubiquitous and the agencies tasked with securitising it a complex blend of global, national, public and private, the international frame of security studies will be unable to fully appreciate the dynamics of the urbanisation of insecurity. That this is the case has already been noted (albeit in preliminary form) by early analyses of the security governance of urban spaces of the global south (Williams & Abrahamsen, 2007). What will be needed is a security studies that can appreciate the complex ecology of subjectivity that characterises metropolitanisation and the complex transversal dynamics it entails. One thing that is certain is that the simplistic reactive dynamic of contemporary attempts to securitise the city in the face of terrorism do not adequately comprehend that demand.

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