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People, animals and biosecurity in and through cities

Steve Hinchliffe and Nick Bingham

1. Introduction [h1]

As many chapters in this volume have demonstrated, SARS gave stark relief to the connections between urban public health and other places and others' lives (not just human lives). In this chapter we add to this geography and ecology of disease by noting that cities are not just places where viruses eventually end up and cause havoc. They are not simply dense collections of people that are vulnerable through global networks that connect them to the 'pre-modern' agricultural practices of 'elsewhere' where people and animals mix tissues and excretions. For two reasons. First, cities are also very much a-modern. Many cities and many parts of cities around the world are no better than their rural hinterlands in terms of services (Davis, 2006), and all are full of animals. Second, world cities are rarely, if ever, simply victims of global shifts. They are of course important sites of intensive orderings, where matters as diverse as landscapes and viral forms are organised and distributed. Many chapters in this book rightly point to the uneven quality of life in cities and to the vulnerabilities that are distributed across and within world cities. Thus the interconnections between world cities can produce a particular patterning of viral lives. But we also need to remember that cities are not simply networked, they also network. They are not globalized but form focal points where globalisation is done.

This combination of the a-modern, living city and the networking effects of cities means they are places where issues of biosecurity are starting to be realised and

played out. Loosely speaking biosecurity refers to a set of procedures and infrastructures which seek to control and police the movements of living matters. As a topic of concern it has mainly surfaced in rural locations, partly as a result of the understanding that rural livestock production is the so-called front-line in the generation and distribution of zoonotic diseases (Braun 2007). While this is undoubtedly the case, we will argue that biosecurity is also an issue for urban areas which are rife with living things (humans and animals). Cities, as living places (Hinchliffe and Whatmore, 2006) are made up of dense networks of living relations and are therefore as important to the making and breaking of biosecurity as any rural location. Indeed, it almost goes without saying in this book that the dense networks and the concentrations of human inhabitants in close proximity make for high risk disease ecologies. But it should also be added that cities are, and always have been, full of other animals too. Their role in biosecurity practices needs more attention.

Our main site is Cairo, a city that has long been seen as a colonial site that is both networked and which networks (Mitchell 2002). Our case is the arrival of highly pathogenic avian influenza in winter 2005/6. More broadly we look at the attempts to control and eradicate avian influenza within Egypt through biosecurity measures. Such measures are channelled through and within Cairo to peri-urban, rural, wild and domestic settings where people and birds interact. Our focus on the city does two things. First we note how Cairo acts as a site for a gathering together of orderings. It is a place of networking that makes and repairs links to other world cities, international governments, international organizations, disease control centres, surveillance operations and so on. Second, we argue that rather than biosecurity being a case of a militarised state imposing orders upon a populace, our urban focus allows us to trace the rough textures of disease 'control' networks. Our argument is

that cities mark places where the never finished products of state and society are actually being made and re-made, where expertise is being re-distributed through an attempted elimination of certain city-nature formations (Hinchliffe 1999). We conclude by arguing that biosecure states emerge in practices, are always incomplete and are far from secure.

We start the chapter with a brief introduction to the term biosecurity. Following this we outline the avian influenza disease group and then provide an account of Egyptian disease control practices. The paper ends with a discussion of the fraught relation between networks and control.

2. Biosecurities [h1]

Biosecurity involves lots of things and practices. In terms of its things, a brief review of the uses of the term suggests at least three elements. First there are the attempts to manage the movement of agricultural pests and diseases, with the aim of protecting **national agricultural productivity**. Second, there are the attempts to reduce the effects of invasive species on so-called indigenous flora and fauna, or the protection of **national natures**. Third, there are the dangers of purposeful and inadvertent spreading of biological agents into the human population. This protection of **human populations** focuses on laboratories which handle potentially hazardous organisms, possible uses of pathogens in bioweapons and bioterrorism, and the possible crossings of animal borne diseases into the human species (zoonotic diseases).

Biosecurity also involves different forms of security practices. Collier and Lakoff (2006), in part following Foucault (Foucault 1973; Foucault 1977), identify

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three political logics of security. The first of these, **Nation-State Security**, has its roots in the establishment of states in 17th Century Europe, and involves the will to secure territorial sovereignty. It is premised on a bipolar world of friend and enemy, its spatialisation into territorial units and a militarisation of various borders. The latter can be external or internal (the enemy within), with the result that policing borders becomes a matter of foreign and domestic policy. Second, there is the logic of **population security**. With its origins in late 19th Century social welfare reforms, population security involves attempts to improve overall and individual levels of and access to health and welfare by organising the purchase of health and social securities. The collectivisation of health and social safety nets through public and private insurance and through the organisation of health and social infrastructures are the main recognisable instances of population security. Finally, for Collier and Lakoff, there is **Vital Systems Security**. This is a mid-20th Century response to the development of extreme emergencies, including most notably the possibility of nuclear attack or other incalculable, and thereby uninsurable, events which lie outside the technologies of formal risk assessments (earthquakes, hurricanes). The logic here is preparedness and emergency planning.

Putting these biosecurities together we can start to map matters of concern with characteristic responses. And yet, as a reading of the table (below) will confirm, biosecurities are not easily separated into single forms or single logics. There are overlaps that require us to look more carefully at biosecurity operations.

[insert Table 1]

To elaborate we can make four related points: First, in practice, a particular thing may not fall neatly into the categorisations outlined above. As we will develop later in the chapter, the current avian flu situation, for example, mixes aspects of the

ecological integrity issue (the importation of exotic birds along with seasonal migrations), aspects of the agricultural disease issue (the spread into and within domestic poultry and other bird stocks), and aspects of the human health issues (the risk of infection to those humans living and working with poultry and the wider fears of the development of a human to human transmissible form of influenza from H5N1). Second, as Foucault reminds us (a point repeated in the recent collective work of Rabinow, Collier & Lakoff) in practice, a form of security is always already multiple in that it involves at least assemblages, apparatuses, and normativities which while mostly hanging together, never completely coincide. Thirdly, different logics or orderings do not exist in historical or geographical isolation, replacing one another completely from time to time or varying completely from place to place. Rather (and Foucault is again very clear about this), they are added to one another, sometimes arising in answer to the failing of previous orderings, but always interpenetrating to a greater or lesser extent. Finally, security is probably not best understood as a matter of responding to an already defined threat. Security (as Foucault once again demonstrated only too well), is about the public production of norms, their surveillance, regulation and enaction (Foucault 1977). Thus, the three forms of collective security detailed earlier (state, population, and vital systems) are never simply a reaction to self-evident hazards, but always at least in part about the constitution of both a particular kind of body politic (self-contained, healthy, alert respectively) and a particular kind of bio-insecurity (fear of the outside, hypochondria, terror of the inevitable respectively).

What this situation suggests is that one form of security is unlikely to be either pure in form or dominant in terms of effect, and that analytically and politically it is

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worth exploring the complexities, inter-topological effects, and crossings that occur when biosecurities are put into practice. Some of this work which would elucidate precise configurations of ways of life (bios), sickness (nosos) and the law (nomos) (Thacker 2005b) already exists, but (much) more remains to be done. Here we work with the multiple practices that make up avian influenzas in order to elaborate on the possibilities once we recognise the contingencies of more than one kind of actor and more than one enaction of disease.

Ordering avian influenzas [h1]

Avian influenza or bird flu is a common enough condition for wild and domestic birds. Indeed, the wide variety of subtypes of influenza virus (all 16 haemagluttinin and 9 neuraminidase subtypes of influenza viruses are known to infect wild waterfowl, WHO (2006a)), provides a large reservoir of viruses which 'perpetually circulate' in bird populations (WHO 2006a). In many cases such viral infections produce few clinical effects (ruffled feathers, reduced egg production in poultry and little else). However, more pathogenic and lethal forms of avian flu exist which can spread rapidly and approach a lethality rate of close to 100% in birds. All are H5 or H7 subtypes with a distinctive set of amino acids in the cleavage site of haemagluttinin. Not all H5 or H7 subtypes are highly pathogenic but, according to the WHO, "H5 and H7 viruses of low pathogenicity can, after circulation for sometimes short periods in a poultry population, mutate into highly pathogenic viruses" (WHO 2006a page 1). How avian influenza viruses circulate and how they change is a topic of vital concern for bird health. But it is also of concern for many other species too, for subtypes of avian influenza can jump species.

Trans-species crossings of avian flu viruses to humans have been relatively uncommon and have to date and in the main produced only mild forms of human disease. The exception is the H5N1 strain which had already crossed to humans in 1997 (in Hong Kong where there were 18 cases) and whose crossings have gradually increased in frequency and distribution in recent years. While individual cases have been tragic and caused human suffering, outbreaks have remained limited in number. Notably, they have all occurred at the same time as H5N1 has been clinically present in nearby poultry flocks, and there have as yet been few if any clear cases of human to human transmission. All of which suggests that the current H5N1 virus is poorly adapted to its human host. For many, the more worrying danger is that H5N1 or another avian influenza virus will develop the capability to move quickly and effectively through human populations, as it undergoes reassortments (where avian and human viruses 'exchange' genetic material during a co-infection of a host pig or human) or through gradual adaptive mutations. While the latter may be detectable through a pattern of relatively small clusters of disease incidence and limited human to human transmission, reassortment may give rise to a rapid onset of a pandemic strain whose spread along existing networks could well prove so fast that current detection systems based on syndromic surveillance or even environmental monitoring followed by bioassay techniques would be too slow to signal a warning.

The mutability and adaptability of viruses along with the complexity, intensity and density of animal-human and human-human interactions makes for a complex political and policy environment (Wilbert 2006), especially in large, densely populated cities. It is to this environment and to the interventions being made in the

name of staving off the prospect of urban animal and human disease that this chapter now turns.

Cairo and Avian flu – making Cairo urban [h1]

According to many official sources, avian flu is a disease carried by migrating wild fowl, passing to domestic bird life through physical contact, itself a result of poorly secured bird keeping premises. Any danger of the disease spreading to people is also through direct physical contact, with poorly regulated poultry handling a cause for concern. Where wild and domestic birds exist in close and visceral proximity to pigs and people the risk of highly infectious diseases crossing species barriers is considered to be at its highest. One WHO document expands,

'Most human cases of H5N1 avian influenza have occurred in rural or periurban areas where many households keep small domestic poultry flocks. The H5N1 avian influenza virus is probably transmitted to humans through exposure during slaughter, defeathering, butchering and preparation of domestic poultry for cooking.' (WHO 2006b: 2)

Following this simple infection story, an equally straightforward plan of action has emerged. Control is easiest, it is argued, in large commercial farms, "where birds are housed indoors, usually under strictly controlled sanitary conditions, in large numbers. Control is far more difficult under poultry production systems in which most birds are raised in small backyard flocks scattered throughout rural or periurban areas" (WHO 2006a: 2). The UN's Food and Agriculture Organisation (FAO) in New York –coordinating the global response closely with both the WHO in Geneva and

Global Organisation for Animal Health (OIE) in Paris – followed suit, reversing its earlier policy of encouraging small scale poultry farming (as a means to development, self-sufficiency, and small business promotion). Instead it had turned to encouraging secure factory farms.

So as avian flu started to appear more frequently and be more widely distributed from 2003 onwards, a control network was being mobilised in Geneva, New York, Paris and Hong Kong. The network was informed by and in some senses solidified the main narrative/ aetiology. So, with the prospect of the H5N1 virus reaching Egypt becoming ever more likely, the government in Cairo took up the disease narrative and started to enact a programme of disease control. In the autumn of 2005 the government announced a series of measures: hunting of wild ducks and quail was banned; imports of poultry from infected countries were prohibited; there was to be increased border monitoring, and migratory flocks were to be subject to virological surveillance.

Despite these measures, Cairo's place within a network of abundant international flows generated a sense of foreboding. In a communication made in mid-October 2005 by the WHO's Regional Office for the Eastern Mediterranean, itself located in Cairo, it was noted that 'migratory bird flyways pass through the EMR [Eastern Mediterranean Region] on their way between Asia, Europe, and Africa' and 'daily dynamic interaction with other countries in the world (expatriate workers, trade, religious visitors, and tourism) could easily result in the introduction of influenza into the Region' (EMRO-WHO 2005: 1). The same report made it very plain that states needed to behave as model citizens in order to maintain public

(global) health. 'What is expected from countries', identifying highly pathogenic avian influenza is 'rapidly and appropriately destroy[ing] all infected or exposed birds with proper destruction or carcasses', 'functional and efficient influenza surveillance hand in hand with focussed and timely public health measures', 'reasonable stockpiles of Tamiflu', 'production of influenza vaccines', and 'an efficient communication system' (EMRO-WHO 2005: 2-3).

Having convened a 'Supreme National Committee to Combat Bird Flu' with representatives from the ministries of defence, agriculture, and health as well as the WHO, officials were at pains to assure a doubtful and distrusting Egyptian public that all possible safety measures had been taken and that there would be open and transparent reporting of any avian influenza cases. Whether or not this was the case (and with a prestigious African Nations Football tournament taking place in Egypt immediately beforehand, there were doubts as to the actual timing of events and reportage) the official statement that H5N1 had reached Egypt came in mid February 2006.

Despite indications that the initial outbreaks had occurred at least in part on factory farms, public officials began stressing the safety of such 'highly controlled environments' and suggested that the vast majority of reported cases were occurring in flocks of home raised birds. After banning poultry movements, the main policy response was to announce a cull of all backyard and rooftop poultry and the banning of live bird markets (where 80% of the country's poultry was sold). Echoing the joint WHO/FAO/OIE line and specifically the words of a senior FAO official who had declared that 'The fight against bird flu must be waged in the backyard of the world's

poor' (quoted in Grain 2006a: 3), the Prime Minister, Ahmed Nazif, announced the ban with the following words: 'The world is moving towards big farms because they can be controlled under veterinarian supervision […] the time has come to get rid the idea of the breeding chickens on the roofs of houses' (quoted in Grain 2006b: 1).

This replacement of roof top and back yard agriculture with industrial poultry production represented a hugely significant intervention into Cairo's urban ecology and the political ecology of Egypt more generally. Urban subsistence production in Egypt generally and small scale animal husbandry in the capital in particular had taken on a new importance over the previous two decades. The reasons for this growth relate in part to shifts in rural land tenure and resultant increases in rural landless labourers, increasing rural urban migrations and an increase in numbers of urban poor, many of whom were used to keeping livestock. In addition to this growing urban population, reductions in food subsidies from the 1970s onwards, increases in food imports, the privatisation and deregulation of strategic food supplies (see for example Mitchell 2002), combined to drive food prices up, and made home poultry production especially attractive. One fairly conservative estimate put the proportion of Cairo households that kept animals at 16%, rising to well over 25% once the informal settlements and the former villages were included (Gertel & Samir 2000). The keeping of birds – particularly chickens and ducks – was a way of life for people (especially women) in the low income, densely populated parts of the city: a cheap way of adding expensive animal protein to the family diet (95% of this farming was for home consumption). Meanwhile, the home produced meat was often perceived as being cleaner than bought-in meat, and livestock acted as an economic buffer of sorts in times of increased hardship (ibid.). This living city (Hinchliffe &

Whatmore 2006) was not one that matched the ideal city envisioned by modernisers and planners. Indeed, the announcement of the rooftop cull dovetailed with other interventions in city life, and the ongoing re-branding of Cairo as a modern, world city (Mitchell, 2002).

Modernity and Biosecurity in practice [h1]

The cull was led by teams of officials from the ministries of health, agriculture, and environment and enforced by the security forces. Despite this, and despite the issuing of fines for keeping birds and the encouragement to report neighbours who didn't comply with the plan of action, the cull was far from clean or smooth. Some householders hid their birds and refused to let apparently healthy birds join the cull. Compensation levels were unattractive, so sub-clinical birds were rushed to markets in order to realise their best monetary value. When the disease struck, sub-clinical birds were killed by farmers in order to 'rescue them' (as people called it) from the disease (Slackman 2006). These dead but infective birds then circulated through markets and into food chains. As chickens were given up to the cull, many households kept their ducks as these seemed to stay healthy (ducks are good at shielding the virus). The secretion of live household birds to keep them safe and the dumping of diseased birds in canals and water ways by both individuals and the authorities may have risked greater spread of disease. In Spring, avian influenza had claimed its first human victim in Egypt (one of six deaths of fourteen infected). There had not been anywhere near enough vaccine or Tamiflu available and stocks were urgently having to be imported at great expense.

The collapse in home produced poultry and the fall in demand for Egyptian poultry more generally (35% of poultry farms reportedly closed down and one third or

1 million farm workers were laid off), resulted in a 40% price hike for fish and non-bird meat (Leila 2006a). Attempts by the government to then import chickens led to street demonstrations as workers in the poultry industry protested the effect this would have on their businesses.

These practical difficulties in managing the disease in terms of urban food provision, public health, employment and economies, were exacerbated outside the city. Poor information, non-compliance and a lack of personnel made the cull completely unenforceable in practice in the 20 of Egypt's 26 governorates where bird flu had been detected. As a result authorities in Cairo had to declare that backyard flocks could be kept as long as they were healthy and caged.

In early summer a report by a parliamentary committee asked to assess the government's handling of the situation was highly critical of the ways in which the outbreak had been handled (Leila 2006b). Criticism focused on a number of areas including a lack of consultation at the planning stage with civil society groups, poor public information, the rash announcement of the cull which had led to a spreading of disease after infected birds were left on streets and on the banks of rivers, absence of measures to protect the livelihoods of dealers with infected birds, unhygienic transport of culled bird carcasses to often unsuitable burial sites, and a confused avian vaccination policy (exacerbated by the fact that after expensive supplies of vaccine had eventually arrived from China, its use only served to spread the virus) (Leila 2006b).

Despite these failings, the mass killing of birds had seemingly reduced the problem. New infections had declined by early summer and to all intents and purposes the country was thought to be free from the disease by mid 2006. According to the vice-head of the Poultry Union, success was not due to the preventative measures taken by the government and was simply explained by the extermination of an estimated 34 million birds in the cull. In a few weeks : 'Egypt lost 75% of its egg-laying flocks and 50% of all fowl. Since there is almost no poultry in the country, infection rates of bird flu are decreasing' (quoted in Leila 2006b: 1).

The decimation and subsequent re-building of poultry stocks was far from being evenly distributed. The latter was most evident when the Cairo Poultry Company increased its capital, paid out dividends and announced plans to build a new 100 million Egyptian Dollar slaughterhouse in Noubaria. The new facility would increase the company's output by 350% from the present level of 80,000 chickens slaughtered per day to 280,000, and the company hoped that it would supply 10% of the country's poultry consumption (Rasromani 2006).

At this point it might be argued that even though the method and practice was undoubtedly messy, the results were predictable. Looking beyond the local practices it might be argued that big capital and government had held sway. Certainly, industrially integrated farming in Egypt seemed to be doing better than household farms. However, it may be that such an outcome is neither inevitable nor incontestable. As the next subsection details, there are other narratives which undermine this sense of an onward march of a modern, technological state.

4. Overlaps, interferences and netwars [h1]

The particular doing of biosecurity in Egypt following the detection of highly pathogenic bird flu, with its military style cull of bird stocks would, at first blush, suggest a nation state security response to a known threat. The attempt was to cleanse the country of the enemy virus and in so doing enact a modernist, urban and industrial- agricultural landscape. The associated removal of urban and peri-urban livelihoods, and wholesale changes to the political ecologies of livestock certainly suggest the imposition of martial law and a concomitant curtailing of civil liberties. However, to tell the story in this way would be to over-emphasise the 'orderly' nature of the process. Securing also involved many other practices, in a variety of locations and with a variety of effects. The result is that to talk of a single logic, or to even talk of a dominant power is rather premature. It is for this reason that we prefer to speak of biosecuring rather than securitisation or even biosecurity. We can make two points here. First of all, biosecuring involved practices of surveillance and self regulation which were not simply about territory and securing boundaries but also about the policing of populations (chickens and people) and the extensions of some liberties (e.g. trade and large corporations) over others (animals, small holders). Second, as this suggests, securing took place in many locations, involving many different things and objects, many of which were related to other programmes of action and other logics (Hinchliffe 2007). Among these were: changes to hunting practices, border controls, surveillance and testing, trade restrictions, public information campaigns, vaccination policies, mass culling, market manipulation, corporate restructuring, food imports, reports, parliamentary reviews and so on. This was hardly the pure and simple establishment of a (sovereign) state of biosecurity, a predetermined and coordinated national response to a known threat. This was the usually trial and error

and often desperate attempt to enact different, partially connected, avian influenzas and the associated reshaping of worlds that stretched into, pervaded through, and reached out of Cairo as the central but widely distributed player in a rapidly unfolding drama.

A question to ask at this point is how do these various practices, places and things interact with one another? What are, to use other terms, the interferences (Law 2004; Mol 2002) or ecologies of action (Hinchliffe, et al. 2006)? We can trace four kinds of interference here.

Firstly, places, practices and things can interfere in ways that support and reinforce each other through operational and ideological cross-fertilisations and cross-subsidies. In the case of Cairo, for example, it would be foolish to ignore how neatly the WHO and FAO's proclamations on the wild and unregulated causes and consequences of avian influenza chimed with the Egyptian government's longstanding and ongoing attempts to 'clean up' Cairo in order to present it as a shining beacon of Africa modern(ist) (see Mitchell (2002) for much more detail on this battle). Cairo's backyard and rooftop flocks became something of a 'target of opportunity' (Weber 2005). Likewise, in the name of securing the health of the national body politic the apparatuses of international agribusiness and Northern biosecurity diktats have meshed to produce a landscape of opportunity. Once the cull policy had been settled the government had to ease import restrictions on frozen meat and other protein products to make up for domestic shortfalls (especially in the lead up to and during Ramadam when food consumption increases). The restrictions had previously been part of a plan to reduce the national debt crisis and to encourage more

domestic production (Mitchell 2002). In another move which benefited large multinational corporations, commercial Egyptian farms were restocked with chicks from the US and Europe and, as we have noted, there was now massive commercial potential for an expansion of factory farming in the country.

On the other hand (and secondly), it is also not difficult to identify how the same events involved activities which might be clear contradictions of one another. It is unclear, for example, how the shift from small producers to commercial factories ultimately aids national sovereignty and biosecurity in Egypt or elsewhere. For what it produces in the name of eradication and purity is at once a whole set of food insecurities (the country is no longer self-sufficient) and quite possibly – as various commentators from academics, (Davis, 2005), NGOs (Grain, 2006a, b, Bird Life International, 2006) to medics (Editorial, *The Lancet*, 2006) have suggested – the very conditions of animal density and bio-simplicity that can nourish viral multiplication.

Although perhaps the easiest to point to, and most familiar in terms of conventional social science accounts, reinforcement and contradiction are by no means the only kind of interference that can emerge between different modes of biosecuring. A disease like bird flu is constituted thirdly of other ecologies of action including confusion (for example in the relationship between vaccination and culling programmes), concession (for example when the government were forced to rein back the extent of the cull in rural areas leaving public information and surveillance in the ascendancy in those parts of the country), adaptation (for example when the government had to manipulate the market to provide cheap poultry in the run up to

Ramadan), accommodation (for example when the complete failure of the Chinese-sourced vaccine became apparent and restocking became a priority).

Finally, we want to note how securing the bio can take the form of a paradox. In Eugene Thacker's work in this area, for example, he notes how a certain, becoming-dominant version of biosurveillance can be characterised as what the US defence industry refers to as 'netwars'. That is to say, they involve 'networks fighting networks, in which one type of network is positioned against another, and the opposing topologies made to confront each other's respective strengths, robustness, and flexibilities' (Thacker 2005a: 8). Increasingly diseases (as well as terrorist organisations) are conceived of as having a network topology, as attempts to produce a distributed mode of existence, one that is self-organising, mutable and in process. Such forms of organisation are highly resistant to top-down, centralized forms of control and thereby, networks require networks to fight them. The paradigmatic case has become the relative success of the WHO's efforts to combat SARS (see other chapters in this volume) – involving a "hybrid of computers, communications, hospitals, health advisories, and … medical countermeasures such as quarantine and travel restriction" (Thacker 2005a:12). Yet as Thacker goes on to suggest, the topological realisation of netwars is possibly not radical enough – for in the current design of biosurveillance and disease surveillance networks (DSNs), there remains a logic of control and instrumentalism, one that underestimates the nonhuman and thereby fails to adjust to the indeterminate characteristics of networks. The challenge as he says of establishing sovereignty within a network becomes a necessary paradox, where the need for control is also the need for an absence of control (Thacker 2005a: 13). It may just be that the dynamism and looseness of a disease network, its

adaptabilities and accommodations (from the conformations of amino acid cleavages to the hiding of animals) is what gives it strength. This would explain why purifying schemes and conventional surveillance tend to fail. And would suggest that the martial metaphor of a war on disease is not quite right. In terms of taking this forward, a guide might be to ask, with this paradox of control in mind, just as Donna Haraway has done in the past with the immunological body (Haraway 1991) and Annemarie Mol has done more recently with the logic of care (Mol forthcoming) – whether we might find in these practices any hints that there are other ways of collectively living with disease than imagining that we are perpetually in conflict with it, ways that recognise rather than repress the fragile stabilities involved.

5. Conclusions [h1]

In concluding this discussion of avian flu and its various networks we will make three points. First, cities are themselves in process and are not simply networked by diseases – they also network and in so doing are dynamic and are being made. The same can be said for nation states. Neither the urban nor the state are explanations for disease or for its control, they are rather the fragile outcomes of a host of activities and materialities. Cities, states and diseases are being made in a variety of places, through many different kinds of practices and with all manner of different things. In the case of bird flu in Cairo and Egypt, the management of disease cannot be described as a nation state imposing its power or will on society – nor for that matter would we suggest that there was a well-formed resistance on the part of society. Rather, city, state and disease and society are in process in this story – their boundaries and the distinctions between them are not pre-set. To be sure this does not make our account apolitical – indeed it is the assertion of new forms of practice and

new ecologies of action that may redistribute expertise and knowledge in Egypt (from household food production to large commercial holdings). The analysis here suggests only that this process is not pre-ordained or following some pre-established social order. Rather the process is dynamic, always heterogeneous and open to political contestation. Moreover, while we have focused on the practices rather than the ideas of biosecurity in this chapter our point is not so much that things don't necessarily work out as they were planned (although that is of course part of it) or even that there are or need to be local enactments of more global methods. Rather it is to argue that in the making of a biosecure state there is always an issue of heterogeneity – which we take to indicate that there is always more at stake than that which is to be included in the making of a social order. From the roof-top poultry keepers to the mutable viral forms, there is more to the performance of state than the idea of a modern city form.

Second, and relatedly, rather than inadvertently promoting the programmes of the already powerful by suggesting that their schemes are both singular and likely to bear fruit, we would suggest that any attempt at biosecurity is already multiple, made up of a number of modes of ordering (Law 1994). Thus we have talked of modes of securing. We are trying to emphasise a number of things with this term:
- that there is likely to be more than one mode of securing in operation in any situation.
- that modes will relate to one another in ways that can be mutually supportive, destructive, indifferent, in conflict, coexist, reduce each other's effectiveness and so on.

- that each mode is practised and thereby marks an imperfect attempt at security. Therefore, rather than call them modes of security they are securings. The resulting state of security will always be, more or less, provisional and subject to change.

- that these modes are heterogeneous and distributed over a wide array of actors and things, and don't have a thinking human subject at their centre. They are not therefore equivalent to rationalities.

- that the potent mixings and interplays within and between people, places, animals, forms, chemicals, embargos, cells and so on are more than likely to be generative, to produce new conformations.

Our final point is that given this heterogeneity and incompleteness, biosecurity may be as much about surrendering control as it is about jurisdiction over the bios. While it is clearly contentious to argue against efforts to eliminate disease when people's lives and livelihoods are at stake there is nevertheless a strong sense that when emergency gives way there are reasons to generate broader debates as to the proficiency of current stories, practices and methods in terms of their ability to address networking diseases.

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