

Biopolitics and the molecularization of life

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In what ways can it be said of the molecularization of life that it has made our biological existence a political concern in new ways? This essay examines two different answers to this question. The first, exemplified by the work of Nikolas Rose, suggests that the molecularization of life, together with the individualization of risk, has given rise to a new 'somatic' self, and a new 'ethopolitical' order in which our biological life has become our life's work. The second, most evident in growing concern over 'biosecurity', posits a vulnerable subject, thrown into an unpredictable molecular world characterized by exchange and circulation and full of 'emergent' risks. Whereas the former has arguably led to new forms of governmentality, and new kinds of pastoral power, this paper argues that the latter has been widely taken up as a justification for the global extension of forms of sovereign power whose purpose is to pre-empt certain biological futures in favour of others. An exclusive focus on the former not only risks leaving the latter unexamined, it may leave us unable to consider how the two are related.

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When Spinoza says we do not know what a body can do, this is practically a war cry.
(Gilles Deleuze)¹

In what ways can it be said of the molecularization of life that it has made our biological existence a political concern in new ways? In his essay 'The politics of life itself', Nikolas Rose gives us one answer.² With advances in molecular biology, genetics and biochemistry, he argues, we have come to understand the body in terms of its genetic inheritance, with important implications for how we are governed and the ways in which we govern ourselves.³ Like his colleague Sarah Franklin, and the anthropologist Paul Rabinow (who uses slightly different terminology – biosociality – to understand similar practices of bodily self-regulation and management), Rose understands this to entail a shift within the biopolitical regimes of modernity, from political rationalities directed toward the management of risk at the level of populations to the individual management of the genetic risks peculiar to one's own body, or what he calls 'ethopolitics'.⁴

There is much to admire in Rose's formulation. On the one hand, he eschews the sort of conservative reactions to technological change that are based on notions of an essential human nature, or that rely on a sharp distinction between the biological and

the technological body. For Rose, like others writing in posthumanist traditions, bodies are composite entities, at once biological, technological and political. Hence, recent advances in genetics and biotechnology do not register a decisive break with a prior human essence; they partially constitute what it means to live our humanity today. To use familiar terms, they are part of the ongoing history that is our 'species being', and open possibilities for new 'forms of life' in the future.⁵ Like others working in this tradition, Rose also recognizes that technological advances in biomedicine have transformed social identities, given rise to new forms of political association, and opened new circuits of capital. Indeed, as numerous commentators have noted, in the wake of new reproductive technologies, stem cell research and other biotechnological advances, there have emerged countless new forms of 'genetic citizenship', by which individuals and groups have made their biological existence a matter of ethical concern and a basis for political action.⁶

In important respects Rose's analysis of ethopolitics, and the rapidly expanding literature that explores the impact of biomedicine and biotechnology through the lens of governmentality, has become the dominant story about how life has been brought into law and politics in the molecular age. But do these accounts fully exhaust how the relation between our biological existence and our political existence is lived today? While it is certainly true that molecular biology, genetics and biochemistry have spatialized our bodies in novel ways and, in conjunction with shifts in governance, have transformed our ethical and political relations to them, is ethopolitics the only game in town? Perhaps better, for *whom* is the molecular age an *ethopolitical* age that is defined and experienced primarily as a matter of choice and the individual management of risk? Despite the appeal of Rose's powerful account of ethopolitics, there may be reasons to read it with caution, from his somewhat limited account of how the body has been 'molecularized' and the political rationalities subsequently arrayed around it, to his complete erasure of sovereign power in favour of what he sees as pervasive forms of pastoral power.

This paper calls both of these into question. On the one hand, I will argue that Rose relies on a singular and somewhat simplistic account of what has transpired with the rise of molecular biology and genetics; namely, that the body has come to be figured in terms of a genetic code that belongs to the individual alone – its own 'proper', so to speak, which is both its own property, and that which forms the basis for its life. For Rose, the individual self and the genetic body coincide; the body is conceived as a bounded entity whose molecular existence is *internal* to it (albeit open to technological modification), and ethics and politics come to focus on the relation between the molecular self as it exists in the present and its possible biotechnological futures. Yet this is hardly the only way that molecular biology knows bodies. Alongside the genomic body, and at times overlapping with it, can be found another, post-genomic body which is *also* understood at the molecular scale, but considered instead in terms of its *displacement* within wider molecular fields. From this perspective, bodies are understood less in terms of their intrinsic genetic essence – the fantasy of one's genetic code carried around on a CD – and more in terms of a global economy of exchange and circulation, where the body is thrown into a chaotic and unpredictable molecular world filled with emergent yet unspecifiable risks. Far from a stable

molecular life internal to the bounded body, to be managed and potentially improved, this account gives us a *precarious* body immersed in what Bernard Vallat, Director General of the World Organization for Animal Health (OIE), has called the ‘great biological cauldron’ of the twenty-first century, where biology is virtuality, and where the future is less about ‘care of the self’ than it is about imminent catastrophe.⁷

This molecularized body, I will argue, has become the site of very different political rationalities, gathered around the concept of ‘security’, which find no place in Rose’s ethopolitical account of the molecular age. Rather than accept a simple and singular account of the molecular age in which biopolitics morphs into ethopolitics, I will ask whether, under the sign of biology-as-virtuality, it may be necessary to trace the ways that biopolitics has merged with geopolitics, and the government of ‘life’ has revealed itself to be intimately related to the exercise and extension of sovereign power. We are perhaps left not with opposed understandings of how our biological existence is related to our political existence – one that draws on notions of governmentality, and another that focuses on sovereignty – but with the task of understanding how the two are related.

From biopolitics to ethopolitics: intrinsic molecularization and the individual management of risk

For Spinoza no one can tell what the body is capable of from simply observing the laws of nature.
(Keith Ansell-Pearson)⁸

Let me turn first to Rose’s account of ethopolitics. The key point of reference for Rose is clearly the work of Michel Foucault. Foucault argued that in the seventeenth and eighteenth centuries political power came to interest itself less in decisions over life and death, or control over territory – the traditional concerns of the sovereign prince – and more with the management of ‘life’, that is, with ordering and enhancing the vital or productive processes of human existence.⁹ While Foucault used the general term ‘biopower’ to designate those new forms of power that took the capacities of bodies and conduct of individuals as their concern, he at times distinguished between two more specific forms. He used the term ‘anatomy-politics’, for instance, for those disciplinary techniques that sought to maximize the body’s forces and integrate it into efficient systems, such as through proper training, or through rationally organizing workplaces, armies and domestic economies. The term ‘biopolitics’, on the other hand, designated those political technologies that took the biological existence of the *nation* as their object, understood as a ‘population’ imbued with mechanisms of life – birth, morbidity, mortality, longevity, vitality – and knowable in terms of statistical norms. Examples of the latter included public health, town planning and hygienics, each of which conjoined state science (demography, vital statistics, administration) with forms of self-regulation to bring about the normalization of life processes.¹⁰

Whether or not this resulted in the replacement of sovereign power (power to *take* life or *let* live) by more dispersed forms of disciplinary or pastoral power (power

to *make* live or *let* die) has become widely debated, but these debates seem to concern Rose less than the possibility that Foucault's account of biopolitics has become horribly outdated.¹¹ As Rose puts it, 'the truth regimes of the life sciences have mutated' and with these changes 'biopolitics has merged with ethopolitics'.¹² Rose's description of these mutations is worth quoting at length, since it forms the basis for all that follows:

The body that 20th century medicine inherited from the 19th century was visualized via a clinical gaze, as it appeared in the hospital, on the dissection table and inscribed in the anatomical atlas. The body was a vital living system, or a system of systems. The skin enclosed a 'natural' volume of functionally interconnected organs, tissues, functions, controls, feedbacks, reflexes, rhythms, circulations and so forth. This unified clinical body was located within a social body made up of extra-corporeal systems – of environment, of culture – also conceptualized in terms of large scale-flows – of air, water, sewage, germs, contagion, familial influences, moral climates and the like. Eugenic strategies took their character from this way of linking the individual and the social body. The genetic body differs on all counts from this eugenic body. Most notably, it is conceived on a different scale. In the 1930s, biology came to visualize life phenomena at the submicroscopic region – between 10^{-6} and 10^{-7} cm. Life, that is to say, was molecularized. This molecularization was not merely a matter of the framing of explanations at the molecular level. Nor was it simply a matter of the use of artifacts fabricated at the molecular level. It was a reorganization of the gaze of the life sciences, their institutions, procedures, instruments, spaces of operation and forms of capitalization. . . . Life was imagined as sub-cellular processes and events, controlled by a genome which is neither diagram nor blueprint but a digital code written on the molecular structure of the chromosome. This is 'the language of life' that contains 'the digital instructions' that make us what we are.¹³

In other words, when it comes to how we understand biological life today, molecular biology and genetics have replaced physics and chemistry, and with this shift we have witnessed new ways of conceiving and acting upon bodies.

Later we may have reason to question whether such a sharp epochal shift has occurred, and whether the body is 'molecularized' today in such a singular fashion and with such singular effects. Here we need only note that Rose's position has become commonplace in the social sciences and humanities today. As the story is usually told, with such things as DNA diagnostic tools, automated gene-sequencing computers and data-mining and gene-discovery software, we can at once encode, recode and decode biological materials, translating 'wet' DNA (physical samples), for instance, into 'dry' DNA (information), which can subsequently be manipulated and ultimately reassembled in a form that may not be the same at the end of the process as at the beginning.¹⁴ For some writers this encoding, recoding and decoding has allowed for ever lighter links between biology and capital, as biological matter is translated into mobile and fluid networks of information that can be owned, bought and sold as intellectual property.¹⁵ For Rose, on the other hand, the most significant effects of this shift appear to be found in how we understand and govern bodies and its possibilities. Gene therapy treatments – the novel idea that we can actively transform the genetic material in a living being – and nanotechnologies – the construction of organic and non-organic objects, molecule by molecule – are seen to give us a biological body which is understood less in terms of fate and more in terms of the management and pre-emption of risks, even as something that can potentially be improved. In Rose's words,

Life now appears to be open to shaping and reshaping at the molecular level: by precisely calculated interventions that prevent something happening, alter the way something happens, [or] make something new happen in the cellular processes themselves.

The result is that our *ethical* relation to our bodies has changed:

Dilemmas about what we are, what we are capable of, what we may hope for, now have a molecular form¹⁶.

Translated into the language of biopolitics, Rose argues that it is increasingly our *corporeality* – ‘life itself’ – and not just our conduct which has become subject to what Foucault called ‘technologies of self’.

Ethopolitics, then, is the name Rose gives to this new ethical-political relation to our bodies, which are now defined in terms of open-ended futures. But there is more to Rose’s account than merely a shift in the target of political rationalities from the behaviour of bodies to their actual make-up; for Rose, ethopolitics also relates to crucial changes in the relation between the individual and the state. Rose develops this point in response to critics of biotechnology, for whom the molecularization of life is inescapably haunted by eugenics. With our newfound capacity to diagnose genetic conditions in embryos, for instance, we can now make choices about whether to continue a pregnancy, or to accept an embryo for implantation in IVF therapies, based upon the knowledge of future risks. For a number of critics this has raised the unsettling possibility of political rationalities directed toward eliminating ‘taints or weaknesses’ in populations, based on some bodies being calculated to have less biological worth than others. This discomfort should come as little surprise; as we are all too aware from events in the twentieth century, biopolitics, defined as the care of life, can just as readily invest in the life of the collective body through purging ‘defective’ bodies as through improving, training or selecting ‘healthy’ ones.¹⁷

It is partly in response to these anxieties that Rose spells out his account of a historical shift from a biopolitics of populations to an ethopolitics characterized by the individual management of the ‘somatic’ self. While he readily agrees that political rationalities are still organized around risks to health, he claims that the nature of these political rationalities has changed in such a way that eugenics is no longer the threat it once was. Biopolitical practices in the past, he argues, were directed toward improving the *national* stock, and took two forms which contained the potential for eugenics: hygienics, which was concerned with maximizing the health and productive powers of the national body in the present; and the regulation of reproduction, which was concerned with improving the national stock by eliminating risks to its wellbeing in the future. These were matters of concern for state policy, as well as for individuals who understood their biological lives (and the lives of their children) in terms of an ethical responsibility to the national body, thus blurring the boundaries between coercive and voluntary eugenics.

The present age, Rose argues, is markedly different. To begin with, it is not at all apparent that we are still in an age where the state seeks to take charge of ‘the lives of each in the name of the destiny of all’.¹⁸ In other words, for Rose the idea that the state should coordinate and manage the affairs of all sectors of society – that it should attach importance to the ‘fitness’ of the national body *en masse* – has fallen into disrepute,

since the question of 'fitness' is no longer framed in terms of a struggle between national populations, but instead posed in economic terms, such as the cost of days off from work that are caused by ill health. Hence, when it comes to national health, the state seeks to 'enable' or 'facilitate' the health of individuals, rather than govern bodies in any direct way. The difference between 'old' eugenics and what some have today labelled 'liberal' eugenics, then, can be seen as the difference between state-led programmes that in the past sought to produce a particular population with particular traits and capabilities, and the ethical decisions of individuals in the present, who are exercising 'choice' in reproductive matters. Although forms of pastoral power clearly shape these reproductive choices, the state remains neutral. For Rose, this is a crucial difference, and symptomatic of a larger shift, whereby health is increasingly a matter of individual rather than state responsibility and citizens are asked to take responsibility for securing their own wellbeing, through such things as purchasing private health insurance, being informed citizens, actively investigating health conditions, joining with others in support groups, contributing to lobby groups and seeking genetic counselling.

It is here, *at the intersection of the molecularization of life with the individualization of risk*, that Rose locates ethopolitics as the dominant biopolitical regime of the present. Within such a biopolitical order, he argues, individuals are presented with new ways of rendering their bodies to themselves in thought and language, making judgements about them, and ultimately acting upon them, whether these decisions are based on DNA samples from amniotic fluid, in the case of reproductive health, or susceptibility to Alzheimer's, due to the presence or absence of particular genes. Thus, the individual who 'takes responsibility for her health' is at the same time the individual who thinks her body through its 'genetic inheritance', an inheritance to be managed wisely or potentially improved. This government of the genetic self is thus decidedly *not* about following general programmes, aimed at the population at large, but about understanding and making wise choices about the risks that are peculiar to one's self. Risk becomes 'individualized'; the individual becomes 'intrinsically somatic'; and ethical practices 'increasingly take the body as a key site for work on the self'¹⁹.

Within the social sciences and humanities this formulation of the biopolitical present predominates, as is evident in a great deal of work on the social and cultural aspects of biomedicine and biotechnology. From anthropologists and sociologists, for example, we learn that the molecularization of life and the individualization of risk have given rise to new forms of identity and sociality around disease and risk.²⁰ Individuals are said to increasingly recognize the 'self' as the bearer of this or that genetic risk, around which daily routines and future plans must be prudently organized. Likewise, researchers have begun to attend to the myriad of ways that our genetic lives are lived, and ethical decisions about 'life itself' are made, within complex networks of activists, scientists, doctors, politicians and corporate interests that are clustered around particular 'risks'.²¹ In many of these accounts the Internet looms large, providing novel possibilities for the sharing of biomedical knowledge and life experience among lay advocates, scientists and clinicians, and for forging translocal communities around particular genetic identities.²² These new de-territorialized 'body-geographies' can be seen to challenge local cultures of health and local etiologies of disease, while also

providing space for the proliferation of alternative body-knowledges, or for the emergence and organization of new demands on state and capital by individuals and collectives. For Rose and Novas, such practices provide further evidence of the 'making up' of the biological citizen from below, rather than the shaping of citizens by the disciplinary power of the state.²³

We should not take this to mean that power relations are absent from ethopolitics. Indeed, one of the crucial questions to emerge from Rose's account is precisely what it means to 'exercise choice' in the self-management of the body. What defines choice? And who is this ethopolitical subject who understands their body in such terms? Drawing upon Dean's discussion of the formation of neo-liberal subjects, we might begin with an initial observation that with the shift to private health insurance and away from the providential state we are in a sense compelled to be subjects who 'make choices' about our health.²⁴ As Deborah Heath, Rayna Rapp and Karen-Sue Taussig put it, we are asked to be good genetic citizens, which is to say that we are *obliged* to wisely manage our own lives through exercising choice.²⁵ In the absence of other options for securing health, such as those provided by a providential state, *we must make our biological life our life's work*. But this presents us with a further range of problems. On the one hand we are faced with growing populations – undocumented workers, the working poor – who are excluded from this ethopolitical order; that is, those who are denied the political right to health, or who lack the resources that might enable them to 'choose' – in short, who cannot be the neo-liberal subjects that Rose presupposes. For these subjects the biological self is a *precarious* entity – bare life, exposed to death – rather than an object for personal reconstruction. On the other hand, we find that as soon as we look carefully at the social and medical field in which the 'somatic' self exercises choice, we find it delimited by numerous parameters: not only traversed by countless forms of pastoral power – all those 'professionals of vitality', counsellors, therapists and ethicists, not to mention geneticists and physicians, who are there to guide our decisions – but shaped by what Catherine Waldby has called the production of 'biovalue'.²⁶

Indeed, if molecular biology and genetics have reconfigured the body in terms of information, and if the ethical care of the self occurs *within* this field of informatics, then the question arises of what *sort* of bioinformation is being produced, to what end, and for whom. It is no secret that the driving force behind bioinformatics today is finance capital, such that the future of any given field of research, the sequencing of this or that genome, or the data-mining of this or that genomic database, more often than not, flourishes or perishes depending on stock values, and those stock values in turn are tied to the actual – or proclaimed – successes or failures of research results. Moreover, research is most likely to occur if results can be transformed into products (genetic-based drugs or therapies, for instance), or if it can be mobilized as part of some product development pipeline. Not just anyone can participate in building this informational field, despite the organizing of advocacy groups and online medical communities. As Eugene Thacker notes, life at the molecular level is only knowable through complex and expensive apparatuses – electron microscopes, ultracentrifuges and x-ray diffraction – and through the expensive, computer-driven analysis of genebanks. The development

of cures and preventive practices is exorbitantly expensive, and inaccessible to non-specialists.²⁷ And the patenting of bio-information means that the right to use such information is constrained by property and law. Not only does this modern day form of enclosure mean that the field of 'choice' is circumscribed, but biotechnology's high capitalization and specialization means that immense challenges stand in the way of any sort of informed critique and public debate.

As Rose notes, Foucault famously argued that 'medical thought [has been] fully engaged in the philosophical status of man.'²⁸ If so, the philosophical status of the human is shaped today as much by the calculations of entrepreneurs as by the decisions of researchers, doctors or patients. Not only does this point out the bankruptcy of much of what travels as 'bioethics' – a professional field which always seems to arrive too late, *after* biomedicine, biotechnology and finance capital have ushered in the future, and thus can act only to incorporate new biotechnological realities within law – it also suggests limits for the sort of generalized governmentality, or 'self-management', that Rose assumes defines our biological existence today, for it becomes impossible to reduce the biopolitical field to the actions of citizens alternately empowered or ensnared in webs of pastoral power.

This does not mean that Rose's account is without merit, or that it fails to cast light on meaningful questions about how individuals negotiate their biological lives in the molecular age. To the extent that the biological lives of affluent members of Western societies have come to be understood in terms of ethopolitics, where the molecularization of life coincides with the individualization of risk, the politics of 'life itself' has increasingly come to turn on a set of ethical questions about what a body can do, and a set of political questions surrounding how the body's capacities can be increased, such as through the *recognition* of certain genetic conditions or the *establishment* of institutional forms and legal frameworks that might enable individuals to maximize their genetic potential. Indeed, although he doesn't put it in these terms, Rose's account brings us face to face with the question of democracy; for if 'being' has neither fixed form nor determined end, and if what it means to live our humanity is the outcome of politics rather than something given in advance, then it would seem that our most pressing need is for a political order that *corresponds* to this new corporeal order, where the flourishing of life, and the technoscientific practices that facilitate it, is not determined by rates of return on investments, or constrained by law, property and nation, but is open to an ontological and ethical play beyond the current integration of life and law.²⁹

Biology, virtuality, security: extrinsic molecularization and the geopolitics of 'life'

Bodies-in-formation betray a virtual potential towards becoming dangerous and so our politics of security are progressively becoming a virtual security politics. (Michael Dillon)³⁰

The concept of ethopolitics gives us a powerful way to think about ethical-political projects of self-formation in the molecular age. But is Rose's genomic body the *only* form that the molecularized body takes today? And is ethopolitics the only game in town? Or, stated differently, is political power in the molecular age primarily pastoral in nature?

Two aspects of Rose's account of mutations in the truth regimes of the life sciences bear further scrutiny. The first is his faith in epistemic shifts. For Rose, the genetic body of the twenty-first century 'differs on all counts' from the clinical or eugenic body of the nineteenth century. But does it? Can such a bold proclamation of a new epoch be sustained? The second has to do with *how* Rose imagines that the body has been 'molecularized'. While it may be true that we now visualize life phenomena at the submicroscopic level, is the biological life of the body conceptualized only in terms of one's 'genetic inheritance' and its technological improvement? Is the body really the bounded and autonomous entity that Rose makes it out to be, constituted only in terms of an *internal* genetic essence that is its own 'proper', and that contains its future within it?³¹

While it may be true that in industrialized liberal democracies this model of the 'somatic' self holds sway, there is another dimension to the molecularization of life that has received far less attention. This has to do with the conceptualization of the body in terms of its *displacement* within wider molecular fields. That is, at the same time that molecular biology and genetics have given us a body known at the molecular scale, and thus made the physical mechanisms of 'life' available to political and economic calculation in new ways, they have also, in conjunction with the science of immunology and virology, given us another way to conceive of our biological existence, no longer in terms of a self-contained body whose genetic inheritance is to be managed and improved, but in terms of a body embedded in a chaotic and unpredictable molecular world, a body understood in terms of a general economy of exchange and circulation, haunted by the spectre of newly emerging or still unspecifiable risks.³² For every story in the US media that speaks breathlessly of advances in stem cell research and gene therapy, or that worries over the 'post-human' futures these might usher into being, we find two or three other stories that speak ominously of migrating birds and backyard chickens, and that mix together Vietnamese peasants, influenza viruses and homeland security. This conjunction of biopolitics and geopolitics, of the molecularized body and the question of biosecurity, finds no place in Rose's ethopolitics, but merits equally close attention. By tracing its tangled threads, we may find ourselves faced with very different political rationalities, no longer framed in terms of the governmentalization of 'life itself', but in terms of the extension of forms of sovereign power by which life is ever more tightly integrated with law.

Before turning to these, we should note that there is a long history of thinking the body in terms of exchange and circulation, well documented by historians and epidemiologists. During the plague epidemics of the fourteenth century, for instance, 'public health' involved the quarantining of people and goods suspected of harbouring infectious diseases. Urban renewal campaigns of the early twentieth century understood disease to be spread through food, water and waste, and today the ongoing AIDS

pandemic has brought renewed attention to the porosity of human bodies. There is an equally long history of public health linked explicitly to security. As Nicholas King notes, the Center for Disease Control (CDC) in the United States began during the Second World War as an effort to investigate and control infections among soldiers, and to keep malaria from spreading to the armed forces from its 'reservoir' in the civilian population of occupied countries.³³

From its inception, then, public health has taken the body to be a *geopolitical* body. Yet in important respects the present moment is more than bare repetition. Two developments hold particular significance. On the one hand we are witness to a set of geographical and historical transformations that have come to be discussed under the rubric of 'globalization'. These are commonly taken to include the liberalization of markets, the unprecedented mobility of capital and goods, the extension of global supply chains, the transformation of ecosystems and the growth of international travel and tourism. Within these accounts, the present moment is understood in terms of the collapse of space and time (or the 'folding' of topological space-time). On the other hand, molecular biology, in conjunction with virology and immunology, has given us ways of conceptualizing bodies in terms of their *molecular geographies* – in terms of networks and pathways, movements and exchanges – with the sort of detail and complexity unimaginable in fourteenth century Venice, or at the time of Typhoid Mary, or even during the influenza pandemic of 1918. In what follows I propose that one way we can understand the recent emergence of 'biosecurity' as a political concern is to acknowledge that it corresponds to a particular way in which the molecularized body has been apprehended within globalization.³⁴ Stated in slightly different terms, we might propose that, in contrast to 'ethopolitics', which names a form of neoliberal governmentality that comes into being at the intersection of the molecularization of life and the individualization of risk, 'biosecurity' today names a set of political responses within globalization that take the *unpredictability* of molecular life – its 'virtuality' or 'waywardness' – as their own justification, and in such a way that 'security' appears the only viable political response.

We can explore this proposition further by reference to the current avian influenza scare. HPAI, or highly pathogenic avian influenza, is the name given by virologists to a number of influenza A viruses that cause high mortality and morbidity, both in animal populations (especially domestic poultry) and among infected humans. Of most concern today is a particular type of HPAI virus known as H5N1, the most recent in a series of 'emerging infectious diseases' that have received growing attention since the mid-1990s.

From molecular immunology we learn that viruses consist of genetic material encased in surface proteins that stick out from the viral envelope (see Figure 1). Hemagglutinin (HA) proteins determine how, and whether, a virus can penetrate human cells. Once in a cell the virus can replicate. Neuraminidase (NA) proteins determine the exit strategy, i.e. whether the replicated viral matter can escape the cell to infect other cells. Viruses are named on the basis of these proteins. The designation H5N1, then, corresponds to the type of HA and NA proteins found in the virus. Among influenza A viruses there are believed to exist 16 HA subtypes and

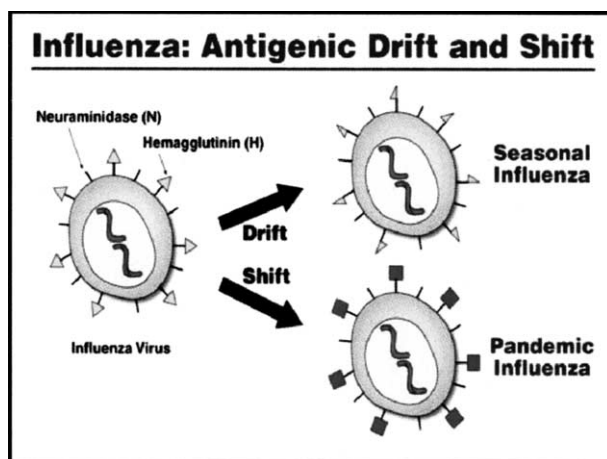


FIGURE 1 Image of ‘shift and drift’ presented in testimony to Congress by Dr Anthony Fauci, Director of National Institute of Allergy and Infectious Diseases, National Institutes of Health, United States Department of Health and Human Services, on 2 March 2006. Available at: <http://www3.niaid.nih.gov/about/directors/congress/default.htm>

9 NA subtypes. Of the 16 known HA subtypes, all are thought to infect birds while only some are known to infect humans.

Except in rare cases, H5 viruses do not infect humans. It is even more rare for an H5 virus to be transmitted from one human to another. As we hear repeatedly, however, the problem with influenza viruses is that they mutate at an alarming rate. Such transformations are caused by changes to the viral genome, which is segmented into 8 separate RNA molecules and thought to mutate in two ways. Genetic drift refers to a slow process of mutation that occurs as viruses replicate. Genetic shift refers to the much more rapid reassortment of genes that is thought to occur when different viruses come into contact with each other, such as when an H5N1 virus and a H3N2 virus are found in the same host. Changes to the genome are of great significance, virologists believe, because they can result in changes to the HA and NA proteins.³⁵

The mutation of HPAI viruses are said to have two potential outcomes of great significance for humans. Genetic reassortment, and accompanying changes to HA proteins, can potentially change the *transmissibility* of a virus, giving it the capacity to infect new hosts. Mutation can also change the *virulence* of the virus, and thus affect morbidity and mortality rates in the infected population. The widely reported worry is that with the right kind of mutation, H5N1 could mutate into a virulent form that is transmissible between humans, plunging the world into a catastrophic global pandemic.

For our purposes, what is of interest in the story of H5N1 is less the accuracy of biomolecular immunology’s account of viral mutation, or the probability of whether a pandemic will occur (for reasons that will soon become clear, the latter is a matter of speculation rather than prediction) than *how* this understanding of molecular life, and

the discourse of ‘emerging infectious diseases’ that has emerged with it, has transformed our understanding of our own biological existence and given rise to new forms of political rationality. We can begin with the simple observation that with increased focus on such things as avian flu, the ebola virus, mad cow disease and other zoonotic diseases, molecular life has been recoded as inherently unpredictable, as always, in a sense, ‘uncanny’. Human life, in turn, is understood to be thrown into, or exposed to, this molecular world of chaotic change. Far from a self-contained body with a clear genetic code – the fantasy of the essential ‘self’ stored as information on a CD – what we find in the medical and political discourse of ‘emerging infectious diseases’ is a body that is radically open to the world, thrown into the flux of an inherently mutable molecular life where reassortment is not what we control, but what we fear.

This post-genomic world is not understood in terms of one’s genetic inheritance – nor is it primarily about ‘care of the self’ or ‘genetic citizenship’ – it is instead understood in terms of a global economy of circulation and exchange that at once precedes and transcends the individual body. By this account, biomolecular life is not governed by fixed taxonomies or known in terms of genetic essences; it is instead a dynamic world characterized by ever novel combinations, where entities jump between bodies and cross between species, and where ‘life itself’ continuously confronts us with the new and the unknown. The philosopher Brian Massumi has succinctly captured the temporal and affective dimensions of this epistemic shift:

Viral or environmental . . . these faceless, unseen and unseeable enemies operate on an inhuman scale. The enemy is not simply indefinite (masked or at a hidden location). In the infinity of its here-and-to-come, it is elsewhere, by nature. It is humanly ungraspable. It exists in a different dimension of space from the human, and in a different dimension of time. . . . The pertinent enemy question is not who, where, when, or even what. The enemy is a what not; an unspecifiable may-come-to-pass, in another dimension. In a word, the enemy is virtual.³⁶

For Massumi the ‘virtual’ has a precise meaning, taken from Henri Bergson and Gilles Deleuze. It refers not to a nonexistent or immaterial entity, as in popular usage, but to a potentiality that is immanent in every object and in every situation. Unlike the ‘possible’, which is opposed to the real, the virtual *is* real, which is to say that it exists *as concretely* in the present. It is immaterial yet real, abstract yet concrete, a ‘future to come’ that is already with us, but which remains ungraspable.

To relate this to H5N1, we might say that the virtual has to do with all the potential mutations that could occur, given what the virus presently is, and the heterogeneous associations into which it may enter. This molecular future is immanent in the present, although it cannot be known in advance.³⁷

What is the significance of recoding molecular life in terms of virtuality? Most immediately, it transforms our relation to the future, which is in a sense already with us. This biological future is radically open, of the same nature as a throw of the dice, full of surprises and unexpected forms.³⁸ Yet, as evident in the discourse of ‘emerging infectious diseases’, this future can also be defined in terms of the imminence of a generalized, yet nondescript catastrophe. As bird flu ‘expert’ Michael Osterholm is fond of putting it in

relation to the next pandemic: 'it's not if, but when.'³⁹ The present is populated by unknown and unknowable risks; we don't know what comes next, but it could be bad.

It is not difficult to see how the virtuality of molecular life can be articulated with fear and dread. Nor does it take much imagination to see how an understanding of globalization, which frames the present in terms of the collapse of time and space, might further augment this sense of biological terror. As food networks become increasingly complex and global, this story goes, the molecular geographies that constitute our biological existence are changing in both speed and scale. Air travel is likewise said to give 'biological emergence' new urgency, as planes cross between continents far quicker than the incubation period for many pathogens. To borrow language from the medical anthropologist Nicholas King, the lesson that we were all asked to learn from the SARS crisis of 2003 was that networks were dangerous: through a specific configuration of live animal markets, migration and air travel, the biological existence of people in Singapore and Toronto had become intimately connected in 'real time' to the lives of wild bats and civet cats in China.⁴⁰ The articulation of biology-as-virtuality with globalization, then, is said to raise the level of urgency and uncertainty; in this fearsome new world of global networks, dangerous fragments circulate and recombine in novel ways, threatening our bodies and identities.

We are now told that the unruly movements of animals are part of the problem, for the problem isn't just that molecular life 'shifts' and 'drifts', or that transportation technologies and global trade have collapsed space and time, but that birds fly (see Figure 2). As was widely reported in western media, it is widely suspected that at least some wild birds have the capacity to carry HPAI without showing symptoms.⁴¹ To use the familiar epidemiological metaphor, wild birds compose a 'silent reservoir' of viruses – a faceless, unseen and unseeable enemy – where the distinction between friend and enemy is rendered indistinct. Indeed, the metaphor of 'reservoir' is too static for this world of emergence; because birds migrate, they form 'uncanny' reservoirs that disperse and move about: now in China, then in Turkey, now mixing with these flocks, now with those, forming amorphous transnational networks that respect no borders and that are visible only in their effects.

It is not difficult to see how this view of molecular life might be taken up in a political register. Although he did not have birds in mind, Donald Rumsfeld in 2003 captured brilliantly what was at stake in a world of virtual risks. As he put it in the context of the 'war on terror':

There are known knowns. These are things we know that we know. There are known unknowns. That is to say, there are things that we know we don't know. But there are also unknown unknowns. These are things we don't know we don't know.⁴²

In a similar way, biology-as-virtuality comes to matter – politically and economically – in terms of emergence and its unpredictable spatio-temporalities; that is, in terms of those biological 'unknown unknowns' that in an age of globalization could appear from anywhere, and threaten to bring about catastrophic effects, a point driven home to Congress in 2004 by Anthony Fauci, director of NIAID, who presented the world in terms of a complex cartography of 'emergence' (see Figure 3).⁴³

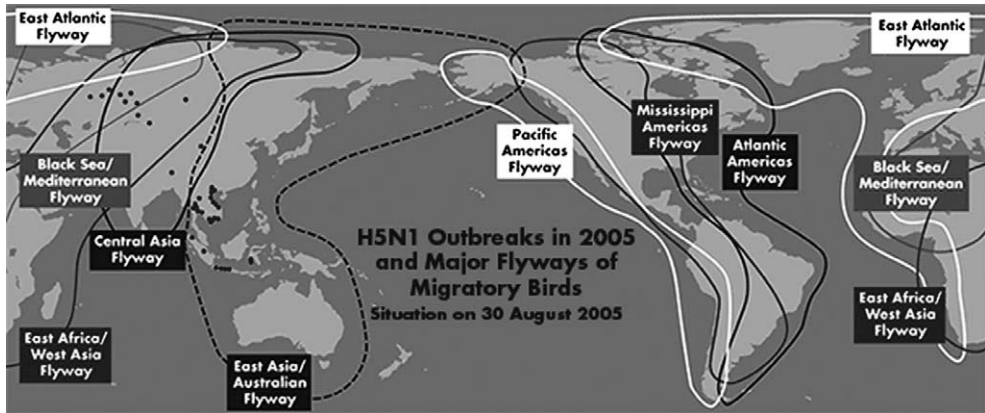


FIGURE 2 Global flyways as vectors of environmental risk. UC Davis Avian Influenza Website, <http://universityofcalifornia.edu/everyday/avianflu/>

In important respects ‘biosecurity’ names an answer to the problem of the mutability and unpredictability of biological life within a political-economic order that is premised upon global economic integration. But biosecurity in practice may be more difficult than it may appear: how does one bring the ‘unspecifiable’ future-to-come within the realm of economic and political calculation? By definition the virtual is incalculable. No algorithm can exhaust its possibilities. Nor can it be incorporated into the probabilistic calculations of insurance. As Melinda Cooper notes, when biology comes to be known in terms of ‘emergence’ the future can only be ‘speculative’ and political calculation must become ‘future- invocative’, actively intervening *within* the disorder of biological life in order to produce a desired future.⁴⁴

Today, security’s principal answer to the problem of ‘unknown unknowns’ is the speculative act of *pre-emption*, which takes as its target potential rather than actual risks. Cooper argues that these ‘speculative biological futures’ have become an important basis for the integration of biomedicine and defence in the United States, including the re-emergence of biological weapons research.⁴⁵ What interests me here, however, are the ways in which the future- invocative act of biological pre-emption is played out globally in a geopolitical register, in ways that extend forms of sovereign power. We can trace this across a variety of practices, beginning with the multiplication and expansion of surveillance networks, which in recent years have increased in number, scale and complexity. These include ‘early warning’ systems whose objective is to identify and contain ‘outbreaks’ before they threaten the security of either the state or commerce. Many of these are data-mining operations. The Global Public Health Intelligence Network (GPHIN), for instance, is an Internet-based multilingual early-warning tool that continuously scans global media sources – news wires, websites – for information about disease outbreaks. ProMED is similar but more extensive, adding reports of diseases among farm animals and plants to GPHIN’s focus on humans. Reports are often contributed by ProMED-mail subscribers, who act as informal ‘eyes

Global Examples of Emerging and Re-Emerging Infectious Diseases

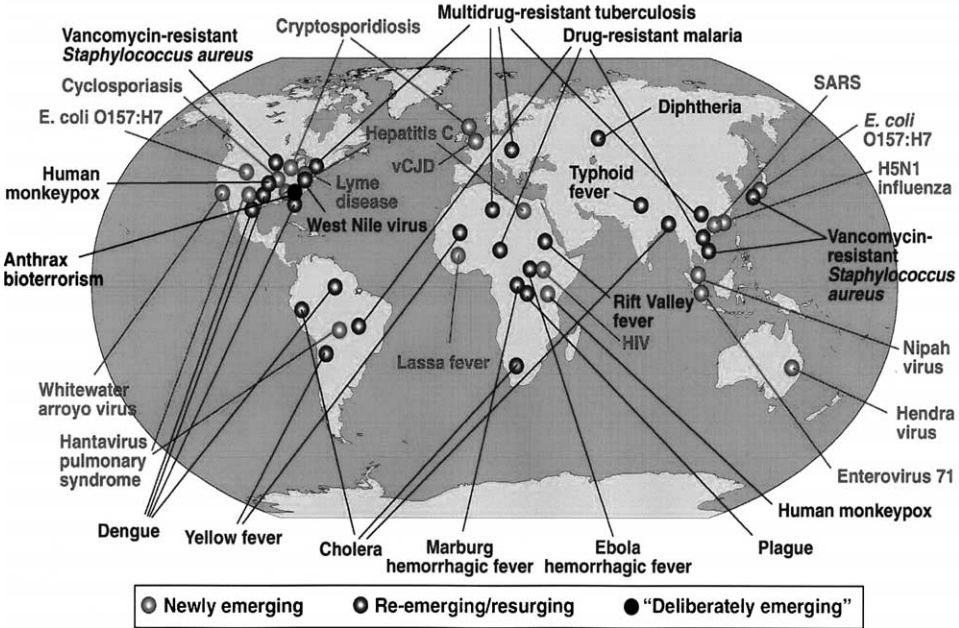


FIGURE 3 Global risks:biology as virtuality. Image presented in testimony to Congress by Dr Anthony Fauci, Director of National Institute of Allergy and Infectious Diseases, National Institutes of Health, United States Department of Health and Human Services, on 28 July 2005. Available at: http://www3.niaid.nih.gov/about/directors/pdf/7-20-2005_slides.pdf

and ears' for the network. The goal of these surveillance networks is nothing less than an unlimited, unending examination of global populations, tied in turn to rapid response teams administered by the WHO, which arrive at 'hot spots' within 24 hours to do on-the-spot investigations, confirm diagnoses, help with patient management and ultimately contain any outbreak.⁴⁶ These teams carry with them sophisticated field offices with 'robust' information technology and communications set-ups (satellite telephones, radio communications, and field video-conferencing capacity); and, much like the US's global network of military bases, they have pre-positioned specialized protective equipment and medical supplies located at strategic sites around the world.

All of the above are tied to emerging laboratory networks that are linked in real time. These laboratory networks – like the OIE's OFFLU and the WHO's Global Influenza Programme – are the diagnostic and research arms of this integrated system, with collaborating centres that circle the globe. At least in principle, these collaborating centres agree to share knowledge, disseminate strains, facilitate the movement of reagents needed for laboratory research, develop databases of virus genomes through gene sequencing and so on.⁴⁷

When it comes to 'surveillance' the impulse is to rush to judgement, since the very word connotes the extension and exercise of sovereign power. But such networks are not necessarily bad in and of themselves; they must be evaluated in terms of their effects. What are these effects? The first thing to note is perhaps the obvious point: that these networks are increasingly global in reach. As Nicholas King comments, we are long past the days of nationally bounded surveillance systems whose goal was to monitor and protect the population of any particular state. What we are witnessing instead are familiar techniques of medical surveillance multiplied globally, where the monitoring of individual bodies in specific places is augmented by the surveillance of the global population in the de-territorialized space of informatics, databases and the Internet.⁴⁸ Today these surveillance networks are being extended to animal populations, including wildlife, as animals are reclassified as 'biohazards', both to each other and to humans. The US Department of the Interior, for instance, has begun sampling migrating birds in the Pacific Flyway, adding to the growing influenza gene bank maintained by the NIH, and, with the US Departments of Agriculture and Health and Human Services, has begun an interagency strategic plan for the early detection of HPAI. The European Union is doing the same, and the UN's FAO, in conjunction with the USGS, has recently unveiled an ambitious programme that will fit wild birds with tiny backpacks carrying communication technologies linked to a system of radio beacons and satellites, in order to collect and disseminate real-time migration data to ecologists, virologists and epidemiologists around the world.⁴⁹ While the image is comical, it represents both the capacity and the desire to extend the unending examination of global populations across the animal kingdom in order to govern the 'global biological' as a single, integrated system containing emergent risks.

Ultimately, these surveillance systems seek to manage time and space. On the one hand, they are about early detection and rapid response, continuously striving to reduce the time between detection, diagnosis and action in order to contain outbreaks, and to accelerate the production of antivirals and vaccines needed to protect more distant populations. Analogies to fighting forest fires abound. At still another level, they are about anticipating the future through the development of immense gene banks of influenza viruses – more than 900 at the last count – which can be quickly mined for relevant data by corporations, research labs and state agencies, in the race to discover and patent pharmaceutical solutions. In important respects, then, these networks presume that the answer to 'biology-as-virtuality' is technology – better surveillance, better laboratories, better vaccines – and their advocates frame 'emergence' as a logistical problem that demands a technological answer, rather than as an existential problem that requires a philosophical response, or a social or an economic problem that demands a political solution.

Perhaps most important for my purposes, these networks involve efforts by states to act extraterritorially. This *geopolitical* dimension was made explicit in the August 2003 statement of Tommy Thompson, the former director of Health and Human Services (HHS) in the United States. Although it begins by framing health security as a 'humanitarian' concern – about 'America's mission of compassion abroad' – it becomes clear that 'health security' is about something quite different:

As secretary of Health and Human Services it is my privilege to run a department that performs a critical role in America's mission of compassion abroad. *Public health knows no borders and no politics*. In recent memory alone, we have seen AIDS leap from Africa into our own cities; we have seen severe acute respiratory syndrome (SARS) spread with shocking rapidity from southern China to North America; we have seen the West Nile virus somehow cross the Atlantic and begin a slow spread across our continent; and we have seen that a key to controlling tuberculosis in the United States is controlling it in potential visitors to and from abroad.⁵⁰

It should come as no great surprise that even in its 'post-Westphalian' manifestation, public health remains a geopolitical exercise concerned with the sanctity of borders, dangerous migrations and foreign risks. What *has* changed under the regime of 'biosecurity' is the *geography* of health security, for in an age of globalization it is not enough to protect borders: the fight must be taken 'over there', before it 'reaches here'. Like the war on terror, amorphous viral networks require a global strategy of pre-emption. For such a strategy America needs allies: other countries, and international organizations such as the WHO, FAO and OIE.

Indispensable to our public health efforts, then, is the cooperation, leadership, and engagement of our partner nations. The United States can lead and contribute to the cause of global health, but cannot accomplish its mission alone. A prime example of our cooperation with fellow nations was seen in our response to the SARS epidemic. To fight this disease, U.S. health officials cooperated with and worked in places like China, Singapore, Thailand, Taiwan, and Vietnam. *We swiftly undertook several measures designed to turn the tide and defeat the epidemic before it became a serious threat on U.S. soil.*⁵¹

As the CDC put it in 2000, in an age of global networks, 'it was far more effective to help other countries control or prevent dangerous diseases at their source than try to prevent their importation.'⁵²

Thompson's comments remind us that 'security' – even in a biological or medical register – is a geopolitical discourse that simultaneously names the enemy and is to be protected from it. With this in mind, we may wish to modify our definition of biosecurity further, as the term given to a set of political technologies that seek to *govern biological disorder* in the name of a *particular community*, through acts that are *extraterritorial*. Or, to say this differently, biosecurity under the auspices of the CDC and HHS retains the ideal of territoriality while simultaneously seizing on de-territorialization as the solution.⁵³ Indeed, US public health policy, much like its foreign policy, has abandoned isolation in favour of (forced) integration, premised on the idea that the world can be split into a 'functioning core' of liberal peace and a 'non-integrated gap' within which emerging threats must be suppressed.⁵⁴ Biosecurity is framed in much the same way, as about *penetrating into* this gap, and *reorganizing it internally* so as to minimize risk.⁵⁵ Indeed, one of the most noted aspects of surveillance networks such as GPHIN is precisely that they can 'reach into' the sovereign space of other states, gathering biological and health information from a variety of sources, often informal or unofficial, and thereby bypass 'uncooperative' states that might otherwise not wish to share such information.⁵⁶

While these interventions are frequently posed in terms of 'enlightened self-interest' – the idea that by acting extraterritorially to achieve security at home, we benefit others

too – it is crucial to attend carefully to what these ‘actions abroad’ entail. Most visible in the news media has been the culling of bird populations, often resisted by local communities who have much to lose, but encouraged through promises of compensation. Less visible has been the collection of viral genomes from countries like Vietnam and Indonesia by institutions like the CDC, resulting in fierce struggles over property rights. Even less visible have been attempts to reorganize internally social, cultural and biological practices, what the development industry likes to call ‘capacity building’. USAID, for instance, has begun to put money into improving states’ diagnostic capacities and the integration of local laboratories into global networks.⁵⁷ Money is also flooding into creating professional or paraprofessional workers charged with ‘modernizing’ agricultural practices by reordering village spaces and introducing ‘biosecurity’ practices into village life – essentially ‘investing in life through and through’ at the village scale. The WHO, for instance, has printed ‘biosecurity’ guides for health workers and development NGOs that outline specific spatial practices targeting so-called ‘sector 3’ and ‘sector 4’ livestock, and which arrange different forms of human–animal association in terms of lowest to highest biosecurity (Figure 4). These efforts to shrink the ‘non-integrated gap’ through ‘harmonizing’ practices raises countless questions, from the further integration of law with life, to the displacement of local epistemologies and local etiologies of disease, to the social, cultural and economic displacements that accompany new husbandry practices.

Not surprisingly, such attempts to enclose the biological life of villages turn on distinctions between the normal and the pathological, troped as a distinction between the ‘modern’ and the ‘primitive’. Indeed, over the past year nothing has signified ‘backward’ more than the image of peasant children playing with domestic birds, whether alive or dead, the surest sign of the ‘premodernity’ and ‘naivety’ of the Third World villager, whose practices are ultimately a threat to us all. Indeed, newspapers in the United States have been full of stories about the owners of fighting cocks in Indonesia sucking blood from wounded birds and the Vietnamese delicacy of blood pudding, while the Turkish press has focused on the husbandry of Kurdish peasants, who yet again threaten the nation, this time through their improper relations with animals.

Conclusion

If security is a political discourse that justifies new forms of sovereign power by placing the actions of the state ‘outside’ politics, then biosecurity risks doing much the same, justifying a continuous *state of emergency* at the level of political life by reference to a continuous *state of emergence* at the level of molecular life. We might conclude, then, that biosecurity names much more than a set of political technologies whose purpose is to govern the disorder of biological life; it increasingly names a global project that seeks to achieve *certain* biomolecular futures by pre-empting others, and does so in part by reconfiguring in other places relations between people, and between people and their animals. Biosecurity weds biopolitics with geopolitics.

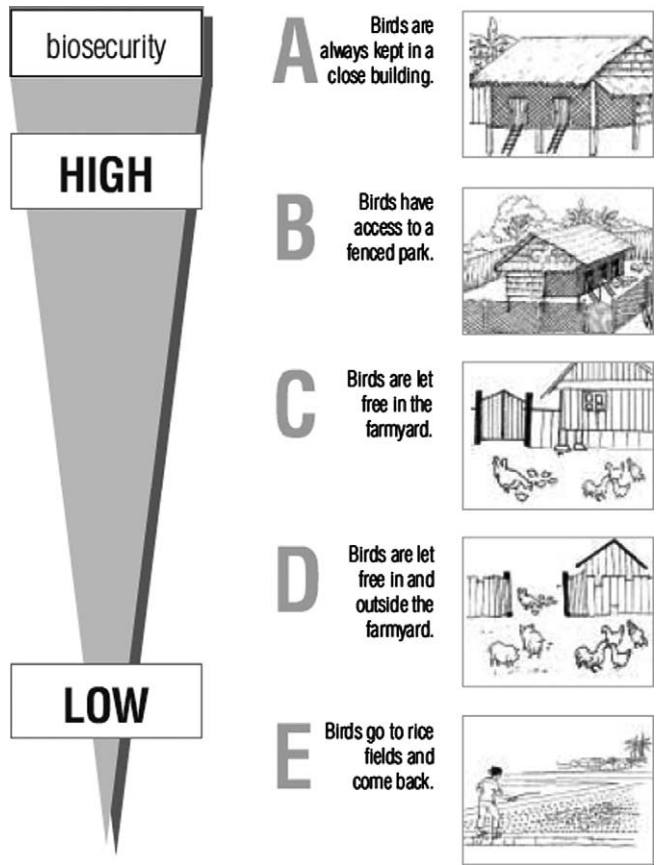


FIGURE 4 Pre-empting biological risk. Image taken from FAO, Agronomes et Vétérinaires Sans Frontières (VSF-CICDA), and Department of Animal Health, Socialist Republic of Vietnam, 'Prevention and control of avian flu in small-scale poultry: a guide for veterinary paraprofessionals in Vietnam'. Available at: [http://www.fao.org/ag.againfo/subjects/documents/ai/AIManual_VN2005\(en\).pdf](http://www.fao.org/ag.againfo/subjects/documents/ai/AIManual_VN2005(en).pdf). Last accessed 10 September 2006

We are perhaps now in a position to bring the two halves of this paper together. In what ways can it be said of the molecularization of life that it has made our biological existence a political concern in new ways? For Nikolas Rose, the molecularization of life has brought us to a new moment in the history of biopolitics, one in which bodies are understood in terms of their 'genetic inheritance', the management of risk is individualized, and the make-up of our bodies, and not just their conduct, has become the subject of technologies of self. In this ethopolitical regime biopolitics is understood in terms of governmentality, and politics takes as its concern the recognition of genetic conditions and the mobilizing of resources in their name.

But this is not the only way in which the molecularization of life has been apprehended. If we attend to the global biopolitics of biosecurity – the government of the 'global biological' – we find a quite different relation between the biological and

the political. On the one hand, the 'genetic inheritance' of the 'somatic' self comes to be replaced by 'precarious' bodies inhabiting 'virtual' biologies. On the other hand, forms of pastoral power recede while new forms of sovereign power appear. But how are we to understand the relation between the two? At the very least, we must see Rose's ethopolitics as something more particular and less universal, as perhaps a form of biopolitics within globalization that is specific to the zone of 'liberal peace' in the affluent spaces of the West. But more important, we must ask whether the conditions of possibility for ethopolitics – for secure bodies that are open to 'improvement' – include the extension of sovereign power elsewhere in the name of biological security. For not only does the global South lie outside the technoscientific and cultural networks that compose the ethopolitical for Rose, but arguably biological existence *there* is increasingly subject to projects that seek to pre-empt risk through new forms of sovereign power. We are faced with the troubling thought that in the molecular age, what appears to us in terms of an ethics of 'care of self', and as a pressing problem of democracy, may appear to others as yet another expression of empire.

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Notes

¹ G. Deleuze, *Expressionism in philosophy: Spinoza* (New York, Zone, 1990 [1968]), p. 255.

² N. Rose, 'The politics of life itself', *Theory, culture and society*, 18 (2001), pp. 1–30.

- ³ C. Novas and N. Rose, 'Genetic risk and the birth of the somatic individual', *Economy and society*, 29 (2000), pp. 485–513.
- ⁴ See S. Franklin, *Born and made: an ethnography of pre-implantation genetic diagnosis* (Princeton, NJ, Princeton University Press, 2006); S. Franklin, C. Lury and J. Stacey, *Global nature, global culture* (London, Sage, 2000); P. Rabinow, *Essays in the anthropology of reason* (Princeton, NJ, Princeton University Press, 1997).
- ⁵ See E. Thacker, *The global genome: biotechnology, politics and culture* (Cambridge, MA, MIT Press, 2005).
- ⁶ See D. Heath, R. Rapp and K. Taussig, 'Genetic citizenship', in D. Nugent and J. Vincent, eds, *A companion to the anthropology of politics* (Malden, MA, Blackwell, 2004), pp. 152–67; N. Rose and C. Novas, 'Biological citizenship', in A. Ong and S. Collier, eds, *Global assemblages: technology, politics, and ethics as anthropological problems* (Malden, MA, Blackwell, 2004), pp. 439–63.
- ⁷ Vallet made his comments at the International Symposium on Emerging Zoonoses, Atlanta, 22–24 Mar. 2006.
- ⁸ K. Ansell-Pearson, *Geminal life: the difference and repetition of Deleuze* (London, Routledge, 1999), p. 13.
- ⁹ M. Foucault, *Discipline and punish: the birth of the prison* (New York, Vintage, 1977); M. Foucault, *The history of sexuality*, vol. 1 (New York, Pantheon, 1979); M. Foucault, 'Governmentality', in G. Burchell, C. Gordon and P. Miller, eds, *The Foucault effect: studies in governmentality* (Chicago, University of Chicago Press 1991 [1978]), pp. 87–104.
- ¹⁰ This making a political object of 'life' also provided means of resistance to techniques of power, often through the language of 'rights'. The 'right' to a healthy body, for instance, emerged as a right in conjunction with a biopolitical regime that took the health of populations as their concern. That the language of rights is *internal* to biopolitics, rather than that which modifies or contests it from the outside, is certainly one of the most far-reaching conclusions that emanates from Giorgio Agamben's understanding of sovereign power. See G. Agamben, *Homo Sacer: sovereign power and bare life*, trans. by D. Heller-Roazen (Stanford, CA, Stanford University Press, 1998).
- ¹¹ Giorgio Agamben has famously argued that the production of the biopolitical body was the 'original activity of sovereign power', and locates this politicization of biological life as far back as Aristotle's distinction between *zoe* (biological life) and *bios* (political life, or a qualified way of life). In Foucault's work the relation between biopower and sovereign power was never clearly articulated, existing as a sort of 'vanishing point' in his writing. Catherine Mills notes that in *History of sexuality*, Foucault suggests that sovereignty is replaced by biopower, while in his essay 'Governmentality', he suggests that discipline, government and sovereignty coincide historically. See C. Mills, 'Biopolitics, liberal eugenics and nihilism', in S. DeCaroli and M. Calarco, eds, *Sovereignty and life: essays on the work of Giorgio Agamben* (Stanford, CA, Stanford University Press, forthcoming).
- ¹² Rose, 'The politics of life itself', pp. 1, 13.
- ¹³ *Ibid.*, pp. 13–14.
- ¹⁴ Thacker, *Global genome*.
- ¹⁵ C. Waldby, *The visible human project: informatic bodies and posthuman medicine* (New York, Routledge, 2000); Thacker, *Global genome*.
- ¹⁶ Rose, 'The politics of life itself', pp. 16–17.
- ¹⁷ Habermas sets out the problem in somewhat different terms, as contradicting the Enlightenment ideal of autonomy, and thus the ethical self-understanding of the species. With pre-implantation genetic screening, the child *has determined for it* its biological future, with the risk that 'we may

- no longer see ourselves as ethically free and morally equal beings guided by norms and reason': J. Habermas, *The future of human nature* (Cambridge, Polity Press, 2003), p. 41.
- ¹⁸ Rose, 'The politics of life itself', p. 5.
- ¹⁹ *Ibid.*, p. 17.
- ²⁰ For examples, see Heath et al., 'Genetic citizenship', pp. 152–6.
- ²¹ See Rose and Novas, 'Biological citizenship'.
- ²² See H. Parr, 'New body-geographies: the embodied spaces of health and medical information on the Internet' *Environment and planning D: society and space* 20 (2002), pp. 73–95; Heath et al., 'Genetic citizenship'. Indeed, so important has the Internet become for the politics of health that *how* these virtual spaces are constructed and negotiated by different individuals and social groups, from accreditation organizations like URAC to individuals and social groups with differing ability to negotiate what is often a bewildering array of information, is of growing concern.
- ²³ Rose and Novas, 'Biological citizenship'.
- ²⁴ For Dean, neoliberal governmentality rests on the production of a particular kind of subject who understands themselves in terms of making (wise) choices, and thus in terms of individual responsibility. See M. Dean, *Governmentality: power and rule in modern society* (Thousand Oaks, CA, Sage, 1999).
- ²⁵ Heath et al., 'Genetic citizenship'.
- ²⁶ Waldby, *Visible human project*.
- ²⁷ See E. Thacker, 'Diversity.com/Population.gov', Walker Art Center Web Gallery, <http://www.walkerart.org/archive/5/AF73755568388DC9616B>. Accessed 2 Mar. 2006.
- ²⁸ Quoted in Rose, 'Politics of life itself', p. 20.
- ²⁹ For more on this last point, see C. Mills, 'Biopolitics, liberal eugenics and nihilism'.
- ³⁰ M. Dillon, 'Virtual security: a life science of (dis)order', *Millennium: journal of international studies* 32 (2003), p. 531
- ³¹ Under the terms of Rose's ontology, 'subjects' are relational, but the 'genetic' body *becomes* so only in contact with biotechnology.
- ³² Post-genomic microbiology not only suggests that there are much longer 'sequential chains' involved in genetic events but, as Melinda Cooper notes, it has increasingly posited a 'co-evolution' of humans and microbes, such that 'We are literally born of ancient alliances between bacteria and our own cells; microbes are inside us, in our history, but are also implicated in the continuing evolution of all forms of life on earth': M. Cooper, 'Pre-empting emergence: the biological turn in the War on Terror', *Theory, culture and society*, 23 (2006), p. 17.
- ³³ N. King, 'The influence of anxiety: September 11, bioterrorism, and American public health', *Journal of the history of medicine*, 58 (2003), pp. 433–41.
- ³⁴ Hinchliffe and Bingham identify three different ways that 'biosecurity' has entered the political agenda: in terms of invasive species, foodborne illnesses and infectious diseases. Each of these names a different set of material conditions, and ethical and political practices. My focus on infectious diseases – and the political rationalities organized around it – is meant to call attention to emergent forms of sovereign power. S. Hinchliffe and N. Bingham, 'Mapping the multiplicities of biosecurity: an introduction', paper delivered at the Annual Meeting of the Association of American Geographers, Chicago, 10 Mar. 2006.
- ³⁵ Indeed, officials from the WHO believe that there are multiple 'strains' of H5N1 currently in circulation, with each strain containing HA and NA proteins with slightly different amino-acid sequences.

- ³⁶ B. Massumi, *The politics of everyday fear* (Minneapolis, University of Minnesota Press, 1993), p. 11.
- ³⁷ For more on the virtual, see B. Massumi, *Parables for the virtual: movement, affect, sensation* (Durham, NC, Duke University Press, 2002).
- ³⁸ See G. Davies, 'The funny business of biotechnology: better living through comedy', *Geoforum* (forthcoming).
- ³⁹ 'U.S. bird flu scenario eyed', *Associated Press* (21 Sept. 2005). Accessed at <http://www.cbsnews.com/stories/2005/09/21/health/main870945.shtml>, Feb. 2006.
- ⁴⁰ N. King, 'Dangerous fragments', *Grey Room* 7 (2002), pp. 72-81. See also the collection of essays in A. Harris and R. Keil, eds, *Networked disease* (Oxford, Blackwell, forthcoming).
- ⁴¹ This is a highly contested claim, criticized by some for deflecting attention from industrial agriculture.
- ⁴² Rumsfeld first made these comments at a Defense Department briefing on 12 Feb. 2002.
- ⁴³ NIAID is the acronym for the National Institute of Allergies and Infectious Diseases, a branch of the NIH.
- ⁴⁴ Cooper, 'Pre-empting emergence'; see also Dillon, 'Virtual security'.
- ⁴⁵ See K. Zeese, 'Return of the petri dish warriors', *Counterpunch* (1 June 2006).
- ⁴⁶ For further discussion, see N. King, 'Security, disease, commerce: ideologies of postcolonial global health', *Social studies of science*, 32 (2002), pp. 763-789.
- ⁴⁷ These networks have been limited by conflicts over intellectual property, with the USA, and the CDC in particular, receiving considerable blame for failing fully to share information. Other countries – Indonesia in particular – have worried about neocolonial forms of bioprospecting and genetic enclosure around infectious disease research.
- ⁴⁸ See King, 'Security, disease, commerce'.
- ⁴⁹ The FAO-USGS programme began during summer 2006 with wild swans moving between Mongolia and Eurasia. See 'Satellites help scientists track migratory birds', FAO Newsroom. <http://www.fao.org/newsroom/en/news/2006/1000388/index.html>, accessed 10 Sept. 2006.
- ⁵⁰ Emphasis added. T. Thompson, 'Public health knows no borders', *U.S. Foreign Policy Agenda* 8 (2003). <http://usinfo.state.gov/journals/itps/0803/ijpe/pj81thompson.htm>, Accessed 19 Jan. 2006.
- ⁵¹ *Ibid.* Emphasis added.
- ⁵² Quoted in King, 'Security, disease, commerce'.
- ⁵³ For more on this, see *ibid.*
- ⁵⁴ See T. Barnett, 'The "core" and the "gap"', *Providence journal-bulletin* (7 Nov. 2003); see also S. Roberts, A. Secor and M. Sparke, 'Neoliberal geopolitics', *Antipode* 35 (2003), pp. 886-97.
- ⁵⁵ As explained by the OiE's Bernard Vallat: 'One country with weaknesses in veterinary services [is] a threat to all', while capacity building is an 'international public good'. Comments at the 2006 International Symposium on Emerging Zoonoses, Atlanta, 22-24 Mar. 2006.
- ⁵⁶ The goal of 'reaching into' the sovereign space of the nation-state, or 'improving' their reporting to global institutions, is the explicit aim of the OiE's WAHIS Web application. As Bernard Vallat explains, 'The active search and verification procedure for unofficial information from various sources that was introduced in 2002 has become more effective each year. Its results have improved the exhaustiveness of the OIE's information in general, and the credibility of official information from certain Member Countries in particular': B. Vallat, 'Entering a new era: the birth of the WAHIS Web application', OiE (Dec. 2005). http://www.oie.int/eng/Edito/en_edito_mai06.htm, last accessed 10 Sep. 2006.
- ⁵⁷ Interview with Scott Dowell (CDC), 2006 International Symposium on Emerging Zoonoses, Atlanta, 24 Mar. 2006.