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#### November 27th, 2126: “When the final extinction event has taken place…”(1)

(1) [Arthur **Kroker**, running out of jokes here. **2014**. “Exits to the Posthuman Future.”] pat

When the final extinction event has taken place and that lonely morning finally comes when the sun rises on a planet of the dead and dying and cities of the vanquished and disappeared, the only visible motion will likely be purely prosthetic – the aimless flapping of wings by vulture robots still circling in the sky on an indefinite hovering cycle, the only nighttime movement the furtive flights of virtual bats with their beautiful memory-shaped alloys and miniaturized specs of artificial intelligence, and the only sounds those of the remaining virtual hornets or swarms of robotic bees or perhaps, by that time, spectral flights of dragons fashioned in some long forgotten and now abandoned Stanford robotic research lab by a graduate student in mechanical engineering who, following in the literary footsteps of all the great futurists of what was then the human world of Philip K. Dick, Neal Stephenson, and Raymond Z. Gallun, read A Game of Thrones with such feverish intensity that his mind immediately generated its robotic offspring in the form of a perfect simulacra of flying dragons indefinitely nuclear powered. The bones of the last of the humans may have gone to their burial sites, but their residues remain in the form of a lingering mechanics of clones and drones and androids and virtual zombies.

And on that day, I wonder what the real survivors of the extinction event – bats and rats and beetles and cockroaches and eagles and vultures and hornets – will have to say? When a turkey vulture looks a virtual vulture in the eye, will it feel technological envy at its prosthetic finery, or only a sense of shame that it has to share the daytime sky with robotic pretenders on a terminal doomsday flight to a final cybernetic spasm when the virtual vulture crashes to earth for lack of power? And what will real swarms of truly angry hornets make of their simulacra? Will they turn on them in predatory fashion, mocking their sudden defenselessness, or simply swarm on by in hornet-like indifference? What stories would Japanese samurais have to tell about their virtual descendents in the form of the Lockheed Samurai MAV drone? And what biblical memories will crack open the earth over the graves of the dead when they hear that war-machine robots, called Old Testament names like the “Reaper” or the “Predator,” circle the earth in one last search for the Messiah that never comes? Once the human shield of technology has been removed, I wonder how long a micro-bat will last, a virtual worm will squirm, a turkey vulture will hover, an army of simulated ants will continue to dig, or a human clone, for that matter, will drone?

#### April 30, 1796: The first medical patent was approved for the new invention of “Bilious Pills”, marketed as a drug that solves all sorts of ailments. These pills, however, were a gimmick.

CT Humanities. “First American Medicine Patent – Today in History: April 30 | Connecticut History | a CTHumanities Project.” Connecticut History | a CTHumanities Project, 30 Apr. 2020, connecticuthistory.org/first-american-medicine-patent-today-in-history-april-30/.

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#### Two and a half centuries later: Apps are being developed to track and exteriorize the human senses by syncing ourselves with technology, marketed as a way to monitor our health and transmit biological data.

[Arthur **Kroker**, running out of jokes here. **2014**. “Exits to the Posthuman Future.”] sosa

There is a patent application for a new iPhone app that involves synching your heart to the smartphone. The immediate function of this app is to repurpose the iPhone as a mobile heart monitor (“seamlessly embedded heart rate monitor”).4 Dispensing with the need for medical infrastructure housing EKG machines, individuals would simply need to touch the side of their own mobile device, specifically an iPhone, thus transmitting their most vital biological data – heart rate, blood rhythm and velocity – directly to a central digital heart monitoring station. If the data flow suggests that your heart is about to go into frenzied hyperdrive or, at the other extreme, cease functioning, you will be immediately alerted to take your body to the nearest ER. And not only that but the inventors claim that the mobile heart monitor has a second important purpose. Since everyone has a distinctive heart signature, the mobile heart monitor opens up the possibility of a third major form of body recognition software. Not just iris scanners or fingerprint analysis, but in the future the mobile heart monitor will be a way of scanning the body to verify its authenticity. Since all hearts move to their own internal rhythm with their own electronic signature, what could be a better way of securing identity than the beat-beat of an often unruly heart? A world of instant biofeedback: everything is fine. There is a disturbance in the rhythm of your heart. What does it mean when we literally synch our hearts to the iPhone? On the face of it, this is a useful medical app – social networking technology in the service of better health. In the context of contemporary cultural anxieties about fatal heart attacks and catastrophic strokes, who would not want to secure their good health with 24/7 monitoring of the often errant signature of the individual heart? With data uploaded onto a smart grid for hearts, there is also the added benefit that this stream of heart data will provide an organic basis for digital authentication with your heartbeat proving that you are the person whom your very singular heart rhythm says you actually are. Understood as a medical device facilitating health, the mobile heart monitor augments good health. Considered as an “extension of man,” this technological innovation suddenly provides global outreach to what was heretofore the private and unpredictable history of an individual heart. Considered as data, the history of the heart discovers that it has given birth to a digital echo, a duplicate reality in which individuals possess two hearts: one organic, the other virtual. Conceived as a technological device, the mobile heart monitor can be repurposed at will, from medical therapy to security requirements. However, it is when the heart intersects with the language of code that things become very interesting. We know that for more than fifty years, the electronic sensorium of the mass media have increasingly mimicked the logic of biology, first exteriorizing the human senses by way of the amplified senses of the electronic sensorium and then imitating the process of evolution itself. While McLuhan predicted in Understanding Media that the effect of accelerated technological change would be the triumphant transformation of mass media into an electronic nervous system, what happens with new media such as the mobile heart monitor is something deeply uncanny: the production of a digital heartbeat by the electronic nervous system. At some indefinable point, the massing together of individual heart signatures provides the electronic nervous system with a heart of its own, the pumping sound of a virtual heart cut to the normativity of a heterogeneous world of individual hearts. Are we witnessing here the first tentative steps in a greater migration from body to code, a data archive housing the biorhythms of the remotely scanned heart, with its own history of blood velocity, arterial blocks, and sudden failures? Or are we witness to something different? By bringing the rhythms of the bodily heart into a greater public visibility, are we suddenly creating the necessary condition for a new order of bio-politics, with its potential drive to bring its data archive of individual heart signatures within the boundaries of normative intelligibility – an alias heart? In other words, the potential resynching of the beat-beat of our own heart to that of society as a whole – the surveillance heartbeat, the repressive heartbeat, the beyond suspicion heartbeat. And all this simply by initializing your heart to the digital recognition software of the smartphone.

#### After all, data is always haunted by the trace of death.

Kroker ‘14

[Arthur, running out of jokes here. 2014. “Exits to the Posthuman Future.”] pat

Digital cosmology? Its ontology is epigenesist, the belief that digital organisms proliferate by the new appearance of code structures and networking functions. Always disloyal to evolutionary logic, software code only recognizes digital life as a random struggle between digital design – repetitive patterned instructions – and the wild side of ruptures, conjurations, and intermediations.

There's no real difference between the two sides. They are only apparent opposites. This is the story of identity and difference: patterns and randomness, a strict tutelary of programmed instructions and the outlaw will to disturb the codes, disobey instructions, take programs to their wild side, surveillance to the extremes of micro-granular detail, and the persistent human desire to wetware machines.

Coming to maturity under the sign of the terrorism of intelligibility, the real seduction of code lies in its desire in the end to be unintelligible, untraceable, unknowable, not capable of being archived. That's why the story of digital complexity today is captured beautifully by the language of clouds, storm vectors of codes moving at high velocity across the electronic sky, data hurricanes, BitStorm tornadoes, all those drifting clouds of networked subjectivity circulating through social networking technologies with their unexpected new structures and functions of FaceBook, YouTube, Twitter, and iChat. Like the collective authorship over many centuries of the Book of Genesis, the Book of Digital Epigenesis also has its cosmologists now and into the future. For who can really anticipate what will happen in the time of digital epigenesis? Who can predict with any certainty what new structures and functions will emerge from this new story of creation from digital nothingness? In desperation, astrophysicists describe the situation as that of “punctuated catastrophe.” But we know better: digital epigenesis is the newest temporary solution to an ancient biblical riddle – creation out of nothingness – and to an equally ancient philosophical puzzle: the question of identity and difference.

And not only that but digital cosmology also introduces in its wake a new theory of epistemology: epigenetics – the study of the neural mechanisms by which digital genes bring about their phenotypic effects. The earliest of the technological utopians, Marshall McLuhan, Wyndham Lewis, and Teilhard de Chardin, provided eloquent anticipatory warnings that the externalization of the human sensorium under the pressure of technological media of communication would enable the emergence of a digital nervous system. Since the mid-twentieth century, this haunting prophecy concerning the digital nervous system has remained a literary construct, a metaphor begging to be made operational. That's definitely no longer the case. Through a curious twist of fate, the great discourses of digitality and genomics shared historical periodicity because data is actually the genetic structure of the digital body – the global data genome.

Like the seasons of life itself, data moves from plenitude to senescence, it also has dawns and twilights. The global data genome is a vastly improved nervous system since its neurological mechanisms can never be confused with the embedded mind as the locus of consciousness, but from its moment of inception are distributive, circulating, relational, complex. Seemingly always one step out of season with regimes of intelligibility, the very best of data has its own broken synapses, overloaded consciousness, flickering memory, and software glitches. When digitality and genomics merge in the form of the global digital genome, post-traumatic (data) stress disorder with all its traumas is finally realized as the animating principle of augmented reality. “Post-traumatic” because the abrupt shutting down of the human sensorium accompanied by the immersion of the human organism in the skin of data, this profound originary event, announcing the termination of the human species as we have known it with its privatized ego, localized consciousness, and radical separation of the senses; and the inception of something profoundly new, simultaneously ominous and exciting – the subject as an emergent ecology of biology/sociality/data – this awesome event announcing the eclipse of one (human) species-form and the immediate emergence of its networked successor has already occurred.

McLuhan once claimed that the blast has already happened: we're floating in the debris from the breakup of the autonomous body, discrete ego, and embedded nervous system. Who was prepared for this? Who was ready for the immediate mutation eclipse of the species-form of the human into half flesh/half code? In this epochal shift, data itself suffers stress disorder as its primary trauma. It is not really so much that the new organism of half flesh/half code cannot tolerate the speed of technological acceleration. Liberated from the plodding world of materiality by networked regimes of relational processing and ubiquitous computing, the neural mechanisms of the human mind demonstrate unexpected plasticity and openness to heterogeneity. The evidence is all around us: brains sustaining physical injury that instantly reorganize the field of perception, artistic vision accelerating the speed of data, sci-fi literature overstimulating the nervous system of information, cinematic futurism that easily outruns the speed of technological change, a new aesthetics of perception that eagerly embraces the delirious simulacra of gaming. Everywhere the neural mechanisms of data flesh skip across liquid streams of information flows like flat-edged stones tossed on a lazy data summer afternoon. Every bit of media evidence, from television and radio through computing, cells, Blackberries, Twitters, and the virtual apparatus of augmented reality, suggests that the human brain has absorbed, easily and enthusiastically, its ablation into the nervous system of the fully externalized technological media of communication.

The real challenge is data trauma, the fact that data cannot keep up, either metaphorically or materially, with the speed of perception. That is why data often resembles the conservative ressentiment of Wendy Brown's States of Injury, resentful, left behind, revenge-seeking. Data seeks the safety of digital purity; firewalling itself in the hygienic spaces of closed data dumps. In other instances, data become aggressive – it turns on its human companion species, taking cold comfort in the durational memory and identity triangulations so necessary to surveillance systems. Like the worst of the human species before it, data is capable of the ethics of Heidegger's “injurious neglect.” It too can sometimes only find expression in terms of a “malice of strife.” Born again in the baptistery of genomics, data is a fully completed nihilist, infected with the ressentiment of the human species that it was so eager to replace, the spearhead of a purely technical will – drifting, oscillating, wiping away the horizon, in its leading expression a software animation precisely because data is haunted by the trace of death. But of course the death of data is precisely why information culture can be so dynamic. It is the tangible scent of the necropolis in the data storm that makes information culture so deeply, so seductively charismatic. Bored with the logic of presence, the ablated neural mechanisms of the networked subject sift in deepest fascination through the debris of the human remains of the species – shards of memory, strands of forgotten codes, dead media, broken thoughts, book after book of fatally overcome faces. It is this hint of death that drives the necropolis of software. Feasting on the remains, the massive accumulation that is dead information is finally free to express itself as a pure technical will, and nothing besides. Literally, data today is a nervous breakthrough. Refusing stability, never stationary, data is condemned to a cycle of endless circulation. It has no destiny other than that of the pure will: augmented, streamed, mobilized, Facebooked, Twittered, iPodded, flickered, upgraded, downloaded, wide-screened, multitasked, and GPSed. Like all species before it, there will finally come a time when data will grow weary with itself and, as an exhausted nihilist, find pleasure only in making itself ill. My suspicion is that, in this time of accelerated data flows, the appearance of data as an exhausted nihilist is already upon us. In this age of exhausted data, everything counts, everything apps precisely because nothing now counts but the ersatz nothingness of data itself. Digital trauma.

#### This dawns the new age of bioinformatics- where expansion of biotechnology via IPRs and the globalization of cybernetics have become indistinguishable

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Blurred Distinctions In an insightful study Eugene Thacker (2006) stresses that biotechnology is indissociable from globalization, understood as a complex process of intensification and rescaling of relations. This regards not only the biotech industry but also ‘big science’ projects, such as the mapping of the human genome or the emergence of, and response to, new infectious diseases such as the SARS (Severe Acute Respiratory Syndrome). It is therefore sensible to talk of the exchange, circulation and distribution of biological information and materials as an additional dimension to the three main types of exchange (economic, political and cultural) characterizing globalization. The way genomics has developed is emblematic. Genomics relies on computer and biological databases that are networked across the world. The human genome, Thacker contends, is global in a threefold sense: technological (online database accessible all over the world); scientific (through access and distribution of data scientific knowledge can be shared worldwide) and economic (data in the genome database are connected to patent databases, with consequent creation of worldwide proprietary networks of information-sharing). As other aspects of globalization, biological exchange does not erase but rather restructures spatial relations, creating new centralities, localities and exclusions. This applies for example to bioprospecting (the collection, usually from developing countries, of forms of life and related traditional knowledge for their scientific interest and economic potentials)16 and biopiracy (the commercial exploitation of biodiversity and local knowledge without permission and compensation), as well as to ‘big science’ enterprises, such as the Human Genome Project, which involves only a selected number of countries and research centres.

Thacker contends that, to understand the actual character of current biotechnologies it is crucial to consider their inbuilt tensions. The fundamental feature of biotech is the combination of biology and informatics – the simultaneous growth of, and interaction between, biosciences and ICTs. Biotechnology, he says, is first and foremost bioinformatics. It is in the context of this synergy that the core tension of biotech emerges. ‘Life itself’ is at the same time matter and information, presence and pattern, wet’ and ‘dry’, real and virtual. It is this tension – I would call it an ambivalence – that enables a worldwide biological exchange, as ‘the circulation and distribution of biological information, be it in a material or immaterial instantiation, that is mediated by one or more value systems’ (Thacker 2006: 7). Information moves fluidly across media, from a living cell to a test tube, to a digital database. DNA, for example, exists in the nucleus of cells; it can be extracted and kept in vitro for diagnostics and analysis; it can be transferred from one cell to another or from one organism to another; it can be digitized or encoded and stored as a sequence on a computer database; it can be synthesized using the digital form in databases; it can be re-materialized as a biological molecule, then as drugs, GMOs and so on; it can become an intellectual property.

Hence, Thacker stresses, biological exchanges informationalize without dematerializing. It is possibly more accurate to say that the difference between matter and information becomes irrelevant, or gains salience according to context and purpose. Consider, for example, the issue of ‘big data’. The expression refers to the fact that research is increasingly driven by data mining and processing. This has major effects on its outcomes (Mitchell and Thurtle 2004, Calvert and Fushimura 2011, Calvert 2012). Unforeseen insights are generated, where knowledge and production of reality, discovery (of interesting relationships within the data) and invention (of meaningful associations among data), can hardly be distinguished. Similarly, biometric profiling for purposes of surveillance, research, diagnostics and design of ‘smart environments’ (online-offline environments that anticipate the inhabitants), applies algorithms that associate huge amounts of data, often of disparate type (biological traits, places, events, individual and collective behaviours, etc.), generating unforeseen knowledge, thus in a sense answering questions that users did not know to ask (Hildebrand 2008, Amoore 2009, Mattelart 2010, Mitchell and Waldby 2010). Moreover, it is unclear whether this is just knowledge or rather the production of reality – for example a forthcoming disease, or a user-tailored socio-technical environment.

In short, we are confronted with a fluid or ambivalent state of affairs, where the distinction between matter and information, discovery and invention, real and virtual, natural and artificial, blurs. Also the difference between the organic and the inorganic: as Evelyn Fox Keller (2007, 2011) remarks, with the advent of cybernetics and non-linear dynamical systems theory self-organization – the distinctive feature of life, since Aristotle – has been increasingly understood in physical, rather than biological, terms. Thus, it is no longer organic life that, as usual in modernity, is depicted in mechanistic ways (that is, as an assembly of elements governed by efficient causality)17 It is the inorganic realm that is regarded as having ‘vital’ connotations. For example, in the field of supramolecular chemistry, scholars talk of ‘informed matter’, referring to the spontaneous self-organization of molecular systems out of components, through molecular recognition (Lehn 2004). Simultaneously, life is infused with characterizations like textuality, information and codification, which are foreign to traditional descriptions of organisms as eminently material entities.”

#### This bioinformatic mastery of the world enables bioprospecting- only furthering the cybernetic order.

James Ming Chen 13, Justin Smith Morrill Chair in Law, Michigan State University; Of Counsel, Technology Law Group of Washington, D.C. 5-15-13. “BIOPROSPECT THEORY,”<https://www.uakron.edu/dotAsset/989023a4-c9c1-49a6-854d-26ea7eb01cca.pdf> brett

Conventional wisdom treats biodiversity and biotechnology as rivalrous values. The global south is home to most of earth’s vanishing species, while the global north holds the capital and technology needed to develop this natural wealth. The south argues that intellectual property laws enable pharmaceutical companies and seed breeders in the industrialized north to commit biopiracy.1 By contrast, the United States has characterized calls for profit-sharing as a threat to the global life sciences industry.2 Both sides magnify the dispute, on the apparent consensus that commercial exploitation of genetic resources holds the key to biodiversity conservation. Both sides of this debate misunderstand the relationship between biodiversity and biotechnology.3 Both sides have overstated the significance of bioprospecting. It is misleading to frame the issue as whether intellectual property in the abstract can coexist with the international legal framework for preserving biodiversity. As a matter of legal gymnastics, any lawyer can reconfigure intellectual property to embrace all of the intangible assets at stake, including raw genetic resources, advanced agricultural and pharmaceutical research, and ethnobiological knowledge. The real challenge lies in directing the law of biodiversity conservation and the law of intellectual property toward appropriate preservation and exploitation of the global biospheric commons.5 Commercial development aids biodiversity primarily by overcoming perverse economic incentives to consume scarce natural resources that may turn out to have greater global, long-term value. We contest these issues not because we are rational, but precisely because we are not. Indeed, legal approaches to biodiversity and biotechnology are so twisted that they represent an extreme application of prospect theory. Nearly half a century before Daniel Kahneman and Amos Tversky published Prospect Theory: An Analysis of Decision Under Risk, 6 the 1979 article that became the foundational work of behavioral economics and the principal basis for Kahneman’s 2002 Nobel Prize in Economics,7 the Supreme Court of the United States succinctly summarized a core tenet of prospect theory: “Threat of loss, not hope of gain, is the essence of economic coercion.”8 In plainer terms, “losing hurts worse than winning feels good.”9 Stated in formal terms, prospect theory posits that most individuals, as an expression of innate risk aversion, fear potential losses far more than they covet potential gains.10 The law of biodiversity and biotechnology appears to reverse this presumption. Although humans innately fear losses more than they value gains, worldwide policy appears to assign relatively little value to biodiversity as an invaluable, incommensurate, and indefinitely important component of global ecological health.11 Biodiversity loss is staggering and undeniable.12 Humans are responsible for the sixth great extinction spasm of the Phanerozoic Eon, a unit of geologic time spanning half a billion years.13 Cataclysmic loss of biological diversity is merely one of several ecological threats looming over Holocene humanity.14 In assembling this brief analysis, I hasten to add this observation: so far I have assigned no weight to global climate change, a threat that has raised the probability of human extinction to a non-negligible value. Risks as grandiose as these, sufficient in their magnitude to portend the end of civilization, possibly even the survival of humans as a species, support the most dismal of theorems in the dismal science of economics: “the catastrophe-insurance aspect of such a fat-tailed unlimited-exposure situation, which can never be fully learned away, can dominate the social-discounting aspect, the pure-risk aspect, and the consumptionsmoothing aspect.”15 In plainer language, the dismal theorem posits that “under limited conditions concerning the structure of uncertainty and societal preferences, the expected loss from certain risks such as climate change is infinite and that standard economic analysis cannot be applied.”16 By contrast, the global north and the global south alike have reached an apparent consensus that the primary object of the international debate over “biopiracy” is the appropriate profit-sharing protocol (including the possibility of no redistributive mechanism whatsoever) for gains from bioprospecting.17 Such gains, at best, are highly speculative.18 Even if profits from bioprospecting are ever realized, they will be extremely concentrated. No champion of redistributive justice on a global scale could defend a system of transferring northern wealth that would favor Brazil, Costa Rica, and Madagascar while neglecting Bolivia, Mali, and Afghanistan. There simply is no defensible basis for treating ethnobiological knowledge as the foundation of a globally coherent approach to economic development. Yet the global community continues to spend its extremely small and fragile storehouse of political capital on this contentious corner of international environmental law.19 Global economic diplomacy should be made of saner stuff. The fact that it is not invites us to treat the entire charade as a distinct branch of behavioral law and economics: bioprospect theory. Upon closer examination, prospect theory and related branches of behavioral economics do supply a powerful explanation for international economic law’s systematic failure to reach the optimal solutions for biodiversity conservation. Prospect theory arises from three basic features of human beings’ core cognitive system:20 1. All decisionmaking takes place relative to a neutral reference point, or “adaptation level.” Outcomes exceeding this reference point are gains. Outcomes below the reference point are losses. 2. Loss aversion means that losses, when directly weighted or compared against gains, loom larger. 3. Diminishing sensitivity applies to upward and downward perceptions and to evaluation of changes of wealth. In concert, these three principles — neutral reference point, loss aversion, diminishing sensitivity — can be illustrated through a graph showing an asymmetrical sigmoid curve whose inflection point occurs at the neutral adaptation level, whose steeper slope below the adaptation level demonstrates loss aversion, and whose declining rate of change in both directions reflects diminishing sensitivity to gains and losses:21 19. See Chen, supra note 5, at 506. 20. See KAHNEMAN, supra note 10, at 282. 21. Id. at 282-83. One readily implemented way of parametrically modeling prospect theory with closed-form expressions and elementary functions is the cumulative distribution function of the log-logistic 2014] BIOPROSPECT THEORY 23 “If prospect theory had a flag, this image would be drawn on it.”22 The asymmetrical utility curve that emerges from prospect theory’s reevaluation of conventional accounts of expected economic utility leads to some apparent contradictions.23 In mixed gambles, for instance, where a decisionmaker may realize either a gain or a loss, loss aversion leads to extreme, even costly risk aversion. This is the primary conclusion of prospect theory, the one most readily summarized by the slogan, “losing hurts worse than winning feels good.”24 But prospect theory predicts affirmatively risk-seeking behavior in other circumstances. When a decisionmaker is confronted with nothing but “bad choices” — specifically, those “where a sure loss is compared to a larger loss that is merely probable” — diminishing sensitivity to losses will generate a greater willingness to absorb risk.25 Prospect theory therefore rests on two principal insights. First, humans “attach values to gains and losses rather than to wealth.”26 Second, humans making decisions assign “weights . . . to outcomes [that] are different from 22. KAHNEMAN, supra note 10, at 282. Graph reproduced from Basic Concepts: Prospect Theory, THE DICKINSON COLLEGE WIKI, http://wiki.dickinson.edu/index.php/Basic\_Concepts#Prospect\_Theory (last modified May 3, 2007). 23. See KAHNEMAN, supra note 10, at 285. 24. GRIZZARD, supra note 9; accord GARAGIOLA, supra note 9. 25. KAHNEMAN, supra note 10, at 285. 26. Id. at 316-17. 24 AKRON INTELLECTUAL PROPERTY JOURNAL [7:19 probabilities.”27 The combination of these two heuristics generates “a distinctive pattern of preferences” that Kahneman and Tversky have called the “fourfold pattern”:28 The four-fold pattern Gains Losses High probability (certainty effect) E.g., a 95% chance to win $10,000 leads to . . . Risk aversion (annuities and sinecures) E.g., a 95% chance to lose $10,000 leads to . . . Risk seeking (rogue trading and other reckless gambles) Low probability (possibility effect) E.g., a 5% chance to win $10,000 leads to . . . Risk seeking (lotteries) E.g., a 5% chance to lose $10,000 leads to . . . Risk aversion (insurance) Let us examine more closely each of the four vanes in prospect theory’s pinwheel of fortune. Three of these four behavioral possibilities have long been understood; prospect theory merely provided the means by which to describe them formally.29 The cell at top left describes how risk aversion leads people to lock in a sure gain below the expected value of a gamble. Annuities work on this principle, as do employment guarantees in unionized trades or on tenure-protected university faculties. The cell at lower right describes insurance: individuals will pay much more than the expected value of a loss to insure themselves against the disturbing prospect of a catastrophic loss.30 On the flip side of that transaction, insurance companies can pool risks assigned to them by risk-averse policyholders and profit from the spread between expected losses and premium payments. These risk-averse decisions reflect the core instinct of prospect theory. But there is also a risk-seeking side to this account of human behavior. Lotteries routinely exploit the possibility effect. When the potential payout is enormous, ticket buyers become indifferent to their miniscule chances of winning. This is the behavioral pattern reflected by the lower left cell. It is 27. Id. at 317. 28. Id. 29. See id. at 317-18. 30. See, e.g., Jim Chen, Modern Disaster Theory: Evaluating Disaster Law as a Portfolio of Legal Rules, 25 EMORY INT’L L. REV. 1121 (2011); Jim Chen, Postmodern Disaster Theory (Mich. State Univ. Coll. of Law Legal Studies Research Paper Series, Paper No. 11-17, 2012), available at http://papers.ssrn.com/sol3/papers.cfm?abstract\_id=2141591. 2014] BIOPROSPECT THEORY 25 sufficiently powerful that banks and credit unions have resorted to depositor lotteries to induce lower- to middle-income customers to open and fund savings accounts.31 What Kahneman and Tversky found most surprising was the fourth possibility, the one described in the risk-seeking cell at upper right. When humans face the high probability of severe losses, they engage in affirmatively riskier behavior. Prospect theory identifies two reasons for this sudden shift in strategy.32 First, diminishing sensitivity means that humans react very adversely to a sure loss: “the reaction to a loss of $900 is more than 90% as intense as the reaction to a loss of $1,000.”33 Second and perhaps even more significant, humans assign a much lower decision weight to an extreme loss than its rationally expected value as calculated by the laws of probability. The certainty effect, coupled with diminishing sensitivity, enhances the aversiveness of a sure loss and reduces the aversiveness of the gamble. This is the ugly corner of human decisionmaking where otherwise responsible parties find themselves tempted to take risks that can “turn[] manageable failures into disasters.”34 “Rogue traders” who have amassed appalling losses let it all ride on a single act of reckless arbitrage. That gamble may destroy a systemically important financial institution.35 “Because defeat is so difficult to accept,” chief executive officers and field marshals suffer from a comparable inability to cut their losses and salvage what is left of their companies and armies.36 Bioprospect theory helps explain why international economic and environmental law reaches such perverse outcomes in its approach to biodiversity conservation and bioprospecting. Biodiversity policy is perverse because it disobeys the standard risk-averse pattern of human conduct and follows instead the contrary axis of risk-seeking behavior. The fate of the biosphere presents either (1) a low probability of immense gain (through bioprospecting) or (2) a high probability of immense loss (through global climate change). The lottery effect readily explains the overvaluing of commercial bioprospecting. Pharmaceutical companies and protesters accusing them of biopiracy have this much in common: both sides are bedazzled — irrationally — by the possibility that some lucrative cure for cancer may lurk in a Brazilian rain forest.37 The looming loss of global biological diversity, on a geologically significant scale, poses an even more disturbing prospect. The magnitude of ecological losses is increasing at an alarming rate, even more so once we move past the relatively narrow frame of biodiversity and contemplate the possibility of complete disruption of global climatic systems. As the costs and the likely futility of mitigating action increase,38 humans find their own heuristics shoving their collective decisionmaking processes further onto the frontier of desperation where risk-averse acts such as insurance lose their appeal and yield ground to active risk-seeking. System 1 — the rapid, automatic decisionmaking system that has propelled humanity from Pleistocene competitiveness to Holocene dominance39 — may be pushing Homo sapiens sapiens to the edge of extinction by its own talented hand. The global collapse of biodiversity is the ultimate ecosystem service provided by indicator species: “never send to know for whom the bell tolls; it tolls for thee.”40 Bioprospect theory provides the blueprint by which humanity might eschew the remote prospect of wealth, if only momentarily, and focus on how it might better manage anthropogenic ecological disasters before they become full-blown, irreversible cataclysms of global proportions.

#### As the cybernetic order progresses, the virtual class utilizes violent and combative strategies like IPRs to restructure society into a digital superhighway paved by our own flesh

Kroker and Weinstein ‘94

[Arthur, (post?)human meth pipe, and Michael Weinstein, Purdue University. 1994. “Data Trash.”] sosa – ask for the PDF

Privileging the question of ethics via virtuality lays bare the impulse to nihilism that is central to the virtual class. For it, the drive to planetary mastery represented by the will to virtuality relegates the ethical suasion to the electronic trashbin. Claiming with monumental hubris to be already beyond good and evil, it assumes perfect equivalency between the will to virtuality and the will to the (virtual) good. If the good is equivalent to the disintegration of experience into cybernetic interactivity or to the disappearance of memory and solitary reflection into massive Sunstations of archived information, then the virtual class is the leading exponent of the era of telematic ethics. Far from having abandoned ethical concerns, the virtual class has patched a coherent, dynamic, and comprehensive system of ethics onto the hard-line processors of the will to virtuality. Against economic justice, the virtual class practices a mixture of predatory capitalism and gung-ho technocratic rationalizations for laying waste to social concerns for employment, with insistent demands for “restructuring economies, ” “public policies of labor adjustment,” and “deficit cutting,” all aimed at maximal profitability. Against democratic discourse, the virtual class institutes anew the authoritarian mind, projecting its class interests onto cyberspace from which vantagenpoint it crushes any and all dissent to the prevailing orthodoxies of technotopia. For the virtual class, politics is about absolute control over intellectual property by means of war-like strategies of communication, control, and command. Against social solidarity, the virtual class promotes a grisly form of raw social materialism, whereby social experience is reduced to its prosethetic after-effects: the body becomes a passive archive to be processed, entertained, and stockpiled by the seduction apertures of the virtual reality complex. And finally, against aesthetic creativity, the virtual class promotes the value of pattern-maintenance (of its own choosing), whereby human intelligence is reduced to a circulating medium of cybernetic exchange floating in the interfaces of the cultural animation machines. Key to the success of the virtual class is its promotion of a radically diminished vision of human experience and of a disintegrated conception of the human good: for virtualizers, the good is ultimately that which disappears human subjectivity, substituting the war-machine of cyberspace for the data trash of experience. Beyond this, the virtual class can achieve dominance today because its reduced vision of human experience consists of a digital superhighway, a fatal scene of circulation and gridlock, which corresponds to how the late twentieth-century mind likes to see itself. Reverse nihilist: not the nihilistic will as projected outwards onto an external object, but the nihilistic will turned inwards, decomposing subjectivity, reducing the self to an object of conscience- and body vivisectioning. What does it mean when the body is virtualized without a sustaining ethical vision? Can anyone be strong enough for this? What results is rage against the body: a hatred of existence that can only be satisfied by an abandonment of flesh and subjectivity and, with it, a. flight into virtuality. Virtuality without ethics is a primal scene of social suicide: a site of mass cyrogenics where bodies are quick-frozen for future resequencing by the archived data networks. The virtual class can be this dynamic because it is already the after-shock of the living dead: body vivisectionists and early (mind) abandoners surfing the Net on a road trip to the virtual Inferno. The virtual class has driven to global power along the digital superhighway. Representing perfectly the expansionary interests of the recombinant commodity-form, the virtual class has seized the imagination of contemporary culture by conceiving a techno-utopian high-speed cybernetic grid for travelling across the electronic frontier. In this mythology of the new technological frontier, contemporary society is either equipped for fast travel down the main arterial lanes of the information highway, or it simply ceases to exist as a functioning member of technotopia. As the CEO’s and the specialist consultants of the virtual class triumphantly proclaim: “Adapt or you’re toast.” We now live in the age of dead information, dead (electronic) space, and dead (cybernetic) rhetoric. Dead information? That’s our cooptation as servomechanisms of the cybernetic grid (the digital superhighway) that swallows bodies, and even whole societies, into the dynamic momentum of its telematic logic. Always working on the basis of the illusion of enhanced interactivity, the digital superhighway is really about the full immersion of the flesh into its virtual double. As dead (electronic) space, the digital superhighway is a big real estate venture in cybernetic form, where competing claims to intellectual property rights in an array of multi-media technologies of communication are at stake. No longer capitalism under the doubled sign of consumer and production models, the digital superhighway represents the disappearance of capitalism into colonized virtual space. And&ad (cybernetic) rhetoric? That’s the Internet’s subordination to the predatory business interests of a virtual class, which might pay virtual lip service to the growth of electronic communities on a global basis, but which is devoted in actuality to shutting down the anarchy of the Net in favor of virtualized (commercial) exchange. Like a mirror image, the digital superhighway always means its opposite: not an open telematic autoroute for fast circulation across the electronic galaxy, but an immensely seductive harvesting machine for delivering bodies, culture, and labor to virtualization. The information highway is paved with (our) flesh. So consequently, the theory of the virtual class: cultural accomodation to technotopia is its goal, political consolidation (around the aims of the virtual class) its method, multi-media nervous systems its relay, and (our) disappearance into pure virtualities its ecstatic destiny.

#### Thus, the inhuman ought to eliminate intellectual property rights for medicine

#### You should understand the affirmative as an analysis of our orientation to technology that reconfigures thought from cybernetic to techno-diverse- by starting with the question of how bioinformatics are made, we rupture the cybernetic future whilst creating affective resistance

Hui ‘19

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We would now like to return to Lyotard’s critique of system and to offer a reinterpretation of his concept of the inhuman. It is important to bear in mind that the form of resistance Lyotard is talking about here is not a humanist critique but rather inhumanist. The concept of system poses a major problem to Lyotard and is one of the main features of postmodern society. If systemic thinking becomes dominant, it is because it shows itself to be a better explanation of the efficient cause and the final cause. It is against system that Lyotard proposes the concept of the inhuman. The inhuman is the leading concept of his collection of essays and conference presentations that he delivered to a general audience: The Inhuman: Reflections on Time. Although it is not written for specialists, The Inhuman remains one of the most important publications of Lyotard, since it also allows him the freedom to speculate on some themes that appear “too dialectical to take seriously.” The systemic becoming is the inhuman, since it owes its metaphysical root to development; it is the mastery of human being over all beings:

The striking thing about this metaphysics of development is that it needs no finality. Development is not attached to an Idea, like that of the emancipation of reason and of human freedoms. It is reproduced by accelerating and extending itself according to its internal dynamic alone. It assimilates contingencies [hasards], memorizes their informational value and uses this as a new mediation necessary to its functioning. It has no other necessity than a cosmological chance [hasard].

How should we understand the two occurrences of the word hasard in this passage? We rendered the first as contingency, because becoming system means precisely the capacity to assimilate contingencies into its operation. That is to say, contingency is not something destructive that interrupts the causalities of the system, but rather that which allows the system to empower its internal dynamic. We render the second occurrence of hasard as chance or accident, since in such a system there is no longer any difference between necessity and contingency, as what we tried to demonstrate with Schelling’s concept of nature. Recursion extends from the mechanism of nature to the mechanism of the machine, the mechanism of capital and now the mechanism of globalized culture. Development, as Lyotard continues, “has thus no end, but it does have a limit, the expectation of the life of the sun.” What is meant by an endlessness with a limit, an affirmative negation? This brings us to the famous essay in the collection, “Can Thought Go On without a Body?” This essay is a conversation between a female interlocutor and a male philosopher. It starts with an event, which is the explosion of the sun in 4.5 billion years’ time that will put an end to all organic life, an event after which nothing is thinkable—an event that Lyotard himself coins solar catastrophe and Ray Brassier considers to be the ultimate challenge to what Quentin Meillassoux calls “correlationism.”

The destruction of all organic life points to the only possibility for the survival of the human, which is the separation between body and mind, between hardware and software. This metaphor of software and hardware is technological, but it is also not a metaphor because it is a research agenda that covers everything from dietetics, neurophysiology, genetics, and tissue synthesis to particle physics, astrophysics, electronics, information science, and nuclear physics. The search for the separation between thinking and organic life is a response to the prospect of solar catastrophe, since the central question is, how is it possible to survive without an organic form of life? Or, as Lyotard puts it: “[H]ow to provide this software with a hardware that is independent of the conditions of life on earth?” This is a negative organology, or an extreme humanism. It is negative since it is based on a total negation of the organic and on the belief that there is a possibility, no matter how small it might be, of replacing the organic body with an inorganic artifice for the survival of thinking. Lyotard, through the incarnation of a female interrogator called Him, implicitly goes back to the recursive structure of organization and the possibility that such a recursive algorithm could be independent from the organic body:

Most of all: [human]’s equipped with a symbolic system that’s both arbitrary (in semantics and syntax), letting it be less dependent on an immediate environment, and also “recursive” (Hofstadter), allowing it to take into account (above and beyond raw data) the way it has of processing such data. . . . Isn’t that exactly what constitutes the basis of your transcendence in immanence?

The notion of recursivity is raised here, but Lyotard does not explore the relation between recursivity and reflective judgment further. He did not understand the concept of recursion, just as he had already dismissed information theory in cybernetics for its “triviality” earlier in his The Postmodern Condition. Here he is prepared to reject this thesis by invoking Hubert Dreyfus, whose What Computers Cannot Do? A Critique of Artificial Reason (1972) challenged the research in artificial intelligence (AI) of that time as being too Cartesian in the sense that AI reduces intelligence to a very limited way of knowing. This could be briefly explained with what in classical AI or “Good Old-Fashioned AI” (GOFAI) is called the frame problem, which is about the AI’s description of the world. In order to know an event or an environment, the AI will have to produce a huge amount of descriptions. However, it remains very difficult to contextualize these descriptions. It is Cartesian because, in this form of knowing, everything is merely present-at-hand in the sense of Heidegger, while it ignores the fact that in the preoccupations of everyday life Dasein encounters situations that are ready-to-hand and have to do with embodiment and intuition. The rejection of reducing thinking to a binary form is also a rejection of the separation between body and mind. The philosopher, who is challenged in this dialogue, is also a phenomenologist. He has to defend the importance of the body and of sexuality, since without the body and without sexuality, can thinking exist at all? Brassier has nicely summarized the perspectives of the two interrogators:

one for which the inseparability between thought and its material substrate necessitates separating thought from its rootedness in organic life in general, and the human organism in particular; another according to which it is the irreducible separation of the sexes that renders thought inseparable from organic embodiment, and human embodiment specifically.

If becoming system presents a negativity for Lyotard, this is because it is based on a negative organology, which ignores the question of life and existence. And if Lyotard here invokes this negativity, it is because he wants to think through the question of resistance, as he asks in his introduction: “[W]hat else remains as ‘politics’ except resistance to this inhuman?” This resistance is also inhuman since the negative inhuman doesn’t occupy the totality of this concept. Like the sublime, the inhuman also has its double, as Lyotard emphasizes: “The inhumanity of the system which is currently being consolidated under the name of development (among others) must not be confused with the infinitely secret one of which the soul is hostage.”

The inhuman is truly posthuman in the sense that it considers the dissolution of the human as messages, waves, particles, and cells. However, the inhuman is not transhuman. Although the inhuman shares the negativity of the transhuman—that is to say, it is imprisoned by the fanaticism of development or technological singularity—at the same time it resists such negativity not by rejecting a human-machine hybridity but by rejecting the tendency imposed by a transhumanist ideology that is motivated by the anticipation of the solar catastrophe and desire of inorganic immortality. What is meant by “the infinitely secret one of which the soul is hostage”? Ashley Woodward identifies the double of the inhuman by suggesting that the negative inhuman can be identified with nihilism, and further that art is the second sense of the inhuman. However, I have strong reservations about this second observation since this is too narrow and it does not seem to be what Lyotard was referring to, though it is interesting here to consider in art the potential of overcoming the determination of the system. If the soul is the hostage of the inhuman, it is because the inhuman is like its preindividual reality as well as its call. It is like water to fish: Even though the latter live in the former, it remains transparent to it. This inhuman cannot be reduced to calculation and to representation. The possible explanation of seeing an intimacy between art and the inhuman is that art sends the system back to a primordial creativity in order to undo the totalization of the system. It is clearer when we refer to Lyotard’s reading of Augustine. However, instead of discussing his The Confession of Augustine, I will instead make a short-cut by referring to an episode of a TV program called Apostrophes that was broadcast on the January 9, 1981. I transcribe part of the lengthy conversation below.

JFL: You remember that in the eleventh book that you cited, and that you remember, those confessions, there is this formula, it is a god more interior in myself than me, that is what I make allusion to, what Wilson searches, it is that, isn’t it? There is something in me which is more interior in myself than me, well, this what I call the inhuman, I have the right, it is perfectly clear, in fact, because it is just something with which I will never arrive at having . . .

Interrogator: Vulgarly, when we employ the word inhuman, we think about the horrible, appalling, cruel, and detestable, we don’t think about interior being which unfolds . . .

JFL: You do it on purpose!

Interrogator: But I am not philosopher, I am journalist, I am a bit flat.

Lyotard sometimes refers to this inhuman “which is more interior in myself than me,” as la chose or the child, which carries within it the antidote to the negative inhuman. However, these two inhumans are not completely separate, since the latter is also partially a condition for the former, without which the positive inhuman remains merely an element of theology, meaning that there is only one mode of rationalization of the Unknown through God. The logical sense of the inhuman is exemplified in Ludwig Wittgenstein and Gödel, since both logicians refused the subordination to positivism. Like Gödel, who shows the incompleteness of any logical system in terms of proof, for his part Wittgenstein “did not opt for the positivism that was being developed by the Vienna Circle, but outlined in his investigation of language games a kind of legitimation not based on performativity.” The positive inhuman is that which resists systematization and reduction to calculation. The question is, how can we articulate the question of the inhuman, which is not hermeneutic, and not reflexive, without returning to theology or mysticism?

The concept of the inhuman (like the Unknown) should be considered an organological concept rather than a theological one since it is not necessarily the transcendent God. Lyotard rejects the reduction of thinking to algorithms or to the determination of any technological system, but he doesn’t explicitly reject technology. In some places the intimacy between technology and culture as modes of inscription is the condition under which thinking is possible, and this condition always carries a negative dimension such as incompleteness, lack, or obstacle:

[W]e think in a world of inscriptions already there. Call this culture if you like. And if we think, this is because there’s still something missing in this plenitude and room has to be made for this lack by making the mind a blank, which allows the something else remaining to be thought to happen. But this can only “emerge” as already inscribed in its turn.

There is something that presents itself as a lack, which hurts the already thought as plenitude, since it suspends the already thought in order to allow something new to come. Like the leaving of blank margins in Chinese and Japanese calligraphy and painting, the empty is what completes the fullness; the empty is already inscribed. I would like to return to what we discussed in the previous chapter regarding the rationalization of the incalculable or the unknowable, though here Lyotard may use the terms unpresentable or unthinkable. The transcendence would be challenged by the transhumanists: What could not be thought by a superintelligence? And if all is already inscribed in the superintelligence, there is no longer an unthought. Does it also mean that there will be no longer any thinking, and no longer anything contingent?

#### Cybernetics ensures the production of catastrophe is maintained to enable new technological innovations.

Duffield, 19 [Mark Duffield is a Professor of Development Politics and Director of the Global Insecurities Centre @ the University of Bristol, “Post-Humanitarianism: Governing Precarity in the Digital World,” 2019, Polity Press]//thanks Townes

At the time of writing, there is a consensus among Western security specialists that the world has entered a period of uncertainty and political instability unprecedented in recent times. One such source is the latest Munich Security Report (MSR 2017) provocatively entitled ‘Post-truth, post-West, post-order?’. Intended for policy and security professionals, the Report is a digest of the latest international trends and events. Like a breathless messenger, it describes the different flags and factions of the illiberal barbarians now massing at the gates. In concert with a clutch of new books,1 it depicts a groundswell of populist and fundamentalist movements, laying claim to local or cultural authenticities, which are now challenging and pushing back cosmopolitan values and libertarian identities. Expected since the mid-1990s, it looks as if the ‘coming anarchy’ may now be arriving (Kaplan 1994). There are several factors, however, that give the present a new and distinct feel. Divisions and contradictions are appearing in the West. Random terrorism is becoming routine, while dissatisfaction is growing among those who feel left behind and abandoned. Apart from increasing security measures and orchestrating public displays of resilience, political elites are challenged for real answers. With Syria as a case in point, compared to the 1990s, Western states have also lost their interventionary nerve.

Citizens of democracies believe less and less that their systems are able to deliver positive outcomes for them, and increasingly favour national solutions and closed borders over globalism and openness. Illiberal regimes, on the other hand, seem to be on solid footing and act with assertiveness, while the willingness and ability of Western democracies to shape international affairs and to defend the rules-based liberal order are declining (MSR 2017: 5).

This book is not concerned with questioning whether this picture of international push-back and Western decline is accurate or not. That it exists and has credence is sufficient. Our point of departure is the stark contrast between this imaginary future–present and a different, earlier one – namely, how the international scene looked a mere five or six decades ago. Driven by frequently violent struggles for national liberation, decolonization and the dismantling of imperialism from below were in full swing. With its excess of youthful radicalism, for many commentators the 1960s were a volatile interregnum of emancipatory forces pushing towards world revolution (Mills 1960). Breaking with Victorian Marxism, the rash of anticolonial struggles ushered in a New Left convinced that the peasantry was now the true heir of this revolution. As the colonial order eroded, continuing privation and exploitation meant that it was the peasantry, unlike most industrial workers, that now had nothing to gain from compromise: ‘In China and Vietnam, in Cuba, Kenya and Algeria, in Brazil’s North-east and in the back-country of Angola, the peasantry has emerged as the decisive force in revolutionary struggles’ (Buchanan 1963: 11).

Contrary to an earlier Eurocentric left orthodoxy, while a radicalized intelligentsia and worker vanguard could prime the revolutionary fuse in the industrial countries, it was an emergent Third World that would now ignite it (Marcuse 1967). Moreover, without the active alignment and international solidarity between these spatially separated forces and struggles, the chance of world revolution would be lost. Whether such views were realistic or delusional should not detract from the fact that they were real enough to mobilize people on an international scale. The contrast between a revolutionary, anti-racist future–present, where the international appeared as a space of political optimism and fraternity, and today’s more pessimistic vista of rupture and political failure is striking.

This book is a preliminary attempt to try to understand this shift and assess what we may have lost and, for good or ill, what we have gained. Methodologically attentive to history, it addresses this question in relation to the changing understanding of the nature of humanitarian disaster. How disasters are understood and communicated shapes the nature of the global North–South interface (Chouliaraki 2013).2 Indeed, one could go further. Since the 1980s, disasters have become a new ontological force. From the crash of asteroids into a primeval Earth, disasters have been given a pivotal role in the evolution of life, in the development of creativity and, not least, as key punctuation marks in the emergence and spread of human society (Homer-Dixon 2007). This catastrophism has accompanied the rise to dominance of an ecology-based resilience thinking, with its signature view that ‘authentic’ life exists in the jouissance that lies on the edge of extinction. Resilience is a measure of the probability of escaping disaster through socializing the smart moves that drive developmental evolution (Holling 1973). Disasters are thus a potent bridging mechanism that connects humanitarian practice with wider ideological and societal change. These changes, moreover, help illuminate the move from optimism to political pessimism. This shift, it will be argued, is integral to the rise of post-humanitarianism.

However, in making a link from disasters to these broader questions, two additional and accompanying registers or sets of differences are important. Over the period in question, there has been a spatial shift from ‘circulation’ to ‘connectivity’, together with an interrelated ontological, epistemological and methodological transition from deductive ‘knowledge’, framed by history and causation, to an increasing reliance on inductive mathematical ‘data’ and machine-thinking for sense-making. The way we know the world and understand what it means to be human has fundamentally changed (Chandler 2018). Rather than seeing the emergence of a new post-human essence, this book grounds these shifts and registers in the changing nature of capitalism. While corporations, governments and the academy celebrate the age of connectivity, and regard the sort of international foreboding described in the Munich Security Report as a separate issue, we are more open to the possibility of their causal correlation. This Introduction unpacks these registers and gives the reader an indication of the structure of the book.

Circulation and Connectivity

Between the 1960s and the present, the nature and organization of international space have changed. Of primary importance has been the relative shift from ‘circulation’ to ‘connectivity’ (Reid 2009). As a factor of spatial organization, circulation involves the physical movement or flow of people and things within, across or around terrestrial milieus and topographies. Discussed more fully in chapter 5, Foucault has argued, that the principle of circulation was central to a liberal conception of security arising from the discovery of the early modern town in terms of its spatial and logistical dynamics. The problem of the town ‘was essentially and fundamentally a problem of circulation’ (Foucault 2007: 13). During the nineteenth century, improving the circulation of people, goods, sewage, light and air, together with managing the movement of disease, crime and political unrest, would become a key feature of modernist planning and urban design (Rabinow 1995). From the perspective of modern urban planning, the city was an infrastructure designed to maximize the circulatory potential of autonomous people and things, while controlling the bad and inimical. Through the opening-up achieved by roads, canals, sewers and railways, for example, people and things were enabled to move, change place and transact. While not without risks, and thus needing administrative, health and police oversight, the aim was to maximize circulation along such fixed conduits.

Connectivity is similar but fundamentally different. Google’s notion of a data-based urbanism, for example, sees cities as key sites for the conversion of data extracted from the electronic interactions of individuals into continually adapting forms of artificial urban intelligence. A 12-acre site in Toronto’s waterfront area is currently being developed as a testbed. It envisions: ‘Modular buildings assembled quickly; sensors monitoring air quality; traffic lights prioritising pedestrians and cyclists; parking systems directing cars to available slots; delivery robots; advanced energy grids; automated waste sorting and self-driving cars’ (Morozov 2017).

Here the city appears as a closed interactive milieu involving the continuous recording and exchange of information between people, things and computer interfaces in motion. Connectivity draws together different domains such as consumer needs, waste disposal, transport, parking and delivery requirements into an integrated real-time information network. While people and things still move, change place and transact, it is no longer autonomous circulation in the modernist sense. Without triggering a series of alerts, a person could not, for example, arrive unexpectedly at a railway station, and buy a ticket for destination A but leave instead at station B. Within the smart city, movement and behaviour are constantly recorded, algorithmically analysed, optimized and directed (Halpern 2014b). Unlike the spontaneous circulation allowed by the modern city, movement within the smart city is essentially robotic.

As a science of information, cybernetics requires the recording and storing of data on all past interactions as a precondition for predicting future behaviour and signalling the presence of anomalies (Wiener 1954). Unlike free circulation, which always involves a potential threat to security (Foucault 2007: 19), connectivity uses the command and control functions made possible by data informatics to avoid surprise. To put this another way, while circulation is necessary it is also open to accidents, dangers and unforeseen consequences. Air travel, for example, can be a vector in the spread of disease. As a way of controlling the necessary risks of circulation, security has evolved as an expanding and invasive technology of connectivity (see chapter 5).

There is another aspect of connectivity, however, that is also important for this book, and which further distinguishes it from the territorially grounded nature of circulation. Imagine a dozen computers scattered around the globe, networked together via a central hub and each machine being able to transmit and exchange data with the others instantaneously. Rather than having to flow through or circulate within frictive topographies, connectivity has the power to leap directly across them, bypassing terrestrial insecurity while rendering distance insignificant. Finance capital, for example, is not like physical money. The latter constantly circulates between pockets, cash registers and banks until it is worn out. As an example of connectivity, finance is capital encoded as data that travels at the speed of light between the vast territorially dispersed network of computers that constitute the global banking system (Lewis 2014): ‘[Connectivity] de-spatializes the real globe, replacing the curved earth with an almost extensionless point, or a network of intersection points and lines that amount to nothing other than connections between two computers any given distance apart’ (Sloterdijk 2013 [2005]: 13).

Although different, circulation and connectivity are not mutually exclusive. They exist together, shape each other and, over time, exist in varying combinations. For this book, the relative shift from circulation to connectivity is implicated in the displacement of revolutionary optimism by political pessimism. In the 1960s, at the height of international expectation, the ability for people, their histories, experience and politics, to circulate internationally was greater than it is today. For a while, the circulation and flow of political praxis was possible as never before. During the period of decolonization, Western European countries were moved to accept permanent immigrants from their colonies and former colonies, together with allowing refugee settlement and recruiting significant numbers of migrant workers. Aspirational white settler colonies such as Australia, New Zealand and Canada also temporally lifted the ‘colour line’ that had earlier applied, especially toward Asian labour migrants (Meyers 2002). For Herbert Marcuse, as for other radicals exiled at some point in their lives, the ability for political praxis to circulate was taken for granted. At a time when journalists were not embedded (Page 1989), this ability was an essential condition of the international solidarity necessary for world revolution. By the mid-1970s, however, the near-universal curtailment of immigration was already underway. Driven by a mix of racial, social and security fears, the relative post-World War II openness to migration has narrowed and closed under successive waves of immigration controls, nationality laws and refugee restrictions (Hammerstad 2014). Since the end of the Cold War, as a visible register of this institutional move to closure and return, the number of physical border fences, demarcation walls or separation zones to contain the risk of autonomous movement has exploded globally (Brown 2010). Of course, the barriers and restrictions that now striate the globe have not prevented the urge to move. Indeed, as the upward track of numbers suggests (UNHCR 2017a), the pressure to escape poverty, disaster and war, even at the risk of an arduous and perilous passage, is as strong as ever. With millions in the queue, it shows few signs of abating. While offering no viable solution, the interdiction and return measures used to insulate the West have done little more than criminalize autonomous human circulation.

Connectivity and remoteness

As the legal circulation of migrants, refugees and other sans-papiers has narrowed and closed, in terms of the data being stored and exchanged between machines and screen interfaces, connectivity has expanded exponentially (Cortada 2012). At the same time, computational technologies including remote satellite sensing, computer modelling and Big Data informatics have come to shape a dominant, if particular, understanding of the world, how it works and the status of the humans that inhabit it (Halpern 2014a; Chandler 2018). Climate change, for example, was a key discovery of predictive computer modelling (Edwards 2010). The juxtaposition between the international closure to the circulation of political praxis and the expansion of data connectivity and its new remote sensemaking tools is a formative tension that runs throughout this book. To put this another way, since the 1990s there has been an associated growth in physical and existential ‘remoteness’ from the world that is being compensated by the digital recoupment of distance. Remoteness, however, is ambiguous. It is negative, as in a loss of familiarity, while also being a positive condition – that is, as a challenge for technoscience to overcome.

A negative remoteness is not only reflected in the erection of physical and technological barriers to stop the circulation of political praxis; it can be seen at many levels, including the fragmentation of nations. With examples spanning the globe, over the last three or four decades many erstwhile multicultural or mixed societies have been wrenched apart, fragmenting and polarizing along inimical ethnic, cultural and religious lines (Gregory 2008; Sorensen 2014; Mishra 2017a). Mid-level technological societies have been reduced to – or, should we say, ‘revealed’ as – a chimera of competing tribal amalgams (Usborne 2004). As if designed for it, the trend towards individuation, separation and polarization has taken to social media with alacrity (McBain 2014; O’Callaghan et al. 2014; Cadwalladr 2017). As discussed in chapter 7, through a combination of risk aversion and political push-back, a loss of familiarity can also be seen in the increasing absence of grounded international aid workers, journalists and academics within ‘challenging environments’ (Healy & Tiller 2014). President Trump’s travel ban on selected Muslim countries, and the current uncertainty over the future of EU nationals in Brexit Britain, are symptoms of this pervasive, and often violent and discriminatory, tendency towards distancing and a loss of familiarity.

Remoteness, however, also has a positive dynamic that springs from the ability of connectivity to leap across, sidestep or pass beneath the ground friction3 of a dangerous world productively, while simultaneously creating new ways of knowing and appropriating that world. First identified over fifty years ago, the inverse relationship that technoscience establishes between familiarity and distance is what Hannah Arendt called ‘world alienation’ (Arendt 1998 [1958]: 48–254). The paradox of exploration is that, while its aim was to widen horizons, the maps and charts of the early modern age ‘anticipated the technical inventions through which all earthly space has become small and close at hand’ (1998 [1958]: 251). This shrinking of the globe has continued through the surveying capacity of the human mind, ‘whose uses of numbers, symbols, and models condense and scale earthly physical distance down to the size of the human body’s natural sense and understanding’ (1998 [1958]: 251). The shrinkage of the Earth, however, has been compensated for by the objectivity that distance gives. Objectivity necessitates a disentanglement ‘from all involvement in and concern with the close at hand’ (1998 [1958]: 251). For Arendt in the 1950s, the decisive technology of shrinkage was the aeroplane. The advent of satellites, geospatial technology and interactive broadband, however, redoubles her point. The ability to leave the Earth, either physically or as an Internaut,4 ‘is like a symbol for the general phenomenon that any decrease of terrestrial distance can be won only at the price of putting a decisive distance between man and earth, of alienating man from his immediate earthly surroundings’ (1998 [1958]: 251).

World alienation is the hallmark of the modern age and is ‘inherent in the discovery and taking possession of the earth’ (1998 [1958]: 254). As the political history of maps suggests (Wood 2010), remoteness and distance call forth new sense-making tools which furnish new ways to strategize and project power – and, thus, to appropriate and reappropriate the Earth.

#### The time for change is now- the medical industry serves as an expansion of biopolitics in order to incorporate more bodies into the system.

Thacker, Eugene. “The global genome - biotechnology, politics, and culture.” (2005). |Harun + Sosa|

In addition, it is important to recognize that the rise of biowar does not mean that nuclear arms are now simply out of fashion, just as the demonstration of “infowar” during the Kosovo crisis did not mean that all war simply became “virtual.” If anything, the narratives of scientific and technological progress told by the United States create a picture of a military-industrial (and military-medical) complex that multiplies its forces and proliferates its means of security. Nuclear arms races, biological warfare, chemical warfare, infowar, and good old-fashioned air, sea, and ground combat are all at the disposal of these military superpowers. Thus, in thinking about biowar generally, we might do better to think about concurrent but historically differentiated levels of conflict that proceed through the knowledge and know-how of biology. Thus, we can outline several “layers” or “levels” of biowar, all of which are present to varying degrees in any event or identified threat. First Level: Biological Sabotage Accounts of early examples of biological warfare in antiquity already outline three main components of biowar: the use of substances that make the body ill, the sabotage of food and water resources, and attempts to create “modern” biological weapons.15 Examples include forms of sabotage of food, water, or animals among the Greeks.16 The use of poisons directly or indirectly (“weapons” composed of venomous snakes or scorpions) was not uncommon in Greek and Roman warfare. Examples of the second kind are found in Thucydides’ account of possible pollution of wells during the Peloponnesian War.17 In his account of the outbreak of plague in Attica following the invasion of the Peloponnesian army, Thucydides notes the patterns of infection and the disastrous political effect that the plague had in the battle: “Athens owed to the plague the beginnings of a state of unprecedented lawlessness.”18 Although Thucydides’ account concerning pollution of food and water is conjecture, what is relevant is that he consciously juxtaposes war and epidemic, as if the two become naturally coexisting phenomena (in this case, the latter determining the former). The development of perhaps the first “modern” biological weapons is found during the first outbreak of the Black Death during the Middle Ages.19 The adjective modern is in quotes because, although the Black Death did not result in a formalized, scientific knowledge of infectious disease, it did demonstrate a moment in which war was consciously thought of in terms of biological death. As is known, the Black Death first spread throughout Europe between 1347 and 1351, by some estimates destroying nearly half of Europe’s population. Trade routes, trading posts and towns, religious conflict, and the use of military organizations in facilitating trade are known to have had a significant effect in the transmission of the plague. One event is of particular note, and it is thought to have occurred around the early part of 1346. Historical records are lacking for this Bioinfowar: Biologically Enhancing National Security 217 often-mythologized event, except for one Italian chronicler, Gabriele de Mussis, a lawyer from Piacenza, whose Historia de Morbo remains one of the important accounts of the early stages of the Black Death.20 According to de Mussis, in September 1345 the Black Death crossed into European territory. How did this happen? At an Italian trading settlement in Caffa, on the northern coast of the Black Sea, a skirmish broke out between the Italian Christian merchants and local Muslims. The skirmish escalated into a gang war, involving a small Tartar army and military exchanges from both sides. The Tartar army attempted to siege Caffa but was hit with the Black Death, which had then been spreading throughout the Mongol region. Before retreating, the Tartar commander ordered troops to take soldiers’ diseased corpses and catapult them over the walls of Caffa, where the Christian armies were entrenched. Days later the Black Death was reported in Caffa, and by 1351 it had traveled through Asia Minor, Greece, Egypt, Libya, Syria, and southern Europe.21 Historians continue to debate the accuracy of the events at Caffa and the degree to which it may be exaggerated. Even if exaggerated, the case of the Black Death is interesting for several reasons. First, it very literally demonstrates the weaponizing of the body, in which biology becomes both weapon and target, a propagator of disease and death. But more than this, the siege at Caffa demonstrates something that is at the core of biowar: the application of knowledge in the service of war. The very idea that a diseased cadaver could have biological and strategic effects beyond its own lifelessness is itself a significant moment in biowar thinking. In fact, even in contemporary contexts, the concurrence of disease and war is striking (bioterrorist threats alongside new infectious diseases such as SARS), and the events at the siege of Caffa illustrate the basic strategy of biowar: that, metaphors aside, disease is war. These early examples of biowar place an emphasis on the uses of disease or toxins to affect an enemy or target indirectly; they did not yet include direct militaristic methods of attack, and certainly did not yet have access to the new technologies of genetic engineering. They made a rudimentary and fairly uncontrolled use of disease and toxins, most often as a means of sabotage. In contrast, the controlled sabotage of food and water systems is a top concern for the U.S. FDA, whose responsibility within the 2002 Bioterrorist Act is to monitor and prepare for possible terrorist attacks in the food and water supply.22 Unlike direct combat, sabotage occurs invisibly and in secret; its effects are often not immediately felt or are noticed only after a delay. Biological saboChapter 6 218 tage operates in this indirect manner, even more indirectly than the dispersal of a biological agent. Infection happens not directly through the air or blood, but through the metabolic process of food and water—the very substances that maintain the body. In addition, in our contemporary context, the preparation, distribution, and processing of food constitutes a complex network of farms, slaughterhouses, train cargo, food handlers, and so on, which can make the backtracking of sabotage a difficult task. It is for these reasons that biological sabotage continues to be one of the primary concerns in terrorist preparedness programs in the United States. Indeed, in 1984 an attack such as this was carried out on a small scale within the United States. Followers of the Bagwan Shree Rajneesh cult living in Oregon contaminated salad bars in several restaurants with salmonella.23 In an effort to thwart a local election, cult leaders had intended this act as a precursor to a more extensive act of sabotage that would be carried out at a later date. More than 700 cases of food poisoning were reported, some of which required hospitalization. In addition, early-twenty-first-century scares over the nonterrorist outbreaks of mad cow disease, bird flu, and monkey pox have further heightened fears about the possibility of a terrorist attack through biological sabotage.24 Second Level: Biological Weapons Biological sabotage was made “more scientific” through the application of microbiology and germ theory during World War I. The antiplant and antianimal campaigns carried out in the two world wars are an important aspect of biowar, for they not only demonstrate the systematic application of the life sciences to war, but also show an awareness of the network properties of infectious agents, be they in food, water, or distribution systems.25 This second level of biological weapons extends from the scientifically driven sabotages of World War I to the emergence of recombinant DNA, genetic engineering, and a biotech industry during the 1970s. Here, a scientific knowledge of disease and lethal biological agents is more closely fused with contemporary tactics and strategies of war (including the chemical bomb or nerve gas bomb). The most common approaches were mobilizing pathogenic agents toward targeted areas, biological resources, and both the military and civilian populations.26 A greater effort is made on this level to control the biological weapon and its desired impact (its target area, carriers, lethal rate and dose, infected perimeter, modes of protecting soldiers). Bioinfowar: Biologically Enhancing National Security 219 During 1915 and 1916, the German army initiated a number of antiplant and antianimal biological warfare campaigns against Allied forces.27 The primary agents developed were anthrax and glanders, and the primary targets were grain stocks and livestock such as horses and cows. Pathogens were cultured in the lab, then distributed by German operatives within the United States to various distribution points, in which horses and other livestock would be injected with infected needles. In addition, some evidence also exists that the French also had an antianimal biological warfare program during the war.28 Though by most estimates the effects of these attacks were minimal, the alarm they caused, along with the specter of chemical weapons, led to the 1925 Geneva Protocol, which was, in effect, a “no-first-use” agreement between the signatory nations.29 However, although the Geneva Protocol prohibited the use of chemical and bacteriological weapons, it did not prevent the further research, development, and weaponizing of biological weapons. This major weakness in the agreement left the door open to a number of offensive biological warfare programs, including those in the United States, Japan, Germany, France, Great Britain, and the Soviet Union. One of the most harrowing examples of offensive biological warfare programs involves the Japanese experiments on Chinese prisoners during World War II. Known by the name Unit 731, this top-secret program began in 1936 in occupied Manchuria, under the leadership of Ishii Shiro.30 Over the next four years, the respected scientists and physicians of Unit 731 would intentionally infect Chinese prisoners with a range of diseases, including anthrax, cholera, and bubonic plague. Other experiments involved the use of biological sabotage, bacteriological bombs, and insect disease vectors on the unsuspecting civilians of local Chinese towns. Historians estimate that some 10,000 people were killed as a direct result of Unit 731’s experiments. As the war came to an end, Unit 731 members came into U.S. hands. The U.S. government brokered a deal with the Unit 731 members, granting them immunity from war crimes prosecution in exchange for the knowledge they had gained from their experiments.31 Following World War II, the awareness of the extent of Unit 731’s program led a number of leading nations, including the United States, the Soviet Union, and Great Britain, to more aggressive research into offensive biological warfare. Much of this research centered around field tests, either in populated, civilian areas with nonlethal forms of a biological agent or in Chapter 6 220 unpopulated areas with lethal agents and animal subjects.32 In 1942 and 1943, the British government tested an anthrax bomb (N-bomb) on Gruinard Island off the coast of Scotland.33 The most extensive of these activities was that of the U.S. biological warfare program, initiated in 1942 by the War Research Service.34 Between 1949 and 1969, field tests led by the Committee on Biological Warfare in the Defense Department were conducted in more than 200 populated areas within the United States, totally unknown to the civilians who lived in those areas. Examples of such field tests include a 1950 Serratia marcescens and Bacillus globigii test off the shore of San Francisco; a 1951 Aspergillosis test at a shipping center in Virginia; a 1955 test of Hemophilus pertussis in the Gulf Coast of Florida; as well as urban field tests in Minneapolis (1953), St. Louis (1953), and New York City (1966).35 In the examples of Unit 731 and the field tests conducted in the United States, we see a noticeable shift away from an ad hoc, tentative deployment of biological sabotage (in World War I) to the development of specifically funded, government-mandated research programs. In addition, in the case of the U.S. program and a bit later in the Soviet germ warfare program, we also see the use of the civilian population as a kind of testing ground for the theoretical effectiveness of bioweapons. This level of biowar might be said to close with the BWC, which was signed by the United Kingdom, the Soviet Union, Japan, and many other countries in 1972 and was ratified by the United States in 1975. Numerous reviews, policy modifications, and suggestions have been made to the original BWC since its inception date, including more stringent methods of verification. To this day, an agreed upon, workable protocol for biological weapons monitoring and verification remains one of the central weak points of the BWC.36 Third Level: Genetic Warfare Whereas the biowar programs of the previous level were dedicated primarily to the analysis and experimental use of already existing biological agents, another level—that of genetic warfare—takes a further step into the possibility of engineering and designing novel biological weapons. The controversy over the Soviet germ warfare program is but one example. A 1979 outbreak of anthrax in the city of Sverdlovsk resulted in the death of approximately 70 civilians and the illness of many more.37 It was not until 1992 that inspectors were allowed to visit the city, but their visit was presaged by the Bioinfowar: Biologically Enhancing National Security 221 defection of a number of Soviet scientists such as Ken Alibek, who publicly testified to his and other scientists’ government research into a genetically altered “superplague.” Thus, this layer of genetic warfare is dominated by the recent advances in molecular genetics and biotechnology, in examples such as the HGP and the HGDP. This level involves the use of techniques in genetic engineering, gene therapy, medical genetics, and genomics to design, for the first time, biological weapons that may be able to target specific regions, ethnic groups, populations, or biological resources. One hypothetical example is the use of the information from human genome projects and the HGDP, to develop novel pathogens to target ethnic groups, which would use a gene therapy–based carrier.38 However, the concept of engineering biological weapons has to be understood also in light of the history of eugenics in the United States and Germany. Modern eugenics follows upon the work of Francis Galton, who in the 1880s coined the term and had proposed applying Darwinian principles of artificial selection to human beings. Galton’s eugenics took hold in a United States grappling with mass immigration, population growth, rising urban poverty, and a looming economic depression. The idea that science could be used to prevent social degeneration was formalized in a number of institutions, primary among them the Eugenics Record Office, founded and run by Charles Davenport, a respected biology professor at the University of Chicago.39 The Eugenics Record Office generated an immense amount of survey data, including studies of “feeblemindedness.” Such studies feed into the perceived social need to exercise a “negative eugenics,” or a set of restraints on population growth and reproduction, in order to prevent a range of ills—from criminality to “imbecility”—from spreading across the United States generally.40 By the late 1920s, nearly half of the states had passed eugenic sterilization laws. In the 1927 case Buck v. Bell, the Supreme Court ruled that such laws were constitutional, Justice Oliver Wendell Holmes punctuating the decision by noting that “three generations of imbeciles were enough.” American eugenic legislation paved the way for the German programs, that began in the early 1920s. In 1923, the Kaiser Wilhelm Institute for Research in Psychiatry established a chair for race hygiene. Other institutes would follow suit, including the Institute for Anthropology, Human Heredity, and Eugenics and the Society for Racial Hygiene, also in Germany, as well as the Galton Laboratory for National Eugenics in London, headed by population Chapter 6 222 biologist Karl Pearson. Eugenics in Germany took up many of the Americans’ racial policies.41 Together, the American and German movements helped to introduce Mendelian heredity (then recently rediscovered by biologists) into the field of eugenics and social policy. Involuntary sterilization laws led to thousands of sterilized individuals in the United States, not to mention the extremes to which the eugenics movement would go in the Nazi regime. In 1933, Hitler decreed the Heredity Health Law, directly inspired by eugenics. At the same time, U.S. societies, such as the Genetics Society of America debated about whether or not to condemn the Nazi policies. According to some accounts, they were never able to reach a decision on the topic; in addition, following the war, many Nazi scientists and physicians were never prosecuted and in fact returned to university posts within Germany. As Daniel Kevles notes, there is a strong continuity between the American eugenics movement and the emergence of modern genetics in the 1940s and 1950s in the United States and Great Britain.42 Following the atrocities to which the Nazi program led, so-called reform eugenicists such as Ronald Fisher and J. B. S. Haldane aimed to bring a more scientific view to eugenics study, purged of its racism and doctrine of racial hygiene. To do so, molecular biologists began focusing on early techniques in genetic mapping and linkage analysis. One result was a wave of innovations in the use of this more “scientific” eugenics in the diagnosis and prognosis of a range of illnesses. This emphasis on the medical aspect of genetics—without the rhetoric of social degeneration—led the way to the late-twentieth-century emphasis on genetic testing and hereditary study of the transmission of disease. Although quite different from the negative eugenics of the early part of the century, this “new eugenics” was instead characterized by a consumer model for health care, hightech testing, and an emphasis on prevention.43 The context of eugenics helps to frame this layer of genetic warfare, in which largely defensive measures are taken to protect either the military body of the soldier or the social body of a population. The level of genetic warfare is both preventive and preemptive at the same time. Several real-world examples give further credence to this third level: first, the Gulf War demonstrated that biological warfare was continuing to make its way steadily into the standard armament of modern war, as revealed by Gulf War Syndrome and the experimental vaccines given to soldiers prior to battle.44 Second, examples of intranational genocide—in Cambodia, Yugoslavia, and Rwanda—suggest that the possibility of targeting ethnic groups through genetics could offer a Bioinfowar: Biologically Enhancing National Security 223 potentially powerful tool in the hands of regimes bent on ethnic cleansing or racial war. Fourth Level: Biocolonial Mission A more directed use of biowar as a tool of ethnic and political conflict occurred during the eighteenth century, in which we find documented instances of biowar used within a colonial context. One example is British Soldiers’ intentional use of smallpox to infect Native American tribes. In 1763, Jeffery Amherst, the British commander in chief in North America, gave an order for the presentation of smallpox-infected blankets to Native American tribes in the Delaware region.45 The blankets were to be taken from infected patients in the infirmary and given to the Indians as a peacemaking gesture. As General Amherst emphasized, the aim was “to try every other method that can serve to extirpate this execrable race.”46 It can be argued that colonialism is unthinkable without medicine. Without an ability to ensure the health of a colonial army or the health of colonizing populations, the colonial project is compromised from the start. As David Arnold notes in his analysis of British colonial medicine in India, there is “a sense in which all modern medicine is engaged in a colonizing process.”47 Yet, as Arnold points out, this notion of “medicine in the service of empire” is also two sided. On the one hand, there are instances in which the spread of a disease has worked to the advantage of the colonizer or explorer. On the other hand, there are also instances in which disease—“native disease”—has served to obstruct the colonialist or expansionist enterprise.48 Malaria, yellow fever, sleeping sickness, and a host of other “native diseases” often served to impede European expansionism as much as other illnesses indirectly furthered its cause. As medical historian Roy Porter notes, “without disease, European intruders would not have met with such success or found indigenes so feeble in their resistance. Yet endemic diseases also held back European expansion into Africa.”49 Recent efforts to provide assistance in the fight against AIDS in Africa— most notably by the Gates Foundation as well as by the U.S. government— is undoubtedly a positive sign of an awareness of global health issues.50 But it is also important to assess how such financial aid is spent and whether financing alone is enough in a situation where education, communication, and the complexities of the physician-patient relationship are still primary issues. Furthermore, it is also important to ask whether the global health-care industry or the pharmaceutical industry stands to gain from such relief efforts. Although it is clear that AIDS and malaria in countries such as Africa do constitute serious health crises, it is also important to recall the tangled history of colonialism and medicine, as well as the often one-sided narrative of British “medical missionaries” in India and Africa during the nineteenth century.51 Today the logic of this level of biocolonial war is, strictly speaking, not war at all, but rather the establishment of a naturalized, permanent link between “developed nations” and a Western health-care paradigm based on costly prescription drugs. Although such treatments are often quite effective and life saving, their benefits are always abetted by what Frantz Fanon describes as a structure of indebtedness.52 A number of pharmaceutical companies have noted the potential market for generics in developing nations, and controversies still ensue over the corporate patenting of genetic material and cell lines from diverse regions around the world. A multifactorial health-care approach—including environment, diet, cultural context, poverty, education, and drugs—is clearly what such health crises demand. Of course, the limit of this biocolonial level is when it is turned inward, within the United States itself. This is what Paul Virilio and Sylvère Lotringer call “endocolonization,” in which the social body is invaded internally through genetic screening, in vitro fertilization, medical prostheses, and so forth.53 If it is true that the newest biotechnologies will be field tested in the United States—DNA chips, tissue engineered skin or organs, stem cell therapies— then this testing will be preceded by efforts by the “medical missionaries” of the biotech industry to establish biotechnology as safe, desirable, beneficial, and, above all, natural. Fifth Level: Bioinfowar Thus far I have covered four levels, each existing simultaneously, but to varying degrees depending on historical, social, and political context: a first level of biological sabotage, a second level of biological weapons, a third level of genetic warfare, and a fourth level of biocolonial mission. A fifth and final level is that represented by the integration of molecular genetics and computer science in the biotech industry: bioinfowar. Bioinfowar is not yet a reality, but it is, arguably, quickly becoming one. It includes what has for some time been the practice of “infowar,” or the military conflict played out on the level of computer codes, databases, Internet Bioinfowar: Biologically Enhancing National Security 225 servers, electronic wiretapping, computer viruses, firewalls, and physical communications infrastructures.54 The development of infowar does not occur as a technological feat, but takes place in the development of military use of information technologies, most explicitly demonstrated in the Gulf War and the Kosovo conflict. Recent discussions on the intersections of war, global politics, and technology have raised the issue of how the increasing importance of computer and information technologies have transformed the field of combat into a logistical, screenal Sega System (or PS2).55 This entrance of both spectaclebased technologies (media-based infowar) and information technologies (communications and hacking) into the domain of war has meant, in part, that the enemy ceases to be a body or mass of bodies, but rather coordinates among other coordinates on a pixel plane. These “wars which did not happen,” as Jean Baudrillard states, show two fundamental changes occurring in postmodern war. First, the physical encounter of hand-to-hand combat is increasingly being replaced by the mediated encounter of vision machines. The model here is Orson Scott Card’s novel Ender’s Game, in which a young video game wiz unsuspectingly becomes the futuristic military’s top combat pilot. Second, war is increasingly coming to be seen as so much more than actual battlefield combat; during every modern war, there are several other levels of combat: media war, encryption and decryption, finances, the business of production for war, the opportunities for revitalizing nationalism, the dark opportunities for genocide and ethnic cleansing, and the use of new media such as networks, computers, and databases of automated war machines. At the most extreme end of this war business, we enter a condition that Paul Virilio and Sylvère Lotringer call “pure war,” or the situation of infinite preparedness for an always deferred war. 56 Juxtapose this scenario of infowar with current developments in biotechnology: the automation of genome sequencing, the rise of bioinformatics and gene discovery software, DNA microarrays and microfluidic “labs on a chip,” data mining software, DNA encryption, and other developments show that biotech is becoming thoroughly computerized, and that the biotech patient of the future will be less an anatomical, individuated body than a computerized profile of gene patterns and statistical predispositions analyzed by bioinformatic expert systems. Yet, for all this, biotechnology remains resolutely material in the drugs, therapies, and diagnostics that regularly rub up against the patient’s body. Chapter 6 226 Biotechnology currently plays a number of roles in biological warfare. One recent area of application has been in portable hazardous bioagent detection systems. Nanogen, for example, has a hand-held biochip device for the detection of aerosolized agents such as anthrax. Another area is in the use of genetic engineering for the design of vaccines to potential pathogens such as anthrax, ricin, or smallpox. As noted previously, the U.S. Project BioShield has as one of its priorities the development of “next-generation medical countermeasures”—that is, new drugs produced by the American-based global pharmaceutical industry. Finally, a third area of application has been in medical surveillance systems for the monitoring of potential outbreaks of a naturally occurring or terrorist type. The WHO and the CDC have such networks currently in place.57 What would a merger between infowar and the new computerzied biotech look like? Is the answer here nanotechnology? The use of nanomedical particle systems? The use of robotic drones to disperse engineered pathogens to ethnically targeted regions and populations? Will we see the horrific hybrid of the biological suicide bomber? Bioinfowar seems at once less material than the catapulting of diseased cadavers and more material than the targeted military release of computer viruses on an enemy subnetwork. To recap: a history of biowar cannot be told from one perspective, be it technological development, scientific progress, or the culture of fear and paranoia. A critical account of biowar would have to take into account the social and political dynamics that enframe the transition from military application to civilian use. In the case of biowar, we can see (at least) five coexistent levels at play in any given event, each of which raises fundamental issues concerning the way in which biological “life itself” is instrumentalized in political, military, and ideological conflict. Targeting the Body In any consideration of these different but coexisting levels of biowar, it is important to note also how the concept and the practice of biowar has historically changed. We might ask: How does biowar “target” the body? In biowar, biology is both the weapon and the target, a form of “life itself” that targets “death itself” through the use of a range of pathogens, epidemic infections, and, in some cases, engineered life forms. Bioinfowar: Biologically Enhancing National Security 227 As discussed in other chapters in this book, one key historical transition in the concept of “life itself” involved a “taking charge of life, more than the threat of death” in the development of a wide range of medicopolitical practices during the eighteenth and nineteenth centuries: the application of statistics and demographics to account for the “health” of populations, the attempts to reform hospitals in terms of management and infections, urban hygiene programs, the establishment of professional societies dedicated to maintaining and monitoring health standards for a population, and the notion of a “medical police” or a managerial apparatus for ensuring the health of the body politic. Michel Foucault refers to such practices as a form of “biopolitics,” a form of power in which the health of the population is also the health of the nation, and vice versa. In these and other instances, “biological existence was reflected in political existence,” and the medical often dovetailed into the governmental.58 Biopolitics “tends to treat the ‘population’ as a mass of living and coexisting beings who present particular biological and pathological traits and who thus come under specific knowledge and technologies.”59 At the center of biopolitics is a concern over the “population,” defined in terms that are both biological and informatic—an attempt “to rationalize the problems presented to governmental practice by the phenomena characteristic of a group of living human beings constituted as a population: health, sanitation, birthrate, longevity, race.”

#### The Role of the Judge is to think through virtual reality.

#### We control a uniqueness question with regards to how the virtual collapses all thought and flesh into the digital archive – what we do now in response to this end of history and the recombination of human experience is the only discussion left.

Kroker and Weinstein ‘94

[Arthur, (post?)human meth pipe, and Michael Weinstein, Purdue University. 1994. “Data Trash.”] pat – ask for the PDF 😊

Virtual reality sells the illusion of displacement. It allows you to jump out of the inertial drag of skin and bones, and patch into the cybernetic side of your schizoid other, leaving the “there” behind like a burning car wreck that quickly recedes in the rear-view mirror as you zoom down the freeway on the way from nothing to nowhere.

Artificial games are the reality-principle of virtual culture: real cybernetic flesh, real vaporized eyes, real data organs. A strange matrix of play-functions for travelling across the electronic frontier. Ludic only because they are work training sessions for virtualized flesh, artificial games have a veneer of imaginative fantasy, but an inner reality of reworking the organic body into its virtual replacement. In this mirrored universe, things appear only in their opposite sign-form: games are, in fact, hard cyber-work for virtualized flesh. Artificial, here, means the grubbly street materialism of a new (cyber) reality-principle, in which fantasy is the projection of the operational logic of telematic life onto the body electronic.

In virtual culture, the only interesting artificial game is life, itself: that hybrid world of organic flesh that has been left behind as excess ballast when virtual reality launches into the stratosphere of cyberspace. Once in a while, virtual bodies that have lost their way in the maze of cybernetic dungeons, and strange attractors have been known to accidentally download into the body organic, finding themselves in an eerie world of air, trees, and bio-organs breathing without technical support functions. Like amphibians struggling out of the primordial muck of ocean foam, virtualized flesh, has to learn anew the artificial game of earthly life. But it never will. It is speeding to nowhere.

Recombinant History

The millennium is most certainly not the “end of history” so lamented by all the conservatives, nor a period of “post-history” as trumpeted by liberal historians, but, most definitely, the beginning of recombinant history. We live, that is, at the edge of a fantastic intensification of a history that is yet to be written: the telematic history of the virtual body. It is a history marked by a double moment: its reflex, the archiving of the horizon of human experience into relational data bases; and its dynamic will, the creative recombination of our telemetried past into monstrous hybrids that will form the incisions of the electronic landscape of the twenty-first century.

While the “end of history” thesis had use-value as an explanation for the fading role of ideology in the twilight days of the Cold War, and the perspective of “post-history” expressed insightfully the eclipse of the referential illusion of modernist history, recombinant history is the telematic future of virtualized flesh. Here, the (virtual) history file compresses the electronic body into a universal digital archive, always available for sampling, triggered by system operators at its XY axis, and indefinitely recombined into hybrid images of the telematic future.

No longer localized in bounded energy fields, virtual history is finally free to produce recombinant images of life once the organic body has been fitted with a customized nervous system. Expressing perfectly the ruling mentality of the virtual class, recombinant history archives the human condition in the form of its smallest elementary data particles, and then, as Data philosophizes in Star Trek, “reassembles the body as a machine.” Pushed from behind by the will to (data) archivalism and pulled from ahead by the will to recombination, virtual history recounts how electronic flesh comes to full self-consciousness, how the digital body becomes aware of its abandonment of the drag-weight of skin as it synchs smoothly with its bio-machine interfaces. The virtual sex archive beckons to us from the welcoming shore of a third sex, a floating sexual screen where gender signs go to ground, as the electronic body flips into the non-space of the ecstasy of anamorphosis. The electronic body archive scans the future of organs without a body, perfectly fibrillated and hyper-charged for nomadic journeys across the media-net. The military-entertainment archive seduces it with its telematic vision of a logistics of perception, so precise in its greenish thermal infra-imaging that data becomes the only battleground: the event-horizon of the war machine as the indispensable entertainment conglomerate for virtualized flesh.

In recombinant history, archiving is always on its way to recombination into a new configuration. Electronic bodies merge: the consumer body is a war machine; the medicalized body has its financial history stored in the spooling gateways of hospital computers, waiting to be leeched (recombined) of the weight of its earthly possessions; and the celebrity body is a dead star, which, like the luminous brilliance of a “red dwarf,” is understandable only by the rules of deep space astronomy. Just when we thought that history as a grand récit had finally died as the last victim of the modernist illusion of misplaced virtuality, suddenly it returns in full recombinant force: that point where history merges with digital technology, becoming the world-historical process animating the will to virtuality.