Virtual Epidemics: Registers of Emergence in an Age of Biosecurity

by

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Class of 2009

A thesis submitted to the faculty of Wesleyan University in partial fulfillment of the requirements for the Degree of Bachelor of Arts with Departmental Honors in Sociology

Middletown, Connecticut April, 2009
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When I joined Charles Lemert’s social theory class last spring, I had just returned from a semester abroad in Paris. Nostalgic for France and disappointed by past classes at Wesleyan, I had spent that winter break reluctant to return to school. My thanks first and foremost go to Charles, whose theory class introduced me to a discipline that has quite honestly transformed my worldview and to whom I can attribute my change of heart. Whether in class, seminar or thesis tutorial, he has been an infinite source of inspiration and wisdom. It has been an honor to work alongside him on this project.

My gratitude also goes to Mike Litwack, who has been indispensible as both friend and resource throughout this experience. His guidance set my thesis in motion and his support quite possibly saved it from derailing on more than one occasion. In addition to Mikey, I would thank our fellow social theory seminar participants of the last three semesters for sharing their valuable advice and critical eyes. Their excellent projects have challenged my own and introduced me to theorists and ideas that have proved foundational to my work. Particular thanks to Kohei Saito for asking the dreaded question “so what?” and to Josh Scannell, who brought me to my first seminar last spring and whose thesis instilled in me the healthy terror of admiration. His counsel undoubtedly got me through some of the most difficult months, for which I am truly grateful. Additional thanks to the other thesis writers of ’09; to my partners in commiseration Will Runge and Andrea Neustein; and to my housemates, Sara Akant, Cory Baldwin, and Sheila Jackson, who have been there for me through stress-induced breakdowns and relieved celebrations alike.

Most of all, my family, and particularly my parents, are due more appreciation than can possibly be expressed. Their patience, encouragement and confidence in me have been the cornerstone of this project and these pages are dedicated to them.
Introduction

defect and prevent

In November 2008, I came across an article in The New York Times science section called “Google Uses Searches to Track Flu’s Spread.”¹ The piece covered a web service dubbed Google Flu Trends, the first publically accessible product of the company’s new philanthropic global health initiative, “Predict and Prevent.” The software monitors the content and frequency of influenza-related queries entered into the Google search engine, marking trends in conjunction with users’ locations. These data are aggregated to predict and map the sites and severity of prospective outbreaks on a state-by-state and national level. Researchers have found that the program consistently generates accurate estimates of flu activity weeks, and sometimes days, before remarkably similar findings are confirmed by the Centers for Disease Control and Prevention (CDC). Such statistically significant results have inspired hope among public health officials and infectious disease experts, who believe that this kind of study might grow to encompass more countries and illnesses, potentially playing an important role in the future of global surveillance, prevention and management of epidemics.

The Google Flu Trends homepage features an interactive map of the United States that displays whether the number of influenza cases is anticipated to be minimal, low, moderate, high, or intense, with respect to historical averages. Though the site makes no secret of its general methodology, its projections are labeled as the “level of flu activity,” with no explicit indication of their probabilistic quality. These estimates are traced on an accompanying graph and superimposed

over the CDC’s records of influenza incidence for the previous five years, allowing users to comparatively evaluate current trends. Running a cursor over the map shows projections for each state, while clicking on a specific state modifies the graph to display local data. Both map and graph are color-coded, spanning the scale from green (minimal) to red (intense) that has become a familiar measurement of national security threats in a post-9/11 America.

Google’s graphics share more than a suggestive color scheme with those used to communicate the risk of terrorism. These visuals present neither quantitative data nor qualitative explanations by which to evaluate their independent variables. The Flu Trends homepage does include a link to the “raw data” from which its risk assessments are ostensibly derived, but the website offers no indication of which criteria are used to determine and sort specific keywords or phrases for inclusion in their study. Nowhere are these numbers contextualized and, from a layman’s perspective, they prove indecipherable. Though estimates are apparently categorized by their degree of deviation from an established historical baseline, Google.org admits that since state-level surveillance data are not publically accessible, their results have only been compared to the CDC’s on national and regional scales.

Nevertheless, a page called “How Does This Work?” offers a series of diagrams comparing Google’s previous trail studies to statistics issued by the CDC, boasting the accurate data that query trend surveillance can yield long before more rigorous and empirical investigations have ploughed through layers of red tape. Though the programmers admit that these correlations might falter in the future, their animated diagrams subsume the indeterminate precision of the CDC’s
statistics, which are rough estimates themselves. As very few cases of influenza are confirmed by laboratory analyses, the vast majority of physicians instead report “influenza-like illnesses.” The infection is so difficult to monitor and conclusively diagnose that most North American and European countries actually approximate the annual number of influenza-related deaths as an excess in overall mortalities. In this light, Google.org’s distinction between a “minimal” and “high” level of flu activity is sufficiently subjective as to render these risk assessments inconclusive at best.

Misleading or not, the website’s probabilistic judgments are quite literally linked to promotional material designed to encourage behavioral responses from visitors to the site. Under the heading “First step: flu vaccine,” the homepage provides a list of reasons to seek immunization and a link to the Centers for Disease Control and Prevention website. Directly below, sections titled “Flu shot locator” and “Flu in the news,” join the chorus of voices advocating preventative self-care. This trinity of media, state and private sectors does not expressly instruct readers to take preventative measures so much as facilitate their actions, tacitly warning that to forgo vaccination is to do so at one’s own risk.

Though doubtless a rich topic, the influenza vaccine industry and its means of self-promotion are merely symptomatic of broader changes in the sphere of risk-
based health management. Google.org’s Predict and Prevent mission statement is particularly perplexing in this respect, outlining plans to further develop the Flu Trends software in order to implement similar predictive mapping and surveillance networks on a global scale:

Google.org’s initial focus is on emerging infectious diseases, which are on the rise worldwide. Climate change, deforestation, and rising international travel and trade all contribute to this threat. Moreover, humans and animals are coming into closer contact because of environmental degradation and increased demand for animal products...While everyone faces increasing risk from emerging infectious diseases, the world's poor – who have minimal or no access to health care and may live with and depend on animals for their livelihood – are exceptionally vulnerable and stand to suffer the most. Today, emerging diseases are generally detected once they are already entrenched in the human population, and response systems are often slow and uneven. Predict and Prevent supports the move from a reactive to a proactive response to emerging threats.5

Though these humanitarian aspirations may seem compelling, their articulation is predicated on a particular vision of impending international peril and its site of origin among the impoverished. This statement attests to the unfamiliar process by which epidemic disease has become an increasingly abstract concept in recent years, focusing on the threat of outbreaks of new diseases over their actual pathology. Google.org frames these “emerging” contagions as a substantial and imminent threat, at once creating a demand for their detection and meeting it with “proactive” – that is to say, ubiquitous – surveillance mechanisms.

5 Google.org, <http://www.google.org/predict>
Google Flu Trends homepage displaying the color-coded map and graph of "United States flu activity" in March, 2009.  

A screen shot of the Google Flu Trends raw data. The list continues horizontally for all states and vertically for each week the data was collected. No additional information accompanied or contextualized these numbers. 

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6 “Google Flu Trends,” Google.org <http://www.google.org/flutrends>  
7 “Raw Data,” Google.org <http://google.org/flutrends/data.txt>, 12/09/08
In a decade introduced to the threats of mad cow disease and avian flu, the first sign of sickly livestock has led to the decimation of entire cattle herds and poultry farms. Villages are quarantined, national alerts sounded and on occasion local economies, particularly in the impoverished periphery, are wiped out in a matter of days. Alongside mounting attention in the social sciences devoted to transnationalism, population mobility and the fading of national borders, there remains a great deal of research invested in localizing epidemics, tracing their points of origin and the vectors by which they spread. An investigation of contemporary epidemiological maps reveals a burgeoning field of cartographies dedicated to the prediction of future outbreaks. These maps forecast time-sensitive intensities not only of known infectious diseases, as Google does for the flu, but of an imagined future riddled with emerging pandemic threats.

Surveillance technologies and statistical risk assessments are well-established counter-intelligence measures against the menaces of infectious disease. With the international community depicted as a sitting duck, blindly facing an array of an array of unknown and unpredictable pathogens poised for attack, these practices acquire novel privileges, seeming all the more compelling, necessary, even commendable. These are the traits of biosecurity, in which the object of state power has become the life, and specifically the molecular life, of the population. Yet how is it that biomedicine came to conceptualize these virtual epidemics in the first place, and what are the wider implications of the pervasive uncertainty to which they have given birth? What exactly do we fear about the emerging diseases of tomorrow and how do these concerns and their causes fundamentally differ from those of earlier
generations exposed to the devastating toll of epidemics such as the bubonic plague or smallpox?

The threat of “emerging viruses” was first described by virologist Stephen Morse in 1989. By the early 1990s, “emerging infectious diseases” (EIDs) had entered the common lexicon, exchanging Morse’s term for one with wider scope. Nearly two decades have since passed, over the course of which emerging diseases have become a central figure in global health discourse, replete with a unique ontology and heuristics. This futural conceptualization of biological risk has grown to incorporate as-of-yet nonexistent and unidentified conditions, along with strategies for their prediction, detection and management. Though little can conclusively be known about historical epidemics in the molecular terms by which disease is currently interpreted and categorized, a vast number of recent primary texts on human health argue that there is presently an accelerating increase in the number, diversity and resistance of pathogens.

That the emerging disease operates as a comprehensible category, let alone as an effective medical or political platform, signifies a substantial departure from past epistemological, ontological and etiological frameworks of medicine and illness. Disease, and particularly epidemic disease, originally held mythological and allegorical significance in Western societies. Today, it is technically defined as “a condition of the body, or of some part or organ of the body, in which its functions are disturbed or deranged; a morbid physical condition; ‘a departure from the state of health, especially when caused by structural change.”8 This localization of illness

in the individual and collective body is one that permitted, and was in turn expanded upon by, developments in medical treatments – particularly of vaccinations and other pharmaceutical products – and discoveries in molecular biology and biochemistry. However, its relativist stance with respect to health and the aims of its practitioners is one predicated on a statistically organized knowledge of populations and the range and median of their physical states.

Though not always acknowledged, it is safe to say that scientific positivism is hardly the sole factor to have influenced this trajectory. In noting those social factors that reflect and foster relations of power, the framework of disease can be identified as distinct from, though undeniably intertwined with, the empirical claims of the medical community. For centuries medical research was, and in certain fields continues to be, largely occupied with contributing to the vast and growing number of classifications one now finds in any biology textbook. The expansion of diagnostic categories is generally believed to create greater specificity and resist essentialisms, a teleological course whose progress is uniformly desirable, beneficial, and ultimately likely to lead to better patient care. This goal is the driving force behind research initiatives such as the human genome project that are in endless pursuit of an exhaustive biological knowledge of our species. However, the enthusiasm for the cataloguing of disease is a socially induced, if not produced, process. Rather than adhering to an external and empirical logic, the impetus to acquire and disseminate this kind of knowledge must be regarded as inextricable from formulations of governance. The methodical compression and simplification of available data is as much an objective science as science is a socially constructed discipline; an
institutionalized production of information that is available, and often indispensable, to the state.

The specificity of a diagnostic category is one inevitably achieved through a practice of exclusion, evoking precision no more than it does the nonrepresentational space from which it first required distinction. Indeed, it is the “application of such criteria, and the very activity whose progress they are to monitor, [that] are the ultimate sources of ambivalence.” 9 The study of disease is one that operated for several hundred years as a semiotic system, a means of condensing and giving shape to the human body and its assailants. The emerging diseases worldview, however, has passed beyond the tacit presupposition of illness as physically manifested and identifiable. Abandoning the ordering of symptoms that produced the notion of disease itself, the emerging disease occupies a virtual realm while nonetheless wielding the influential clout of its predecessors.

Though it may seem an intuitive dedication to security and safety, the rhetoric of emergence is in fact founded on a socially constructed knowledge of medicine that, when deconstructed, stands to draw into question the validity of its evaluations and the legitimacy of its recommendations. While a great deal of literature on this subject is concerned with medical epistemology and the cultivation of fear, the discourse tends to scrutinize formal constructions, exaggerations or distortions of the threat and severity of specific health hazards, particularly as disseminated by media and popular culture representations. Because the emerging diseases worldview is devoted to the assessment of unknown potentialities, its study

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must examine the sources and implications of a knowledge that privileges the non-representational form, rather than the content, of the communication of risk.

As the primacy of the physical symptom is exchanged for the securitizing effects of potential threats, as the quality of a specific disease is replaced with the proliferation of its potential and unknown relatives, so too does a rift grow between disease and the body, both of the individual and of the population. A growing field of social theory drawing from physics, systems biology, and computer science offers a unique lens through which to read this disarticulation. Gilles Deleuze’s short but provocative description of contemporary governance in “Societies of Control” and Eugene Thacker’s *Biomedia* are among a number of texts that, like the emerging disease, are predicated on an ontology in which essential properties are secondary to an emphasis on movement, fluidity and change. In the volatile spaces of the postmodern world, individual subject formation melts into the modulation and interplay of populations. Bodies simultaneously produce and invest in their always-and-already-potential fates, circulating in “a general economy of exchange and circulation, haunted by the spectre of newly emerging or still unspecifiable risks.”

How does the emerging diseases worldview alter our understandings of health, bodies, and their capacities? What are the goals and implications of predictive surveillance technologies, such as Google Flu Trends, that superimpose maps of future events upon specific territories and populations? How is the volatile space of virtual disease influencing domestic and global health policy? In tracing the process by which disease came to acquire, and then lose, the human body, this

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project seeks to identify the implications of virtual epidemics and what could indeed be termed an epidemic of virtual security.

While I hope in part to shed light upon the medical, political, and economic apparatuses deeply entwined in the emerging diseases worldview, I do not seek to undermine the very real experiences of those who are indeed sick, or even to unequivocally suggest that diseases do not warrant public attention and intervention. How, when, and why these practices occur, on the other hand, are far less objectively determined than many are inclined to admit or believe.
Chapter One

epidemics: from the bible to bacteria

For us, the human body defines, by natural right, the space of origin and of distribution of disease: a space whose lines, volumes, surfaces, and routes are laid down, in accordance with a now familiar geometry, by the anatomical atlas. But this order of the solid, visible body is only one way – in likelihood neither the first, nor the most fundamental – in which one spatializes disease. There have been, and will be, other distributions of illness."

Contagion is today defined as the “communication of disease from body to body by contact direct or mediate.” It is this infectious quality that has become the foremost concern of modern epidemiological policies, whose primary directives are the prevention and mitigation of pathogenic spread. Though human history is rife with accounts of epidemic diseases, the degree to which their transmissibility has been understood by the societies they have tormented is elusive at best. Often this ambiguity lies in the discrepancy between discursive framings of disease and practices of patient care and corpse disposal during times of endemic illness.

The Western canon of primary documents detailing epidemic outbreaks comprises a diverse range of authors, including historians, theologians, medical practitioners, scientists, and politicians. Until recent centuries, their texts rarely, if ever, focused on how or why diseases were spread, even when preventative techniques – whether flight, quarantine, or mass burial or incineration of the dead – became common practice. Most medical historians cite scientist Robert Koch’s isolation of the anthrax bacteria as the inception of germ theory, the first empirical

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11 Michel Foucault, The Birth of the Clinic (New York: Pantheon Books, 1973), 3
evidence to disprove the era’s prevailing belief in a miasmatic\textsuperscript{13} theory of disease transmission. Surveillance systems, vaccination regulations and genetic research are the principal procedures currently deployed in the name of infectious disease management. Many incorrectly assume that the institutionalization of these preventative measures followed the synthesis of biomedical discoveries of the origins, vectors and effects of the transmission of viruses and bacteria by which they are now justified. As with earlier institutionalized methods for responding to epidemics, the chronology of physiological findings and scientific discourses is often disjointed from innovations in praxis. It is in identifying those moments when medical knowledge and social practice fall out of their rationalized alignment, and when one or both are forced to evolve, that the broader significance of their divergence is most fully revealed.

\textbf{The Will of the Gods}

It is no secret that the outbreak narratives of early Western civilizations, such as those recorded in the Old Testament and early Greco-Roman histories, framed disease allegorically. In these accounts, epidemic disease generally carried the same set of attributions and meanings as do other natural events such as famines, floods, and earthquakes. While the ascription of maladies to divine or supernatural powers persists as a validated etiology in contemporary cultures across the globe, even surfacing from time to time in our own heavily biomedicalized society, its logic met few persuasive challengers until relatively recent history.

\textsuperscript{13} Miasmatic theory postulated that diseases were spread by foul smelling air. This differs from current knowledge of airborne diseases, which distinguishes airborne molecular particles from the air itself.
Whether or not one chooses to believe that the plagues of Exodus were but “a series of natural catastrophes that might well occur during a particularly dry season in a climate such as that of Egypt,” their narrative influence and social significance lie in their cumulative and targeted impact rather than their particularities. For the liberated slaves who gave birth to this paradigmatic account, the presentation of disease and illness in the individual body was largely inconsequential, serving primarily to distinguish between good and evil, Israelite and Egyptian, man and animal; a tale of triumph, acquisition and exceptionalism. As they departed from Egypt and embarked on their forty year exodus:

The children of Israel...borrowed of the Egyptians jewels of silver, and jewels of gold, and raiment: and the Lord gave the people favour in the sight of the Egyptians, so that they lent unto them such things as they required.15

Similarly, writing of a plague that broke out in Rome in 790 B.C., the historian Plutarch contributes to a dynamic of cause and effect that depicts the presentation or transmission of disease as negligible in comparison to its metaphorical significance:

All agreed, it was for neglecting to do justice on the murders of the ambassadors and of Tatius that the divine vengeance pursued both cities. Indeed, when those murderers were given up and punished by both parties, their calamities visibly abated and Romulus purified the city with lustrations, which, they tell us, are yet celebrated at the Ferentine gate.16

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15 Exod., 7:20-21 in Geoffrey Marks and Warren K. Beatty, *Epidemics* (New York: Charles Scriber's Sons, 1976), 5. This book is a compendium of primary sources from ancient and classical records of epidemics. Though not exclusively, many of my references to material of this kind are quoted from Marks and Beatty's *Epidemics*. For the remainder of this paper, I will cite the original source author in the following format: “Name,” M&B, Page number. In other instances I have quoted the source from independent and standard translations and there provide the publication information. I was not in a position to qualitatively compare the ancient and classical languages to their translations. However, where possible and necessary I did make an effort to confirm that Marks and Beatty provided reliable and accurate use of these primary documents.
16 Plutarch, M&B, 13.
Of course, it was not always possible to subsume the manifestation of infectious diseases beneath an ideological mantle, with disasters skirting the blessed and ravaging the damned. While it is conceivable that in certain cases the Jews, for example, carried an acquired or genetic immunity to the pathogen afflicting their persecutors, they too experienced the devastating toll of epidemic disease on numerous occasions. The rationale behind these early chronicles of illness thus remains fluid, tailored to the circumstances of each outbreak so as to incorporate potentially contradictory incidents.

Occasionally, though, one stumbles upon anomalies that mark an increase, however gradual or minute, in the flexibility of a given dogma. One such example can be found in *The Books of Samuel*, whose authors provide an etiologically ambiguous description of a widespread plague. The text tells of an insidious disease that pursued the Philistines, who, upon conquering the Israelites in 1141 B.C., had taken possession of the Ark of the Covenant. As the Ark was transported from city to city, all in its wake were stricken ill. Many came to believe that they were suffering the wrath of Yahweh for their transgressions against the Jews and their desecration of the Ark, which they had enshrined in one of their own temples. When neither prayers nor offerings to their own deities proved effective deterrents, the Philistines decided to deliver the Ark to the Israelite town of Beth-shemesh. The gesture, they hoped, would simultaneously provide evidence that God had indeed caused the plague and lead him to grant forgiveness for their sins. Instead, the epidemic showed no signs of abating at the gates of Beth-shemesh. Just as it had the Philistines, the malady wreaked havoc among the Jews.

Religious scholars continue to seek plausible ways to explain this seemingly inexplicable occurrence, unearthing convoluted etymological arguments to suggest wrongdoing on the part of the Beth-shemesh Jews in order to frame the plague as punitive. Some theologians believe that the Israelites, in gazing upon the newly delivered Ark, worshipped it as “a material representation of God,…an abomination” that would constitute a gross violation of Jewish law. Nonetheless, there is limited rabbinical consensus as to the paradox of Beth-shemesh and neither the original text nor those influenced by it seem able to provide a divine narrative that corresponds to the presumptive, if loose, accuracy of the actual events described. Exceptions such as these indicate an evolving awareness of the patterns of disease eruption and its spread; perhaps a tacit acceptance of the possibility of a secular etiology.

**Sighting Symptom, Sign, Pathology: The Empirical Gaze**

By the fifth century B.C., this foreshadowing of medical positivism had started to surface as a methodological approach in Greco-Roman studies of epidemics. Though subsidiary to the vague and often inconsistent mythologies of divine will, historians and physicians were beginning to generate eye-witness accounts of specific diseases. In 430 B.C., during the second year of the Peloponnesian war, an unknown contagion broke out in Attica, eventually wreaking havoc throughout Athens. In his *History of the Peloponnesian War*, the Greek historian Thucydides, after whom the plague has since been named, provides an account of the epidemic that demonstrates a novel attention to the systematic

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18 Ibid, 19
19 Ibid, 20
cataloguing of symptoms and signs of infection. As both chronicler and survivor of the disease, Thucydides abstained from explicitly hypothesizing its causality, supposing that “every man, whether physician or not, will give his own opinion.”20 In this sense, his texts do not necessarily diverge from a supernatural etiology so much as widen the breadth of literature concerned with particular epidemic diseases and their consequences.

Thucydides was primarily devoted to detailing the effects of the illness itself, writing vividly of its movement through the body: first of the sudden “violent heats in the head and redness and inflammation of the eyes,” which soon “reached the chest” as a wracking cough. These ailments were followed by convulsive vomiting and retching, and not long afterward by an affliction of the digestive tract, climaxing in explosive bouts of diarrhea. His observations take a linear approach, tracing the disease from where it “originally settled in the head [and] passed through the whole body.”

Amid this chronological mapping of symptoms, the historian produces a secondary image of the body that distinguishes between its surface and its depths, the observer’s gaze and the victim’s account. He describes the patient’s ‘fetid breath,’ the cool temperature of their skin, its red tinge and the eruptions of blisters and sores characteristic of the epidemic. These superficial observations stand in sharp contrast to the patients’ behavioral responses, which Thucydides attributes to an “internal fever.” So torturous was this heat that the afflicted insisted on remaining naked and demanded ice-water baths. When left unsupervised, many

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20 Thucydides, M&B, 21-24. This and the series of Thucydides citations to follow are excerpted from The Peloponnesian War, trans. Benjamin Jowett, I:1, in The Greek Historians, I:567. I have taken care to confirm this to be a respected English translation of Thucydides’ original text, and have found it cited in multiple academic texts on Greek history and epidemic diseases.
“actually plunged into the cisterns, for they were tormented by unceasing thirst, which was not in the least assuaged whether they drank little or much.” Nor, the narrator recounts, could the diseased sleep, for “a restlessness which was intolerable never left them.” Death, he remarks, was caused not by a wasting away of the body, which “held out amid these sufferings in a marvelous manner,” but by the fire that coursed beneath the skin, imperceptible to all but the victims themselves.

Though here attributed to an internal fever, Thucydides names multiple other causes of death in his account. In one instance, he writes that it was incessant defecation and persistent exhaustion that “with few exceptions carried them off.” In another, caretakers’ exposure to the infected “was the principal cause of mortality.” Not only does he clearly indicate an awareness of the plague’s communicability, but he draws a distinction between fatal symptoms and the disease itself. In essence, Thucydides describes a syndrome, a semiotics of illness that singles out and identifies individual signs, assumes knowledge of the differing severity of their effects, and a particular permutation of which gives rise to the definition of a given condition.

Michel Foucault and medical historian Erwin Ackerknecht have both conducted widely respected studies of this technique of cataloguing disease, which they call the “primary spatialization” and “Bedside Medicine,” respectively. This phase of medical practice is characterized by the doctor’s focus on “the mobility of illness through the body,” a model whereby diagnosis “could be captured by closely monitoring the sequencing of symptoms.”

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scarcely differs from Thucydides’ approach, both Foucault and Ackerknecht trace its emergence not to ancient Greece, but to 18th century Europe.

In keeping with the intriguingly prescient nature of his structural methodology, Thucydides admits in his notes that he “omit[s] many strange peculiarities which characterized individual cases.” That the author extrapolates a typical case is not in and of itself arresting. However, his decision to acknowledge the existence of various abnormalities, and his ensuing dismissal of them as irrelevant, is seminal. This schema is reproduced on a larger scale as the historian writes with surprise that unlike “ordinary diseases,” the preponderance of unburied corpses were assiduously avoided by animals, which “never came near them, or died if they touched them.” Accompanied by an alarmed observation of the epidemic’s blindness to moral character and social status, this commentary at the very least signifies Thucydides’ implicit rejection of religiously invested depictions of illness, if only in the scope of their criteria. But ultimately it is the composite effect of his analyses – for intentionally or no, they are most certainly evaluative – that proves most remarkable. In an era far preceding the institutionalization of the science of epidemiology, Thucydides’ text demonstrates an astounding awareness of the discipline’s founding assumptions.

These suppositions, though only tacitly embedded in his observations, constitute the basic criteria that led to contemporary definitions of epidemic. An epidemic, meaning in Greek “among the people,” is today understood to be a disease that is “prevalent among a people or a community at a special time, and produced by
some special causes not generally present in the affected locality.”

Thucydides’ study is among the first to produce a detailed textual map of disease whose boundaries are first and foremost delineated with respect to the individual human body. He moreover demonstrates a noteworthy awareness of a pool of potential victims, an indication of who was and was not expected to fall ill, and a recognition and prioritization of normal, versus abnormal or anomalous, bodily states. Though he was by no means a physician, Thucydides’ documentary style follows a framework strikingly similar to that which came to constitute the very basis Western medical practice and pathology more than one thousand years after his death.

Though Thucydides was himself hesitant to propose theories of causality, other historians and physicians were beginning to direct their gaze not only upon the course of disease within human body, but its responses to environmental factors and various forms of medical intervention. Among the most prominent of these contemporaries was Hippocrates, who, like Thucydides, maintained a rigid fidelity to detail and observation. However, the research and conclusions expressed in Hippocrates’ multi-volume text *Epidemics* provide more than a mere cataloguing of symptoms: the physician offered hypotheses that advanced his belief that “observation, diagnosis, and treatment were closely intertwined activities.”

While this premise may seem elementary, Hippocrates’ dedication to theories based on a

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23 Hippocrates in De Paolo, 53
“composite memory of things apprehended with sense-perception,” rather than deductive postulations, sets his work apart from the majority of his predecessors’.

Hippocrates’ careful compilation of case studies led him to note a particular correspondence between incidence of disease and the time of year. “Whoever wishes to investigate medicine properly,” he asserted, must first “consider the season in which a disease occurs and then the winds, the hot and the cold, especially such as are common to all countries, and then such as are peculiar to each locality.”

Because Hippocrates sought to compile an objective historical record of maladies, his sorting of winds and seasons are framed similarly to his classifications of physical symptoms, correlations and divergences rather than suggestions of causality. However, his interest in territory, if not expressly etiological, stands as one of the first documented and evidence-supported inclusions of environmental factors in diagnostic procedure. In the centuries to follow, this association was to develop into an explicit attribution of origin to the specific characteristics of a given territory. Despite medical advances that came to drastically alter the prognosis of many diseases, this theory persisted with relative consistency, though by no means uncontested, in scientific circles through the mid-19th century.

Though Thucydides and Hippocrates set secular accounts of disease into circulation, their empirical efforts did little to dispel the general population’s ascription of epidemics to supernatural will or forces. In early Christian societies, however, the narrative of divine vengeance became but one of several different lines of reasoning by which illness was comprehended. As with earlier shifts in epidemic narratives, this can in part be attributed to anomalies sufficiently inconsistent with

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24 Ibid, 53
prevailing ontological frameworks of the era. Charles De Paolo points to the Plague of Justinian as one such case. In 541 A.D. the pandemic took lives with such abandon as to draw into question both the possibility of theological intent and post-Hippocratic extrapolations of the winds and seasons as carriers of disease.

Procopius of Caesarea documented the spread and effects of this affliction so vile that “the whole of the human race came near to being annihilated.” He writes in apparent surprise:

It did not come in a part of the world nor upon certain men, nor did it confine itself to any season of the year, so that from such circumstances it might be possible to find subtle explanations of a cause, but it embraced the entire world, and blighted the lives of all men, though differing from one another in a most marked degree…it seemed to move by fixed arrangement, and to tarry for a specified time in each country, casting its blight slightingly upon none, but spreading in either direction right out to the ends of the world, as if fearing lest some corner of the earth might escape it.

Procopius’ account is of particular historical interest as, at the time of the plague’s emergence, he and the majority of his contemporaries were firm believers in its supernatural origin. Simultaneously personifying the malady and its annihilating intent while ruling out its seasonal or behavioral-specific causes, he seems to find himself caught in an etiological double-bind. His report at this point suddenly changes direction, echoing Thucydides in both style and method as he attends to the symptoms and timeframe of the disease itself. In his vacillation between the two competing medical approaches of the era, Procopius produces a text that is arguably “a turning point in the history of epidemiological thought: in it, graphic description

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26 Procopius of Caesarea, M&B
supplants pre-conceptual thought…the philosophical turn from pre-conceptuality to empiricism occurs at this point.”

**Sovereign Concerns**

With the rise of the nation-state and the growth of European cities, the epidemic narrative began to widen in scope, no longer merely a matter of identifying witches, pagans, or other transgressors of religious doctrine for blame. This is not to suggest that these beliefs did not endure as theories of origin and as sociopolitical instruments, often as grounds for the exclusion and stigmatization of minority groups and foreigners alike. Rather, such causes of widespread sickness came to be framed in terms of the state’s ability to successfully intervene in the practical challenges of corpse disposal, food and labor supply, and the maintenance of social order. The role of the sovereign, which might easily have been destabilized by wave upon wave of infectious disease, entered a period of drastic transformation during the late Middle Ages.

Emphasis on the state’s management of epidemic disease was principally invoked by the coalescence of basic legitimizing qualifications expected of monarchical rule. This was a notion of an art of government, one that only acquired meaning gradually, from its introduction in the mid-sixteenth century through its solidification over the course of the eighteenth. Michel Foucault, in his celebrated *explication de texte* of Machiavelli’s *The Prince*, highlights the ways in which sovereign power, once occupied with protecting a fragile and synthetic link between ruler and territory, progressively redirected its energy toward a politically imbued

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27 De Paolo, 55–6
awareness and cultivation of man’s relationship with the economic, territorial, cultural, and medical facets of society.\textsuperscript{28}

This augmentation in the breadth and logic of sovereign power rose from the ashes of feudalism, materializing at the unique intersection of newly emerging “territorial, administrative, and colonial states” and the widespread “dispersion and religious dissidence” of the Reformation and Counter-reformation.\textsuperscript{29} The complex magnitude of these two concurrent processes clawed away at the staid patterns of the European social fabric, drawing into question anew who and what constituted government and how it was to be properly exercised.

Thus, where ruling power once exerted control over the conditions of life and for death, newer modes of power came to privilege “the right of the social body to ensure, maintain, or develop its life,”\textsuperscript{30} such that death can be figured as a transgression of this right. This modification can be identified in the institution and proliferation of prescriptive standards intended to attain and maintain the well-being of the population, a direct implication of the state in the family economy that subsumed the artificiality of the sovereign’s authority.

The nature of these mechanisms altered the terminology used to justify warfare and surveillance and permitted more pervasive formulations and enforcements of normative practices, be it medically or through the inscription of social norms and mores. In this spirit, Foucault describes two primary forms taken by the power over life: a disciplinary “anatomo-politics of the human body,” and a

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\textsuperscript{28} Michel Foucault, \textit{Power}, (New York: The New Press, 2001)
\textsuperscript{29} Ibid, 202
control-oriented “biopolitics of the population.” The strategy of biopower is knowledge, the acquisition and dissemination of which necessitated the monarch’s gaze. His legitimacy was no longer at stake but assumed, his administrative counsel a prerequisite to the functioning of economy, family, and health. This might otherwise be phrased as a reformulation of the government’s capacity for interference predicated on the conception and statistical knowledge of populations and carried out by the state’s apparatuses of security, the ensemble of which Foucault terms the exercise of “governmentality.”

To illustrate the mechanisms and changes effected by this evolution in governance, he takes as one example the surfacing of the politics of disease, or noso-politics. In the early middle ages, the management of leprosy stood as an archetype of sovereign control. Combining legal and regulatory measures, leprous populations were carefully segregated from the citizenry, banished to restricted territories such that the afflicted ceased to be a subject of the monarch’s concern. Exclusionary practices of this kind were in keeping with an authority that held the right to seize, as well as abandon, properties and individuals alike.

The juridical architecture of binary divisions, its fixed rules and consequences, was gradually supplemented, if not supplanted, by the establishment of nuanced and continuous instructive behavioral programs. These “disciplinary societies,” as Foucault names them, targeted the life and wellbeing of the territory’s constituents, correctly attending to all segments and practices of the population rather than solely those deemed valuable. This arrangement of the mechanisms of

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31 Ibid, 139
governance is apparent in the control of highly contagious epidemics, particularly by the 16th and 17th centuries, which operated upon the population as a whole.

The Black Death and Medicine’s Bright Light

When the Black Death first struck Europe in 1348, it encountered an era of unprecedented population density in a civilization whose livelihood depended on the grossly disproportionate class divisions of the feudal mode of production. In the immediate years following this initial wave of disease, the workforce was sufficiently depleted as to cause the prices of agricultural produce to skyrocket. Inflation was rampant and many survived the plague only to die of starvation. However, the shortage of manpower eventually granted remaining laborers new bargaining leverage. Workers, suddenly a prized commodity, were able on the one hand to double and even triple their wages, and on the other to access the plummeting costs of agricultural rent.

Between 1375 and 1395, the price of wheat and other staple commodities in high demand began to decline, and continued on this trajectory for more than a century.32 The lower classes found they were able to afford new goods, threatening “to erase the visible marks of social distinctions and to undermine the social order.”33 Governments throughout Europe responded by effecting new laws, attempting with limited success to regulate dress codes and standardize wages. The ensuing development and substitution of new technologies of production, from agricultural

33 Ibid, 48
practices to the Gutenberg printing press, can in part be attributed to this increased cost of labor.

Evolution in the mode and structure of production was but one of the significant changes unraveling in Medieval Europe during this period of exceptional volatility. As mortalities rose to exceptional heights, traditional Christian burial practices were largely abandoned. In the frenzied terror of contagion, the dying were no longer attended to by priests. The dead were heaped in mass graves, corpses covered in lye, last rites pronounced, if at all, from a safe distance in rushed incantations. The Church’s comforting depictions of death and heavenly reunion were ripped asunder by the resounding shocks of bubonic plague, the grotesque and painful presentation of its symptoms, its indiscriminant spread. The fear of falling victim to the epidemic “easily expanded into a horror of death, into the sense that life itself was a desperate battle against death’s dominion.”

Priests, along with government officials, intellectuals, and of course the sovereign himself, faced new scrutiny. Amidst the catastrophic havoc wreaked by the 14th century outbreak, “these elites were obviously failing in their prime social function, the defense of the common welfare, in the name of which they enjoyed their privileges.” In the wake of the plague, empirical accounts of the symptoms of epidemics ceased to blend with those of individual cases of illness. The epidemic became, from this point onward, first and foremost a political symbol. Inextricably tied to the state, the politics of disease were created out of the institutionalized knowledge and management of its threat.

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34 Ibid, 63
35 Ibid, 64
As the Black Death continued to surge through Europe with devastating frequency over the next several centuries, states began to employ new tactics in response to outbreaks. Attending to the epidemic became a matter of “literally imposing a partitioning grid on the regions and towns struck by plague, with regulations indicating when people can go out, how, at what times, what they must do at home, what type of food they must have,”36 along with countless other intrusions into the life-processes of the citizenry. This regimented management of disease stands as an extreme manifestation of the mechanisms of an emerging society of discipline.

It was through the cultivation of this link between medicine and the nation that governing bodies found themselves able to reformulate the social significance of disease in an advantageous light. In portraying its regulatory regime in terms of the survival and quality of life of its citizenry, the state opened up a space in which it acquired newfound authenticity. To the sovereign’s traditional role was added the task of producing a simulation of disease and detailed instructions for its management, a dynamic that imbued illness with new connotations. Rather than signifying “‘the dry, sorry analysis of millions of infirmities,’ the dubious negation of the negative, it was given the splendid task of establishing in men’s lives the positive role of health, virtue, and happiness.”37

A secondary manifestation of the medicalizing impact of biopolitics can be identified in the surfacing of somatoform illnesses. One such example is revealed in the etymology of hypochondria, stemming from the Greek “hypo,” for under or below,

37 Michel Foucault, *The Birth of the Clinic*, 34
and “chondros,” meaning the cartilage of the breastbone. The term was initially coined by Hippocrates to refer to the abdominal area, and more generally “the viscera situated in the hypochondria; the liver, gall-bladder, spleen, etc., formerly supposed to be the seat of melancholy and ‘vapours’.” It entered the English lexicon as an anatomical term but had by the late 1600s become a figurative expression for “a morbid state of mind, characterized by general depression, melancholy, or low spirits, for which there is no real cause.”

However, the contemporary diagnostic term hypochondriasis was only first coming to light in 1766 when British author and scientist Sir John Hill published a paper entitled “Hypochondriasis, a practical Treatise on the Nature and Cure of that Disorder; Commonly called the Hyp and Hypo.” The hypochondriac patient displayed a novel and “unfounded belief that he is suffering from some serious bodily disease,” characterized by “exaggerated anxieties about real or imagined ailments, usually the symptom of a neurotic disorder.” It was hardly incidental to the nosopolitical elements of disciplinary governance that mid-18th century physicians began to note and study this emerging phenomenon.

Simultaneously, this century saw the birth of the modern European hospital. These medical institutions granted doctors a more authoritative role as the
guardians of public health. Sociologists and historians of medicine have given this transition a variety of names, but their chronologies remain roughly consistent. Synthesizing two such works, David Armstrong again aligns the studies of Foucault and Ackerknecht, comparing Foucault’s analysis of the clinic’s “secondary spatialization” of the body to Ackerknecht’s definition of “Hospital Medicine.” The methods associated with these terms have alternately been called Western medicine, biomedicine, and pathological medicine, and continue, though not exclusively, to characterize the discipline’s contemporary practices.

Whereas earlier medical practitioners made few distinctions between the symptoms of an illness and its true nature, Hospital Medicine sought to isolate disease from its presentation. Between the symptoms proffered by the patient and correlating signs recognized by the doctor there was a nuanced conceptual space in which to locate the condition’s pathology. In this sense, the traits of the individual case became essential to acquiring knowledge of a given disease, in order that they might be subtracted from the nosological study. The depths of the patient’s body thus became the primary object of medical investigation, demanding detailed knowledge of its internal organs and their circuitry.

Foucault credits this reconfiguration of disease with the inversion of the relationship between life and illness. The autopsy was the ideal “procedure to identify incontrovertibly the exact nature of the hidden lesion,” and its disclosures made of death the Rosetta stone by which modernity was to understand the body of disease and the life of the human. The corpse no longer concealed the knowledge

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42 Armstrong, 393
43 Ibid, 394
essential to pathology; beneath the physician’s gaze it promised a precise anatomical
cataloguing of disease. Rather than standing in opposition to life, “the night in
which life disappeared, in which even the disease becomes blurred, it is now
endowed with that great power of elucidation that dominates and reveals both the
space of the organism and the time of the disease.”

Nosopo-political Cartographies

Today disease is one of the most common objects of statistical measurement
and interpretation. Its localization in the human body, and the appraisal of this
embodiment as a site of government interest, regulation and intervention, were
necessary precursors to the development of its statistical representations. Though
the late Middle Ages reveal a changing conception of epidemics that reflects a broad
epistemological shift in modes of governance, it was not until the 17th and 18th
centuries that the surveillance and analysis of biological trends yielded the
technology of epidemiology.

As previously acknowledged, the Hippocratic conception of illness as
environmentally determined and geographically tethered remained a popular
etiology well into the 19th century. By the Enlightenment, it was known as the
miasmatic or contagionist theory of disease. The prevailing assumption of the era
was that foul smelling air, or miasmas, gave rise to most sicknesses. Miasmas were
thought to be hazardous poisons spontaneously generated out of decaying organic
matter, stagnant water, or deposits of waste and feces. Most shared the belief that
inhalation of these odors, either at a distance of several hundred feet (contamination

44 Ibid, 144
by ‘exhalation’), or in close proximity (contamination by ‘contagion’), were the cause of infection.

As global traffic spiked, driven by international trade and colonial conquests, European populations were introduced to a number of unfamiliar diseases. Noting the frequency with which these new epidemics originated in port cities, a growing minority of ‘anticontagionists’ began to organize around the suspicion that infectious diseases were in fact transmitted in the course of interpersonal contact.

When yellow fever broke out in the United States in 1793, and again in 1798, port cities such as Philadelphia, New York and Boston were quickly destabilized, lacking the resources to care for the ill or slow the epidemic’s spread. Medical professionals were left desperately seeking to understand the source of the disease, hoping to prevent its reoccurrence. At this time, mapping was becoming a popular and authoritative method of examining the structure of epidemics. The birth of modern epidemiology was, of course, an urban incident. It was the evolving metropolis, its population density and infrastructural needs, whose management begged of the epidemic a map. The towns of the 16th and 17th centuries were a project of composing artificial spaces, the iteration of a social structure no less than a housing one. By the late 18th century, these budding cities were beginning to overflow their bounds. The urban ebb and flow, the circulation of merchandise, bodies, currency, carried an undercurrent that pushed disease about, flooding the precision of the planner’s grids, threatening to sweep away the artifices of home, class, and order. The added focus of miasmatic theory upon waste and refuse made
of “the city with its principal spatial variables…a medicalized object.”

How serene the epidemiological maps must have seemed, their coded numbers, colors, shadings and precise lines, which needed only be deciphered to return disease to its proper place.

Dr. Valentine Seaman charted the incidence of yellow fever mortalities in New York during a 1795 outbreak. Seaman was the first to deploy his maps as a logical proof of the epidemic’s origin and means of transmission. Deaths are marked by residential location and numbered chronologically, while sites of waste disposal and spaces of public access are indicated by the symbols S and x, respectively.

Approaching the mapping process from a contagionist perspective, he deduced that the close proximity of the infected to sites of waste disposal indicated that “no yellow fever can be spread, but by the influence of putrid effluvia.”

Dr. Valentine Seaman’s map of the 1795 yellow fever in New York, published in 1798.

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46 Koch, 28.
Similarly, during an 1819 outbreak of the same disease, Felix Pascalis seized medical mapping as an opportunity to advance his platform for the development of an urban sanitation infrastructure. Neglecting the port’s significance as a site of movement and migration, he mapped the cases of yellow fever fatalities in Old Slip, New York, and proceeded to present his findings as proof of the miasmatic theory of disease. Though the disease was most dense along the city’s ports, thinning but nonetheless spreading outward, Pascalis, like Seaman before him, interpreted the concentration of cases at sites of waste dumps as proof of a causal relationship, arguing that “the presence of ships in the harbor was incidental to the foul-smelling urban wastes concentrated in the area.”\textsuperscript{47}

Threatening as yellow fever may have seemed, if the epidemic disease of the Middle Ages was the plague then that of the 19\textsuperscript{th} century was undoubtedly cholera. In the decades prior to cholera’s arrival on British shores, Europeans had already heard tell of its devastating effects in India. In 1783-1784 alone, an epidemic carried off at least twenty thousand pilgrims at Hudwar\textsuperscript{48}. British troops stationed abroad began to fall ill in 1817, causing even greater alarm. In 1831, the first documented case of “ Asiatic cholera” struck in England. As wave upon wave of the disease scourg ed the cities of Europe, it became one of the primary objects of public and state concern.

The series of cholera pandemics proved a shocking contradiction to an age otherwise characterized by optimism in economic, scientific and colonial endeavors. The disease had a high fatality rate and an extraordinarily rapid progression of remarkably grotesque effects. In fact, “there could be few more violent affronts to

\textsuperscript{47} Ibid, 36.
\textsuperscript{48} Ibid, 43.
Victorian prudery than the grossly physical symptoms of a cholera attack.”

Accompanied by advances in printing technologies that saw a proliferation of journals, newspapers and magazines, cholera quickly became a sensationalized topic in the media. In growing contrast to the epidemic responses of the preceding centuries, cholera-era “resentment was focused in the first place on the authorities, and in the second on the medical profession” throughout most of the continent.

In 1849 England again found itself in the throes of cholera, in what was now the third major wave to pass through the country. The epidemic caused 14,600 deaths in London alone. In medical and social circles alike, most remained persuaded by the miasmatic theory of disease, seeing a direct correlation between urban waste and infection, socioeconomic class and health. For the poor, mired in sewage, foul smelling air fostered a climate of terror. In a letter to the London Times, one man beseeched the “rich and great people” of London to provide “protection and power,” explaining that “we aint got no priviz, no dust bins, no drains, no water splyes and no drain or suer in the hole place…the stench of a Gully-hole is disgustin. We, all of us, suffer and numbers are ill, and if Colera comes Lord Help Us.” Refuse had come to signify not only the squalor and poverty specific to the metropolis, but morbidity itself. The health of the inhabitants revealed itself in “the disposition of various quarters, their humidity and exposure, the ventilation of the city as a whole, its sewage and drainage systems, the siting of abattoirs and

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50 Ibid, 163

51 Koch, 82.

52 Ibid, 83.
cemeteries, the density of populations.” As the city worked to implement more efficient methods of waste disposal, its efforts were championed as progress toward the eradication of miasmas, and by extension, of epidemic disease. Sanitation projects were thus a responsibility that far exceeded urban beautification: when successful, they were perceived as a marker of the state’s capacity to protect the very lives of its citizens.

Theories of direct disease transmission, which were gradually gaining credibility in the scientific communities of Europe and the United States, stood to undermine not only the humanitarian benefits of waste removal projects, but the logic of medical and state authority. It was in this contentious climate that John Snow, a London physician, began to study the spread of cholera. His work in coal country during epidemics of the 1830s had led to suspicions that “as soon as one pitman gets the cholera, there must be great liability of others…to get their hands contaminated, and to acquire the malady.” In the mid-40s, Snow began to create tables of epidemic duration as a function of population, revealing what is now known as a threshold population: the minimum density of a community required for a pathogen to spread and flourish to epidemic or pandemic proportions, rather than peter out. By 1849, to the dismay of many of his peers, Snow had begun publishing papers on the communicability of disease. Yet his proposals remained at the very least in peaceful coexistence with the sanitary concerns of the contagionists.

Whether epidemics were spontaneously generated and airborne, or caused, as Snow

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53 Michel Foucault, “The Politics of Health in the 18th Century,” 282
54 Koch, 76
believed, by “an unseen animalcule,” both perspectives sought as their solution a more efficient system of waste disposal.

For Snow to prove cholera’s communicability, he needed to find an outbreak of cholera that was concentrated in an area upwind from the supposedly toxic air. It wasn’t until an outbreak struck Soho in 1854 that a case sufficiently anomalous to the miasmatic hypothesis presented itself. Mapping the parish of St. James, Snow discovered the epidemic to be most dense in the area surrounding the now notorious Broad Street water pump. However, the outbreak did not radiate uniformly outward from the pump as might have been expected from the contagionist perspective. Instead he found “intense variations…street by street and house by house,” including several sites remarkably near the Broad Street water supply, and others significantly closer to different, presumably uninfected, pumps. Upon conducting extensive interviews with the parish residents, tracking their commutes to work and school, Snow was able to account for each incongruity.

John Snow’s conclusion, represented on a series of maps marking incidents of cholera mortality by household and street, density of occurrence, and proximity to the water pump, is today hailed as the foundation of modern epidemiology. Yet at the time of their publication in 1849, they were by no means well received. Snow had implicated the sewage system in his schema of causality, destabilizing the direct relationship between governance and territory, the state’s sanitation infrastructure and the health of the populace.

55 Ibid, 84
56 Ibid, 98
John Snow’s map of the Soho outbreak, featuring the Broad Street Pump\textsuperscript{57}

The Broad Street pump was ultimately put out of commission, but the official decision retained a miasmatic justification. The pump, it was argued, lay over a 17\textsuperscript{th} century burial site for plague victims. It was these decomposing bodies, according to the contagionists, that were in fact poisoning the air above ground and spreading cholera. Nearly two decades after the Broad Street study, the third International Sanitary Conference issued a statement maintaining that cholera was a miasmatic disease.\textsuperscript{58} These efforts to rationalize the epidemic quite clearly demonstrate the

\textsuperscript{57} I first encountered this image in Tom Koch, \textit{Cartographies of Disease}. This particular copy I accessed online at http://graphics8.nytimes.com/images/2006/11/15/timesselect/16johnson-map533a.jpg. In all respects it is consistent with the copy in Koch’s text.

\textsuperscript{58} De Paolo, 102
prevailing desire to unite as a single threat, with a single obliterating solution, human waste, the dead and the dying. Despite the reticence of his contemporaries, Snow’s contribution to cholera studies marked a more general turning point in Western constructions of epidemic disease. In the fifty years following his study, the miasmatic theory of transmission would be annihilated by advances in scientific method.

Molecularizing Immunology

Most biology textbooks refer to Robert Koch’s identification of the etiology of anthrax in 1876 as the first successful proof of the microbial transmission of disease. Koch’s research is the earliest published study that systematically identified a bacterium, in this case *Bacillus anthracis*, isolated it from its host, cultured it, and reintroduced it into healthy tissue. The particular appreciation for his work is reflective of a progressive emphasis on scientific method within the medical field, in which legitimacy was largely assessed with respect to the degree of pervasiveness achieved by the medical gaze.

Such an attribution is far more emblematic of an appreciation of his methodology than the novelty of Koch’s discovery. It is important to note that his findings were unique only in terms of the scale by which they were observed. Their implications for the development of vaccines, most famously expanded upon by Louis Pasteur, followed in the footsteps of ancient Greek, Indian and Chinese civilizations, which had for centuries treated certain illnesses with various molds and plants with antibiotic capacities. Variolization, the practice of introducing very small amounts of a live virus into the body to stimulate the immune system to
produce antibodies, is similarly rooted in ancient texts. Records dating back to approximately 1000 B.C. in India, and 1000 A.D. in China, indicate that varioloization against smallpox had long been practiced on the Asian continent, usually by grinding victims’ scabs into a powder and ingesting or inhaling it.\textsuperscript{59}

By the mid-1700s, this procedure had reached British shores and several European physicians began to test what they called \textit{engrafting}. Attempts to induce immunity through limited exposure to the smallpox virus proved more often successful than not, and became standard practice by the turn of the century. Variolization was nonetheless risky, often inducing an outbreak of the disease rather than ensuring its prevention. In the 1790s, physician Edward Jenner experimented with modified inoculations, finding that injections of the cowpox virus induced immunity to smallpox without the danger of falling victim to its life-threatening symptoms. Like the Chinese and Indian practices of variolization, Edward Jenner’s discovery of a safe vaccine, however lauded, is seen as methodologically lacking. Though he made use of the same biological interactions as do modern vaccinations, his technique was not informed by a molecular understanding of the virus and its effects upon the immune system. As such, Koch and Pasteur’s names both remain far more familiar to the general lexicon than does that of Jenner.

Foucault, however, takes particular interest in this period of time between the institutionalization of variolization in Europe and the scientific discovery, more than a century later, of the immunological processes that made it successful. Smallpox was a remarkably common affliction, endemic to a degree that made quarantine practices impractical at best. The introduction of variolization to the

\textsuperscript{59} Ibid, 78–80
general population did not, Foucault notes, “try to prevent smallpox so much as provoke it in inoculated individuals, but under conditions such that nullification of the disease could take place at the same time as this vaccination, which thus did not result in a total and complete disease.”

**Securitizing Populations**

The employment of this particular technology is demonstrative of a transformation in the state’s management of populations, formulated upon its capacity to identify and mitigate naturally occurring threats. In its treatment of smallpox, one which nonetheless preceded the scientific accreditation it enjoys today, governance was occupied with obtaining and disseminating knowledge of the disease, of who was infected and where, their specific traits and attributes, in order to best introduce self-regulating preventative measures into the population as a whole. This was not an attempt to construct in the population a synthetic norm of health, but “a plotting of the normal and the abnormal, of different curves of normality and in acting to bring the most unfavorable in line with the more favorable.”

This domination of practices predicated on the knowledge of the population in its multitudinous forms is what Foucault came to term a society of security. Security, rather than strictly replacing the preceding eras and strategies of governance – first of a juridically-based sovereignty, followed by the norm-dispensing political economy of discipline – might be said to incorporate them into its wider field of concern: namely the assemblages of bodies, environmental

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60 Foucault, *Security, Territory, Population*, 59
61 Ibid, 63
occurrences, and natural phenomena that join together sources of action with the surfaces upon which their causes and effects circulate. It has been said that trees that cannot bend in the wind shall not outlast the storm. The exercise of both sovereignty and discipline sought to induce order by resisting the unpredictable and destabilizing tides of natural events, creating subjects within structures of conformity and regulation, action and performance. Security, “unlike the law that works in the imaginary and discipline that works in a sphere complementary to reality, tries to work within reality, by getting the components of reality to work in relation to each other, thanks to and through a series of analyses and specific arrangements.”

This evolution in the mechanisms of governance might be understood as a gradual narrowing of the space between real and constructed, sign and signifier.

In his celebrated text, The German Ideology, Marx identified what he termed the camera obscura of the capitalist system. He charged the liberal creeds of morality, democracy and progress with disguising an inverted system of relations that did more to fetter the worker than liberate him, arguing that these very freedoms, so prized by modern society and proudly championed by its bourgeois leaders, were but a mask for an economically-driven arrangement of material relations between men and social relations between commodities. More than a century later, Zizek made the subtle distinction that Marx had been wrong to describe a simple “replacement of men with things.” Instead, he specified, “it consists of a certain misrecognition which concerns the relation between a structured network and one of its elements: what is really a structural effect, an effect of the network of relations between

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62 Ibid, 47
elements, appears as an immediate property of one of the elements, as if this property also belongs to it outside its relation with other elements.”

Perhaps hitherto the most invasive of ideological illusions, security is the mask that purports instead to have torn one away. It is the doctrine of transparency and accountability, of an intimate knowledge of a multifaceted “reality,” in essence, the birth of that signifier Freedom. Echoing Marx, Foucault declares that this pretense of freedom is “nothing else but the correlative of the deployment of apparatuses of security.” The notion of security encompasses the state ecology, operating through a language of freedom that is predicated upon populations’ abilities to react according to desire, with limited restrictions, to potential future events. The market, put quite simply, is the enactment of a theory which, at minimal cost to the state, nullifies threats before they materialize simply by ensuring their articulation and dissemination to populations invested in their outcome. Governance, Foucault explains, no longer stands to profit from forbidding certain desires or labeling them as deviant, but in affirming, permitting, and even facilitating such impulses as frequently as possible.

With respect to the institutionalization of vaccination practices, Foucault explains of security, “it will no longer be the problem of exclusion, as with leprosy, or of quarantine, as with the plague, but of epidemics and the medical campaigns that try to halt epidemic or endemic phenomena.” The biological and territorial preservation of the nation, its inhabitants and their relationship to the environment,
the maintenance and quality their lives: these are the manifold threads into which the objective of state power has been woven and upon which it sees fit to operate.

Since Foucault’s death in 1984, late modern capitalism has seen the unique and remarkable proliferation of technologies capable of producing both artificial phenomena and invested reactions, essentially producing surplus value out of simulated scenarios. One means of observing these transformations in governance is in pursuing the trajectory of its framing of epidemic diseases.
Chapter Two

the birth of emergence

As epidemiologists trace the routes of the microbes, they catalog the spaces and interactions of global modernity. Microbes, spaces, and interactions blend together as they animate the landscape and motivate the plot of the outbreak narrative: a contradictory but compelling story of the perils of human interdependence and the triumph of human connection and cooperation, scientific authority and the evolutionary advantages of the microbe, ecological balance and impending disaster.  

In 1884, a young Irish woman named Mary Mallon reached the shores of Manhattan. Just five years earlier, Congress had passed an “Act to Prevent the Introduction of Contagious or Infectious Diseases into the United States.” The legislation granted the National Institutes of Health authorization to examine immigrants for transmittable illnesses and, if diagnosed, deny them entry. Though Mary passed two standard rounds of health inspections without incident, it was not long before authorities learned that her good health did not preclude her from posing a biological threat.

Mallon initially took up residence in upstate New York, where she found employment as a household cook. Moving with remarkable frequency, she went on to work for at least eight different families in a span of less than ten years. In 1906 she had occupied a post on Long Island for only three weeks when six of the eleven members of the household and staff suddenly took ill. Mary quickly left the vicinity, fleeing what had become all too familiar a scenario. When the patients were soon afterward diagnosed with typhoid, Dr. George Soper, an epidemiologist and engineer for the U.S. Army Sanitary Corps, was hired to research the mysterious outbreak. Soper set out to trace the disease’s eruption to its source, but

66 Wald, Contagious, 6
soon ruled out both environmental factors and all the infected victims as possible points of origin. Learning of the family’s absent cook, he concluded that Mary was the missing link in his investigation. As he began to inquire as to her whereabouts, the doctor uncovered a disconcerting and ominous history. In almost all the homes at which she had been employed over the last six years, she had left confirmed cases of typhoid in her wake.68

Mary’s was the first documented case of a healthy carrier of infectious disease, a possibility that had hitherto remained an object of scientific conjecture. She was, in Soper’s words, a “living culture tube and chronic typhoid germ producer.”69 Her chosen profession only increased the likelihood of the pathogen’s transmission; a threat made all the more terrifying to the general public by Mallon’s adamant denial of her condition and vocal resistance to observation and quarantine. Against her will, she was moved to a hospital for infectious diseases on North Brother Island in 1907. Her case was eventually brought before the New York State Supreme Court but despite a ruling in favor of the Department of Health Department, a change in the hospital’s administration three years later led to Mary’s conditional release. Ignoring stipulations that she continue regular visits and practice certain hygienic precautions, she quickly assumed an alias and vanished.

In 1915, just five years after Mallon’s disappearance, Soper was again summoned to study an outbreak of typhoid in New York, this time at the Sloane Hospital for Women, where twenty-five employees had been infected. Upon

68 I have endeavored to piece together Mary Mallon’s story from a number of sources, including: Priscilla Wald, *Contagious: Cultures Carriers and the Outbreak Narrative*, (Durham: Duke University Press, 2008) and J. Brooks, "The sad and tragic life of Typhoid Mary," *Canadian Medical Association journal* 154.6 (March, 1996).
discovering that the hospital staff referred to their cook as Typhoid Mary, Soper’s suspicions immediately turned to Mallon. By the time she was apprehended, the media had adopted the moniker and her plight had grown in notoriety. Mary was forced to return to North Brother Island, where she remained confined and contagious until her death in 1938. During her years of freedom, amounting to less than half her lifetime, Typhoid Mary is believed to have infected at least fifty three individuals with the bacteria, without once manifesting its symptoms.

As more cases like Mallon’s were discovered, the healthy carrier became the archetypal embodiment of the fear and uncertainty associated with infectious disease. The legacy of Typhoid Mary, whose name has since become a term for any asymptomatic carrier of disease, elicited a reevaluation of the hegemony of sensory perception in identifying the ill, undermining the ability of physician and layman alike to sight potential biological threats and respond accordingly. Her anonymity and benign masquerade abstracted the face of disease, making suspect the entire population. The focus on these “narratives called forth the new authority of science to substantiate the danger and entrust the health and wellbeing of the nation to social engineers like George Soper.”70 The molecular knowledge of medical professionals was now valuable not only in its capacity to develop vaccines and treatments, but crucial for the proper identification of diseases themselves.

Expansion of the Milieu

The alacrity with which stories such as Mary Mallon’s were received and acquired infamy bespeak the dying hegemony of miasmatic theory and the thorough

70 Ibid, 183
rupture of its ontological linkage of illness with location. Though epidemic diseases often catalyzed transitions in biological knowledge, it was their incorporation into general medical practice that ensured their endurance. Studies of the Hippocratic tradition, which had centralized disease in the human body through their primary attention to its signs and symptoms, were transformed by the emergence of European hospitals and the ascendancy of the medical profession in the 18th century.

While it may have been “the invention of the classical techniques of the clinical examination – inspection, percussion, palpation and auscultation – that allowed the volume of the human body to be mapped,” it was germ theory’s molecular units of knowledge that amplified the physician’s gaze into the depths of the body, permitting new insight into its complex biological dynamics. The surfacing of modern etiological research thus demanded of medical and state apparatuses a reconceptualized map not only of the body, but of the milieu in which it was discerned, interpellated and managed.

The epidemic was no longer considered a macro-symptom of place, nor was its incarnation in the population discerned only subsequent to its manifestation and diagnosis. In what would prove a formative precursor to the epidemiology of emerging diseases, populations became envisaged as preceding the onset of disease, embodying not only its symptoms but the threat of its potential materialization and spread. These perceptions of the origins and vectors of contagious outbreaks were not limited to trained specialists; experts issued instructive regulations such as sanitary precautions and hygienic standards that shifted preventative responsibilities onto the population. Measures encouraging self-care were among

71 Armstrong, 393
the first to identify healthy individuals as a pre-patients, further stressed as a broader social responsibility to be continuously informed of one’s own state of health. The conflation of individual and common welfare signified the transformation of “personal susceptibility…into an image of community.”

This transformation of noso-politics filtered into general health care practices in what David Armstrong calls “the rise of Surveillance Medicine.” Like Foucault, Armstrong identifies an expanding concept of health that, rather than attempting to produce ideally unimpaired individuals, abandons its direct rapport with illness. Health in this schema carries no definition external to its fluctuating measurements of the actual physical condition(s) of the population; a practice of medicine predicated on “a world in which everything is normal and at the same time precariously abnormal, and in which a future that can be transformed remains a constant possibility.”

Globalizing Biomedicine

The focus on healthy carrier identification was central to growing apprehension of the ubiquitous threat of disease. This was a discovery not only that an epidemic could emerge from anyone, anywhere, but that the human vector was not unlike that of the animal, often impossible to recognize as dangerous. Not incidentally, the social and political investment in such figures surfaced at precisely the time that population mobility was skyrocketing, with military and colonial pursuits eventually joined by advances in transportation technologies such as automobiles, trains, and airplanes.

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72 Priscilla Wald, Contagious, 74
73 Armstrong, 400
The rise of biomedical risk assessments in the late 19th century led to a proliferation of state-sanctioned sanitation and health institutions. In 1851, twelve European countries held the first of more than a dozen International Sanitary Conferences which ultimately led to the standardization of quarantine regulations across the continent. The Red Cross was founded in 1863, the Pan-American Sanitary Bureau in 1902, the Office International d'hygiène publique in 1907, and the League of Nations Health Organization in 1920. Simultaneously, extraterritorial projects, such as the Panama Canal, military engagement and colonial conquests, forced the extension of state medical apparatuses into the global arena.⁷⁴

As colonial infrastructures came to rely heavily on exports from their holdings abroad, European governments were forced to address the health of indigenous populations, whose labor was essential to the maintenance of production. With this directive, public health policies in these areas were selectively and minimally applied, with “improvements in local health (excepting male members of the labour force) a negligible and secondary side-effect.”⁷⁵ Though Western medical technologies were in practice limited to the economically valuable subsets of the general populace, political discourses of the era nonetheless cited these modernizing endeavors as evidence of the humanitarian benevolence of colonization, a prideful justification for their exploitative and paternalistic practices in the third world.

This overseas ideology was mirrored by domestic invocations of infectious disease that proffered foreign biological menaces as a principal rationalization for the securitization of state borders. Western immigration policies employed public

⁷⁴ Nicholas King, “Security, Disease, Commerce: Ideologies of Postcolonial Global Health,” *Social Studies of Science*, 32/5-6 (October-December 2002), 763-789
⁷⁵ King, 765
health as a palatable pretense for the population racism implicit in entry quotas and border policing. United States legislation such as the 1882 Chinese Exclusion Act and the Immigration Act of 1924, championed by eugenicists such as Madison Grant, halted migration from Asia and grossly reduced the influx of Southern and Eastern Europeans. Efforts to exclude particular ethnic groups became a political and social theme reproduced through the early 20th century, often in the context of their biological weaknesses.

These nationalist exercises faded following the Second World War as colonial regimes began to unravel and technological advances made border control an increasingly impossible prospect. Public and global health policies underwent significant transformation following the birth of the United Nations and other international organizations, opening new spaces and expectations for the management of contagions. The post-war politics of health were invested in more than maintaining the “flows of international trade and commerce of powerful trading nations.”

In the wake of two devastating worldwide conflicts, the preservation of peace was no longer perceived as a national, or even transcontinental, project. Groups such as the World Health Organization, established by the United Nations in 1948, phrased biological security in humanitarian terms, hoping that improved standards of living would ward off future global strife. Taking as their primary goal the wellbeing of the entire population, the post-war politics of disease occupied a rank of soft or “low” politics, their endeavors largely independent from “the real game of international politics.”

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77 Ibid, 202
Between the 1930s and the 1960s, medical and biological knowledge accelerated with exceptional rapidity. In 1937 English physicist and molecular biologist William Astbury made groundbreaking headway in the field of molecular biology, producing the first X-ray diffraction images to reveal the basic structure of DNA. Several years earlier, the first influenza virus had been ‘cultured’ in fertilized chicken eggs, proving a formative moment in the history of virology and vaccine production. As viruses require a host, until to this point the primary object of virology research had been bacterial and plant viruses. Over the following decades, developments in distinct disciplines within the life sciences coalesced around the emerging field of molecular biology. This development opened the door to the landscape of biological code, its seemingly infinite wisdom begging the discerning gaze of the laboratory scientist.

Molecular biology of course transformed the pharmaceutical industry, while post-war Fordist economies ensured the large-scale manufacture of, and market for, these medical products. Affordable treatments were soon available for all known bacterial infections, with newly developed antiviral drugs following closely on their heels. Infectious disease health policies in the United States and Europe became chiefly occupied with the development of their treatment and prevention capacities, producing and distributing vaccines and antibiotics on the free market and encouraging, or legislating, their consumption. By the end of the 1950s, it seemed as though these medical developments were on the brink of eliminating the threat of infectious disease. The Pan American Health Organization had already demonstrated outstanding success in its crusade against smallpox, eliminating the disease from the majority of countries in the Western hemisphere. It was believed
that other fatal diseases such as bubonic plague and malaria would soon join smallpox as relics of an antiquated past. The defeat of all life-threatening contagions was alleged to be merely a matter of time, funding and organizational skills. The zeitgeist was one of bold optimism and paradigmatically liberal notions of the worldwide benefits to be reaped from capitalist progress and the growing availability medical technologies. “Gone was the fear of infection,” when in 1967 U.S. Surgeon General Dr. William H. Stewart “informed a meeting of state and territorial health officials that infectious diseases were now conquered.”

Such assertions certainly seemed warranted when the World Health Organization confirmed assertions that the variola virus had been successfully eradicated in 1977, signifying an end to the ravaging smallpox campaign that had spanned centuries and afflicted millions worldwide. Lauded as a triumph of global mobilization and cooperation, the extermination of the disease relied primarily upon a technique known as “ring vaccination,” a method that fuses surveillance technologies with containment and inoculation operations, allowing authorities to locate cases and prevent their spread. From 18th century variolization in Europe to 20th century global eradication, smallpox is often cited by epidemiologists as the ideal framework for disease management. Since 1988, an alliance of health organizations including the World Health Organization, the Centers for Disease Control and Prevention and UNICEF, has followed this model in their battle against polio. While their efforts have been remarkably successful, decreasing the number of polio cases across the globe by more than 99%, the target year for the

79 This announcement was officially made on May 8, 1980.
81 1,997 cases were reported in 2006, as opposed to 350,000 in 1988.
disease’s eradication has been annually postponed since 2000. 1960s optimism to the contrary, smallpox remains the sole infection to have been successfully suppressed.

**The Swine Flu Scare**

The final years of the smallpox eradication program coincided with another epidemiologic event which, though no less remarkable for its unprecedented outcome, has since remained conspicuously absent from health policy considerations. In January 1976, a number of soldiers stationed at Fort Dix began complaining of flu-like symptoms and respiratory problems. Though several of the more serious cases were hospitalized, one cadet refused treatment in order to participate in an overnight training exercise. His condition deteriorated with shocking speed and he died less than twenty-four hours later. That same week, a county medical conference ended rather unconventionally when an epidemiologist bet the Army’s senior physician that the Fort Dix patients were suffering an influenza epidemic. Several blood samples were sent to a laboratory for analysis. Though the Army doctor lost the bet, the epidemiologist was no less surprised by the alarming test results.

While the most of the patients were infected with the common “Victoria” influenza, the deceased man and four others were found to be carrying an unfamiliar virus. Health officials identified it as a strain of influenza commonly found in livestock, and particularly pigs, giving rise to the name “swine flu.” Further testing revealed that approximately five hundred soldiers at the base had developed

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antigens against the infection, indicating they too had been exposed. The rate at which it had spread through the Fort Dix recruits led to concerns that an incidence within the general population might easily reach pandemic proportions.

The director of the Centers for Disease Control and Prevention (CDC), Dr. David Spencer, met with public officials and virology experts in Washington to formulate a response plan. Though the swine flu outbreak had thus far remained confined to the military base and was asymptomatic in all but thirteen cases, they decided upon drastic preventative measures. While scientists hastily worked to develop a vaccine, Spencer rallied pharmaceutical companies behind a $135 million proposal for government funds to immunize the entire nation. After extensively debating the necessity of such a costly initiative, Congress finally acquiesced in August of ’76. Deliberation continued into the fall as insurance companies, fearing potential side-effects, refused to provide coverage for the new vaccine. In late November the government begrudgingly agreed to assume liability and the Department of Health, Education and Welfare (HEW) immediately embarked on the daunting task of inoculating upwards of 200 million Americans.

The National Influenza Immunization Program, which included the instatement of an extensive surveillance network, managed to inject more than 40 million citizens before it was suddenly discontinued on December 16, after only ten weeks of operation. Reports had begun to circulate of the vaccine’s close correlation to diagnoses of a rare neurological condition called Guillain-Barré syndrome (GBS). Cases of the disorder, whose symptoms include muscle weakness and paralysis, numbered in the hundreds and included several dozen fatalities. Public outrage only
mounted when the swine flu did not make an appearance that winter, or any other thereafter. The government was soon inundated with lawsuits.

But the scandal did not end upon the program’s suspension. The NIIP had formulated two versions of the vaccine: one which was limited to protection against the swine flu, and the other to which had been added the A/Victoria immunization. In February 1977, less than two weeks after taking office as Secretary of HEW, Joseph Califano was, in his words, “faced with a difficult health policy decision.”

Since “no one could be certain” whether GBS was caused by “the swine flu vaccine, the A/Victoria vaccine, or all flu vaccines,” both had been taken off the market in December. However, the bivalent form of the swine flu vaccine was the only stock of the A/Victoria immunization when in January the latter infection broke out in a nursing home in Miami.

Califano feared that the virus might spread to the city and quickly multiply, causing fatalities among high-risk persons such as the geriatric patients it had first afflicted. Producing a new serum was too time-intensive, while releasing the vaccine preemptively could prove a superfluous measure and come at the cost of unnecessary incidents of GBS. The Secretary consulted infectious disease experts, but, as a lawyer new to his post, found his medical expertise so limited “that it was difficult even to determine the questions to ask in an attempt to reach an intelligent decision.” He ultimately decided that the dangers of Guillain-Barré were outweighed by the risks associated with a potential influenza epidemic in Miami. While the vaccine’s

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84 Ibid, 3
85 Ibid, 4
release doubtlessly caused additional cases of the neurological condition, it cannot be known to what degree, if at all, it prevented the spread of an A/Victoria epidemic.

In the wake of the swine flu scare, the government faced allegations that its poor judgment calls had resulted in the undue endangerment of the American public. In pursuit of “lessons for the future, not of fault in the past,” Califano enlisted Harvard Professors Richard Neustadt and Harvey Fineberg to conduct a review of the policy decisions concerning the NIIP affair. In 1979, they testified before the Senate Subcommittee on Health and Scientific Research as to the findings of their report, concluding that that “the administrative aspects of the swine flu program – its machinery for implementation and adjustments, and the skills of those at work there – interacted badly with the slippery features of the disease...leading toward a credibility gap of serious proportions between Federal authorities and those they sought to serve.”

However, the faulty management of the vaccine initiative is one the report cites as a secondary concern to that of the irrational conclusions drawn by medical experts and further sensationalized by the media. At the forefront of their critique was scientists’ initial risk assessment of the swine flu strain. Neustadt and Fineberg argue that health officials not only drew conclusions that were based on insufficient research, but made poor use of what little data they had collected. The CDC showed “more concern than surprise,” a response that indicated their unfounded anticipation of a highly lethal strain of influenza. These officials shared in the widely-held,

86 Ibid, 6
87 Ibid, xxvi
though fallacious, assumption that the infection reemerged in exceedingly
dangerous forms approximately every decade.\textsuperscript{88}

Speculations that swine flu was somehow associated with the notorious 1918
“Spanish influenza” pandemic abounded. Named “the third of the three most
devastating epidemics to hit mankind,”\textsuperscript{89} estimations of the 1918 fatalities cover a
broad spectrum, but even the lowest of evaluations exceeds the total number of
World War I casualties by millions.\textsuperscript{90} Worries that the swine flu strain might
portend similar catastrophic losses were recapitulated by the press: Neustadt and
Fineberg cite a \textit{New York Times} article from February 20, 1976 that expressly stated
that “the virus that caused the greatest world epidemic of influenza in modern
history – the pandemic of 1918-19 – may have returned.”\textsuperscript{91}

In addition to their condemnation of this undue panic, Neustadt and
Fineberg ultimately identify seven primary traits of the policy choices made in
response to this largely imagined threat:

1. Overconfidence by specialists in theories spun from meager evidence.
2. Conviction fueled by a conjunction of some preexisting personal
   agendas
3. Zeal by health professionals to make their lay superiors do right
4. Premature commitment to deciding more than had to be decided
5. Failure to address uncertainties in such a way as to prepare for
   reconsideration
6. Insufficient questioning of scientific logic and of implementation
   prospects
7. Insensitivity to media relations and the long-term credibility of
   institutions\textsuperscript{92}

\textsuperscript{88} Ibid, 18
\textsuperscript{89} Marks and Beatty, 271
\textsuperscript{90} WWI cost approximately 37 million lives, while the Spanish Flu is thought to have killed
between 40 and 100 million people across the globe.
\textsuperscript{91} Ibid, 19
\textsuperscript{92} Ibid, 12
Thematic in these points is their criticism of policy-makers’ fanciful departures into a realm of uncertainty and conjecture, a world in which their preconceptions of a potential future acquired more clout than the circumstances of the present. In these concerns, we can see the first glimmers of the emerging diseases worldview. Indeed, had it not faced nightmarish consequences of GBS, swine flu might easily have taken the place of HIV as the first virus in the chronology of emergence.

From Patient Zero to Epidemic Zero

When HIV was identified as a “new” virus in 1981, directly on the heels of the WHO’s celebratory announcement of smallpox’s annihilation, the confident tone of global health discourse quickly ceded to one of apprehension. By 1984, an article published in the American Journal of Medicine claimed to have identified the index patient of the North American HIV/AIDS epidemic. The virus’ source was said to be a homosexual man, later revealed to be Canadian flight attendant Gaëtan Dugas, who was estimated to have had as many as 2,500 sexual partners at the time of his participation in the survey. Epidemiologists believed that he had contracted the virus in Africa and initiated its spread across the United States, facilitated by his regular transcontinental travel and frequent engagement in unprotected sex. Dugas, who died the year the study was published, was a prominent figure in journalist Randy Shilt’s 1987 book And the Band Played On, which chronicled the early years of AIDS in the United States.

Priscilla Wald credits Shilt’s sensationalized portrayal of Dugas as the origin of the “Patient Zero narrative.” The companion figure to that of the healthy carrier,
patient zero is now a title commonly given to the first victim of an epidemic.\footnote{The term is more strictly applied to mean the index case of an epidemiological survey. When capitalized, Patient Zero refers to a specific person whose identity is protected.} The narrative is one Wald problematizes for its Africanization of the disease and its depiction of Dugas as “human-virus hybrid, haunting San Francisco’s gay bathhouses.”\footnote{Wald, 218} Though it has since been disproved, Dugas’ story fueled pervasive condemnation of the homosexual community for its association with promiscuity and AIDS; it would be more than a decade before the disease began to shed epithets such as ‘gay cancer.’ Wald points out that though these social connotations emerged from patterns that allowed the virus to be identified, they also constrained its proper diagnosis, a dynamic that revealed “both the utility and the danger involved in…incorporating them into an outbreak narrative.”\footnote{Wald, 219}

While locating the origins and trends of infectious disease outbreaks are admittedly of use to the expansion of etiological and epidemiological knowledge, cases of mistaken identity in patient zero accounts abound. Such portraits have nonetheless become a popular subject of human interest pieces and, though generally presented as empirical fact, journalists omit that it is rarely possible to confirm an outbreak’s primary case. In certain instances attempts to do so have been further demedicalized and even fictionalized by the press. Like the healthy carrier, the index patient’s true impact might be said to lay in her abstraction, the possibility that she might not be possible to locate, assign blame or mine for valuable information.
The Birth of Emergence

In the trajectory from Typhoid Mary to Patient Zero, and perhaps nowhere better exemplified than in the swine flu affair, Surveillance Medicine merged with epidemic surveillance as together they oriented toward “an extracorporeal space...to identify the precursors of future illness.”96 These three cases exemplify the distinct phases that were necessary precursors to the birth of an ontology of emerging disease:

1. Disease is ubiquitous: the dislocation of illness from its manifestation in the individual or population body.
2. Diseases want to be the 1918 pandemic: the risk-based management of epidemic diseases, in which responses institutionally presume the worst case scenario.
3. Territory is not a barrier: the belief that new diseases will come from impoverished countries but threaten to spread by cross-continental air travel.

In the years since scientists discovered HIV, the virus has become a placeholder in epidemiological history, often listed as the first of the emerging infections. Shortly after Morse coined the term in 1989, “emerging viruses” served as the title for a conference held that spring by the NIH and Rockefeller University.97 These emerging diseases are not categorized by etiology or pathology; whether virus, parasite or bacteria, they are spatiotemporally defined. Though sporadically evidenced in the present, it is their futural ontology that lends these infections a shared identity. This circumstantial and socially contingent classification is a striking anomaly in a discipline as traditionally loyal to taxonomy as biomedicine.

96 Armstrong, 401
97 King, 766
It should be noted that most viruses categorized as “emerging,” though capable of mutation, are only new to their human hosts, or to those populations receiving biomedical care. Similarly, many of these diseases can be traced back centuries through oral histories or studies in paleomicrobiology. Though specialists acknowledge that “‘new’ infectious diseases often turn out not to be so new after all, or may be extensions of existing epidemics,” these histories are often subsumed by dramatized portrayals of their most recent outbreaks. The employment of “emergence” can thus be said to lack a concrete definition, often merely indicative of the canonization of a given pathogen in Western medicine.

Nonetheless, as virologists and immunologists direct their attention to threats posed by virus mutations, antibiotic resistance and zoonotic contamination, their observations have incited a widespread belief that all humankind stands on the precipitous brink of an inevitable, and potentially infinite, series of new and unpredictable biological risks. Among the first to set this tone were the authors of a National Academy of Science’s Institute of Medicine (IOM) report published in 1992, entitled *Emerging Infections: Microbial Threats to Health in the United States.* The report narrowed the definition of emerging infectious diseases to refer to “clinically distinct conditions whose incidence in humans has increased…in the United States within the past two decades.” Warning American citizens that “in the context of infectious diseases, there is nowhere in the world from which we are

99 Animal-to-human transmission
remote and no one from whom we are disconnected,” the authors emphasized the need for global surveillance to sight these particularly elusive threats and contain them within their sites of origin.

The specter of emerging diseases infiltrated a wider audience as books on the subject began to be successfully marketed to mainstream consumers. The critical acclaim for Laurie Garrett’s *The Coming Plague: Newly Emerging Diseases in a World Out of Balance* and Richard Preston’s *The Hot Zone*, both released in 1994, “ensured that emerging diseases remained front-page news throughout the 1990s;” a focus that has by no means faded in the 21st century. A 2007 book entitled *Understanding New, Resurgent, and Resistant Diseases* devotes one chapter to an array of illnesses whose causes remain unknown but may be infectious, and another to ten “New Diseases” that have been identified since the 1950s. Some are relatively foreign to the general lexicon, but many are notorious and highly publicized conditions such as HIV, Lyme disease, SARS, West Nile virus, and avian influenza. These particular diseases are among the most commonly referenced threats in texts on emerging infections, which have come to constitute an entirely new genre of epidemiologic literature. The vast majority of these studies identify emerging pathogens as the bastard offspring of globalization; a molecular chaos incurred by global warming, population growth and overcrowding, increased human-animal proximity, and widespread transmission facilitated by the general affordability and accessibility of rapid transit systems.

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101 “Emerging Infections: Microbial Threats to Health in the United States,” cited in King, 767
102 King, 769–70
The social, political and ecological tropes embedded in these assertions have become the mantra of what Nicholas King calls the emerging diseases worldview. To this worldview King ascribes the etiological narratives and ethical concerns, the risk assessments and measures proposed for their management, that together form “a universalizing template for understanding the interactions between humans and the microbial world: the rules and assumptions that it lays out are presumed to be globally applicable.”

The field of emergence is particularly devoted to the production of statistical evaluations of threat, advocating the enhancement and interstate sharing of surveillance technologies in the name of preparedness for the uncertain future(s) of disease.

The CDC’s Emerging Infectious Diseases Journal and the WHO’s Global Outbreak Alert and Response Network are two such programs instated for the prevention and control of emerging diseases. Political discourse has similarly taken a particularly securitizing approach to the management of EIDs. In a 1997 Congressional hearing bearing the title The Threat to the United States from Emerging Infectious Diseases, the framework of biosecurity in which this rhetoric is situated becomes disturbingly clear. Chairman of the Committee on International Relations, Benjamin Gilman, opened the hearing by explicitly linking naturally occurring diseases to acts of terrorism:

The purpose of today’s hearing is to focus congressional attention on emerging and infectious diseases that threaten Americans here and abroad. There is, however, another disease that threatens all civilized peoples and that is a disease of terrorism. As is well known by now, a pair of terrorist bombings in Jerusalem today in the vegetable market have left more than a dozen people dead and scores wounded, approximately 150 to date…With regard to the issue at hand,

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104 King, 767
smallpox was a deadly, infectious disease that has been eradicated through the application of medical science. Eradicating the deadly disease of terrorism requires the application of political will by the leaders of the Palestinian authorities. Our hearing today on infectious and emerging disease will begin with a briefing and demonstration by our U.S. Army and some of the equipment that our government has ready to respond to any outbreak of a deadly disease.\footnote{United States Congress, \textit{The Threat to the United States from Emerging Infectious Diseases}, 105th Cong., 1st session. (Washington: U.S. Government Printing Office, 1997).}

Gilman’s simultaneous invocation of disease and terrorism were reiterated in a Congressional hearing six years later concerning the threat of SARS. In remarkably similar language, Representative Henry Waxman began the session by commenting that “the emerging epidemic reminds us…that nature is the most dangerous bioterrorist.”\footnote{United States Congress, \textit{Dangerous Secrets: SARS and China’s Healthcare System: Roundtable before the Congressional-Executive Commission on China}, 108th Cong., 1st session. (Washington: U.S. Government Printing Office, 2003).} The perpetrators may have changed, but the rhetoric remains consistent. These statements feed the underlying basis of uncertainty and fear by which governance produces a demand for, and justifies, the institution of technologies of biosecurity such as ‘preventative’ or ‘preemptive’ global surveillance networks.

Though the concerns over emerging viruses and new bacterial strains are buttressed by the scientific identification of unfamiliar diseases, the production of this atmosphere of terror is one amplified by a wider field of mainstream media and social sciences texts that focus on this ambiguous future and against which it seeks to develop new methods of combat. As a temporal process whose completion is never guaranteed, emergence has fundamentally altered the outbreak narrative. Once occupied with the experiences and dangers specific to known diseases and their
manifestations in human populations, it has become progressively redirected toward
the anticipation of the range of unknown illnesses lurking in the future.\textsuperscript{107}

The Next Killer Plague

In recent years, Hollywood has poured out post-apocalyptic films with
renewed verve. If box office numbers are any indicator, the American public never
tires of watching the world come to an end. The number of films predicated on
pandemic scenarios has more than tripled since the 1960s, with 21\textsuperscript{st} century features
such as \textit{I Am Legend, The Invasion, The Last Man, Blindness, The Sky Has Fallen, 28
Without dwelling on the film industry or this genre’s particular investment in
allegory, it is worthwhile to note the pandemic subgenre’s exponential growth over
the last decade.

In roughly this same period, “popular science” literature on emerging
diseases began to exhibit eschatological rhetoric scarcely distinguishable from that
of their science fiction counterparts. Dr. Frank Ryan, in his book \textit{Virus X: Tracking
the New Killer Plagues}, laments that “today, as one after another of the dismissed
plagues returns to haunt us, as new plagues every bit as deadly as anything seen in
previous history threaten our species, it is obvious that the postwar years were an
age of delusion.”\textsuperscript{108} He concludes with an evaluation of the possibility of a
“doomsday scenario,” warning that without better-regimented international
cooperation in the surveillance and management of epidemic outbreaks, mankind
might face complete annihilation by an unknown deadly virus. “We cannot,” he

\textsuperscript{107} Priscilla Wald, \textit{Contagious}, 2
\textsuperscript{108} Ryan, 9
cautions, “forsake our future to chance, for the roulette wheel is the red tooth and claw of evolution.”109 These finals words are followed by an ominous appendix of fifty five emerging infections he cites as having materialized since 1930.

Published ten years after Ryan’s text, Dr. Robert Baker’s Epidemic: The Past, Present and Future of the Diseases that Made Us supplies an astonishingly similar consideration of the prospect of human extinction. “The emergence of new epidemics in our recent history,” he comments, “leads us to an obvious question. Is there one lurking which could arise to kill every one of us?”110 Like Virus X, the book emphasizes the role humanity has played in this trend of disease emergence, arguing that the primary agent in the proliferation of biological threats has been our own species’ impact on the environment. It is “the quiddity of being a human” that has led us “to new habitats (usually to exploit and destroy them), and places us and our livestock where we do not ‘belong.’”111

Humans have indeed suffered through lethal pandemics in the past and history attests to their capacity to decimate entire populations. In this sense, worries that an unfamiliar disease might cause the collapse of social order, destroying local and national economies and transforming international relations, are not unwarranted. Because the emerging diseases worldview in part seeks to identify the possible location of future outbreaks, its implications operate quite differently on the sub and supranational levels. Developed nations, with the widespread availability of internet access and medical labs with the most updated of technologies and databases, afford their subjects a radically different set of risks and

109 Ibid, 382
110 Baker, 249
111 Ibid, 239
options than they do less affluent or impoverished foreign populations, who are often suspected of playing host to the next deadly pandemic.
Chapter Three

Cartographies of Risk

Risk is the modern approach to foresee and control the future consequences of human action, the various unintended consequences of radicalized modernization. It is an (institutionalized) attempt, a cognitive map, to colonize the future... Risks presuppose decision. These decisions were previously undertaken with fixed norms of calculability, connecting means and ends or causes and effects. These norms are precisely what 'world risk society' has rendered invalid.\(^{112}\)

Coalescing around the emerging diseases worldview and facilitated by new digital technologies, the contemporary politics of health have assembled into a matrix of constantly transforming spatiotemporal assessments of risk, whether individual, national, or global. David Fidler, professor international law and public health, attributes the conflation of these frameworks to the collision of “the policy worlds of security and public health...after the Cold War.”\(^{113}\) The collapse of the Soviet Union, he argues, led to the realization of new fears of both bioterrorism and naturally occurring diseases, and ultimately to the emergence of security politics situated around these biological threats. Though his timeline is accurate, Fidler provides an inadequate account of the broader international conditions that made biosecurity emblematic of, rather than exceptional to, this period.

In considering political and economic circumstances at the turn of the 21\(^{st}\) century, a return to Marx is imperative. The analytic aptitude and lasting prescience of his collected works have caused them to remain among the most infamous and commonly cited texts in social, political, and economic theory for more than 120 years. Even as globalizing technological developments surge through a world increasingly divorced from traditional or classic visions of territory and time,

\(^{113}\) Fidler, 202
the *Manifesto of the Communist Party*, though in certain respects discredited by the failed social revolutions it inspired, continues to offer one of the most insightful and renowned articulations of the mechanisms of capitalism:

Constant revolutionizing of production, uninterrupted disturbance of all social conditions, everlasting uncertainty and agitation distinguish the bourgeois epoch from all earlier ones. All fixed, fast-frozen relations, with their train of ancient and venerable prejudices and opinions, are swept away, all new-formed ones become antiquated before they can ossify. All that is solid melts into air, all that is holy is profaned, and man is at last compelled to face with sober senses, his real conditions of life, and his relations with his kind...In the place of the old wants, satisfied by the productions of the country, we find new wants, requiring for their satisfaction the products of distant lands and climes. In place of the old local and national seclusion and self-sufficiency, we have intercourse in every direction, universal inter-dependence of nations....It compels all nations, on pain of extinction, to adopt the bourgeois mode of production; it compels them to introduce what it calls civilization into their midst, *i.e.* to become bourgeois themselves. In one word, it creates a world after its own image.\(^\text{114}\)

Immanuel Wallerstein famously provides an account of these traits as they appear in what he terms the “modern world-system.”\(^\text{115}\) He describes a multiplicity of political entities encompassed within an increasingly efficient and unifying global super-structure, such that “economic factors operate within an arena larger than that which any political entity can totally control.”\(^\text{116}\) The distribution of labor within the world-economy is geographically situated, creating a distinction between what he terms powerful core-states and weak peripheral areas, as well as a more flexible category of semi-peripheral areas. In this schema, the combination of nationalism with a strong state machinery is used to “protect disparities that have arisen within

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\(^{116}\) Ibid, 393
the world system, and as an ideological mask and justification for the maintenance of these disparities,”

commodifying the periphery much as Marx depicted the bourgeois appropriation of the products of proletariat labor. No matter how impressive their internal machinery, states remain subject to the flow of capital, destined to slip from their position of exploitative strength as others rise to take their place.

As we enter the 21st century, mass migration and growing instability take the form of regionalized cleavages, signifying the escalating disintegration of social stability. No matter its appellation, “liquid,” “reflexive,” “second” or post-modernity is distinguished by its worldwide networking inclinations and an accelerating state of turbulence and chaos. New speeds and qualities of capital flow sweep away and reassemble staid identities, social bonds and political alliances. The interests of state and international affairs are in continuous states of dissolution and rearticulation as capital forges unpredictable paths through the virtual and real spaces of this global order in an ever-revolutionizing drive for profit, pursuing new markets and new modes of production as well as those who own or labor for it. In an era in which no one group or entity can hope to appropriate these currents, uncertainty festers as collective and individual futures collide.

Recalling the optimistic liberal notions of progress that reigned through the late 20th century, Zygmunt Bauman comments that the term has since transformed into “the opposite, dystopian and fatalistic pole of anticipation: it now

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117 Ibid 392.
118 I have grouped these terms together for the basic qualities they collectively attribute to current international affairs. However, I do not intend to conflate Bauman’s “liquid modernity” with Beck’s "second modernity," nor with theories of post-modernity, as in many other respects these works are highly distinct from one another.
119 Theorists tend to identify the early 1990s, particularly the collapse of the Soviet Union in '91, as signifying this shift.
stands for the threat of a relentless and inescapable change that instead of auguring peace and respite portends nothing but continuous crisis and strain and forbids a moment of rest.”\textsuperscript{120} The atmosphere of ubiquitous uncertainty is the operative basis of what Ulrich Beck refers to as “world risk society.” Beck, as does Bauman, suggests that this culture produces an individualization of risk management, a structural, institutionalized requisite that citizens accept responsibility for their personal wellness, economic futures, and general security.

Making Uncertainty

The trajectory followed by developments in medical knowledge and technologies has for the last millennium been a process of learning as thoroughly as possible \textit{where} to find disease. Biomedicine has followed precisely this trajectory, today conducted on the molecularized landscape of human DNA. Since the Human Genome Project was undertaken in 1990, DNA analysis has done more than narrow the nature versus nurture debate. Genetic knowledge has transformed Western conceptualizations of disease, and DNA is taken to be the future of medicine, and, as a recent New York Times article suggests, even our love lives.

As more genetic properties, and the technological mechanisms to cope with them, are identified, the prospect of molecular explanations and treatments for virtually every aspect of human health, and behavior, has raised new questions in bioethics. Nikolas Rose, echoing Beck, has theorized an emerging “ethopolitics,” by which risk management strategies have been shifted from the level of the population to that of the individual biomedical body. His analysis refers to developing

\textsuperscript{120} Zygmunt Bauman, \textit{Liquid Times: Living in an Age of Uncertainty} (Cambridge: Polity Press, 2007), 11
technologies such as gene therapy and nanomedicine that have created new spatializations of the human body in terms of its genetic code. In the 1930s, he claims, life became not only molecularized, but conceived as digitally encoded on the chromosome. This code, he suggests, “is the ‘language of life’ that contains ‘the digital instructions’ that make us what we are.” However, the promise of genetic enlightenment has yet to be matched with confidence; instead these technologies seem to be hemorrhaging conclusive biomedical knowledge of disease. Rapidly disappearing is the hope for a coded answer to all biological quandaries as “genomes, or books of life,” prove to be “far from the stable monoliths once envisaged.”

Since early childhood, Summer Stiers has exhibited an array of health problems ranging from kidney failure to bone-tissue death, intestinal and retinal bleeding to benign vascular brain tumors, in what her doctor has described as a “cascading collapse of systems.” 31 year old Stiers has seen as many diagnoses as she has specialists, each of which has in turn been ruled out either by medical tests or the detection of contradictory symptoms. Her quest for truth is the lens through which journalist Robin Henig tells of the Undiagnosed Diseases Program, established by the N.I.H. in May 2008, whose task is the investigation of new and anomalous diseases. The program consists of specialists, clinicians, and laboratory scientists who together operate as a single diagnostic team, in an effort to widen the reserve of knowledge with which to observe and interpret the patient.

Director William Gahl describes how specific cases are selected for review, explaining that the program prioritizes those most likely to either reveal new

122 Ryan, 10
information about a given disease or lead to the diagnosis of one hitherto unknown or unidentified. It is a competitive selection process, in which three-quarters of applicants are rejected because their condition is either inadequately documented or seem, in Gahl’s opinion, psychosomatic in nature. Out of the remaining quarter, the program’s medical review board accepts only a few each month, evaluated for their potential to advance scientific or care-related knowledge about the disease. Selection alone does not, of course, promise diagnosis, cure, or even prognosis. “For every diagnosis the group makes,” Gahl estimates, “there will be nine cases that remain mostly unresolved.”

The struggle to identify illnesses such as Stiers’ serves to better illuminate the ambiguous space generally masked by diagnostic medicine, where even a widely-accepted definition of a given disease is often only understood in terms of its signs and symptoms, diagnosed through a process of elimination. In these cases of what is termed differential diagnosis, the presentation of new symptoms can upset the boundaries of an accepted category of illness and draw into question the legitimacy of its very existence. Most medical students, the article explains, are taught diagnostic parsimony, also termed Occam’s Razor, which looks for a single diagnosis that accounts for all the patient’s symptoms. Henig references professor of medicine John Hickam, who in the 1950s somewhat humorously proposed an alternative model of diagnosis that he called Hickam’s dictum, by which “patients can have as many diseases as they damn well please.”

Though somewhat limited, these opposing visions of diagnostics are reminders of the fluidity of the criteria by which many diseases are still understood,

124 Ibid, 24
125 Ibid, 29
named and treated. There is not only the problem of distinguishing “authentic” diseases from their psychosomatic imitators, but that of identifying a set of symptoms as either co-morbidities or components of a unified illness. Gahl explains that while his most basic desire is “to define and understand new diseases,” specifically on a molecular, genetic, level, definition of this kind is not synonymous with a cure, or even with better care. Knowledge of a new disease, summarizes Henig, “can be double-edged: useful for the community at large, yes, and in some cases even helpful for the patient, but often incomplete, confusing or unbearably grim.”\textsuperscript{126} It is in this spirit that Henig evaluates the emotional toll of being undiagnosed, adding the normalizing proclamation that “the prospect of physical decline in the face of an unknown future represents, after all, the essence of the human condition.”\textsuperscript{127}

This assessment of universal patienthood is one becoming increasingly common in media coverage of genetic research and the diagnosis of disease, hereditary or otherwise. A recent National Public Radio article follows this approach in a provocative interpretation of the discrepancies between molecular testing and prognosis. “Information is power,” writes journalist Deborah Franklin, “has become a common mantra. But for many people seeking answers through genetic testing, all the DNA probing ends in this twist: Less certainty, not more.”\textsuperscript{128} The article goes on to tell the story of one Susan Gilmore, who took a test to discover whether she was positive for mutations in the BRCA1 or BRCA2 genes. Anomalies

\textsuperscript{126} Ibid, 25.
\textsuperscript{127} Ibid, 44
in their structure have been found to correlate to an increased risk of breast and ovarian cancers.

Gilmore describes months of feeling “like cancer is going to control my life, or even the thought of cancer. Or the fear of cancer.”129 Her desire to take the test was to alleviate this anxiety, believing that the results, whether positive or negative, would be better than wondering, despite the fact that carrying the BRCA mutations is a far cry from being diagnosed with cancer. However, when she finally received her results, Gilmore found no relief. Instead she learned that while she did not have the precise mutations associated with cancer, her DNA did manifest a variant of “undetermined significance.” The doctor further explained that this mutation is present in about 10 percent of all BRCA test cases, a number that increases among African-Americans. While her genes displayed certain abnormalities, they have not been conclusively tied to disease.

The article fixates on the ambiguity of this finding, implying it to be even more threatening than do its researchers. “Susan’s ‘variant,’” the reader is told, “could turn out to be harmless…or not. At this point, no one can say for sure.”130 Like the journalist, Gilmore places a great deal of significance upon the vague connotations of her test results. She even began to ask doctors whether she should have her ovaries removed, but found no “direct advice.”131 Her frustration persisted in spite of the fact that even a negative test result is hardly assurance that one will not fall victim to cancer. Similarly, a positive result carries no guarantees to the

129 Ibid
130 Ibid
131 Ibid
opposite effect. Ultimately, upon a genetic counselor’s advice that she evaluate her own tolerance for risk, Gilmore chose to have her healthy ovaries removed.

While there seems to be an attempt in the article to distinguish between the empowering comfort in concrete findings of a test such as the BRCA, Gilmore’s reaction to the ambiguity of her “variant of undetermined significance” goes a long way in accentuating the truly deterministic qualities of uncertainty in the current biomedical climate. In the end, little distinguishes Gilmore’s doubt-driven hysterectomy from the one she would have elected to undergo had she been motivated by a conclusively positive test result. Aside from the fact that both “results” remain essentially inconclusive, this particular case study demonstrates the merging of statistically supported risk assessments with the mere intimation of risk.

Gilmore believed that “information is knowledge and power,” knowledge and power so essential to her state of mind that she absolutely “need[ed] to know.” Her self-declared empowering decision to preempt ovarian cancer is one that quite concisely reveals the flexible significance information has come to acquire in recent years. Information, even in common parlance, connotes uncertainty as much as it does meaning, and as this instance makes clear, the added possibility of meaning lying in uncertainty.

On the level of the individual case, “What’s Wrong with Summer Stiers?” and “Family Struggles with Ambiguity of Genetic Testing” tell two rather dissimilar stories. While neither grapples with the general etiology of emerging or unknown diseases, Henig and Franklin, and of course the medical institutions they set out to describe, do nonetheless share certain tropes of the rhetoric of the

\[132\] Ibid
emerging diseases worldview. What is clear in these two articles is a class of “new” and “unknown” disease that is serving as a statistical category and source of action in and of itself. This informationalization of the unknown alludes to a knowledge of its semiotics and statistics, despite the fact that there remains neither a formalized means of comprehending it, nor any basis for the grouping of its disparate range of meanings. These statistics present an illusion of control, a knowledge of the “nine cases” out of every ten seen by the Undiagnosed Diseases Program “that remain mostly unresolved”\textsuperscript{133} and the “roughly 10 percent of all cases of BRCA tests” that turn up a “variant mutation of ‘undetermined significance.’”\textsuperscript{134}

In Foucault’s chronology of epistemological shifts in governance, the mechanisms of sovereignty and discipline exercised power through a bifurcated framework of normativity and deviance, maintaining order in situations of uncertainty or threat through the punitive and regulatory ordering of individuals. As the biopolitical state emerged, it required a science of statistics and the mechanisms of surveillance with which to produce them. If the object of biopower is the life of the population, its language is that of statistics. While the normal curve described by Foucault has by no means ceased to operate as a means of identifying and assessing populations, a curve of another sort has come to give shape to a space, and a population, that have no consistent qualities in common, no identifiable criteria, save a confounding condition of the body’s molecular traits. That the human condition is one of uncertainty is no longer masked or denied by medicine, or even raised as a sporadic but generally avoidable or combatable threat. With these data the state meets instability with flexibility, potentialities with illusion.

\textsuperscript{133} Henig, 24
\textsuperscript{134} Franklin, “Family Struggles.”
Naturalizing uncertainty with the promulgation of risk, the greater the chaos, the more a society of security melts into one of insecurity. Attempting to assess relative risk status is at once the primary self-regulating practice encouraged by these channels of health information communication and an increasingly impossible task. The resultant climate of health management, at least in the first world, is one of anxiety as individuals attempt to locate themselves in relation to the perpetually shifting curves that have taken the place of authoritative consensus in representations of ideal health.

Times and Spaces of Disease

In a comparison of anthropological and epidemiological narratives of risk, Ronald Frankenberg suggests that contemporary medical practice relies upon two competing understandings of time. He describes the way in which diverse diseases, one they have been identified and defined as particular conditions, come to exist “if in a time frame at all, in the cycles of supposedly natural time.” To this abstraction of time he contrasts the physician’s investment in the progression of a specific disease within an identified patient, a task requiring knowledge of the “time and date of onset, course of illness, and date of cure and discharge or ‘negative patient outcome.’” Frankenberg asserts that the practice of taking a patient’s history can be read as a metaphorical indication of “both the timelessness of disease

136 Ibid, 225
and the episodic nature of acute sickness” as they are “enacted within the confines of the time-structured clinic.”\textsuperscript{137}

In this schema, episodic sickness and the individual case constitute the statistical knowledge of population risks that permit a conceptualization of disease that sits outside the bounds of time. The codependency of these two times of illness is exemplified by evaluations of conditions which, after lengthy observation, are displayed in terms of their average incidence in extremely brief measures of time; seconds, minutes, hours or days. The North-South Institute on HIV/AIDS, for instance, informs readers that every minute five to six people die from AIDS\textsuperscript{138}. Such representations of disease are all the more problematic in this particular case, since as a syndrome, AIDS — a set of symptoms and infectious that arise with particular complications or severity due to immune system damage from HIV — does not even medically qualify as a cause of death. Thus, while Frankenberg remarks that “for most physicians, asthma and AIDS, syphilis and measles, once established as syndromes, soon cease to have a social history in linear time,”\textsuperscript{139} a great deal of media coverage of emerging and unknown diseases reveals the production and blending of equally abstracted, and adversely connoted, populations who are identifiable only by their unsuccessful pursuit of biological information.

Epidemiologists, once devoted to the study of particular diseases in terms of their incidence within, and effects upon, the afflicted population, now begin at the level of the healthy population and extrapolate disease. Such a move is justified as seeking the maximum possible preservation and protection of general health,

\textsuperscript{137} Ibid, 225
\textsuperscript{138} "The North-South Institute." \textit{The North-South Institute/L’Institut Nord-Sud} <http://www.nsi-ns.ca/english/default.asp>.
\textsuperscript{139} Frankenberg, 225
requiring that researchers “not only define nonsufferers as prepatients but if successful will interrupt the progression of nonsufferer to sufferer, prepatient or even, inadvertently, sufferer to patient.” Whether prevention is in fact the primary intent nonetheless becomes a secondary concern when this trajectory begins to mutate. The interventionist drive of epidemiology, integrating research with health policy proposals, has swept future illness into present time without the intermediary elements of symptom, debility, or the demand for medical attention. It is in this climate that nonsufferers such as Gilmore make the decisions of a patient or patients such as Stiers are grouped with other highly distinct cases on the basis of suffering.

This form of risk-based medicine privileges the act of surveillance over its particular findings, and in a language that seems to be forgetting with increasing rapidity the complex social circumstances that have gradually come to produce an ontology of disease that permits its conceptualization in the uncertain future. Surveillance practices, even when considering diseases that have manifested in the population, are occupied not only with their etiology but with the potential ramifications of their latent mutations: the repercussions of airborne ebola or a super-strain of HIV/AIDS. The traditional classification of diseases on the basis of their traits, degrees of similarity, known treatments or prognoses, is no longer uniformly operative. Whether evaluating a known or future epidemic, this outlook exchanges patient pathology for “a more general category of ‘factor’ that points to,
though does not necessarily produce, some future illness,” such that “illness becomes a point of perpetual becoming.”\textsuperscript{141}

Armstrong offers the brief example of recent attention directed toward the correlation between HPV and cervical cancer. The first identification of Human Papilloma Virus was made from the genital warts caused by certain of its strains, which were considered to be the primary concern with infection. Now other strains of the virus have been identified as increasing the risk for cervical cancer, as a “potential, yet unformed, eventuality."\textsuperscript{142} Like Gilmore’s genetic test, HPV has become a link in a causal chain toward disease, and ultimately death. Such discoveries, though they can undeniably hold the potential to save lives, also reveal a preoccupation with what diseases \textit{can be}, rather than what they are first and foremost known \textit{to do}.

Nowhere is this more clearly expressed than in the emerging diseases worldview, which displaces risk from the individual body and thrusts it into the realm of geopolitics. Thus, while Rose’s ethopolitics may provide a framework by which to begin to understand the entry of uncertainty into the realm of genetic risk, his theory is predicated on a molecularized map of the human body that has reached a degree of authoritative completion. Steirs and Gilmore both exemplify the far more complex biomedical management of genetic risk at work. While theorists of risk focus on the expression of particular threats, dangers or insecurities, the emerging diseases worldview communicates uncertainty that is intrinsically non-representational. Bruce Braun, in an insightful critique of Rose’s theory, argues that “alongside the genomic body, and at times overlapping with it, can be found another,

\textsuperscript{141} Armstrong, 402
\textsuperscript{142} Ibid, 402
post-genomic body which is also understood at the molecular scale, but considered instead in terms of its displacement within wider molecular fields.”

Under this reign of biosecurity, surveillance programs find justification for their invasive gaze and preemptive interventions in the unpredictability of this biological life.

The Geopolitics of Virtual Cartographies

In February of 2008, the epidemiological community hailed a groundbreaking study on the “Global Trends in Emerging Infectious Diseases,” funded by The U.S. National Science Foundation and included as a letter in the British journal *Nature*. The object of widespread media attention, its release was covered under such headlines as “Scientists Make First Map of Emerging Disease Hotspots,” “Map Pinpoints Diseases ‘Hotspots,’” and “Emerging Infectious Diseases on the Rise: Tropical Countries Predicted as Next Hot Spot.” This latter article, published by *Science Daily*, exclaimed that after thirty years, during which “billions of research dollars were unsuccessfully spent to try to explain the seemingly random patterns of infectious disease emergence and spread,” the research compiled in *Nature* had finally provided “the first insight about where future outbreaks may occur — and next up is likely the Tropics, a region rich in

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143 Braun, 7
144 Kate E. Jones, Nikkita G. Patel et al, “Global Trends in Emerging Infectious Diseases,” *Nature*, 451.21, February 2008 was primarily financed by a grant from the U.S. National Science Foundation (NSF). It was additionally supported by public and private research institutes including the National Institutes of Health, The New York Community Trust, V. Kann Rasmussen Foundation, and the Columbia University Earth Institute.
wildlife species and under increasing human pressure.” Each mainstream report of this work similarly celebrated its seminal discovery of spatiotemporal trends in the history of emerging diseases, often referring to its simulated maps as though they evidenced infections already in circulation. Journalists and bloggers seemed to uncritically accept, and even embrace, these probabilistic risk assessments of virtual pathogens as they unhesitatingly championed their architects’ specific policy recommendations as empirically necessary measures.

Methodologically, however, the study is hardly so clear-cut. Its authors, comprising an international team of researchers, explain that while emerging infectious diseases are typically attributed to “socio-economic, environmental and ecological factors” theirs is the first comparative investigation to have “explicitly analysed these linkages to understand global temporal and spatial patterns of EIDs,” correlations they ultimately come to confirm. In conducting their research, Jones et al. referred to a database of 335 diseases classified as “events” of emergence between 1940 and 2004. The criteria for an EID event are broad, far exceeding stricter applications of emergence that typically signify a disease’s first documented manifestation in a human population during a selected period of time. Their dataset encompasses mutated and drug-resistant strains of known pathogens, as well as diseases that “have probably been present in humans historically, but which have recently increased in incidence.” These vague qualifications

148 Ibid
149 For brevity’s sake, authors Kate E. Jones, Nikkita G. Patel, Marc A. Levy, Adam Storeygard, Deborah Balk, John L. Gittleman, and Peter Daszak will be hereafter be referred to as Jones et al.
150 Jones et al, 990
151 Ibid, 990
immediately beg a reconsideration of the fundamental significance of the article’s conclusions.

The study found that emerging infectious diseases have been on the rise since 1940, peaking in the 1980s but continuing to increase in number as of 2004. Jones et al. acknowledge that this trajectory became considerably less steep, though remained statistically significant, upon controlling for reporting bias. Their control variable was derived from the annual number of articles published in the *Journal of Infectious Diseases* since its establishment in 1945. The degree to which this single periodical offers an adequately accurate representation of the relationship between reporting effort and EID events to warrant the study’s quantitative conclusions seems debatable at best.

Nonetheless, it serves as the foundation for the researchers’ introduction of a global model by which to identify sites of future disease emergence. Pinpointed on a world map, these “hotspots” are clustered at the equator, dense over all of Asia, and lightly dusted across Europe and North America. Drawing from these simulated maps, Jones et al. argue that the emerging infections surveillance infrastructure is problematically concentrated in wealthy nations, where pathogens are far less likely to emerge. Like the majority of scientific literature on the global management of infectious diseases, they recommend a “re-allocation of resources for ‘smart surveillance’ of emerging disease hotspots in lower latitudes, such as tropic Africa, Latin America and Asia, including targeted surveillance of at-risk people to identify early case clusters of potentially new EIDs before their large-scale emergence.”

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152 Ibid, 992
The maps generated in the *Nature* study, titled “global distribution of relative risk of an EID event.” The key informs readers of potential events caused by “a, zoonotic pathogens from wildlife, b, zoonotic pathogens from non-wildlife, c, drug-resistant pathogens and d, vector-borne pathogens.”

The language of biosecurity is one quite clearly entwined with constructs of humanitarian responsibility. As Beck argues, the coalescence of risk, care and globalization suggest that “the greater the success of neoliberal politics on a global level – that is, the greater the erosion of state structures – the more likely it is that a ‘cosmopolitan façade’ will emerge to legitimize Western military intervention.”

Core-states and their health organizations, scarcely able to contain their benevolent generosity, promise to rescue third world nations from their pathogenic afflictions and offer to institute surveillance and aid for those unable to do so themselves.

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153 Ibid, 993
154 Beck, 13
These geopolitical tropes provide the context for Charles Zerner’s “Emerging Cartographies of Environmental Danger: Africa, Ebola, and AIDS.”\textsuperscript{155}

His analysis begins with a description of the long history of colonial portrayals of the South American and African forests as spaces of danger and turmoil. Tales of these realms depicted the jungle as deceptively lush and harmonious, furtively biding its time before launching a diabolical attack against transgressors. Invoking the cry ‘enter at your own risk,’ these accounts conjured images of an unnavigable undergrowth concealing indigenous “savages” and teeming with grotesque parasites and plagues that threatened the intrepid explorer with his potentially perilous transformation, be it by capture, assimilation, infection or death.

Zerner finds that these colonial narratives were largely, though only temporarily, effaced in the 1970s and 1980s as rising environmental protection programs sought to communicate the sacred purity of the tropics, and particularly that of the Amazonian rainforest. He posits that since the early 1990s, cultural representations of emerging infectious diseases have instigated a radical departure from these “Edenic images”\textsuperscript{156} of equatorial lands. Citing as evidence Richard Preston’s 1994 bestseller \textit{The Hot Zone}, a vivid tale of the Ebola virus’ odyssey from the heartland of Kenya all the way to Reston, Virginia, Zerner argues that recent texts display a return to the same problematic tropes articulated in earlier colonial literature. But unlike the colonial account, which drew “a spiral inward and downward to a fevered and chaotic center,” the contemporary trajectory follows a distinctly “outward movement, a spiral originating within the heart of the equatorial


\textsuperscript{156} Ibid, 178
forest, arcing across the globe, and penetrating the core nations of the North.”  

Once chiefly criticized as violating intrusions, depleting natural resources and causing pollution, the inroads forged by industrial development have been refigured as the routes by which tropical diseases may exit the forest and enter into global circulation.

Zerner names this inverted representation “the viral forest in motion,” describing it as a synthesis of long-sustained stereotypes of Africanized pathogens and new panic born of globalization. Together these anxieties are situated around pathogenic movement, tracing the contours of “an emerging cartography of environmental danger” that traverses and infiltrates territorially-bounded communities. Zerner worries that amidst the fears of viral intrusions and dissolving border safety is the guiding hand of biosecurity and perhaps even “an American military establishment in search of new missions and enemies.”

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157 Ibid, 178
158 Ibid, 179
159 Ibid, 179
Chapter Four

Virtual Networks

It is not at all that the State knows nothing of speed; but it requires that movement, even the fastest, cease to be the absolute state of a moving body occupying a smooth space, to become the relative characteristic of a ‘moved body’ going from one point to another in a striated space. In this sense, the State never ceases to decompose, recompose, and transform movement, or to regulate speed.”

In his “Postscript on the Societies of Control,” Deleuze formulates an extension of Foucault’s chronology of epistemological shifts in governance. While Foucault’s schema of power is one which produces subjectivities and rights, in part by imbuing difference with social meaning, Deleuze describes a society in which “individuals have become ‘dividuals’ and masses, samples, data, markets, or ‘banks.”

Creating a distinction between the molding instructions of disciplinary power and the modulating effects of post-war technologies of governance, he explains that societies of control modulate in accordance with, rather than in opposition to, change. Unlike Foucault’s depiction of security, however, Deleuze attempts to account for the techno-networking capacities of the digital age. Shattering subjects into data, these mechanisms treat bodies as “undulatory, in orbit, in a continuous network.” Rather than abandoning biopower, governance ceases to view the enclosed body as its primary target, instead seeking to appropriate that which is embedded within it.

Societies of control are invested in the production and manipulation of information rather than its body, equating and merging the human form with that of the machine, and of the population with the network. In this context, information

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162 Ibid
must be understood as distinct from its material instantiation. Originating in 1948 with Claude Shannon’s definition of information as a mathematical quantity, information theory was originally formulated for the purposes of cybernetics research. The leading experts in the field congregated from 1943 to 1954 at a series of conferences financed by the Josiah Macy Foundation with the express hope of producing a “theory of communication and control applying equally to animals, humans, and machines.” Shannon’s theory is based on the idea that a message must be encoded within a signal, and then transmitted through a specific medium, in order to acquire a material form. The efficiency of a given system could thus be quantified by entropy: the degree to which the message’s integrity was lost in the channel of its communication (assuming it indeed arrived at a destination).

Katherine Hayles has situated this distinction between informational code and its meaning in posthumanist discourse, explaining that “embodiment in a biological substrate is seen as an accident of history rather than an inevitability of life.” Hayles goes on to outline the phases of cybernetic theories from homeostasis, to reflexivity, and finally to virtuality. Entropy was initially identified as the ‘noise’ within communication channels or feedback loops that caused a distortion in content. As a system deteriorated, increasing chaos was perceived as its impending heat death. Norbert Wiener, on the other hand, theorized information as a “local organization against entropy, a temporary deferral of entropy – that is life.” This shift to virtuality and complexity theory thus replaced a supposition of entropic finitude with one of emergence, meaning that changes and distortions in

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163 Katherine Hayles, *How We Became Posthuman* (Chicago: University of Chicago Press, 1999), 7
164 Ibid, 2
the flow of information can actually cause codes to “evolve spontaneously in
directions the programmer may not have anticipated.”\textsuperscript{166} Information can thus be
said to have the capacity to produce value in the denial of predictability, in the
infinitude of potential manifestations and combinations of events. Patricia Clough
provides a concise summary of Wiener’s mathematical, as well as Prigogine and
Stengers’ theoretical, contributions as formative to theories of dissipative structures
within chaotic conditions of an open system.

Rather than seeking to organize and harness directed flows of
communication, control is concerned with the making of informational potentialities
arise from the noise and turbulence produced in their transmission. In these
assertions, Deleuze is alluding to and theorizing Spinoza’s concept of affect: the
autonomic, or nervous system, subindividual bodily “capacity to affect or be affected
– not an action but a capacity for activation.”\textsuperscript{167} In his pioneering text, \textit{The Autonomy
of Affect}, Brian Massumi theorizes affect in technological terms, locating the
“primacy of affect” between signal and response, aporiaetic to structuralist semiotics.
The affective field, Massumi explains, is non-phenomenological. Though socially
referent, affect has autonomy, a certain openness that cannot be captured by the
drive to cognitive order. Affect thus precedes consciousness and when expressed,
always leaves behind “a never-to-be-conscious autonomic remainder,”\textsuperscript{168} ubiquitous
but imperceptible. Prior to its realization, affect is subject to modulation: the
widening and heightening or narrowing and dampening of affective capacity. Such
shifts or changes in affect are incited by instances of dynamism, by the resonances of

\textsuperscript{166} Hayles, 11
this piece with Charles Lemert but it has not yet been published.
\textsuperscript{168} Ibid, 17
physical and cognitive biological systems that undergo shared experiences yet respond with “different logics and temporal organizations.”169 The less self-evident the stimuli, the greater the intensity is likely to be; these moments can be said to occur in moments of ambiguity or disorder, prior to the organizing efforts of conscious narration.

Such a concept is at odds with a preponderance of theories that focus on the structures of ideological illusion and subject formation as the primary means of comprehending sociality.170 A reexamination of Althusser’s scenario of the hail elucidates the rapport between subjecthood and affect, revealing that the father of interpellation himself may have unintentionally anticipated affect.

In his theory of the mirror stage, Lacan describes the infant’s reconciliation of self with image (through reflection) as the process of subject formation. Its enclosed body is visually inserted and placed in relation to the people and things it has hitherto perceived non-reflexively, leading the infant to come to the recognition of its outline as distinct from the forces which “the subject feels are animating him.” Lacan contrasts this experience to an “Ideal-I” which “situates the agency of the ego, before its social determination, in a fictional direction, which will always remain irreducible for the individual alone, or rather, which will only rejoin the coming-into-being of the subject asymptotically, whatever the success of the dialectical syntheses by which he must resolve as I his discordance with his own reality.”171

Althusser, nearly twenty years later, borrowed from Lacan’s mirror stage to postulate the concept of subject formation through interpellation. He identifies a set

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169 Massumi, 93
170 Ibid, 20
of Ideological State Apparatuses, essentially institutions of the private domain (religious, educational, family, legal, political, trade-union, communications, cultural), and asserts that the outlooks, or ideologies, proffered by these apparatuses correspond not to reality but rather to “the imaginary relationship of individuals to their real conditions of existence.”\textsuperscript{172} He extends his argument to articulate the material existence of ideology, in which subjects act in response to material conditions under an ideological understanding of these conditions. In this way, ideology and the subject must be understood as codependent, coming-into-being simultaneously; the subject giving a “destination for ideology” as ideology constitutes “concrete individuals as subjects.”\textsuperscript{173} To explain this process, Althusser suggests a simple scenario:

I shall then suggest that ideology ‘acts’ or ‘functions’ in such a way that it ‘recruits’ subjects among the individuals (it recruits them all), or ‘transforms’ the individual (it transforms them all) by that very precise operation which I have called interpellation or hailing, and which can be imagined along the lines of the most commonplace everyday police (or other) hailing: ‘Hey, you there!’

Assuming that the theoretical scene I have imagined takes place in the street, the hailed individual will turn round. By this mere one-hundred-and-eighty-degree physical conversion, he becomes a subject. Why? Because he has recognized that the hail was ‘really’ addressed to him, and that ‘it was really him who was hailed’ (and not someone else). Experience shows that the practical telecommunication of hailings is such that they hardly ever miss their man: verbal call or whistle, the one hailed always recognizes that it is really him who is being hailed. And yet it is a strange phenomenon, and one which cannot be explained solely by ‘guilt feelings,’ despite the large numbers who ‘have something on their consciences.’

Naturally for the convenience and clarity of my little theoretical theatre I have had to present things in the form of a sequence, with a before and after, and thus in the form of a temporal succession. There


\textsuperscript{173} Ibid, 320
are individuals walking along. Somewhere (usually behind them) the hail rings out: ‘Hey, you there!’ One individual (nine times out of ten it is the right one) turns round, believing/suspecting/knowing that it is for him, i.e. recognizing that ‘it really is he’ who is meant by the hailing. But in reality these things happen without any succession. The existence of ideology and the hailing or interpellation of individuals as subjects are one and the same thing. ¹⁷⁴

This scenario has been widely problematized, even by Althusser himself, for misrepresenting interpellation. In the example, the subject’s turn is described to represent the confirmation that he has been hailed while also confirming the existence of that which has hailed him. In other words, the act of turning is used to describe the production of a subject / object relationship.

Striking is Althusser’s decision to publish the scenario despite multiple disavowals of its appropriateness, a clear display of indecisiveness, and the fundamental problem of temporal succession, all of which weaken the integrity of his text. He asks the reader to understand that it is for the sake of “convenience and clarity” that his presentation is sequential. He vacillates between declarations of “hardly ever” and “always,” and admits parenthetically that it is “nine times out of ten the right one” who responds to the hail. The turn is “a strange phenomenon,” and one which ultimately he fails to explain. When the scene is read as Althusser requests, by discounting its sequence of events in favor of an understanding of instantaneity, of “already always,” there arises a problematic dismissal of the originary event while he is in the midst of describing it.

However, if its sequence is taken as essential, the scenario creates a conceptual bridge between ideological interpellation and affect. Affect, to reiterate, is defined as a visceral property, a capacity to affect or be affected. Modulations in

¹⁷⁴ Ibid, 321
its intensity thus occur in moments of heightened uncertainty or disorder, prior to conscious narration or action. Althusser’s character is hailed. He then turns. We can locate the affective shift between signal and response, an affective reaction which incites a conscious curiosity, need, or desire to turn.

In Althusser’s scenario, the moment before the turn represents a state of potentiality in which an array of possibilities exists. The distinguishing factor here — for in any reading, the man turns — is that affect is incited unconsciously and unintentionally, viscerally and, in problematic terms, instinctually, by material conditions with virtual consequences. The narration, in this case the turn (or the feeling which desires it), is, like any expression of affect, always incomplete.

Considering Althusser through a posthumanist lens, his disclaimers and hesitations might be said to illuminate what was already a problem of discounting or failing to identify affect. Though relationship between the ISA and subject is secondary to that between information and affect, both do share a fundamental trait of symbiotic and simultaneous animation of its counterpart. Althusser’s scenario can be read, and problematized, as a “skeuomorph,” both a description of subject formation as well as the unintentional articulation of an affective turn.

It is important to note that the departure from theories concerning ideological interpellation in a society of discipline ought not to suggest that there has been an eradication of such practices. Rather, technologies capable of biopolitical modulations of affect permeate the social body in ways that interpellation and discipline cannot express or encapsulate. A society of control attends to and centralizes the autonomic element that discipline ignores or, at best, relegates to

\[175\] Hayles, 17
psychoanalytic theory. Rather than connoting a relationship between subject and apparatus, affect is a visceral property, a capacity for autonomic activation and response.

Like information, affect is formulated upon an ontology that abandons traditional definitions of information as a vehicle of meaning or representation. Employing the language of complexity and chaos theory, Massumi refers to affect as the emergence of these autonomic resonances, as well as their limit point. In this sense, affect is “the simultaneous participation of the virtual in the actual and the actual in the virtual, as one arises from and returns to the other.”176 This relegates affect to a probabilistic state, “a condition of possibility of meaning’s (im)possibility”177 that can be envisioned as functioning in tandem with affect, both contributing and growing from the intensification of confusion. Given their imbrications with informational channels, autonomic capacities are especially vulnerable to the novel speeds of digital technologies. The autonomic remainder, though destined to elude the human mind, can be uniquely accessed by these media. Clough thus argues that digitalization refigures coding as “a measuring that assembles with…matter’s affective capacity,” allowing current technologies to effect qualitative changes in the intensities of affect.178

Dienst advances one such theory of affective modulation in his theory of television’s socialization of time is one such example of technologies of affect modulation. The procedure of watching television suggests to Dienst a merging of time and image units, in that each image occupies the screen for a given amount of

177 Patricia Clough, “Future Matters: Technoscience, Global Politics, and Cultural Criticism,” Social Text, 22.8 (Fall 2004), 12.
time. Whenever the viewer is exposed to an image she has already seen (already invested), the corresponding unit of time is made independent and thus can be said to produce value. If watching television produces value when the viewer is “merely bodily engaged with the passing of images, one after another,” then the succession’s principal function is not to disseminate plot or social values and norms, but rather to destabilize and communicate the value of time. He thus reworks time into the virtual, where value lies in the denial of time’s predictability, in the infinitude of potential manifestations and combinations. Virtual time has no formula or pattern, it “cannot be thought in terms of the spacing of time; rather, it must be thought in terms of the time of the interval; it is the time of the in-between, the time of affective shifts.”

Drawing from theories of virtuality, Clough postulates that inexhaustible, or surplus, affect and information are produced through feedback loops within a volatile system, merging with the market demand for investment in what is, in the end, little more than a game of chance. The current proliferation of technologies of governance and economy signify not only a “marketization of affective capacity” but also of affective quality. One such example is the proliferation of theories concerning preemptive logics of affective modulation. Societies of security and control, by operating upon the entire milieu, can be thus said to bring “economy and governance and society into a grand, nonlinear matrix guided by a preemptive logic.” By this inverted logic, potentialities of future “actualities” come to define the status of the present. Such a process folds time upon itself in such a way that

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179 Patricia Clough, “Future Matters: Technoscience, Global Politics and Cultural Criticism” Social Text, 22.3 (Fall, 2004), 7
180 Ibid 8
181 Clough, “Future Matters,” 15
182 Clough, “The Affective Turn,” 14-15
future and present become not only indistinguishable but always and already suspended. Clough defines preemptive logic as the relegation of human populations to “being a probe or sensor of the improbable future.” These are predictive technologies which are not based in probabilities and statistics, but instead work to produce them.

**Virtual Cartographies**

The virtual ontology of the emerging diseases worldview is exactly one such preemptive logic, actualized in populations in the form of biosecurity. Among the technologies which mediate this form of control is a generation of Internet surveillance networks designed to “predict and prevent” potential pathogen emergence.

When geographic information systems (GIS) were first developed in the 1960s, their applications were extremely limited. The programs could only be operated by those with adequate computer skills and the software initially did little more than spatially reconstruct manually collected data. With the production of the first personal computers, GIS became far more accessible, while the World Wide Web offered a medium by which data and findings could be transmitted, integrated and reassessed. Today, this software is widely available and easily implemented by non-specialists to perform automated searches and data analyses. The pairing of digital technology with the Internet’s global circuitry has opened a unique space in which established surveillance and mapping practices are assembling in novel ways with the emerging diseases worldview. Google.org is but one of a recent slew of GIS

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183 Ibid, 15
programs that are being used to create maps, both national and global, of potential health risks.

Optimistically echoing the *Nature* article, one textbook on infectious disease surveillance proclaims that the ideal surveillance system would be able to “anticipate what has not yet happened: identify infectious agents before they emerge, detect signals of exposure or prodromal symptoms before a disease has become manifest in large numbers of the population.”184 Similarly, in a speech at the 2008 Conference of Emerging Infectious Diseases, Google.Org director Dr. Larry Brilliant argued for “the integration of human, animal and environmental health sectors to build statistical and process-based models of infectious disease,” lamenting the ways in which timely and cross-disciplinary sharing of information is impeded by the demands of our current academic model and its extraneous peer review process. “Our vision,” he declared, “is to work with all of you to improve what’s already underway and even take ‘two steps to the left’ – and no this is not a political comment – of where we are mainly operating today – to where we want to be moving together as a community – AHEAD of the epicurve.”185 Brilliant’s speech is paradigmatic of the emerging diseases worldview, identifying globalization as the neglectful and monstrous parent of an impending series of catastrophes, including epidemics, while simultaneously championing its technologies and networks as the sole weapons with which to resist its terrorizing consequences.

Facilitated by new digital technologies, these tools are harnessing the energies and anticipations of populations in order to create, propagate, manipulate

and reinvest these data and desires, rather than following a traditional model that employs authorized knowledge and legal regulations in their compilation and structuring. Who is Sick?, a Google-powered website, is a user-generated service that aims “to provide current and local sickness information to the public – without the hassle of dealing with hospitals or doctors.”186 The site collects entries of self-diagnosed symptoms and illnesses such as food poisoning, fever, headache or sore throat. These data are aggregated by region and displayed on pie charts overlaying a world map, which visitors can search by zip code or symptom.

187 Ibid
HealthMap, a comparable but far more ambitious site, is a global disease alert system that maps epidemics and pandemics based on information mined from a diverse range of sources. Founded in 2007, the program is funded by Google, with acknowledged support from the Centers for Disease Control and Prevention, the National Institutes of Health and the Canadian Institute of Health Research. The site is designed to monitor online news feeds from Google and Moreover Technologies, the ProMed-mail website, reports issued by international health organizations such as the WHO and EuroSurveillance, and data released by the Wildlife Disease node. Once integrated, these disparate entities provide “a unified and comprehensive view of the current global state of infectious diseases and their effect on human and animal health.” Users are offered the option of specifying input by source, disease and country, as well as by their categorization as “warnings,” “new and ongoing outbreaks,” or “international significance.”

Who is Sick? homepage, detailing how information is collected, disseminated and utilized by the site.188

188 Who is Sick? <http://whoissick.org/sickness/>

189 Moreover Technologies is a company that offers “real-time” web services, primarily through aggregating RSS (Really Simple Syndication) feeds.

190 HealthMap <http://healthmap.org/en>
settings modify the website’s satellite map, on which each disease is represented by a symbol denoting its scale and severity. The symbol’s shape distinguishes between a local and national outbreak while its color indicates an algorithmically evaluated heat index scored “based on the recency of alerts, the number of disease outbreaks, and the number of sources providing information at a particular location.”

Though the integration of satellite imagery can make such data appear all the more legitimate, these cartographies are, like all data-invested maps, imbued with the desires and theses of those who create them. As Tom Koch reminds readers, “what neither GIS nor the online storage of potentially pertinent data do is guarantee that thinking about illness or disease will be more innovative, more penetrating.” Nonetheless, GIS has been a popular tool of professional and amateur epidemiologists alike for several decades. These cartographies of disease are no less political, and no more empirically accurate, than were the mapping experiments conducted by Seaman or Snow in the 18th and 19th centuries. What make these digitally constructed maps unique is the combination of speed, networking capacities, and focus on the multiplicity and uncertainty of the future.

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191 “About HealthMap,” HealthMap <http://www.healthmap.org/about.php#key>
192 Koch, 292
HealthMap’s homepage, displaying disease outbreaks and their intensities based on aggregated public data of “varying reliability,” intending to provide “a jumping-off point for real-time information on emerging infectious diseases [of] particular interest for public health officials and international travelers.”

In this regard, HealthMap is an intriguingly complex and expansive network, since the majority of its sources are aggregative systems themselves. The Program for Monitoring Emerging Diseases, or ProMed-mail, is a particularly noteworthy example. The network, founded in 1994 by the International Society for Infectious Diseases (ISID), examines media reports, physician submissions, official observations, patient entries, and chat-line posts, in order to detect unusual data and provide speedy alerts of “emerging and re-emerging diseases” to public

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193 “About HealthMap,” HealthMap <http://www.healthmap.org/about.php>
health officials in the United States and the wider international community.\textsuperscript{194} The website can be accessed in eight different languages and, in addition to its own findings, offers links to other sites pertaining to EID events. The ProMed-mail system is an example of what public health experts call “syndromic surveillance” networks, which monitor factors ranging from sharp changes in consumerism, to anomalous absences at schools, to increases in physician visits. Their explicit mission is the identification and localization of outbreaks as close to their instant of materialization as possible. This prioritization of speed “has led to the fashioning of online techniques that \textit{push detection prior to diagnosis}.”\textsuperscript{195}

Another such system is the Global Public Health Intelligence Network (GPHIN). GPHIN is designed to scan online news feeds, compiled by commercial aggregating services such as Factivia, in a constant automated search for health-related keywords and syntaxes in the six official languages of the United Nations. The data are then sorted by a staff of analysts for the early identification of “infectious diseases, biologics, and chemical, environmental, radioactive and natural disasters.”\textsuperscript{196} Conclusive findings are rapidly posted on the organization’s website, which boasts a self-assessed accuracy rate of 95 percent.\textsuperscript{197}

In “The Geopolitics of Global Public Health Surveillance in the Twenty-First Century,” Weir and Mykhalovskiy contrast GPHIN to networks like ProMed-mail and HealthMap. Though GPHIN is solely invested in monitoring media outlets, all three share a logic that privileges decentralized sources over confirmed

\textsuperscript{194} ProMed-mail, <http://www.promedmail.org/pls/otn/?p=2400:1950:3010117837539585::NO::>
\textsuperscript{195} Mykhalovskiy and Weir, 255
\textsuperscript{196} Ibid, 251
\textsuperscript{197} Ibid, 251
epidemiological case reports.\textsuperscript{198} Unlike these privately funded networks, however, GPHIN is under the purview of Health Canada and the World Health Organization, whose authorized response capacities lend the program’s observations a very different set of implications. As a global public health organization, the WHO rescinded its initial participation in the management and financing of GPHIN, but as a paying client it continues to incorporate the system’s findings into its own Global Outbreak Alert and Response Network (GOARN).

These networks allow the United Nations and other paying subscribers to acquire international health data without awaiting the results of long-term medical studies or relying on the integrity of national surveillance systems. Prior to the establishment of GPHIN, the World Health Organization had only mandated that states provide timely reports of outbreaks of plague, yellow fever or cholera.\textsuperscript{199} Over the last decade, fear of emerging infectious diseases led the WHO to expand this requirement to include all communicable diseases. However, state disclosures have in certain instances been modified for economic and political reasons – whether to protect tourism and local industries, shelter national markets or prevent foreign intervention – as in the case of China’s delayed acknowledgement of SARS in 2003 or Mugabe’s recent denial of epidemic Ebola in Zimbabwe.

As proponents of GPHIN, Weir and Mykhalovskiy thus applaud its ability to bypass state authorities. They argue that unlike GPHIN, syndromic surveillance programs are “organized around \textit{national needs, defense needs},” problematically quantitative, rather than founded on qualitative studies of media coverage.\textsuperscript{200}

\textsuperscript{198} Ibid, 241
\textsuperscript{199} Ibid, 248
\textsuperscript{200} Ibid, 255
Journalism, they seem to believe, is the only electronic resource offering consistently accurate time-sensitive data that is also equally distributed across the globe. Though they criticize other surveillance networks for their reliance on input from technologies heavily concentrated in Western countries, the authors ultimately conclude with praise for all emerging Internet-based networks. ‘Real time’ surveillance within “a new spatial organization of the geopolitical borders of infectious diseases control,” has apparently been not only achieved, but has ceased to be “organized around a concept of an external frontier to be defended.”201 In similar humanitarian language, proponents of GIS have excitedly exclaimed that with its development, “and especially GIS for non-GIS specialists, at long last ‘where’ becomes an equal partner with the other three parts of the epidemiologic investigational quartet.”202 The other members of this symphony are, according to this text, the “who,” “what,” and “when” of infectious outbreaks.

The Hegemony of Network Protocol

Writing of the wider economic implications of contemporary global health strategies, Nicholas King addresses the divergence between ideology and praxis in the propagation of preventative measures in the postmodern world. Health policies, increasingly predicated on surveillance networks and international databases, are designed to track and regulate the unpredictable mobility and circulation of bodies, goods, populations, and their pathogens. The fear specific to this biosecuritizing framing of disease is not, King asserts, “the horror of matter (or bodies) out of place,

201 Ibid, 259
which presupposed the identification of a place for matter; instead, it is the horror of places no longer mattering, of a ‘third-worlding’ at home.” He further identifies the emerging diseases worldview as prototypically neoliberal, replacing the language of colonial paternalism with one of international progress and growth. This rhetoric, exceeding earlier Western attempts to effectuate the adoption of biomedical epistemology abroad, aligns itself with “the networking impulse of Western modernity…by the integration of localities into the global circulation of information and commodities.”

Tackling these latter elements of neocolonialism, Donna Haraway argues that our molecularized knowledge of the immune system requires that it be understood as a network of communication, in which codes and their passage from one site to another is a probabilistic function, denaturalizing the body and revealing it as an informationalized construct. She thus observes a configuration of disease as “a subspecies of information malfunction or communications pathology; disease is a process of misrecognition or transgression of the boundaries of a strategic assemblage called self.” Haraway excitedly questions this evocation of selfhood and health, which she attributes to the colonizing medical discourse “obsessed with the notion of contagion and hostile penetration of the healthy body, as well as of terrorism and mutiny from within.” Immunity, she observes, can be understood not only as a question of transgression, but “in terms of shared specificities; of the semipermeable self able to engage with others (human and nonhuman, inner and

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203 King, 773  
204 Ibid, 783  
206 Ibid, 393
outer), but always with finite consequences.”

The connotations of opening organism boundaries to a free field of molecular flow, both “figured and repressed in the lumpy discourses of immunology” is one she evidences as the growing recognition of the cyborg body and its capacity for a new kind of hybridized politics. Since the time of Haraway’s essay, there has been an accelerating “dissolution of the boundary between health and illness,” as well as those boundaries between human, animal, and machine bodies. This move is deeply embedded in the emerging diseases worldview, which has transformed the implications of molecular flow into an endless unfolding of futural risks.

In their article Protocol, Control, and Networks, Eugene Thacker and Alexander Galloway conduct an exposé of the rapport between technical networks and biological systems. The article’s premise is that networks, whether organic or inorganic, operate on the basis of protocol. In its most fundamental form, they define protocol as “a totalizing control apparatus that guides both the technical and political formation of computer networks, biological systems, and other media,” encompassing all the modes of regulation and standardization that order relationships within networks. If the network functions as a connective tool, protocols are the directives that ensure that connections operate according to their intended purpose(s). As opposed to the hierarchical bureaucracies of the modern state, networks are the de facto machinery of a society of control.

Thacker and Galloway enter into an in-depth examination of graph theory, an elementary underpinning of the computer science of networks. Graph theory is a

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207 Ibid, 396
208 Ibid, 396
209 Armstrong, 403
210 Thacker
mathematical mode of representation that articulates a network in terms of its number of nodes, or “order,” and the number of edges connecting these nodes, denoted as “size.” Positing that the number of edges connected to a given node yields its fixed numerical “degree,” graph theory states that for any network, the sum of nodal degrees is equal to twice the number of its edges.\textsuperscript{211} Thacker and Galloway contrast this quantitative formula to Deleuze and Guattari’s contention that rhizomatic networks are “edges that contain nodes (rather than vice versa), or even, paradoxically, as edges without nodes.”\textsuperscript{212} Graph theory privileges the network’s fixed points, rendering them homogenous through mathematical formulae. Such an approach ignores the intensities of the network’s speeds and the heterogeneity of its fluctuating connections and flows. Conventional understandings of networks thus undermine their essential dynamism, paradoxically forcing these mobile edges to “exist in relation to fixed topological configurations.”\textsuperscript{213} Though Thacker and Galloway employ this topological problematic abstractly, its literal implications for the emerging diseases worldview creates the theoretical context in which to launch a critique appropriate to contemporary geopolitical iterations of biosecurity.

The speed of digital technology, easily conflated with that of the pathogen, becomes the central trait of these surveillance networks and their totalizing assertion of “‘emergence’ as a logistical problem that demands a technological answer, rather than as an existential problem that requires a philosophical response, or a social or an economic problem that demands a political solution.”\textsuperscript{214} Just as social theorists are coming to recognize the control-oriented structure of

\textsuperscript{211} Alexander Galloway and Eugene Thacker, “Protocol, Control, and Networks,” Grey Room, 17 (2004), 11
\textsuperscript{212} Ibid, 12
\textsuperscript{213} Ibid, 12
\textsuperscript{214} Braun, 21
contemporary politics, so too are constructions of medical knowledge assimilating with an affective framework.

The socio-temporal classification of emerging diseases on the basis of risk abandons species taxonomies and pathogen identification, assembling much as a network, rather than hierarchically. Quantified by the efficiency of their transmission, these diseases are at once conceptualized and immaterial between moments of instantion, a code mapped across substrates. This worldview synthesizes bodies, communities, and technologies in a futural framework that articulates them in an infinite array of new assemblages. Amplified by information theory, these virtual technologies imagine “that all material objects are interpenetrated by flows of information, from DNA code to the global reach of the World Wide Web.”

Where biopolitics was once primarily concerned with order- and norm-dispensing standards and institutions, its statistics now penetrate beneath the surface of the skin. This is a process that is accessing the sub-, rather than hyper-, individual, in ways similar to affect.

In his book *Biomedia*, Thacker introduces a theory of the body in relation to technology that seeks to do away with questions of chemical composition, function or interface, the “unilinear dichotomy” through which the two are typically figured. Instead, he situates them in conjunction with one another in moments of what he terms the “corporealization” of a biological concept and a technological capability (and/or vice versa), an interactive process of assemblage and becoming. Where the human body was once the appropriate unit by which to create a spatiotemporal map of disease, the spatializations authored by the medical gaze have reached depths...
which are no longer uniquely anchored in a single species, let alone organic matter of any kind.

In kind, recommendations for global surveillance networks have grown increasingly insistent, and systems implemented have extended from human populations to those of wildlife as epidemiologists attempt to capture the disease before it jumps the species barrier. Emerging infections have in this sense incited an explicit epistemological shift in biology as well as the surveillance mechanisms that seek to monitor their movement. Weir and Mykhalovsky cite a GPHIN official, who explains of the program’s inception: “We were squashing the pyramid down to a flat plain in which information could come from any particular place at any time. And governments were no longer in control of their information.” Digital technologies, capable of assembling with the speed of affect, participate in a nosopolitics that seeks to institute networks that overlay maps of two orders: on the one hand they literally trace the geographical points at which these diseases may emerge and the lines by which they are anticipated to spread, on the other, they share and coalesce with its nodes on an informational level, incorporating into its framework the actors affected by these forms of emergence, whether individuals, commercial advertisers, the media, governments, researchers, animals, and populations.

These surveillance networks find their ultimate expression in the geographical graphics produced on websites of mass connectivity such as HealthMap. Thacker refers to this as a misguided and “overwhelming need to locate, position, and literally pinpoint network nodes,” which fundamentally undermines the dynamism, the edges, that the network is designed to capture. In approaching the vibrant and resonating components of these apparatuses in spatial
terms, time and space regress into a direct relationship. The hegemony of nodal-based surveillance networks thus fails in its explicit mission, attending to the anchored sites of an always-becoming network of emerging diseases. What emerges in its place is a clearer image of the apparatuses of biosecurity to which it adheres.
Con clusion

m o l e c u l a r i z a t i o n  o f  t h e  m i l i e u

The growing ubiquity of health risks straddles the complex intersections of subjects and populations, patients past, present, and future in an ever-widening milieu. The endemic promotion of surveillance is what Frankenberg assesses to be “not so much a call to abolish death as a call to medicalize, and thereby depoliticize, everything.”\footnote{Frankenberg, 235} In this context, he suggests that “taking recognized risks with the body incarnate, even at the price of the body corporeal”\footnote{Ibid, 235} might serve as source of resistance, identity-formation, and the re-politicization of disease for certain cultural groups. This is a sentiment echoed by defenders of the so-called cultural phenomenon of “bug-chasing”: the choice of some HIV negative men to actively seek out HIV positive partners with the intention of acquiring the virus. Defenders of the practice describe the empowerment bug-chasers experience as they achieve “seroconversion,” allowing them to decide how and when they contract the disease. Many are quoted as feeling that their sexual preference for unprotected sex, or “barebacking,” makes HIV infection inevitable. The decision to take matters into their own hands echoes Gilmore’s motivation to exert agency in the face of anxiety, uncertainty and consuming fear.

Gregory Tomso takes a radically different approach to the question of bug chasing that draws into question the basic assumptions of journalists and their subjects alike. Attacking with equal force those who defend bug-chasing and its multitude of critics, such as a Rolling Stone journalist who tacitly portrays its
participants as both suicidal and homicidal, Tomso argues that both camps are situated around a single question: “What makes them do it?” The desire, and reflexive inclination, to answer this question is one that “cannot be disentangled – indeed cannot be distinguished – from any empiricism or altruism that motivates inquiries into these mysteries,” a symbol of “the entry of science and morality into the field of everyday lives, the lives of the men whose sexual and psychological habits have elicited curiosity, concern, fear, and rage in the minds of those who ask it.” For Tomso, this is an inquiry that does violence to the “gay ontology: the very possibility of gay ‘being.’” He sees the discourse surrounding bug chasing as intrinsically related to homophobia, not in its classic definition, but as a transgression of the Derridean notion of ethics as the “permitting to let be others in their truth.”

Though Tomso no doubt makes a valid argument, particularly in his insistence that ethics be redirected from the question of intent one of letting be, he himself acknowledges that “in attempting to stave off a certain violence toward gay men that seems inherent to contemporary discourse, I reify the very ontology of gayness over which I have cast a net of suspicion and scrutiny.” This double-bind is a valid illustration of long-standing political questions in queer ethics, but it is one that can also be displaced within the wider field of epidemiology. Tomso’s sole attribution of the problem of bug-chasing to homophobia is one that takes issue with disciplinary interpellations of the queer body, neglecting theoretical analyses of biopolitics and societies of control.

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219 Gregory Tomso, “Barebacking, Bug Chasing, and the Risks of Care.” Literature and Medicine, 23 (Spring, 2004), 90  
220 Ibid  
221 Ibid  
222 Ibid
In the introduction to *Homo Sacer*, Georgio Agamben critically engages Foucault’s description of biopolitics, asserting that sovereignty has always been by definition biopolitical and in its extreme, totalitarian. Writing the Nazi concentration camp as paradigm, he argues that the most acute articulations of sovereign power are also the most accurate. In this light, biopower does not take the *quality* of life as its object; in Agamben’s analysis, sovereign power is qualified as the capacity to define the conditions of and for life itself. The right to declare a state of emergency is one such instance in which the relationship between power and exception is revealed to be a “paradoxical threshold of indistinction between situations of fact and situations of right.”

To elucidate, Agamben describes the ancient Greek distinction between *zoe*, the bare or basic life of all living creatures, and *bios*, the uniquely human capacity for qualified life. Biopolitics, dating back to the Aristotelian tradition, is here understood as the inherently illogical presupposition of bare life in political life, over which sovereignty presides. This inclusive exclusion of animal from intellectual life is, Agamben asserts, the foundational logic of sovereign power. His text revolves around the analogy of the Roman figure of the *homo sacer*, the criminal whose transgression is punished by the sovereign ban. Stripped of all rights, the life of the *homo sacer* cannot be sacrificed, but it may be taken by anyone without juridical consequence. In this “zone of indistinction,” *zoe* is everywhere delineated by *bios*. Nowhere is the difference between bare and political life, inside and outside, life and death, made more indecipherable than in the inclusive exclusion of the sovereign

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ban. The state’s power to distinguish and then fold these opposing concepts upon one another is what Agamben views as the aporia of modern democracy.

Of the rapport between potentiality and law, Agamben argues that “until a new and coherent ontology of potentiality . . . has replaced the ontology founded on the primacy of actuality and its relation to potentiality, a political theory freed from the aporias of sovereignty remains unthinkable.” He further explains that, according to Aristotle, “what is potential can pass over into actuality only at the point at which it sets aside its own potential not to be . . . to turn potential back upon itself in order to give itself to itself.” He likens such a relationship between the potential and actual to the logic of sovereignty, their parallel and intersecting zones of indistinction, and in so doing again designates the necessity of considering potentiality “even without any relation to being in the form of the gift of the self and of letting be . . . nothing less than the thinking ontology and politics beyond every figure of relation, beyond even the limit relation that is the sovereign ban.”

In this sense, Tomso’s approach can be read as ultimately adhering to the same ontological “inclusive exclusion” by which the modern state asserts power over bare life. Deleuze’s description of today’s control societies, particularly in light of Clough’s analysis of preemptive logics, reveals the changing mechanisms of security. The emerging disease, to use Agamben’s terms, is an exceptional state of the noso-politics of control.

224 Agamben, Homo Sacer, 46
225 Ibid, 47
Securing and Securitizing Molecular Life

In his 1950 Harvey Lecture “Adventures in Molecular Biology,” Atbury explained of biomedicine:

It is not so much a technique as an approach, an approach from the viewpoint of the so-called basic sciences with the leading idea of searching below the large-scale manifestations of classical biology for the corresponding molecular plan. It is concerned particularly with the forms of biological molecules, and with the evolution, exploitation and ramification of those forms in the ascent to higher and higher levels of organisation. Molecular biology is predominantly three-dimensional and structural—which does not mean, however, that it is merely a refinement of morphology. It must at the same time inquire into genesis and function.\footnote{William T. Astbury, \textit{The Harvey Lectures 1950–51}, 3 (Thomas, 1952) \textit{in} William Astbury, “Molecular Biology or Ultrastructural Biology? \textit{Nature} 190 (June 1961).}

As this discipline progressed, scientists were forced to abandon the simplistic vision of biology revealed in the macrocosmic structures of bacteria, discovering “a mysterious and much more complex tapestry, a hybrid picture not static at all but constantly changing, with the most subtle implications.”\footnote{Ryan, 10} In more recent years, the emerging diseases worldview has caused it to further abandon its ordered framing of molecular life. One source of contention in the world of biochemistry is whether or not viruses are alive, as they require a host cell in order to function or reproduce. “Quite apart from the fact that there is no generally accepted definition of life,” explains Dr. Kurt Link, “viruses present a particular problem since they range in that foggy area where biology and chemistry become the same thing.”\footnote{Link, 7}

From the 1918 “Spanish flu” pandemic to the creation of Google Flu Trends in 2008, no infectious disease has better characterized the last century of epidemiology than influenza. Indeed, despite the warnings Neustadt and Fineberg...
issued in their 1978 report, the precise faults of the swine flu health officials have, if anything, extended into a wider milieu. In 1997, twenty years after the swine flu epidemic failed to materialize, reports began to circulate of a strange outbreak of influenza in Hong Kong. The virus was not unfamiliar, but until this point it had only been known to afflict poultry. When the disease killed six of the eighteen identified patients, terror ensued as rumors spread of this new deadly strain of “bird flu.” Chroniclers of avian influenza seem as magnetically drawn to 1918 comparisons as their swine flu predecessors. *The Monster at our Door*, Mike Davis’ assessment of the impending threat of the virus, opens with the comment that “in a time of plague, like the influenza pandemic that swept away my mother’s little brother and 40 to 100 million other people in 1918, it is difficult to retain a clear image of individual suffering.” In his 2006 *Bird Flu: Everything You Need to Know About the Next Pandemic*, Dr. Marc Seigal echoes Neustadt and Fineberg as he attributes contemporary hysteria and panic over avian influenza to “the ghost of the 1918 killer flu,” whose “reincarnation in this case has been designated the H5N1 virus.”

Avian influenza is a misleading title for what is often termed a new disease, since influenza is often passed between humans and birds, as well as other animal species, though in the majority of cases with no detrimental effects. Influenza is an RNA virus, meaning in part that unlike DNA viruses it is “radically error prone.” It is further classified into three main forms: A, B and C. The human species has a long history of encounters with types B and C, the former of which is the common

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230 Siegel, 56
231 Davis, 3
flu, the latter the common cold. Influenza A predominately affects wildlife, including poultry, pigs, horses, whales and seals. The speed at which the virus mutates means that given the opportunity, namely through prolonged and close proximity, it can leap from these populations into ours with astonishing ease. What is portrayed as an emerging threat is in this case a biological process of mutation, a process that has always been the primary trait of the influenza virus. It is one of the most volatile known to mankind, undergoing continuous and rapid transformation as it moves from one body to another. In fact, influenza’s evolutionary traits are so erratic, so unpredictable, that it “lives at the very edge of what evolutionary biologists call ‘error catastrophe.’ If the error rate were any higher, information integrity would be lost, and the genome would decay into utter gibberish…to aficionados of complexity theory, then, influenza is an outstanding example of a self-organized system on the edge of chaos.”

In *A Thousand Plateaus*, Deleuze and Guattari describe the War Machine, a form that “exists only in its own metamorphoses” but whose exteriority, “flows and currents,” are the made sites of state appropriation, striated as they are harnessed and seized by its apparatuses. Describing the figure of the nomad as “he who does not move,” they write of speed and movement:

>a movement may be very fast, but that does not give it speed; a speed may be very slow, or even immobile, yet it is still speed. Movement is extensive; speed is intensive. Movement designates the relative character of a body considered as ‘one,’ and which goes from point to point; speed, on the contrary, constitutes the absolute character of a body whose irreducible parts (atoms) occupy or fill a smooth space in the manner of a vortex, with the possibility of springing up at any point.”

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232 Siegel, 14
233 Davis, 15.
234 Deleuze and Guattari, *A Thousand Plateaus*, 381
The emerging diseases worldview has produced a notion of the virus that assembles with Deleuze’s smooth space, demanding it be imagined as the passage of a dynamic force between bodies. Disease, defined as the pathogenic damage to the body, was once a condition that presupposed embodiment. Pathogens, needless to say, affect bodies unequally. Inoculations, vaccinations, and natural autoimmunities ensure that while some react virulently to pathogenic invasion, others remain unaware of their very presence. While in its simple anatomical form a virus may be distinct from a bacteria or parasite, the meaning of these pathogens remains unstably linked to the manifestation of a disease, and the signs and symptoms that qualify it as such.

Diseases as they are conceptualized under a regime of Surveillance Medicine might be said to always be syndromes, aggregations of symptoms that present regularly enough that we have paradoxically come to imagine that diseases, or the human for that matter, might ever exist in an essential state prior to or after their coexistence. When the virus makes a sore and the body a fever, when a pathogen mutates and an individual produces new antigens, it becomes difficult to definitively assert where the infection ends and the body begins. Disease is a call and response that is heard, condensed, as a single chord. What becomes clear is that disease, and particularly the “emerging” disease, no longer has a body. Like the breaking apart of information and meaning in the posthumanist ontology, at the heart of the emerging diseases worldview is a distinction between the syndrome, its transmission, and most importantly, its evolution.

Disease is not an illness, a virus, or the site of infection. Disease does not break out from Patient Zero, nor does it materialize from the rubbing of an animal body against that of the human. As the virus travels between bodies, it creates new
assemblages, linking man and animal, carrier and victim. Priscilla Wald sees in the carrier of disease a figure who is “at once victim and agent, human and microbe, alive and dead, sign of community and of its collapse.” But the carrier is no longer a person and transmission is not even a movement. It is the sheer potentiality of motion between molecules, of their arrival, or failure to arrive, intact, uniformly, in different bodies, disparate species.

The emerging disease is a potentiality, conceptualized but in the same moment seized and molded, actualized by the state’s networking drive for mapping and statistical knowledge. Such a vision of disease carries a definition no different from that of information: biologically, EIDs share no essential meaning or traits. Theorists Michael Dillon and Bruce Braun have both framed this codification of biology within the wider realm of geopolitics as a virtualization of biosecurity. Deleuze’s ontology is what Clough has termed a “quantum-ontology” of matter and timespace. The question of potential and actual, and similar categorical or binary relations, are dissolved by understanding matter – human and non-human alike – as always becoming. In this respect, virtual security has as its object the prevention of molecular life from “becoming-dangerous.”235 What becomes clear in the management and modulation of molecular flow, whether between bodies or machines, is that bare life has been reduced to molecular code.236

The population is no longer an aggregation of bodies, but a zooming in and out, from molecular to topological, skipping the bounded body altogether. Disease is neither a pathogen nor a biological term, but a fluid and vibrating negative space

236 Ibid, 534
at the intersection of globalization and state power. Baker argues that the true
epidemic is none other than the human race, incessantly multiplying, grotesquely
spewing forth putrid waste and poisons, parasitically clawing away at the earth so
that our bodies, our antibodies, must be reimagined, classified as the antigens, the
sepsis, against which disease has come to fight. What better way for governance to
cope with man’s auto-asphyxiation than to embrace it, to encourage its fear to even
more fantastical an extent? If fear is has become the most rapidly transmitted of
pandemics, it necessarily precedes the physical devastation of whose arrival it warns.
If the epidemic can be mapped, can be not only virtually imagined, but virtually
(un)known, it always and already open to the network’s determination.

Diseases are catalogued by their date of recognition, manifestation or
acquisition of “epidemic” status, yet it is the means of transmission and the
possibility of treating such diseases that dictate their political prognoses. While it is
no doubt true that it is human impact upon the environment, population
proliferation, and the increased accessibility of travel that have led to new animal-to-
human and human-to-human virus transmissions and mutations, this temporal
ordering only superficially relates to global health, in that it functions to mask the
ways in which core states have very selectively responded to disease. These
outbreaks, when they do occur, are accompanied by blame directed toward poor
sanitary practices and excessive human-animal contact in ways that displace “the
problem of poverty onto the danger of ‘primitive practices,’” allowing “these
accounts to offer modernization as a promised solution to, rather than part of the
problem of, emerging infections.”

237 Wald, Contagious, 8
The emerging diseases worldview is an ontological riddle. Diseases are surely emerging, but since neither disease nor emergence have a stable definition, their grouping remains irrelevant to the threat they pose, if “they” can be said to exist at all. Threat lies not in the disease but how we come to privilege where it originates, how it spreads, what form it takes, how easily traced it may be, whether its cause or treatment are known. While diseases afflict bodies, fear afflicts populations. It is in excess of the body, it cannot be contained in or upon it. Emergence exists outside of diseases themselves, an epidemic of globalization that is fostered in order that it might be (un)treated. Where the disease-as-enemy once had a face – an epidemic of cholera or the signs of smallpox – it now exists outside its manifestations as a suspension of knowledge. (Un)certainty, (un)predictability, (un)preventability, it shatters our communications and returns them to the feral life of sovereign control. It is an image of hope and change that allows for an invigoration of extraterritorial interventionist strategies, permission once again and in no uncertain terms to modernize, to capitalize, as much as it is a license to kill. And in the process, it turns sites of origin “into relics of an antiquated past rather than spaces of global modernity,” allowing and justifying the decimation of potentially infected livestock with but a fleeting thought to those who depend on them and to what life-state they will be reduced.

There is at once the humanitarian permission to intervene and the reassertion of territorial boundaries, the promise of knowledge and protection, as well as the unspoken question of profitability. Where disease can be made to circulate – where fear can be made to circulate – a market can exist, and in the case

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238 Ibid, 8.
of emergence, indefinitely, everywhere and nowhere at once. Nosopolitical cartographies, whether figurative or literal, are increasingly oriented toward probabilities for contagion and transmission of disease between populations, sites where prevention and treatment, “the accident and its avoidance, have become interchangeable.”

This construction of disease is framed within an array of medical surveillance technologies which target and inscribe hypothetical scenarios upon real populations. The virus has become a disembodied futurity. As globalization and digital technologies come to dominate social science discourses, time and space are being discussed increasingly with respect to their virtual properties, the gaping rift between communication’s speed and the geographical space it traverses. Increasingly, labor and free time alike are spent at the interface, cyberlives that are said to allow anyone anywhere to be, essentially, anyone anywhere. What is striking are the ways in which these technologies function not only as a tool to see, but as a tool that, in returning this gaze, function to reterritorialize the virtual. Disease is an enemy at once hyper-present and intrinsically outside of space and time. It is inherently unknown, “beyond the pale of our accustomed causal laws and classification grids…an unspecifiable may-come-to-pass, in another dimension. In a word, the enemy is the virtual.”

In this context, the act of drawing disease onto maps, particularly atlases of a real-time, refresh button generation, produces a nosopolitical cartography which quite literally etches a future (im)possibility upon actual populations, forcing their pre-emptive embodiment of a virtual enemy. The digital era in particular sees speed

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239 Massumi, 11.
240 Ibid, 11.
refigure coding as “a measuring that assembles with...matter’s affective capacity,”

thus modulating affect in ways both qualitative and quantitative. In this light, the
current proliferation of surveillance technologies signifies an entry of affective
capacities into circulation with capital.

Surveillance is the primary form taken by the state to appropriate the space
of disease, to striate the smooth space of a dynamic molecular universe “as a means
of communication,” an establishment of “a zone of rights over an entire “exterior,”
over all the flows traversing the ecumenon.” The emerging diseases worldview is
not primarily about self-regulation, even of the population, but of affective
modulations incurred by viral speeds that “give time a new rhythm: an endless
succession of catatonic episodes or fainting spells, and flashes or rushes.”

In this way, disease and its surveillance function affectively, in the realm of the virtual,
creating all information, and its mobility across substrates, as viable targets for state
intervention, policy formulation, and the production of knowledge, allowing virtual
spatializations to dictate the fates of populations. Only by observing and
reconceptualizing disease outside its symptoms, and thus its embodiment, can we
reveal the sovereign logic that permeates the apparatuses of biosecurity and its
production of a state of exception in which populations are suspended, circulated,
stripped bare.

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241 Clough, “The New Empiricism,” 15
242 Deleuze and Guattari, 386
243 Ibid, 356
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