CULTURAL ANTHROPOLOGY

VIRAL CLOUDS: Becoming H5N1 in Indonesia

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> Philosophy is not simply a tribunal of reason; it is also a battleground of infections and sicknesses.
>
> —Keith Ansell Pearson, 1997

This essay is an ethnography of a virus—H5N1 (avian influenza)—a cloud of particles, uncertain ontologies, multiplying narratives, and apocalyptic dreams that spread from mainland Southeast Asia to Indonesia in 2003. Contagious viral agents infected a multitude of living beings—domestic poultry, humans, wild birds, and other creatures—at the same time as millions of Indonesian citizens and scores of organizations were scripted into national and international concerns about pandemic preparedness, biosecurity, and sovereignty.

Microbiologists describe influenza viruses as *quasi-species*. As an RNA virus, influenza lacks the "proofreading ability" of DNA to find and repair damaged genetic material. RNA viruses copy themselves unfaithfully, making difficult the determination of any "original" form as well as precise foreknowledge about future forms; the copy is unfaithful to the original (cf. Benjamin 1968; Taussig 1993). The high rate of genetic mutation in RNA viruses therefore make influenzas difficult to cordon off into "species." Rather than existing in well-bounded populations, these biotic entities organize into clusters of genomes with unstable group boundaries—into clusters that biologists call "mutant swarms" or "clouds" (Davis 2005; Eigen 1996).

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In Indonesia the avian flu virus was not only a quasi-species but also, I maintain, a *species multiple* or, better, *species multiplier*—forming and enacting its identity with others (cf. Mol 2003). Multiple ontologies were transformed amid encounters among viruses, the immune systems of animal hosts, and the human institutions that struggled to reckon with the specter of a terrifying pandemic. One can think, then, not only of quasi-species clouds but also of what I call "multispecies clouds," collections of species transforming together in both ordinary and surprising ways. Following the vector of the virus, this essay traces a cloud of uncertain *reassortments* (the mixing of genes from two distinct viral strains infecting the same cell) of identity.

Clouds are a material feature of influenza's epidemiology: viral particles, droplets of spittle, and water in the form of rain and humidity were floating all around as I conducted my research in Indonesia. As the news media was abuzz with prophecies about a global influenza pandemic, an epistemological cloud also emerged. Cloudy insecurities implicated specific social and biological forms in speculation about future possibilities. Was a new "global" pandemic like the influenza pandemic of 1918 on the horizon? If so, via what pathways and mechanisms, and through what inter- or intraspecies interactions? Moreover, who precisely was responsible for responding to it, in what ways, with whose money, and relying on what expertise? Uncertainty about what influenza was and what it could become, disrupted existing arrangements among species, peoples, institutions, and nations—remaking biological and political relations along the way.

Years ago, I had studied the rise and use of "biodiversity" discourse and practice in Indonesia (Lowe 2006), seeking to figure out what, if anything, might be particular to biodiversity in its Indonesian inflection. Now, conducting multisited fieldwork in the worlds of microbiology, security, and agriculture over a series of research trips from 2006 through 2010, I found myself chasing after another "bio" form: biosecurity. How might "biosecurity" look different in Indonesia? How might it be distinct from its appearance in other locales (see Lakoff and Collier 2008)? Would Indonesia's postcoloniality continue to matter? How might H5N1, or avian flu, format the particularities of whatever counted as "biosecurity"?

In fact, a variety of security practices—corporate security, state security, "vital systems security" (Collier and Lakoff 2008), and farm biosecurity—for example, simultaneously came into focus with Indonesian H5N1. Out of the viral cloud, other emergences impressed themselves on me too. Along with security, scale became important. The pandemic threat of this influenza was conceived by international and biomedical communities at the global scale while Indonesia was asked to intervene

at the most intimate of local scales (cf. Tsing 2007). The outbreak of H5N1 in Indonesia also prompted me to examine the role of speculation, because much of the activity around the disease was designed to forestall something that turned out only to ever have existed as a potentiality—a state not so different from, and partly based on, the quasi-species cloud, which also exists in a state of indeterminacy with respect to the future forms it may produce.

Taking the viral quasi-species cloud as an analytic prompt, I here use the cloud—quasi-species, multispecies—as the organizing metaphor for my analysis of H5N1 in Indonesia to indicate the clusters of biosocialities in play and at work with H5N1 in Indonesia. My account begins in July 2005, when a man named Iwan and his two daughters developed severe breathing difficulties in the intensive care unit of Siloam Gleneagles hospital in West Java. Their pulmonologist asked the hospital's lab to test for SARS—the "severe acute respiratory syndrome" that fueled the specter of a pandemic in November 2002 and July 2003. The lab's director, recalling an earlier training session with NAMRU-2 (the U.S. Naval Medical Research Unit-2), asked this Indonesian and U.S. research team based in Jakarta to conduct the test.

When the SARS test turned up negative, this U.S. military lab asked for permission to test for a virus known as H5N1 influenza. When the sample tested positive it was shared with researchers in the Indonesian Ministry of Health, the agency overseeing U.S. naval health surveillance operations in Indonesia. Ministry officials confirmed that the test was positive for H5N1. These were the first "enactments"[1] (Mol 2003) in Indonesia of a human case of the H5N1 virus, a deadly "avian" influenza that had sporadically taken both human and poultry lives across Southeast and Eastern Asia since 1997, and would soon engage ornithologists, medical doctors, poultry farmers, epidemiologists, and a wide range of other human and nonhuman actors across Indonesia.

Just as the collection of genomes that may appear in the rapidly mutating swarm technically known as a quasi-species cloud are heterogeneous and unpredictable, so, too, I found were the bodies, narratives, and politics that appeared in the multispecies cloud surrounding the naturalcultural event known as H5N1.

H5N1 INFLUENZA IN A CLOUD OF UNCERTAINTY

The strain of influenza that infected Iwan and his two daughters was a relatively new disease for humans, jumping the species barrier from poultry only in the mid-1990s when an outbreak struck Hong Kong, killing first a three-year-old boy and then more than a dozen others. Authorities in Guangdong, mainland China (the

FIGURE 1. Influenza patient on the way to Reference Hospital for avian influenza in Yogyakarta. (Author's photograph)

apparent source of the virus) launched a massive poultry cull amid an international blockade on imports from their province. The spread of the disease was apparently stayed, but just a few years later, poultry outbreaks began appearing across Asia: first Korea, Thailand, then Vietnam, with rarer human cases emerging soon thereafter. Indonesia was not far behind, and it began to seem as if Indonesia, with its large population, highest incidence of human cases, and fewest agricultural controls in place was a likely location for the emergence of a deadly human influenza pandemic that could "circle the globe" (Barry 2004).[2] The Indonesian H5N1 outbreak appears to have started in commercial poultry, spread to backyard poultry and, then, two years later, to humans. By 2006, Indonesia was the country with the largest number of human deaths from the virus (Lange 2007). (See Figure 1.)

Were the virus to mutate and acquire the easy transmissibility of seasonal flu, the consequences could be devastating. While the disease proceeded to tear through poultry flocks, making its way west from Southeast Asia to Africa and Europe, becoming the most extensive influenza panzootic in known history (Sims and Brown 2008), human cases remained limited although also deeply troubling. Like the common cold, which does not have a cure, H5N1 is a virtually untreatable disease. With an apparent 80 percent human mortality rate in Indonesia, the potential risks were amplified to become a frightening global specter indeed, even though under actual "pandemic" conditions the mortality rate would drop dramatically.

Anna Tsing (2007) argues that the "global scale" is always a construction and not a self-evident frame. Constructing a global frame around H5N1 raised the status of the problem and made targeted groups of people responsible for the health and well-being of other, far-flung humans on the planet. The desire to prepare for, and even to stop the epidemic before it materialized, initiated a massive response within Indonesia on the part of the global health community, eclipsing other Indonesian scientific, health care, and aid agendas. Indonesians, at times, believed international interventions to arrest H5N1 violated Indonesian sovereignty. Preparedness initiatives did not align with national public health goals, which were oriented around endemic and treatable diseases such as malaria. It would often appear to me, too, that this was an attempt to protect the security of the United States by intervening "there" before the problem came "here"—in other words it seemed not unlike the global war on terror.

Although Indonesia did contribute greatly to pandemic preparedness, outcomes seem to justify a certain skepticism toward the international intervention. As of 2010, there have been only 489 worldwide cases of human H5N1 influenza, with 289 fatalities officially confirmed by the WHO. And the 80 percent mortality rate cited by the Indonesian Ministry of Health and others may have as much to do with sampling techniques as with the ratio of deaths to cases.[3] These low numbers might alternatively be understood as a result of preparedness. Even so, many Indonesians I consulted felt that they were caught in an epistemological haze, a cloud of speculative possibility that made specific demands on them as a national population.

Clusters of nonhuman identities, of course, were likewise at play in the multispecies cloud. Giles Deleuze and Felix Guattari write: "We form a rhizome with our viruses, or rather our viruses cause us to form a rhizome with other animals" (1988:11). Working to get beyond the human exceptionalism underlying much scholarship in anthropology and the humanities (Haraway 2008; Kirksey and Helmreich this volume), I observed that H5N1 influenza brought together humans of diverse types (epidemiologists, chicken farmers, virologists, ornithologists, public health workers, government ministers) and equally diverse animals and strains of microbes.

In the mutating connections among humans, chickens, and wild birds that I focus on below, H5N1 was translated into multiple species registers, at different scales. It became visible through processes such as infection, lab identification, public awareness, or security campaigns. Clouds of viral becomings also spread materially but invisibly—quietly burrowing into the bodies of pet dogs and cats,

civets, stone martens, zoo tigers, among multiple other species (Sims and Brown 2008)—evading detection by health authorities, threatening to suddenly emerge, rupturing established biopolitical relations, and assuming novel forms (Deleuze and Guattari 1983:10).

H5N1 is an "avian" influenza because it is a strain adapted to birds, and does not cause observable illnesses in most waterfowl, the common reservoir of all influenza viruses. The form of a single molecule, hemaglutinin, usually restricts this strain to birds because of the specificity of receptors in host animal cells. Hemaglutinin-receptor interfaces put up a "species barrier" that usually prevents the avian influenzas from infecting mammals, like pigs or humans. Individual hosts, however, can become viral "environments" where mutations can accumulate. Thus, hemaglutinin incompatibility turns out not to be an ultimate barrier to transmission, and cross-species transmission has the potential to transform the virus as well as the host.

This permeable "species barrier" is one thing that keeps H5N1 in the realm of a virtual specter (a panzootic restricted to certain human companion species), rather than a human pandemic. Influenza viruses can evolve through reassortment or mutation (genetic drift) of the original strain. The randomness of these processes adds to the cloudiness of viral futures. Virologists studying influenza have speculated that pigs, if coinfected by human and avian viruses, might become "mixing vessels" in which seasonal influenza could reassort with avian influenza to create a strain with the virulence of H5N1 and the transmissibility of ordinary flu (Suarez 2008). Animal bodies, then, become media for the production of further mutation, further "cloudiness," a material relay for producing more quasi-species blurriness.

The names of influenza viruses also circulate in a kind of multispecies cloud, where legibility depends on affixing an animal host species name—bird, pig, horse, human—to the designation of the virus. Influenza nomenclature contains traces of multispecies connections and also links particular strains to the laboratories and locales in which they were first described. In the naming system set up by the WHO, influenza strains are defined by their antigenic type (A, B, C); the host from which the strain was first isolated (avian, swine, etc.); the geographic origin of the isolate (city, state, province, country); a laboratory reference number; the year of isolation; and subtypes of hemaglutinin (HA) and neuraminidase (NA) glycoproteins found on the surface of the virus: "For example, an Influenza virus isolated from turkeys in Missouri would be A/turkey/Missouri/24093/1999 (H1N1)" (Suarez 2008:4). Types of influenza virus (many strains constitute a type) are referred to by the shorthand of their HA and NA subtype: H5N1 contains the fifth HA subtype

and the first NA subtype.[4] These names, which enact provisional stabilities for viral clouds, are thus the result of encounters between viral antigens and animal hosts in laboratories (themselves networked collecting sites).

Until three-year-old Lam Hoi-ka died of the disease in Hong Kong in 1997, all subtypes of influenza with the H5 hemaglutinin were believed to only affect birds, strictly confining the virus to avian hosts. Its leap to humans required only slight changes to the hemaglutinin molecule. After these subtle molecular transformations the virus proved capable of infecting a limited number of people who seemed to have some unique constellations of genes that made them susceptible.[5] If the H5N1 virus were to suddenly mutate again, and generate a H5 hemaglutinin molecule that was fully compatible with human cellular receptors, the disease could suddenly become as infectious as a garden-variety flu. When viruses jump species boundaries the new animal hosts do not have antibodies to newly evolved strains of influenza. In a cloudy future, humans would have no preexisting immunity to H5N1 if it suddenly jumped from the worlds of birds to those of people.

WILD BIRDS: FROM BIODIVERSITY TO BIOSECURITY

Susanti had come to love birds while writing her undergraduate thesis in the mid-2000s on the swallows of Prambanan temple, a famous tourist pilgrimage site near her university in Yogjakarta. As a master's degree student in biology in 2008, she was hired as a lab technician by the Indonesian Ornithologists' Union to sample wild birds at a beach on the south coast of Java. As she poked a long cotton swab into the cloaca of the sandpiper grasped in her blue rubber gloves, Susanti was hoping she could help answer the question of whether wild birds, either resident or migrant, were a significant transmission vector for H5N1 in Indonesia (see Figure 2). Her research was part of a larger surveillance study conducted on behalf of NAMRU-2, the U.S. naval facility that first identified H5N1 in humans in Indonesia. Ornithologists and bird watchers were thus turned into agents of influenza surveillance. Samples would later be sent to the Naval Unit for genetic analysis.

Following this sample back to the lab, I learned that it was unclear whether it would test positive for the same avian influenza strain that had been devastating Indonesian poultry and claiming human fatalities. One thing was clear, however: The sandpiper was no longer simply the target of casual birdwatchers or of those, like Susanti, specializing in avian biodiversity. It had moved from biodiversity—the subject of my first study—to biosecurity discourse and practice. The wild bird was now part of what I would call a "multispecies cloud" of global health, transnational

FIGURE 2. Sandpiper sampling at Trisik Beachside Laboratory, Central Java. (Author's photograph)

science, industrial agriculture, Southeast Asian foodways, pandemic preparedness, and species-jumping disease emergence.

At the U.S. naval research laboratory, where the sandpiper sample would be tested for H5N1 genetic sequences, the contingent mix of human, avian, and viral beings would contribute to a set of rapidly forming knowledges about transmission patterns, viral mutations, and interspecies entanglements in a potential outbreak scenario. At the beachside lab, Susanti came out of the field and into laboratory science, acquiring new skills, scientific interests, and career possibilities, as well as a means to appreciate the microbial companion species of birds. When we look at the thoroughly sampled bird, the moment of testing enfolds the search for possible futures for humans, viruses, and birds into a potential sandpiper becoming.

As test sample, sandpipers were recognized for how they engaged H5N1 and for the possible consequences that might follow. Sandpipers might or might not become identified as disease carriers in the sampling and analysis process. The result would determine their futures in engagement with both viruses (which may or may not make them sick) and humans (who could decide to target them as carriers). These wild birds were in danger of being moved from the realm of *bios* (forms of life with biographies, part of ecological biodiversity) into the domain of *zoe*—that which is killable (cf. Kirksey and Helmreich this volume). Their biopolitical

status had the potential to mutate as they moved from the realm of biodiversity to biosecurity.

MUTATING CLOUDS OF SECURITY: PRIVATE, VITAL, VIRAL

Facing stark biological facts, and uncertainties about possible eventualities, fears about a possible H5N1 influenza pandemic spread among world leaders. Here is how Michael Greger, Director of Public Health and Animal Agriculture at the Humane Society, documented one set of reactions to a possible H5N1 pandemic:

> Senator Frist has warned that H5N1 "poses an immense potential threat to American civilization." Tara O'Toole, director of the Center for Biosecurity of the University of Pittsburgh Medical Center, agrees. "What we are talking about is not just another health issue—it is a nation-busting issue," she added. This sentiment is expressed world-wide. "It will be the worst nightmare," the President of Indonesia said in 2005. "This plague can be more dangerous than the tsunami which last year killed hundreds of thousands of people in a matter of minutes." [2006:357]

Media and scientific analyses alike played up predictions of catastrophe—H5N1 became a threat to U.S. civilization, nation busting, and worse than the 2004 tsunami in Indonesia. Even critical geographer Mike Davis (2005) called the impending flu pandemic the "monster at our door," not unlike the Food and Agriculture Organization of the United Nations (2005), which called it the "enemy at the gate."

But to read these statements as fully grounding "biosecurity" practice and discourse (see Lakoff and Collier 2008) in Indonesia would be to miss the particularity of "security" talk and activity in the archipelago. Building on Gusterson's idea of "securityscapes" (Gusterson 2004), I view Indonesia as shaped by a variety of security clouds that do not answer, for example, to Andrew Lakoff's recent (2008) notion of "vital security," which centers on the safeguarding of stable transportation, communication and public health infrastructures, many of which are lacking in Indonesia altogether or are only present for the elite. Toll roads, for example, form a visible architecture of apartheid in many cities in Java. These relatively well-maintained roads run through the center of major urban thoroughfares—allowing those who can afford to pay to whiz past traffic jams. Similar divides exist in the realm of health care. The Indonesian capital of Jakarta has state-of-the-art medical diagnostic technologies available for wealthy expatriates and citizens—facilities comparable to those available in Singapore or the United States. Most Indonesians get their health care from underfunded government clinics *(Puskesmas),* that are

only able to do basic diagnoses of common diseases, like malaria, with conventional microscopy.

If the Indonesian state has historically sought to secure its power against the people (Cheah 2003), particularly under the rule of General Suharto (President from 1967 to 1998), the question as H5N1 entered Indonesia became: Whose biosecurity was at stake? Warnings about a deadly influenza pandemic caused a great deal of anxiety in Jakarta, the capital of Indonesia, in the middle of the '00 decade. This was actually more striking among the expatriate community than among Indonesians, and traceable, in the U.S. case, to presentations set up by the U.S. Embassy for the American Chamber of Commerce in Indonesia. These presentations painted a particularly bleak scenario. "You can't underestimate how afraid everyone is," one American management consultant told me. "How will we get out? If we wait and the pandemic strikes, all air travel will be shut down and we will be stuck in Indonesia." Expatriate views of Indonesia's public health care system and always edgy politics added to foreigners' feelings of insecurity in the imagined pandemic that seemed to be on the horizon.[6]

On the trail of security discourses, clouds of narratives and practices that were proliferating in connection with avian influenza, I grounded my multispecies ethnography by visiting one of a burgeoning number of private international security firms operating in Jakarta. Lexington Security (a pseudonym) was a company run by a group of former Australian police and intelligence agents. After passing my passport under the bulletproofed glass, I was brought through a series of secure doors into the underground offices of Lexington for a tour with its president. Lexington's job is to develop strategic security plans for its clients for all kinds of threats including natural disaster and political disruption. Services include instant messages and e-mails informing clients of demonstrations, terror threats, economic issues, court trials, airline accidents, and even traffic jams. Security analyses were carried out by young male Indonesian analysts, who joked with the Australian managers as I watched them dissect virtual security data from both computer screens and TV monitors linked to cameras mounted at client facilities.

Companies like Lexington take up the task of corporate security where the Indonesian state leaves off, or is unable to follow in the postauthoritarian era. They date back only as far as the fall of President Suharto in 1998 when the uncertainty of regime change and the Asian financial crisis caused foreign corporations to look to the private sector to meet their security needs.[7] In the case of an avian influenza outbreak, Lexington clients were directed to follow a pandemic influenza response plan that was part of a written security product provided to clients in advance.

What a security consultant could provide in such a case was early information enabling foreign workers to get a jump on leaving Asia, although I learned the cell phone network would overload in seven minutes of a catastrophe. With an outbreak of deadly influenza, Lexington would aid international clients to evacuate, while Indonesian staff would be left behind. Lexington staff were fully conscious of the racialized separation "us" and "them" in their exit scenario (I imagined the epidemiological "fall of Saigon").

Under epidemic conditions, however, a privatized evacuation would hardly have the support of the international institutions trying to stop the spread of disease by quarantining people in place. A firm like Lexington is only able to provide "security" based on a basic level of order and infrastructure, and the worst-case scenarios described for a H5N1 pandemic would undo this basic order. Recent concerns in the United States, and to some extent Western Europe, over necessary levels of political and infrastructural order have been analyzed by Stephen Collier and Andrew Lakoff (2006; expanded in Lakoff 2008), through their concept of "vital systems security," an emergent mode of rationality that they differentiate from "state security" and "population security." By vital systems security Collier and Lakoff mean security designed by U.S. public health and national security establishments to protect vital infrastructures and current political-economic arrangements. They have in mind the safeguarding and management of oil pipelines, electrical grids, telecommunications systems, and plumbing infrastructures.

Clouds of pandemic disease share the attribute of being unpredictable and potentially devastating to vital systems infrastructures. H5N1 avian influenza focused "First World" attention on the effects of possible pandemics on international transportation, tourism, retail, absenteeism, manufacturing productivity, and the larger global economy.[8] What Collier and Lakoff describe, although apt for the United States or Northern Europe is, I suggest, a particularly Euro-American form of governmentality and not the major form of security thinking in Indonesia.

Indonesian reactions to H5N1 frequently differed from the concerns of foreign governments and did not key to vital systems security or the foreign logics of pandemic preparedness. The President of Indonesia's comparison of the pandemic potential of H5N1 with the 2004 tsunami, a natural disaster with tremendous toll on life and property, for example, indicates an ongoing concern with the normative rationality of population, rather than of vital systems.[9] Even still, scores of Indonesian professionals were interpolated into transnational programs of H5N1 surveillance.

Amid anxieties about an emergent pandemic, Indonesian physicians were asked to respond to avian influenza to ease the anxieties of sick patients, virtually all of who had an ordinary flu. Doctors were also asked to take a position in relation to the risks of the potential pandemic as described by international health officials and the Indonesian government. During one stay in Jakarta, I spoke with an Indonesian doctor whose thoughts turned to wild birds in conjunction with the H5N1 virus. He was a general practitioner who held a degree in epidemiology from a university in southern California. He was not impressed by bird flu and imagined it as a fiction conjured up by then President George W. Bush who he viewed as obsessed by threats coming out of the Muslim world:

> Maybe the reason President Bush is so worried about bird flu is because his advisers told him about a story from the Qur'an called the *Parable of the Elephant Troops.* In the Parable an elephant army is out to destroy the Prophet Mohammed and his followers. The elephants were unstoppable until God sent a flock of birds to drop stones onto the elephants from above. Could the birds be a metaphor for a pandemic? Maybe Bush is afraid of H5N1 because God once sent wild birds to save Muslims, and this could happen again.

This close coupling of security, science, and religion is an example of the kind of unexpected subject formation we might expect in the multispecies cloud. We might be able to trace a past and a present for the doctor's statements but such statements do not contain the future. Despite his status as a nonbeliever in a coming H5N1 pandemic, the physician told me that WHO influenza funding was an easy source of support and he would be applying for a grant. Influenza virus was a companion species that interpolated him in world making projects (Haraway 2008; Tsing 2004) and, of course, shaped his identity and his practice of medicine in the world. In the Parable of the Elephant Troops, the agency of birds is scaled up to eclipse the power of armies and kings. In the story of H5N1, Indonesian birds went from being the agents of history to being framed in the crosshairs of foreign military agents.

MUTANT MULTISPECIES CLOUDS: H5N1 AND CHICKEN

Joe Masco (2004) in "Mutant Ecologies," describes the radioactive landscape of the South Pacific and of northern New Mexico, irradiated by nuclear weapons tests in the mid–20th century. Like the mutant possibilities of the nuclear cloud, the multispecies cloud also has the ability to mutate species bodies and beings. And in the H5N1 cloud, no creature was so affected as the chicken.

After I (along with many Indonesians) began to feel confident (correctly or not) that I was not likely in personal danger from H5N1, I purchased a chicken and a rooster from my neighbors. After trying to keep them caged for the first month, I gave up on the cage, having a better sense of why Indonesians let their poultry roam, and why some commercial growers engage in the cruel practice of debeaking. Tired of being pecked when I cleaned the cage or fed them, and worried about how they were treating each other, I set them free. What my chickens wanted to do was to nest in a tree about three feet off the ground. There, inside the branches, they were safe from cats and other potential predators as they slept. During the day, they would strut around the yard, scratching with their feet in the dirt looking for food, and also eating my garbage if they could get at it. Like my neighbors, I also set out leftover rice and vegetables for them. Every now and then the rooster would chase the chicken around the yard in an attempt to mate. In a few months we had a small flock of tiny chicks that the hen guarded closely under her wings. Casually watching my chickens, taking field notes as an amateur ethologist, I came to think about what this creature brings to the cloud of events and specters I am describing. My multispecies ethnography fieldwork was thus also "homework" of sorts (cf. Clifford 1997:85), and I became familiar with embodied, gallacious goings-on of a nonindustrial variety.

If anything is certain in the H5N1 multispecies cloud, it is this: The chicken has been the most significant casualty. H5N1 is the worst avian influenza epizootic ever in terms of geographical extent and number of infected poultry (Sims and Brown 2008:252). For each human death from H5N1, it is estimated that a million chickens have died (Sipress 2009:327), giving an estimated death toll of 400 million birds. Culling for highly pathogenic avian influenza, with methods that have included gassing, burning, and burying alive, has produced what some have called "a global avian genocide," although it is difficult for me to imagine an alternative response to culling once a flock is infected with H5N1. Virulent strains of influenza lead to a particularly bad death if you are a chicken. Infected birds seem to dissolve from the inside out and can die in a matter of minutes. Javanese farmers have given H5N1 the onomatopoetic name, *krrrrak-plop*—one cluck and the chicken drops dead.

In Southeast Asia, the majority of poultry production is done by individuals raising diverse species of uncaged birds that scratch around searching for worms and bugs to eat. The lack of biosecurity measures (like hand washing, segregating species, preventing public access to birds, vaccination) in this poultry sector was thought to pose a high risk of bird-to-human infection (Woodrow Wilson International Center for Scholars 2006:2–5). Backyard production appeared to

hold greater risks than commercial production because the backyard cannot be made biosecure through techniques of bioexclusion and agricultural sanitation, and because these chickens have closer contact with human populations. I became interested in an H5N1 communications strategy enacted between 2006 and 2009 by a consortium involving U.S. foreign aid and expertise, the Food and Agriculture Organization of the United Nations, and a private sector educational communications firm. This consortium wanted to address the disease in Indonesian backyard poultry production by making the disease's characteristics, its potentially severe consequences, and the appropriate actions to take known to anyone involved in raising, selling, or slaughtering chickens in Indonesia.

What has been valorized in the United States as free-range chicken was transformed, through H5N1 preparedness campaigns, into an agricultural method that threatened the world with a pandemic. In associating backyard poultry production with "traditional, Asian" agricultural practices, in contrast to modern commercial poultry production, "Asian culture" itself became viewed by global health commentators as a potent source of risk (cf. Bickford and DuMont 2007; Woodrow Wilson International Center for Scholars 2006).

For contagion theorist Priscilla Wald (2008), communication about disease risk articulates communities of vulnerability and reaction. Southeast Asian cockfighters were one community that worried the consortium. Recall the cockfight made famous by Clifford Geertz, and the close physical intimacy of the cockfighter with his fighting bird:

> The intimacy of men with their cocks is more than metaphorical. Balinese men, or anyway a large number of Balinese men, spend an enormous amount of time with their favorites, grooming them, feeding them, discussing them, trying them out against one another, or just gazing at them with a mixture of rapt admiration and dreamy self-absorption. [Geertz 1973:418–419]

Cockfighters also suck mucus from avian nostrils, pierce bloody wounds incurred in battle, and inhale aerosolized chicken sputum (Sipress 2009). Now, all the fluffing, petting, and bloodletting had become a cause of epidemiological attention, not only the source of cultural fascination that Geertz had identified.

Hoping to transpose a fear associated with strange dogs onto chickens, a consortium epidemiologist I interviewed wanted Indonesians raising village chickens to "think rabies" when chickens die. She was concerned about close human contact with dead chickens, including children cuddling dead pet birds, cockfighters, and ordinary families consuming and eating sick poultry. It is hard to transmit the

message that dead chickens can kill you, she felt, when H5N1 symptoms mirror many other, more common, poultry diseases, such as the nonzoonotic Newcastle disease. In response, the consortium developed seminars, trainings, and publications in a program called "Communications for Public Awareness" to disseminate one H5N1 message around which there was consensus: The disease can kill you. Report possible disease incidents, then burn and bury affected flocks.

Heather Paxson (2008) argues that insertions of microbes into the social field reflect assertions over how humans ought live with one another. She names this "microbiopolitics," defined as "the creation of categories of microscopic biological agents; the anthropocentric evaluation of such agents; and the elaboration of appropriate human behaviors vis-à-vis microorganisms engaged in infection, inoculation, and digestion" (Paxson 2008:17). The consortium's communications program elaborated the behaviors expected for those who kept, slaughtered, or consumed poultry across rural Indonesia. The presumptive habits of holding dead pets, cockfighting, and consuming sick birds were now not only unhealthy, they were conceived as wrong in moral terms. The consortium's campaign was an exercise in microbiopolitical subjectification that, when it worked as desired, looked something like this:

> On June 16, 2008, Mr. Sunar's backyard poultry were wiped out by a silent killer. Alarmed, he reported the deaths to his neighborhood representative. They had learned that sudden death in poultry could signal an outbreak of deadly bird flu from a television announcement. From their sleepy neighborhood outside Medan, North Sumatra—Indonesia's third largest city—they could have felt panicked and alone. Instead, they stayed calm because the TV message had also taught them what to do: Report the suspected outbreak to local authorities. [USAID 2008]

The consortium claimed 159 million viewers of its media campaign (USAID 2008), or three-fifth's of the Indonesian population.

Although preparedness planners, such as the consortium I describe, attempted to produce singular narratives, the outcomes of public communication of H5N1 messages were multiple. In my periurban middle-class neighborhood of Yogyakarta, my neighbors got rid of their backyard chickens and pet songbirds in 2006 as a result of public awareness campaigns and media messages. By the end of the decade, however, these same neighbors expressed skepticism about bird flu because the predicted human pandemic never occurred. Songbirds are a symbol of being "Javanese," and cages now hang again from roof eves all over

Yogyakarta. One ornamental bird owner I spoke with told me with pride that H5N1 "wouldn't dare" *(tidak berani)* to infect his birds because he took such good care of them.

Skepticism about the dangers of H5N1 became widespread in Indonesia, perhaps because of the gap between messages about H5N1 and actual occurrences of the disease. In 2007, the Association of Poultry Producers in South Sulawesi (Forum Masyarakat Komunitas Perunggasan 2007) claimed H5N1 to be a deliberate act of "bioterror" on the part of the United States. According to association spokesperson Wahyu, because the United States produces 2,500 excess tons of chicken legs a year that Americans do not want to eat, the United States wants to export these to Indonesia. The United States has deliberately used the virus to ruin Indonesian poultry production to improve its poultry export sector. Wahyu expressed disappointment that the Indonesian government succumbed to U.S. pressure to limit the transport of poultry around Indonesia (a biosecurity measure), and observed that domestic poultry producers lost money when Indonesians became scared to eat chicken.

In Pasar Demangan, the farmers' market in Yogyakarta where I used to shop each week, Mrs. Wati sold me both backyard and commercially produced chicken. Just as Wahyu had described, she lost her livelihood at the height of the H5N1 scare, but the disease never made her sick. She buys live chickens directly from the producers and she will not buy chickens that look sick, she told me. As a customer I know I am being reassured, but I also place what she is telling me in a broader context: The intervention and public awareness campaign has been disproportionate to the amount of human illness in Indonesia. Still, in the countryside villages I have visited, women told me about chickens and even entire flocks that died suddenly. Some said it was avian influenza. Others reported that they didn't know why their birds died. Conspiracy theories abounded, and these stories beyond ordinary reason, have to be included in our understanding of a multispecies cloud.

Wald (2008) writes of how disease becomes conventionalized in the form of an "outbreak narrative." Comparing the consortium's H5N1 narrative to the concept of quasi-species, what became clear from my observations and conversations with consortium participants, all kinds of bird owners, and other commentators on the disease in Indonesia is that, like the "consensus" (average) genetic sequence of the quasi-species, the consortium's outbreak narrative represents a "consensus" thread to the H5N1 intervention. In the quasi-species viral cloud every possible base pair is represented in the consensus genome. In human worlds, H5N1 is a "consensus narrative" with a multitude of heterogeneous elements in the cloud.

Although I heard many different stories about H5N1, I rarely met a poultry owner, commercial or backyard, who said to me anything like, "The disease can kill you. Report possible disease incidents, then burn and bury affected flocks."

Although on average the consensus among professionals combating H5N1 was that the biggest problem existed in backyard poultry, the evidence indicated that an even bigger problem might actually exist within the commercial poultry sector. One million commercially grown chickens are brought in to the capital city of Jakarta and consumed each day. They come from farms all across Java and Southern Sumatra. Although broilers are not raised in the battery cages that house layers, they receive a schedule of hormones, antibiotics, and vitamins that brings them from "day-old chick" to market in 33 days. This contrasts with the seven months that it takes to raise a village chicken *(ayam kampung),* like the pair I owned, to a fully grown size. These village chickens are generally raised without medications or enhanced feed, even when raised for commercial sale. Village chickens are also said by Indonesians to both taste better and be healthier for you. They cost twice the price, however, and so village chicken is usually consumed for special ceremonies rather than everyday fare.

For roughly the first five years of the Indonesian outbreak, pandemic preparedness planners largely left the commercial sector to regulate itself. H5N1 in commercial poultry has been, by default and by design, shielded from intervention by both the Indonesian government, and the international community. Commercial producers are widely known to have failed to report H5N1, however, and to sell off potentially infected poultry, rather than to lose profits with culling. It is not hard to find accounts that lay the cause of recent influenza epidemics and other zoonoses at the door of intensive farm animal production (Davis 2005; Greger 2006; Pew Commission 2008; Wallace et al. 2009). These accounts make a link between the intensiveness of agriculture and the proliferation of zoonotic disease, demonstrating that the conventional influenza "outbreak narrative" leaves important sources of contagion out of the picture.

Tracing the genealogy of institutional ecologies that gave rise to 21st-century viral becomings, takes us back some 40 years to the origins of a modular model of industrial agriculture, and to much earlier forms of production. In the 1970s and 1980s, U.S. models of industrial production began to be exported around the world, including to Asia. On the one hand, such factory farming has made possible increased protein consumption globally (Pew 2008). On the other hand, problems associated with export of "Concentrated Animal Feeding Operation" (CAFO) models are increasingly clear. With CAFOs, countries face new problems

of regulating waste, protecting workers, and considering animal welfare, not to mention disease. According to a Pew Commission report:

> multinational corporations involved in the animal protein industry scour the world looking for countries with cheap labor and large expanses of land available to cultivate feed for food animals. When they find these areas, they bring along the production model that served them well in developed countries. [Pew 2008:9]

According to Donna Haraway, the world's first industrial egg production began during the construction of the pyramids in Egypt (2008:265), but by all accounts, everything about the raising of poultry has changed tremendously in just the last 50 years. Smith and Daniel (2000), authors of *The Chicken Book,* claim that the modern industrial chicken has been so engineered away from even its domesticated 19th-century predecessor as to be not a chicken at all. In the gallaceous future they foretold back in 1975, chickens "will not be chickens and their eggs will not be eggs" (Smith and Daniel 2000:299). Perhaps these chickens are closer to Margaret Atwood's science fiction "ChickieNobs"—meat grown without bodies—in her novel *Oryx and Crake* than we would like to think (Haraway 2008:268). One outcome of the new nonchicken chicken is its ability to proliferate disease.

There is hardly any doubt that the intensive methods of the livestock revolution are responsible for many multispecies clouds of new zoonoses. Antibiotic treatment often begins at birth in commercial animal agriculture, and there is an ongoing struggle to keep up with emerging disease. With this in mind, a significant body of research claims that backyard production is vulnerable to "spillover" of disease from commercial production, but does not generate it (Wallace et al. 2009). To the extent that intensive production in Asia has aided in its spread, and may be implicated in H5N1's mutation to virulence, we have to consider that it is not the primitiveness of traditional Asian agriculture but, rather, the so-called modern methods exported from the first world, with concomitant uptake by producers in Asia, that has created this new profile of risk. Structures of neoliberal agribusiness governmentality were obscured by clouds of H5N1 interventions.

HUMANS BECOMING WITH H5N1

In the multispecies cloud, changes in the human and its specificities were prominently at stake. In the uncertain reassortments of identities that comprised the cloud, multiple figures of the human came in to view. Backyard poultry producers, doctors and epidemiologists, patients struggling against steep odds and

security consultants seeking to improve their odds—all of these people imagined the H5N1 quasi-species as a locus of fear, identity, knowledge, resistance, ethics, and opportunity, constructing diverse clusters of knowledge and belief about spaces and substances from the global, to the national, to the human, to the microbial.

At one moment, the H5N1 outbreak narrative proposed that the world was at risk, suggesting that the disease has an egalitarian capacity to threaten us all equally. At another, the scale politics of H5N1 suggested that Indonesians, more than others, bore greatest responsibility both for creating a potential pandemic situation and for stopping it in its tracks. Initially problematized in "First World" terms as a threat to national security ("a nation-busting issue"), the desire to control H5N1 "on the ground" in Indonesia seemed to specify the will to stop the disease "there" before it came "here."[10] Indonesia weighed its own interest in protecting household-level food production schemes, maintaining tourism, and developing its own pharmaceutical and scientific capacity, against international health risks on the global scale.

Indonesia was unable to refuse the terms of massive international disease intervention, however, on any grounds that could be viewed as reasonable. And yet, more than a few Indonesians contested the scalar understanding of "global vulnerability," "Indonesian responsibility," taking up H5N1 as a problem of scientific collaboration, population health, and even international hegemony, in a way that reframed their relationship to H5N1. For example, Susanti, the technician who sampled sandpiper cloacae on the beach, engaged the disease as an opportunity for advancing Indonesia's position in global health and epidemiology, whereas the spokesman for the Association of Poultry Producers in South Sulawesi, Wahyu, alternatively, understood the disease as U.S. bioterror and wanted to refuse biosecurity measures that put poultry producers at economic risk. And although the World Bank argued that H5N1 threatened something called the "global economy," it was Mrs. Wati in Pasar Demangan who could detail the ways her own "market" economy had been affected by H5N1.

The concept of the cloud that I have developed in this essay focuses on processes of infection and reassortment. Despite the proliferation of vaccination technologies and the advent of antibiotics, infections are not under human control. Rapid rates of change are also at play as microorganisms can evolve at a much greater rate than the life forms they infect; in the multispecies cloud that results, viral and vital materials reassort, changing the taken-for-granted boundaries not only of species, but of nations, organizations, and economies.

Cloudy reassortment is thus a metaphor for processes of global exchange such as those explored through Ong and Collier's concept of "global assemblage," an "ensemble of heterogeneous elements" (2004:8) through which world-making significance is articulated. Where the cloud differs from the global assemblage, however, is that the cloud is not limited to forms of "technical, political and ethical reflection and intervention"; it does not assemble a rationality but, rather, operates through infections and reassortments that are coincidental, responsive, opportunistic, and often nonrational. The quasi-species and multispecies cloud also differs from Deleuze and Guattari's idea of "assemblage," conceived as pieces gathered into a single context. Whereas their assemblage lends stability, however fleeting, to a cluster, group boundaries in the cloud are inherently unstable. As a metaphor playing off the viral "mutant swarm" or "cloud," the multispecies cloud will always have multiple components, but also multiple contexts. In other words, the thing that is H5N1 does not gather together adherents in a single context, but rather proliferates contexts.

The cloud focuses on exchange among vital and quasi-species beings, but also queries the boundaries of species. H5N1 influenza infects a multitude of species transforming them in the process, making and remaking them in not always harmonious concert. H5N1, after all, can kill. As a killer with the ability to take life (although never purposefully or methodically), but also with the ability to remake life (as biologically immune or as socially reinvented, like Susanti), the H5N1 multispecies cloud holds life itself at stake. Human responses to such uncertainty over life are a key component of the multispecies cloud, but so is the remaking of the human along with viral and other (friendly and hostile, but also those in agricultural servitude) companions.

As a multispecies cloud of unstable entities, H5N1 emerged amidst a multiplicity of countervailing national, commercial, religious, and other human interests, if only to vanish again as an ephemeral unbecoming. What became of H5N1?

As of mid-2010, an H5N1 pandemic has not appeared. Midway through 2009, however, an influenza pandemic emerged in the form of a different influenza virus, a different quasi-species in the swarm: H1N1, not H5N1. This type of virus was known popularly as the swine flu. The label *swine* was later dropped to keep pigs from being wrongfully culled, indicating the powerful materiality of imposing animal species on the viral. This pandemic H1N1 virus is a reassortment of viral genes from swine, avian, and human influenza viruses. It began in Mexico early in 2009 and was first identified in April, causing Mexico City to close down schools and businesses for a week to try and stop its spread. In early June 2009, the WHO

officially declared the disease a pandemic. By all accounts this H1N1 virus is milder than even the seasonal flu, although there have been deaths.

Critical analysis of this new pandemic flu (Davis 2009; Wallace 2009) details its early emergence around a subsidiary of Smithfield Farms (one of North America's largest pork producers) in Mexico. Opened in the wake of NAFTA, Wallace writes, "if we are to impart responsibility where it should lay, North America's new influenza would be better called the NAFTA flu." He says the name *swine flu*

> detracts from an obvious point: pigs have very little to do with how influenza emerges. They didn't organize themselves into cities of thousands of immunocompromised pigs. They didn't artificially select out the genetic variation that could have helped reduce the transmission rates at which the most virulent influenza strains spread. They weren't organized into livestock ghettos alongside thousands of industrial poultry. They don't ship themselves thousands of miles by truck, train or air. Pigs do not naturally fly. [Wallace 2009]

I have described how things changed for humans and their mammalian, avian, and viral multispecies partners as H5N1 in Indonesia opened up multiple species to transfected identities. In attending to their own sense of vital systems security, what pandemic preparedness planners planned for was an avian influenza of deadly virulence emerging out of Asia; what occurred was a mild swine flu coming out of the United States and Mexico for which we were relatively unprepared. The sense that past and present are tied to but do not contain the future for either humans or influenza viruses is inherent in an ontology of the multispecies cloud. Our futures lie at the junctures where forms of the human, animal, and microbe meet and where each sustains—and clouds—the limits and possibilities of the other.

ABSTRACT

Through an index case in Tangerang, West Java, the Orthomyxoviridae *virus H5N1 influenza became visible in Indonesia and propagated rapidly across the archipelago. This viral event incited fears of a human influenza pandemic, disrupting existing arrangements among species, peoples, institutions, and nations, and remaking their biopolitical relations and specific ontologies along the way. On the basis of ethnographic field work in technoscientific, agricultural, and security communities in Indonesia, this essay examines how a set of strains and species—the H5N1 influenza virus, wild birds, domestic poultry, and, finally, humans—combined with one another, and with ongoing Indonesian and transnational concerns over pandemic preparedness, biosecurity, and national integrity, to create a multispecies cloud. The concept of multispecies cloud refers to the narratives and material practices floating around the H5N1 event and its multiple species companions in Indonesia. As I conceptualize the cloudiness of H5N1,*

its key feature is the uncertainty of precisely what social and biological forms were interacting in the outbreak scenario or might consequently emerge as a consequence of entering into engagement with the virus. The influenza virus, as a quasi-species or cluster of genomes in any case of infection, is a potent source for exploring an array of biopolitical concerns in human communities that emerged alongside the virus. Risk, scale, and speculation are discussed in turn as rubrics for understanding the microbial and multispecies sociality of H5N1 influenza. Examples are drawn from the sciences of virology and ornithology, and the global health practice of disease communication, as well as from poultry agriculture.

Keywords: multispecies, quasi-species, chicken, H5N1 influenza, Indonesia

NOTES

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1. Through her work on atherosclerosis, Annemarie Mol (2003:32–36) tackles the thorny problem of subject–object relations by introducing the concept of "enactment." To describe objects as "enacted," she argues, allows us to see that "things" don't have a life of their own independent of the practices that enliven them. As such, objects require techniques to make them tangible, visible, audible, and ultimately knowable.
2. Virologists had been predicting an epidemic of influenza based on the idea that influenza epidemics periodically appear, and this had not happened for a long time. Influenza pandemics have occurred at an average of every 27.5 years, with 39 years being the longest interval in the past 300 years. That most recent influenza pandemic was in 1968 (Greger 2006:72–93).
3. According to one skeptical microbiologist that I interviewed in Jakarta, there was no effective means of counting mild and asymptomatic cases within the H5N1 statistics in Indonesia because surveillance was based on hospital admissions.
4. There are presently 16 known HA subtypes, and nine known NA subtypes.
5. In Indonesia, human cases of H5N1 infection have frequently affected genetically related family clusters. In a well-known Sumatra cluster, for example, seven of eight family members died of H5N1 in April and May 2006. It was the first Indonesian instance in which the WHO acknowledged likely limited human-to-human (H2H) transmission and the only known probable case of human-to-human-to-human (H2H2H) transmission. The H2H2H event is especially significant for signaling the start of a pandemic; it is what would likely happen as wide transmissibility was ignited (Nature 2006b). For this reason the case was referred to as a "dry run" for a human pandemic (Nature 2006a).
6. One solution seemed to be the Roche product oseltamivir (Tamiflu), a drug that is at the front line of viral influenza treatment. Taken within two days of the onset of symptoms, it can reduce the intensity and duration of disease. According to the WHO (2005), in a pandemic situation, oseltamivir would be in critically short supply, and therefore they recommended national stockpiling programs (which Indonesia carried out) of oseltamivir, which has a five year shelf life. Expatriates who had the financial ability to buy the drug on speculation were stockpiling oseltamivir in their homes and offices.
7. Now, even some elements of the Indonesian government are clients. Thwarting graft is one of the main elements of their business profile. If, for example, a company is being extorted, the court system can be useless. A private security firm, however, can engage in counterextortion, threatening the original extortionist with, for example, pictures of him cheating on his wife. "What will his Imam and his neighbors think of that? The extortion goes away. We have to do

things here we wouldn't be able to do at home." Security firms wish to intervene in pandemic situations in a way that looks different from "home" as well.

8. The World Bank (2006) estimated that a flu pandemic could cost the global economy up to $1.5–$3 trillion.
9. Indonesia has maintained a focus on two forms of security not covered by Collier and Lakoff: internal state security and securitization of the international investment climate. The state, under the dictatorship of former President Suharto (1965–98), was a system of a very different order than one made up of vital infrastructure. The Suharto regime included acts, statements, and images designed to secure the state against the nation (Siegel 1998), or the apparatus of power against the nationalism of the people (Cheah 2003). In the post-Suharto era of reform *(reformasi),* the internal repressive apparatus of the state has become substantially less obvious, while corruption and terror have come to the fore as motivating securitization.
10. This is not unlike the approach to the "War on Terror," which brought the battle to the "enemy" before the enemy could reach the "homeland."

Editors Note: Cultural Anthropology has published a number of essays on social and political crisis in Indonesia. See, for example, Karen Strassler's "The Face of Money: Currency, Crisis, and Remediation in Post-Suharto Indonesia" (2009); Nil Bubandt's "From the Enemy's Point of View: Violence, Empathy, and the Ethnography of Fakes" (2009); and Webb Keane's "Knowing One's Place: National Language and the Idea of the Local in Eastern Indonesia" (1997).

Cultural Anthropology has also published essays on emerging forms and discourses of security, including Andrew Lakoff's "The Generic Biothreat, or, How We Became Unprepared" (2008); Joseph Masco's "'Survival Is Your Business': Engineering Ruins and Affect in Nuclear America" (2008); and Sherene Razack's "From the 'Clean Snows of Petawawa': The Violence of Canadian Peacekeepers in Somalia" (2000).

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