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THE NEW PRESS

NEW YORK
LONDON

Plague and Profit

At the center of the meltdown in Asia's vast poultry industry is a 61-year-old multi-billionaire called Dhanin Chearavanont.¹⁶³

Jasper Becker

All of today's tens of billions of highly engineered factory chickens are descended from red jungle fowl that still roam wild in forest regions of Thailand and Vietnam. Using mitochondrial DNA analysis, Japanese researchers in 1994 demonstrated that chickens were domesticated in the area of present-day Thailand more than 8,000 years ago.¹⁶⁴ The chicken, along with the pig and the buffalo, subsequently became the basis of agrarian culture throughout Southeast Asia. Chickens are likewise the bottom line of Asia's largest and most powerful agricultural-export conglomerate, Bangkok-based Charoen Pokphand. CP, as it is universally known, figures centrally in the story of H5N1's terrifying return in the winter of 2003–4 and the unprecedented HPAI epidemic that threatens to become a global human and ecological cataclysm.

Founded by the immigrant Chia brothers from Guangdong, CP was a rice-seed distributor in Bangkok's Chinatown until Chia Ek Chow, the youngest of four sons, took over the business

in 1964. In the face of growing intolerance toward the Chinese diaspora throughout Southeast Asia, he changed his name to Dhanin Chearavanont and reoriented the company to chicken breeding and broiler farming. Impressed by the success of U.S. companies in transforming poultry raising into a streamlined industrial process more closely resembling chemical manufacture than traditional agriculture, Chearavanont formed two successive strategic partnerships with American companies and quickly became Asia's leading apostle of Tyson-style intensive farming and vertical integration. In 1973 Chearavanont opened Thailand's first modern poultry slaughterhouse and began exporting to Japan. CP's major competitors, the Bangkok Livestock Trading Company and Saha Farms, were forced to keep pace with Chearavanont's innovations, which included organizing networks of contract farms and building modern export processing plants.

By the mid-1990s, Thailand (which had adopted CP's corporate slogan, "Kitchen of the World,") had the most corporatized livestock industry in Asia. CP and a handful of other vertically-integrated exporters controlled 80 percent of production, with chicken farming concentrated in a dense, polluted belt 60 to 150 kilometers outside Bangkok.¹⁶⁵ With 100,000 employees across Asia, CP boasts that its agro-industrial empire is "fully integrated horizontally and vertically. Operations take in animal feed production, breeders, farming systems, meat processing, food production and its very successful value-added products." CP also has promoted the spectacular rise of Western-style fast foods in Asia through the sourcing, or in the case of China, the direct ownership of myriad Kentucky Fried Chicken franchises.¹⁶⁶

For Chearavanont and other "integrators," economies of scale in a booming export environment have produced fabulous profits, but for CP's 10,000 contract farmers, as well as for hundreds of thousands of backyard poultry producers, the situation is radically different. As journalist Isabelle Delforge points out: "With contract farming, large companies control the whole production process: they lend money to the farmers, they sell them chicks, feed and medicine, and they have the right to buy the whole production. But usually the company is not committed to buy the chickens if the demand is low. Contract farmers bear all the risks related to production and become extremely dependent on demand from the world market. They become factory workers in their own field." Companies like CP, an organic farmer told Delforge, "destroy small farmers with false promises."¹⁶⁷ For the majority of Thai farmers, the Livestock Revolution has meant soaring indebtedness, loss of independence, and the continued migration of their daughters to Bangkok's sweatshops and brothels.

While Thailand's chickens (and later, pigs and prawns) have made Chearavanont a billionaire and, according to business magazines, one of the twenty most powerful businessmen in Asia, his central ambition has always been to honor his father's dream of bringing the Livestock Revolution—in the form of large-scale agro-industrial capitalism—back to China. Thanks to astute politicking and powerful Guangdong connections, CP was literally the first multinational investor to step foot inside Deng Xiaoping's "Open Door" in 1979 (CP's foreign business license in Shenzhen was number 001). CP, by itself or in alliances with other capital groups, has subsequently invested billions in the P.R.C. In addition to holding a diversified portfolio of hotels,

shopping malls, fast-food franchises (including Kentucky Fried Chicken), telecommunications, and restaurants, it has built more than one hundred feed mills and poultry-processing plants throughout China in an attempt to forestall both foreign competitors (Tyson Foods, above all) and local upstarts in the world's most dynamic market for chicken products.¹⁶⁸ (During the 1990s, as global poultry output surpassed that of beef, China doubled its share of total world consumption—from less than 8 percent to more than 17 percent—and displaced the United States as the largest consumer.)¹⁶⁹

CP's explosive growth in Thailand and China, as well as its expanding operations in eighteen other countries, has required massive amounts of political grease. In 1996, for example, Chearavanont made an illegal \$250,000 donation to the Democratic National Committee in the United States which backfired, causing bad publicity for both CP and the Clinton administration when fundraiser John Huang was indicted. The right-wing *American Spectator* pointed to CP's alliance with a leading Chinese weapon maker and implied that it was one of the "front companies for communist China" that had been "buying up (and spying on) the United States." But the magazine neglected to mention that a few months earlier, Neil Bush, George W.'s brother, had formed a joint venture company with Chearavanont.¹⁷⁰ Indeed, as Dan Moldea and David Corn would later detail in the *Nation*, both the Bush family and the Carlyle Group—the private investment fund used by the family and other leading Republicans to turn insider access into gold—have long-standing and intimate business relations with CP. Former president George H.W. Bush, for example, was reportedly

paid \$250,000 by CP to lobby Asian and American leaders on its behalf.¹⁷¹

Chearavanont also acquired equity in the Thai state in 2001 with the appointment of his son-in-law Wattana Muangsuk as Deputy Commerce Minister. The cell-phone billionaire Thaksin Shinawatra—Siam's answer to Italy's Silvio Berlusconi—won the presidency that year with a lurid populist campaign. Thaksin's political party is called Thai Rak Thai, or "Thai Loves Thai," and he promised debt relief, cheap medical care, and a tough crack-down on drug dealers (2,500 of whom, indeed, were promptly murdered by police death squads). In reality, explains economist Pasuk Phongpaichit, "His ascendancy signifies a new consolation of big business and politics. Whereas the business people who have dominated Thai politics since parliament became significant in the 1980s used to be mostly provincial figures of only moderate wealth, Thaksin's government is controlled by the biggest Bangkok business groups to have survived the 1997 crisis."¹⁷² On the eve of the plague, in other words, Thailand was governed by a crony coalition of the telecommunications and livestock industries.

The return of avian influenza was shrouded in rumor, denial, and conspiracy during the fall of 2003. The epidemic actually began much earlier (Indonesia later conceded that H5N1 had been detected in August), but Chinese officials denied reports in the Hong Kong *Standard* that "farms throughout China [had] suffered from avian flu for several years."¹⁷³ They also scorned rumors that there was a massive outbreak among ducks in Guangxi Province, bordering Vietnam, and likewise dismissed as Taiwanese propaganda the warning from Taipei that its animal

inspectors in December had found H5N1 in wild ducks smuggled from Fujian, the province that was the likely source of the virus that killed two in early 2003.¹⁷⁴

In January 2004 the British magazine *New Scientist*, interviewing leading flu researchers off the record, created a small tempest with claims that the outbreak was the result of a clandestine and misguided vaccination campaign ("an uncontrolled experiment in viral evolution") by poultry producers in south China after the 1997 crisis in Hong Kong. By using an inactivated virus to immunize their chickens, Chinese growers had actually accelerated the evolution of an H5N1 superstrain—genotype Z (GenZ)—that quickly became endemic but asymptomatic in domestic ducks. From this stable reservoir, it began to spread to other species via direct contact, poultry smuggling, and possibly by wild bird migration. According to the *New Scientist*, "a combination of official cover-up and questionable farming practices allowed it to turn into the epidemic now under way."¹⁷⁵

But Chinese authorities were not the only ones concealing the epidemic. In early November 2003, chickens started dying on farms across Thailand. As one farmer described it: "Their bodies began shaking; it was if they were suffocating, and thick saliva started coming out their mouths. We tried to give the hens herbs to make them better, but it made no difference. The faces then went dark green and black, and then they died."¹⁷⁶ Although a veterinary scientist at Bangkok's Chulalongkorn University warned that he found H5N1 in several dead chickens, he was ignored by Thailand's Livestock Department. ("All the academics and experts," an opposition senator would later allege, "had to shut up due to political interference.") Likewise, when a worried farmer showed the carcasses of his dead flock to an

official, he was told that the birds had died "without any medical cause."¹⁷⁷

Strangely, in the midst of all these bird deaths, the corporate chicken-processing plants were working overtime. As angry trade unionists at one factory just outside the capital told the *Bangkok Post* after the scandal broke: "Before November we were processing about 90,000 chickens a day. But from November to 23 January, we had to kill about 130,000 daily. It's our job to cut the birds up. It was obvious they were ill: their organs were swollen. We didn't know what the disease was, but we understood that the management was rushing to process the chickens before getting any veterinary inspection. We stopped eating [chicken] in October."¹⁷⁸

The wall of official silence across Asia was breached in December when chickens started dying en masse on a farm near Seoul. Korean agricultural officials were stunned to discover H5N1, but, in contrast to their counterparts in China and Thailand, they promptly notified the Office International des Epizooties (OIE); a week later, South Korea announced a massive cull after new infections were identified in chicken and duck flocks in five provinces. Meanwhile children, not just chickens, had been dying mysteriously in Vietnam; just before the New Year, one of the CDC's influenza experts in Atlanta received a worried email from a virologist in Hanoi which described patients suffering from symptoms of viral pneumonia and acute respiratory distress syndrome (ARDS), which had caused the death of many of the 1918 pandemic's victims.

The Hanoi doctor and her colleagues were unaware that their own agriculture bureaucracy had been concealing, at least since October, evidence of a sporadic H5N1 epidemic among

poultry.¹⁷⁹ On 5 January 2004, following the deaths of several more people, Vietnamese public-health officers urgently requested help from the WHO, whose regional office in Manila also soon heard rumors as well of Vietnam's HPAI outbreak; a few days later Hong Kong experts confirmed that the Frankenstein GenZ had been found in forensic samples from three of the dead children in Hanoi. Simultaneously, Vietnam officially acknowledged an avian flu epidemic in two provinces and Japan announced the discovery of H5N1 among hens in Yamaguchi prefecture. (The outbreak in western Japan had originally been concealed by poultry company officials—one of whom later committed suicide—and only came to light thanks to an anonymous tip-off from a company employee.)¹⁸⁰

The WHO and its veterinary counterpart, the OIE, as well as the UN Food and Agricultural Organization (FAO), were horrified to realize that bureaucrats and agribusiness spokespeople had for months been covering up an avian flu epidemic of continental scope. (In impeccable, understated bureaucratese, FAO Director-General Jacques Diouf observed that "the lack of timely reporting of infection to the national competent authorities, OIE and other international bodies has contributed to the scale of the problem.")¹⁸¹ Facing an increasingly cynical world press, it became almost impossible for the international agencies to accept the reassurances that continued to flow from Chinese and Thai ministries—the Chinese, in particular, seemed to have reverted to the Orwellian culture of secrecy and deception previously associated with the Jiang Zemin camp. When another mystery respiratory infection swept Guangdong in January 2004, officials dismissed it (shades of SARS) as the bacterium *Chlamydia pneumoniae* and refused to let the WHO investigate

on the spot. (A skeptical Chinese researcher told *Nature*: "But that can't be the whole story. From a clinical standpoint, it seems to be related to a virus, and we cannot rule out the bird flu.")¹⁸²

In Thailand, meanwhile, lies were being manufactured almost as fast as sick chickens were being slaughtered and shipped to overseas markets. Deputy Minister of Agriculture Newin Chidchob talked nonchalantly about a few cases of "avian cholera," while Prime Minister Thaksin and his ministers, to assuage a nervous public, "devoured a big feast of deliciously cooked, Thai-style chicken dishes in a nationwide television broadcast."¹⁸³ CP senior executive Sarasin Viraphol assured reporters that, although the company would not allow the press to inspect its plants, avian flu was completely absent in Thailand. In fact, as the Bangkok press later reported, the government had been colluding with CP and the other giant poultry producers to conceal the epidemic by paying contract farmers with infected flocks to keep quiet; official deceit gave the big exporters several months to process and sell diseased inventory as well as to disinfect their plants and institute isolation procedures in their battery warehouses. Small producers, however, were left alone to bear the brunt of the epidemic's human and economic costs.¹⁸⁴

Finally, in late January, with two young farm boys critically ill from influenza, the Thai parliamentary opposition, led by maverick senator Nirum Phitakwatchara, was able to force Prime Minister Thaksin Shinawatra to admit that H5N1 was, in fact, ravaging the poultry belt. His staff immediately off-loaded responsibility for official mendacity onto lowly provincial officials. "What looks like a cover-up," Thaksin's spokesman deadpanned, "was a misinterpretation of procedures. The most appropriate word is 'screw-up.' Some agencies screwed up. We

found there was lots of confusion about the kinds of information that needed to be reported upstairs."¹⁸⁵

Small producers, in response, screamed that "by denying the facts, the government was helping out the major operators, but in the end it's us small farmers who are suffering."¹⁸⁶ A Bangkok newspaper contrasted the fate of big and small poultry producers in Sukhothai province. The commercial growers "integrated" by CP and other conglomerates were notified about the epidemic in December and were provided with antiviral vaccines by livestock officials, and thus their inventories were saved. But small holders were kept in the dark about the disease, and as a result most of their chickens perished as did one peasant's teenage son. "If we had at least known about the disease," Laweng Boonrod told the press, "I would not have allowed my son to go close to my sick chickens and he would not have died."¹⁸⁷

The main importers of Thai poultry were also furious at the elaborate deception, none more so than EU Health Commissioner, David Byrne, who had just returned to Brussels with Prime Minister Thaksin's personal assurance that Thailand was free of avian flu. Byrne told the press that he "felt dishonored."¹⁸⁸ The EU, Japan, and South Korea promptly embargoed poultry imports from Thailand, while the Bush administration, grateful for Thaksin's support of U.S. interventions in Afghanistan and Iraq, avoided public criticism of the cover-up.

CP's stock immediately fell by an eighth, and the ground shook. ("In Thailand," writes Isabelle Delforge, "when CP sneezes, the whole business community catches cold—or flu.")¹⁸⁹ Dhanin Chearavanont, however, was surprisingly upbeat and urged Thais to "turn the crisis into opportunity." Another CP

executive promised that "changes resulting from the crisis would benefit the Thai chicken industry in the long term as well as help it recover from the current difficulties." The plague, in other words, might rationalize poultry production. But opportunities and benefits for whom? The government quickly unveiled a sweeping plan to complete the modernization of the Thai poultry industry by culling small-scale, open-air flocks and requiring their operators to build new industrial poultry houses; only those farmers who fully complied with the plan would be eligible for compensation for their dead chickens.

Thailand's agrarian populists, including senator and agricultural economist Chirmsak Pinthong, promptly denounced the government's plan as another cunning move by Chearavanont to force the small operators into the extinction or turn them into serfs of CP.* "The government is regulating small chicken raisers in such a way that it benefits the big conglomerates."¹⁹⁰ Small holders complained that government compensation for their dead chickens was only a fraction of what CP and others were charging them to restock their flocks. There was also evidence that the poultry cull was being used to strengthen the corporations. "When the avian flu was detected," writes Delforge and a Thai colleague, "a red zone was cleared around the farm and all the poultry in the zone were killed to prevent the spread of the disease. However, some farmers reported dead chickens but no red zone was declared around their property. They suspected the authorities of

* An Internet lunatic fringe, American not Thai, maintains that both CP and Tyson are engaged in clandestine biowarfare against small-scale producers and that H5N1 may be their designer weapon. The impetus for this stupidity seems to be both corporations' former support for ex-President Bill Clinton.

protecting neighboring industrial farms or owners of highly valuable fighting cocks."¹⁹¹

He Changchui, FAO Assistant Director-General and Regional Representative for Asia and the Pacific, indirectly criticized the giant producers by stressing the role of "high densities of humans and animals . . . [in] creating new pathways for disease transmission through inappropriate waste disposal, direct contact or through airborne transmission." He urged a "substantial restructuring" of poultry production along lines that favored the poor, protected the environment, and compensated the small producers affected by the outbreak.¹⁹² The Thaksin government, however, uncritically embraced Chearavanont's contention that avian flu's spread was due to the small producers and their "backward" open-air chicken flocks. CP claimed that its industrialized, enclosed farming system was virtually impregnable to viral outbreaks and epidemics.

While it is true that Southeast Asia's traditional backyard chicken flocks offer myriad opportunities for infectious interchange between different species of poultry and wild birds, the huge chicken factories (50,000 birds per two-story structure) maximize the accumulation of viral load and subsequent antigenic drift. Indeed, disease ecologists believe that "a high density of smallholders surrounding intensive or industrial units" creates "a particularly risky situation."¹⁹³ In an epidemiological sense, the outdoor flocks are the fuse, and the dense factory populations, the explosive charge. Moreover, as Delforge emphasizes in one of her exemplary reports, CP's factory farms have themselves been identified as vectors of the epidemic: "In Vietnam, the current chicken flu outbreak infected a large closed farm owned by CP." As *Vietnam News* reported on 4 February 2004,

"The army has been mobilized to kill 117,000 birds on the biggest farm in Ha Tay province, owned by the Thai Charoen Pokphand Company."¹⁹⁴

Once the Thais had publicly acknowledged their outbreak, the other major deceivers—Indonesia and China—were forced to play show-and-tell as well. The scandal of Indonesia's 2 February confession that the government had been concealing knowledge of an H5N1 outbreak since late August was compounded by Agriculture Minister Bungaran Saragih's extraordinary explanation that they had withheld information because "we did not want to cause unnecessary losses through a hasty decision."¹⁹⁵ The minister also asserted that the strain of H5N1 circulating in eighty districts from Sumatra to Kalimantan and West Timor, which had already killed 15 million chickens, was different from the virus in Vietnam and posed no threat to humans—a claim dismissed as nonsense by scientists.

Chinese officials managed to be even more arrogant and egregious in their attempt to save face than their Indonesian counterpart. In the first week of February they grudgingly doled out in bits and pieces the admission that H5N1 was raging in no fewer than twelve provinces and cities, including Guanxi, Guangdong, and even metropolitan Shanghai. Ten days later, Chen Kaizhi, a top official in Guangzhou, demonstrated the stunning scientific ignorance of senior bureaucrats like himself in a speech to the Guangdong People's Congress: "This disease is hundreds of years old and it can be prevented and treated. Vaccines are effective. No humans have been infected, so why this uproar?" Chen went on to contrast the hysteria of Hong Kong health officials, the WHO and other "outsiders" with traditional folk wisdom. "In the past when life

was hard, we hoped for a disease among our chickens so that we got to eat chicken. When a chicken at home dropped its head, we said, 'good, now we get to eat chicken.' Now we are so advanced that people are not allowed to eat diseased chicken."¹⁹⁶

Chen, of course, ignored the fact that, thanks to the cover-ups in Guangdong and elsewhere, thousands of people had consumed diseased chicken products. Meanwhile, the Hong Kong media that had earlier reported suspected cases in the PRC or now dared to criticize the ignorance of officials like Chen were threatened with legal action under the same infamous mainland statute that had been used to suppress reportage of SARS a year earlier.

While observers speculated about what had happened to the short-lived reign of scientific and medical "transparency" in China, the OIE and WHO were desperately worried about the haphazard, and, in some cases, perfunctory character of the poultry culls that were Asia's only hope of containing the H5N1

Table 8.1.
Covering-up the Epidemic

Country	Official Admission	Actual Onset
S. Korea	12/12/03	
Vietnam	1/8/04	10/03
Japan	1/12/04	
Thailand	1/23/04	11/03
Cambodia	1/24/04	
China	1/27/04	early 03
Laos	1/27/04	
Indonesia	2/2/04	8/03

catastrophe. In Thailand, where prisoners were mobilized under army supervision to bury millions of chickens alive, the flocks of small producers, as we have seen, were dutifully massacred, while corporate chickens received special treatment. Activists charged that "workers and consumers' health clearly comes after exporters wealth," and the WHO scolded the government for its lackadaisical attitude toward protecting farmers and cullers from infection. Thai authorities also wasted valuable time in the needless slaughter of wild birds and urban pigeons after Prime Minister Thaksin, in characteristic xenophobic fashion, blamed "foreign" wildfowl for starting the epidemic.¹⁹⁷

The government of Vietnam, previously praised by the WHO for its competent handling of the SARS outbreak, was altogether more cooperative, but the country's poverty and the dispersed character of its largely backyard poultry industry posed huge obstacles to creating effective viral firebreaks. Poor farmers suppressed news of infections and concealed valuable birds such as fighting cocks; in addition, in face of rising anger in the countryside, the government was reluctant to extend the radius of culls around sick flocks beyond one half kilometer—the WHO recommended three kilometers—or to exterminate the domestic ducks that were the infection's probable reservoir. Similarly, the disinfection of farms and the disposal of contaminated poultry manure were Sisyphean tasks that always risked further transmission of the virus, typically via the boots or clothing of cleanup workers. No sooner was an outbreak suppressed in one part of the country than another appeared in a different province. Small children, who frequently played outside with chickens and ducks and were constantly exposed to poultry waste, were particularly vulnerable to these seemingly ineradicable village outbreaks.¹⁹⁸

Indonesian President Megawati Sukarnoputri, meanwhile, balked at the task of killing millions of chickens, and so her government initially proposed a vaccination campaign instead. After angry protests from the rest of the ASEAN bloc, Indonesia finally agreed to slaughter birds, but with a half-heartedness that reassured few critics. The WHO, however, continued to have the most difficulty with Beijing. "We have repeatedly said there is a brief window of opportunity to act within China," warned a WHO representative at the beginning of February 2004, "This latest news [outbreaks in Hunan and Hubei] strongly suggests that the window is getting smaller with each passing day." Another WHO official told the Associated Press that "mass culling is not taking place at the speed we consider absolutely necessary to contain the virus."¹⁹⁹ *The Lancet*, for its part, warned in February that China's "animal-disease surveillance is as good as absent, a vacuum into which global health might hopelessly and terrifyingly fall."²⁰⁰ When leading influenza expert Robert Webster suggested in another *Lancet* article that the time had come to consider closing down China's live-animal markets, he was ignored.²⁰¹

February was, indeed, a terrifying month, with new human victims in Vietnam and Thailand and further avian outbreaks in China and Indonesia. WHO teams, reinforced with a cadre of top experts from American, European, and Japanese laboratories, struggled with the imminent possibility of a global pandemic against which the world would have little protection. An experimental vaccine developed in 1997 was ineffective against GenZ, which was also resistant to amantadine, the cheapest and most common antiviral. (Hong Kong researchers feared this was further evidence of human tampering in the evolution of H5N1

and urged an investigation of chicken feed to test for amantadine-like molecules.)²⁰²

Most disturbingly, the new strain was more lethal than any influenza in scientific experience. In the course of the viral pneumonia it engendered, GenZ was stunningly adept at inducing deadly "cytokine storms" in which victims' own berserk immune systems destroyed their lungs and other organs; two-thirds of GenZ's victims (twenty-two out of thirty-three) had died by 9 March, and, unlike its 1997 cousin, it relished toddlers and teenagers as well as adults.²⁰³ With each passing day, scientists feared they would meet its reassortant offspring, ready to conquer the world, but despite their repeated warnings only one country—Canada—had undertaken truly serious preparations to meet the pandemic threat.²⁰⁴ In the meantime, only the dismal, dirty work of the slaughter—some 120 million chickens were eventually buried alive, burnt to death, electrocuted, or gassed—offered any hope of preventing a fatal rendezvous between a nightmare virus and a vulnerable humanity.

Then in mid-March, the plague suddenly seemed to relent. The last deaths were a twelve-year-old in Vietnam, who passed away on 15 March after a long struggle, and a poultry worker in Thailand who died the following day. On 16 March, China announced that it had eradicated the virus in all forty-nine hot zones; this triumphalist statement alarmed the FAO and the OIE, who cautioned against premature declarations of victory—the international protocol was to carefully monitor flocks for six months before ruling that a region or nation was free of avian influenza. The international agencies warned that the crisis was not over, and they warned countries not to restock poultry until they had adequate surveillance and biosecurity in place.²⁰⁵

Nonetheless, Vietnam followed China's example on 30 March and declared the outbreak over.

Thailand also intimated that it was making splendid progress and would soon join the ranks of the victors. As CP shares began to climb out of the gutter and the Thaksin regime lobbied Europe and Japan to re-admit Thai chicken products, the attention of the international influenza community shifted to the alarming H7 outbreak in British Columbia. Somehow, despite the cover-ups, official lies, and months of lost ground, and despite the bungled culls and the gaping holes in the influenza surveillance network, the great chicken slaughter nevertheless seemed to have turned the tide. The WHO's warnings about an imminent pandemic seemed less urgent, and the more optimistic, especially the politicians and exporters, thought they had defeated H5N1. But alas, the virus had simply taken a brief vacation.

Edge of the Abyss

*Pandemic? Very, very likely.*²⁰⁶

WHO regional director for Asia

The economic impact of the avian flu epidemic on the Southeast Asian countryside was profound. Thousands of small chicken farmers were bankrupted and forced out of business, thus yielding ground, as Chearavanont had urged, to the corporate operators. Meanwhile, the unprecedented market turbulence unleashed by the H5 epidemic in Asia, followed by the H7 outbreaks in North America, encouraged the big poultry producers to poach one another's customers. In the United States, giants like Tyson and Pilgrim's Pride were "already reaping some benefits from the bird flu virus" in late January as they rushed exports to replace the quarantined Thai supply. Jim Summer, president of the Poultry and Egg Export Council, told reporters that the avian flu "is going to have an unbelievable impact on the poultry industry" and boasted of a surge in hiring by U.S. companies. CP, meanwhile, exploited its own disaster by increasing exports from plants in Taiwan and other nonembargoed countries to take advantage of the sharp rise in chicken prices. To offset current and future EU import controls, Chearavanont also announced an ambitious expansion of poultry operations in

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138. James Rhodes, "The Industrialization of Hog Production," *Review of Agricultural Economics* 17 (1995): pp. 107–18.

139. William Boyd and Michael Watts, "Agro-industrial Just-in-Time: The Chicken Industry and Postwar American Capitalism," in *Globalising Food: Agrarian Questions and Global Restructuring*, edited by Michael Goodman and Michael Watts (London: Routledge, 1997), p. 209.

140. J. van Middelkoop, "High Density Broiler Production—The European Way," Government of Alberta Poultry Website, www.agric.gov.ab.ca./livestock/poultry.

141. Ron Fouchier et al., "Avian Influenza A Virus (H7N7) Associated with Human Conjunctivitis and a Fatal Case of Acute Respiratory Distress Syndrome," *PNAS* 101, no. 5 (3 February 2004): p. 1360.

142. Marion Koopmans et al., "Transmission of H7N7 Avian Influenza A Virus to Human Beings during a Large Outbreak in Commercial Poultry Farms in the Netherlands," *Lancet* 363 (21 February 2004): p. 587.

143. Ibid., pp. 587–88.

144. Ibid., pp. 588–90; Adam Meijer et al., "Highly Pathogenic Avian Influenza Virus A (H7N7) Infection of Humans and Human-to-Human Transmission during Avian Influenza Outbreak in the Netherlands," in *Options for the Control of Influenza V*, edited by Y. Kawaoka (Amsterdam, Elsevier, 2004), pp. 65–68; Martin Enserink, "Bird Flu Infected 1000," *Science* 306 (22 October 2004): p. 590; and Fox News, "Dutch Investigation Shows Bird Flu Outbreak Worsens in the Netherlands," 18 January 2005 (2000 figure).

145. Enserink, "Bird Flu," p. 590.

146. Fouchier, "Avian Influenza A," p. 1360.

147. Koopmans, "Transmission of H7N7," p. 593.

148. Wuethrich, "Fickle Swine Flu," pp. 1502–5; and Christopher Olsen, Gabriele Landolt, and Alexander Karasin, "The Emergence of Novel Influenza Viruses among Pigs in North America due to Interspecies Transmission and Reassortment," in Kawaoka, "Options," pp. 196–98.

149. Rodger Ott quoted in Wuethrich, "Fickle Swine Flu," p. 1503.

150. Wuethrich, "Fickle Swine Flu," p. 1503.

151. P. Woolcock, D. Suarez, and D. Kunej, "Low-Pathogenicity Avian Influenza Virus (H6N2) in Chickens in California, 2000–02," *Avian Diseases* 47, Suppl. 3 (2003): pp. 872–81.

152. "Summary and Assessment," in *The Threat of Pandemic Influenza: Are We Ready?*, edited by Knobler et al. (Washington D.C.: Institute of Medicine 2005), pp. 21–23.

153. Ibid.

154. Carol Cardona, "Low Pathogenicity Avian Influenza Outbreaks in Commercial Poultry in California," in Knobler, *Threat*, p. 195.

155. For a review of the debate, see D. Alexander, "Should We Change the Definition of Avian Influenza for Eradication Purposes?" *Avian Diseases* 47, Suppl. 3 (2003): pp. 976–81.

156. Jim Monke, "Avian Influenza: Multiple Strains Cause Different Effects Worldwide," Congressional Research Service, Report for Congress (14 May 2004), pp. 3–5, and USDA, see www.aphis.usda.gov.

157. Canadian Broadcasting Corporation, 8 November 2004.

158. Martin Hirst et al., "Novel Avian Influenza H7N3 Strain Outbreak, British Columbia," *Emerging Infectious Diseases* 10, no. 12 (December 2004).

159. S. Tweed et al., "Human Illness from Avian Influenza H7N3, British Columbia," *Emerging Infectious Diseases* 10, no. 12 (December 2004): pp. 1–2 (CDC Website edition).

160. Ibid., p. 4.

161. CBC News, "Federal Agency Accused of Mishandling Avian Flu in B.C.," 19 January 2005.

162. Wuethrich, "Fickle Swine Flu," p. 1505.

163. Jasper Becker, "Bird Flu Hits China," *Independent* (London), 30 January 2004.

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