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Preparing cities for future pandemics. A Lévi-Straussian analysis of the H5N1 avian influenza in Hong Kong, Istanbul and New York in 2005

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Abstract This article presents the perception and management of avian influenza outbreaks in three cities in 2005, the year when the H5N1 virus spread from south China, where it emerged in 1997, to Europe, and where it was expected to arrive in America, where it finally arrived in 2022. Using the tools of Claude Lévi-Strauss in his 1962 book, *La pensée sauvage*, the article describes how relations between humans and birds (wild and domestic) account for the ways in which the same virus is governed differently in these three cities. If we start from how each city perceives the beings that populate its environment, and particularly the birds that carry warning signals about the threats that affect them in solidarity with humans, we see that these cities interpret differently the threat of a pandemic to which it is exposed, long before the H1N1 flu pandemic in 2010 and the SARS-Cov2 pandemic in 2020. Hong Kong interprets it in terms of the anxiety of the Hong Kong population and Australian experts about the consequences for the British colony to return to Chinese sovereignty. Istanbul interprets it in terms of its unique position at the crossroads between the Christian and Muslim worlds and the glorious memory of its role as an imperial capital. New York interprets it through the trauma of September 11, 2001, but also of the West Nile crisis that largely prefigured it two years earlier.

Keywords H5N1 avian influenza · pandemic · preparedness · Lévi-Strauss · human/animal relations

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Preparing cities for future pandemics. A Lévi-Straussian analysis of the H5N1 avian influenza in Hong Kong, Istanbul and New York in 2005

One of the central issues facing leaders and planners around the world today is how to plan for the future of cities in the face of major environmental threats, such as the proliferation of pandemics and global warming. The Covid pandemic has shown the fragility of cities in the face of the global spread of a new virus caused by changes in relations between humans and animals, since a virus that circulated among bats, named "SARS-Cov2", spread rapidly from central China to the rest of the world. Global warming has an impact on the multiplication of extreme weather events, such as storms and fires. These two phenomena are linked through the arrival of new populations of vectors in cities, such as mosquitoes carrying the dengue virus and resistant to the insecticides previously used against malaria.

Several recent events have brought together leaders of major cities to discuss the organisation of global health, that is to say the planetary interdependence of living beings whose disturbances are signaled by pathogens. The European Cities Summit met in Lyon on 9 February 2021 to discuss the "One Health" principles showing the relationships between human health, animal health, and environmental health. The Parliament of Mayors met in Geneva to form a Global Cities Hub highlighting the role of cities in the "front line" of the fight against epidemics. Since the SARS crisis in 2003, which showed that major Chinese cities such as Hong Kong and Guangzhou are vulnerable to the emergence of a new virus, which can spread very quickly to the rest of the planet due to the connections between China and the rest of the world, cities have formed a network under the supervision of the World Health Organisation to exchange information on the pathogens that threaten them (Harris and Keil, 2008).

I would like to propose here a Lévi-Straussian analysis of the connection between cities confronted with these environmental threats. Pandemics and global warming are often the subject of controversy over their origins, discussing whether these phenomena are "natural" or "anthropogenic". Is the Covid pandemic due to the transmission of a bat virus

in a market or in a laboratory in Wuhan? Is global warming due to the production of greenhouse gases by human machines or to a change in the solar cycles? These controversies show that we have not finished using what Lévi-Strauss calls “savage thought”: we tell stories about our relationships with animals, plants, machines and the stars to explain our present situation, which we interpret as “nature's revenge” against the mistreatment we have inflicted upon it. A scientific analysis of these controversies leads instead to start the investigation from an event and follow how this “savage thought” pulls it in four directions: towards a natural pole (our relations with animals and plants), towards a cultural pole (inequalities between social functions), towards a universal pole (the name given to a new disease) and towards a particular pole (the name given to a new virus). Lévi-Strauss thus analyzes the ways in which the Indian societies of the southeastern United States identify animals and plants in their environment in order to diagnose and treat diseases: they “treat pathological phenomena as the consequence of a conflict among men, animals and plants. Irritated by humans, animals send them diseases; plants, allies of humans, counter-attack by providing remedies” (Lévi-Strauss 2021: 185).

A Lévi-Straussian analysis of the connection between global cities preparing for pandemics leads us to stop looking for their origins in order to determine the similarities and differences between the ways of thinking about them—what is also called, in the words of Michel Foucault, their “techniques of government” (Foucault 1994). One technique is essential to understanding the origins of the Covid pandemic, which can be described as “cryopolitics” (Kowal and Radin, 2017). It involves taking samples from bats in caves and forests and storing them in laboratories where they can be compared with a new virus that emerges, for example, in a market in Wuhan. However, cryopolitics can be extended to the controversies between Chinese leaders over the right way to sell animal meat, frozen or chilled in supermarket stalls or live in small open-air markets. If the controversy over the origins of the Covid pandemic is “cryopolitical”, it shows once again that this pandemic mobilises what Levi-Strauss has called “savage thought”, defined as a mode of thinking that breaks down an event to relate it to pre-existing classifications, in a way that cools

historical temporality, by contrast with societies that use the event to warm up historical temporality (Charbonnier, 1969).

Environmental history and science studies can be used to understand how "cryopolitics" arrived in China's major cities. Chicago was built by transforming nature into a set of flows of goods that could be transported to the rest of the United States and the world (Cronon, 1992). Paris was built by extending to the rest of the world the form of the laboratory, where Louis Pasteur studied microbes transmitted from animals to humans, such as rabies and tuberculosis, and invented vaccines to protect humans from them (Latour, 1984). However, these analyses risk once again leading back to a point of origin, as if the Americans or the French had invented a technique that was then passively disseminated to the rest of the world. A structural analysis of these techniques of government shows, on the contrary, that they respond differently, in each part of the globe where they are used, to the problems that city dwellers have in relation to an environment they perceive as wild.

Claude Lévi-Strauss' most famous book, *Tristes tropiques,* can thus be read as a structural analysis of cities across the globe (Lévi-Strauss, 1954). In this book, Lévi-Strauss tells of his arrival in 1935 in Sao Paulo, a city undergoing rapid transformations due to the massive arrival of immigrant labour for the plantations, and then his exploration of the villages of Mato Grosso, where he identified a fundamental morphology for the relations between humans and their environment that he calls "dualistic organisations". In 1940, he fled France, where he was threatened by the laws against Jews, and arrived in New York, which he described as an entanglement of cultures and temporalities, and where he understood in retrospect, through frequenting anthropology libraries, what he had seen in Brazil. In 1950, he undertook a mission for UNESCO in India and Pakistan, where he visited Calcutta, Lahore and Karachi, devastated by the effects of the Partition of British India, and where he meditated on Buddhism, thus heralding his trip to Japan in 1977, where he met artisans preserving traditional knowledge in urban landscapes. Through each of the cities he visited, Lévi-Strauss analysed how humans invent new ways of life based on pre-existing structures of relations between humans and non-humans that give them stability,

despite the costly metabolism of urban life. The French geographer Michel Lussault echoes this lesson from Lévi-Strauss when he writes: “in the context of the development of the extractivist urban system, we will never be able to separate ourselves from living things in all their forms” (Lussault, 2020).

The analysis I propose here goes in the opposite direction to the itinerary of Claude Lévi-Strauss during his career. I will start with the cities of East Asia and move on to the Middle east and North America. Like Lévi-Strauss, I will leave African cities aside, and contrary to him, I will only say a few words about South American cities. My analysis is Levi-Straussian in the sense that I start from a virus, called H5N1, because of the configuration of its haemagglutinin (H) and neuraminidase (N) molecules. This virus circulates among migratory birds around the world and is transmitted to humans through domestic poultry, threatening to cause a pandemic if it is successfully transmitted between humans. Contrary to the conspiracy theories that sometimes underlie the constructivist framework of the social sciences (Boltanski, 2012), I consider the H5N1 virus to be a virtual reality whose mutations and variants determine the diversity of the ways in which humans react to it through techniques of government. I will therefore analyse the management of the H5N1 virus in 2005 in three global cities: Hong Kong, Istanbul and New York.

Hong Kong, a sentinel on China's borders

The H5N1 virus was detected for the first time in Hong Kong in 1997, but it had probably been circulating in southern China for several years. It is an influenza virus that passed directly from birds to humans without being attenuated by the “mixing vessel” of pigs, which explains its very high lethality and low contagiousness. In 1997, 12 people were infected by this new virus, 8 of whom died. This fatality rate remained stable as the virus spread, since in 2025, the World Health Organisation (WHO) reported 964 people infected by this virus, 466 of whom died (https://www.who. int/publications/m/item/cumulative-number-of-confirmed-human-cases-for-avian-influenza-a(h5n1)-reported-to-who–2003-2025–20-january-2025).

The Hong Kong health authorities feared that this virus would cause a pandemic similar to the last H3N2 flu pandemic, which had also been detected in Hong Kong in 1968 and had caused one million deaths as it spread globally. This memory was less traumatic than the 2 million deaths of the H2N2 pandemic of 1957, and even less traumatic than the H1N1 pandemic of 1918, which had killed 50 million people, but the highly lethal nature of H5N1 led some experts to predict 100 million deaths in 1997. The apocalyptic nature of this prophecy seemed credible in the context of fears about the return of the British colony to the People's Republic of China, which for many observers led to a leap into the unknown for the global economy, as Hong Kong was also struck by the 1997 financial crisis.

Microbiologists at the University of Hong Kong managed to turn these fears into assets for the territory of Hong Kong, since it could present itself to international health authorities as a "sentinel post" detecting early warning signals of flu pandemics. This was the reasoning of Kennedy Shortridge, who was trained at Frank Macfarlane Burnet's school of microbiology and immunology in Australia, when he moved to Hong Kong in 1972 to organise the surveillance of influenza viruses in South China and send the WHO the information it lacked about this country. Shortridge's hypothesis was that southern China was an "epicentre" for pandemics due to the intense relationships between water-fowl, domestic poultry, pigs and humans that caused the emergence of influenza viruses amplified by large cities such as Canton or Hong Kong. In 1982, he wrote: "The densely populated intensively farmed area of Southern China adjacent to Hong Kong is an ideal place for events such as interchange of viruses between host species." (Shortridge and Stuart-Harris, 1982)

This strategy can be characterised as post-colonial, since it consists of converting Hong Kong's position as a hub for people and goods between China and the rest of the world, which had made the British colony rich for two centuries, into a place for the early detection of viruses carried by these globalised flows. Shortridge shares with advocates of tropical medicine the idea that the excess of living beings in the Tropics causes new diseases that will be transmitted to the elites of European nations; however, he converts this vision into the language of genetic sequencing and surveillance of viral mutations,

to assert that Hong Kong will be the first place where a new pandemic flu virus will be detected.

This strategy was promoted by the WHO during the SARS crisis, since the disaster scenario constructed by Shortridge in 1972, and partly confirmed by the emergence of H5N1 in birds in 1997, was amplified by the emergence of SARS-Cov1 in bats in 2003. Shortridge then published an article with Malik Peiris, who discovered the SARS coronavirus in humans in Hong Kong, and Yi Guan, who discovered its circulation in masked palm civets and bats in southern China, in which he claimed that Hong Kong's position as a sentinel for influenza enabled it to prepare for pandemics "at the avian level". "The studies on the ecology of influenza led in Hong Kong in the 1970s, in which Hong Kong acted as a sentinel post for influenza, indicated that it was possible, for the first time, to prepare for an influenza pandemic on the avian level." (Shortridge, Peiris and Guan, 2003: 79)

The same measures thus contained the emergence of the H5N1 virus and SARS in Hong Kong in 1997 and 2003, even though these viruses are very different (one is an orthomyxovirus and the other a coronavirus) and are transmitted by very different species (birds and pigs for the former, bats and civets for the second). In both crises, animals (chickens and civets) were slaughtered in order to dry up the "animal reservoir" (water birds and bats), which was then monitored to detect new viral outbreaks in advance. The success of this strategy explains why Margaret Chan, who served as head of the Hong Kong Department of Health at the time of the H5N1 and SARS crises, was elected director of the WHO in 2006, where she coordinated the global implementation of the pandemic preparedness measures that had worked in Hong Kong (Abraham, 2004).

However, this strategy has a high cost for poultry because it interrupts its co-existence with humans. Hong Kong citizens are not allowed to keep poultry in backyards, even though most of them are migrants from southern China, where backyard chickens are often the only guarantee of a protein-rich meal in precarious situations. Poultry can no longer be bought directly from farmers but must be transported, with the same control measures as poultry imported from China, to a centralised market in the heart of the territory, from

where it is redistributed to retail markets where it is again checked and cleaned. These retail markets are considered as areas at risk of viral transmission because consumers can buy live chickens and check their freshness themselves. As soon as an H5N1 case is discovered on a farm or in a market, all poultry living in the area must be slaughtered (*sha*) at the central market of Cheung Sha Wan. Thus, 1.5 million poultry were killed in November 1997 and 90,000 in December 2009 when I was able to follow an H5N1 outbreak from the market to the farm. These sanitary slaughters are widely shown in the media, which contrasts with Europe where they are hidden. Several people have told me that these poultry culls reminded them of the massacre of students by the Chinese army in Tian'anmen Square in 1989. They explained the effectiveness of these images of slaughter by the Chinese precept: "kill the rooster to scare the monkey".

Relations between the inhabitants of Hong Kong and wild birds have also been transformed by avian influenza. The bird market in Mong Kok is a place where traditions are preserved. Elderly people come to compare the songs of their birds and sometimes organise fights between them. But some birds are also sold to be released. This practice, called "*fangsheng*", literally "let live", has a long history among Confucian scholars and Taoist monks, but it has been amplified over the past two centuries by Buddhist organisations, which encourage ordinary citizens to buy and release animals out of compassion. Hong Kong birdwatchers have observed a large number of cases of dead wild birds, some carrying H5N1 viruses, in the parks near the Mong Kok bird market ; they explain these fatal cases by the stressful conditions in which birds are kept in cages before being released. Birdwatchers thus emphasised that the risk of catching avian influenza viruses from wild birds was not highest at the edges of the territory, where migratory seabirds or resident forest birds can be observed, but at the heart of the territory, where ordinary citizens engage in dangerous compassionate practices. The Hong Kong government first asked its citizens to wear masks when releasing birds and then recommended that they release fish and shellfish rather than birds, thus respecting its liberal tradition of encouragement rather than prohibition.

The Hong Kong Birdwatching Society (HKBWS) is an association founded in 1957 by British officers, who made lists of the 500 species of birds visible in the territory with a view to their conservation. They met in the Mai Po wetland, an hour's drive from the city of Hong Kong, and protected by the World Wildlife Fund. In 1997, this association became predominantly Chinese, but it maintained its vocation as a civil society defending the environment against construction projects. Mike Kilburn, who was the vice-president of this association when I met him in 2007, showed me the map of cases of avian flu in wild birds in Hong Kong, making the following comment: "We've been collecting records of birds for fifty years in Hong Kong. This gives us an authority that nobody can question on birds, because the HKBWS was started by English birdwatchers who had this amateur birdwatching model: You write down the birds that you see and you submit your records to the society at the end of the year, and those records are available for anybody who wants to use them."

This map, which aimed to alert the health authorities to the risks of avian flu transmission by wild birds, was impressive. It shows the territory of Hong Kong as a collection of islands and seaside forests with an infectious hotspot at its heart: the Mong Kok market, where Buddhists release birds. This image is very similar to that of the "sentinel cells" produced by virologists when they explain how the avian influenza virus infects the body. These sentinel cells (also called "dendritic" cells, because they stretch out like the synapses in the brain to capture information from microorganisms) form the first line of the immune system and are distributed throughout the body. When a microorganism bypasses these "sentinel cells", the immune system panics and triggers a "cytokine storm" that can be fatal, which explains the lethal nature of the H5N1 virus in young and healthy people.

The territory of Hong Kong is therefore analogous to a sentinel in the global network for the surveillance of zoonotic viruses, considered as a planetary immune system, aiming to avoid the panic caused by the pandemic transmission of emerging viruses. In the vocabulary of Lévi-Strauss (1962), the sentinel plays the role of a "totemic operator": it transforms the relationships between humans and animals into signs that circulate around the

globe at different levels of generality and allow humans to perceive and manage other environmental threats. The term “sentinel” is also applied to unvaccinated poultry placed at the entrance of farms, which “raise the alarm” when a new flu virus enters the farm by developing antibodies against that virus. We can therefore say that the citizens of Hong Kong, many of whom have told me that they live in “cages” like chickens, have the same position, at the geopolitical level, as the “sentinel chickens” in the poultry farming system and as the “sentinel cells” in the body.

Istanbul, an imperial capital between East and West

In 2005, the H5N1 virus spread from southern China to the rest of Asia, Russia, Europe, and Africa. Virologists explained this spread by the movements of migratory wild birds, but ornithologists observed that it rather followed the poultry smuggling routes along the Trans-Siberian Railway. When this virus was identified in eastern Turkey, the alert was sounded throughout Europe, where health authorities feared the arrival of this lethal virus. However, Turkey is also located at a turning point in the East Africa West Asia Flyway, which may explain why outbreaks of H5N1 avian influenza were quickly reported in Egypt; other outbreaks reported later in Nigeria are thought to be related to the poultry trade with Great Britain. There were 12 outbreaks of avian influenza in Turkey in 2005, most of them in the east of the country: 12 people were infected, and 4 children died.

Istanbul, like Hong Kong, is at a junction point between East and West. Like Hong Kong, it has a long history of controlling epidemics, particularly due to its role in the plague pandemic of the late 19th century, when it was the capital of the Ottoman Empire (Varlık 2015). The health authorities, under the direction of the prime minister and former mayor of Istanbul Recep Tayyip Erdoğan, took radical measures to contain the panzootic disease. All poultry had to be killed (*itlaf*) with carbon dioxide within a 10 km radius of an outbreak of bird flu, which led to the slaughter (*imha*) of 2.5 million birds. The Turkish state paid good compensation to the farmers thanks to generous international subsidies. As 80% of Turkish poultry farms are located on the shores of the Sea of Marmara, these measures were concentrated in this area, where the human population is also the largest.

Turkish veterinarians now consider these measures to have been effective, as there were only a few cases in 2007-2008 (in family-run free-range farms) and then in 2015 and 2023 (in confined industrial farms). Thanks to funding from the World Bank, biosecurity measures were strengthened in poultry farms, 99% of which are estimated to be confined. To face the threat of avian influenza, the poultry sector has united in a cooperative called BESBIR, which applies an industrial integration model *(entegrasyon modeli)* to all farms. The poultry sector has compartmentalised (*bölümlendirme*) to prevent the entire industry from being paralysed in the event of a new avian influenza outbreak. Turkey's health authorities do not consider vaccinating poultry because it is an obstacle to exports. Turkey is the 9th largest exporter of chicken and by, turkey meat and chicken eggs to North Africa, Iran, and Iraq (which buys 60% of the poultry consumed in Turkey), as far as China and the Philippines. Poultry raised in Turkey is fed corn (25% of which is imported) and soy (all of which is imported). Compensation measures for the slaughter of poultry infected with avian influenza were suspended in 2019 to follow the example of the United States.

The Turkish population was initially very shocked by these measures of slaughter. Families who raised poultry within the security perimeter did not want to let the veterinarians slaughter their poultry and often hid them. When the veterinarians, assisted by the police, found them, they used ethical and religious arguments: "You are killing them even though they are not sick, how can you do that?" The sale of poultry was abruptly halted, and all the poultry produced in 2005 was stored and sold the following year. In Küçükçekmece and Esenler, two suburbs of Istanbul, residents were requisitioned on the day of the Eid festival to slaughter 6,000 birds in white coveralls with masks and gloves. In these slums, where Anatolian rural populations flock to the capital, poultry raised in backyards or on rooftops is an indispensable source of protein. The inhabitants of these suburbs suspected the authorities of taking the poultry to eat, while the inhabitants of the chic districts of Istanbul rushed to the hospital as soon as their children felt unwell after eating poultry.

To convince the population, the health authorities resorted to an analogy between avian influenza and terrorism. Images of bomb-carrying chickens were broadcast in the

media to make people understand the risk of an outbreak (*patlamak* or *salgın*). Cartoonists pointed out that the Islamic headscarf did not protect against bird flu. In this secular republic led by an Islamic party still in shock from a jihadist attack that killed 59 people in 2003, the analogy between the virus-carrying chicken and the terrorist made sense (Pérouse 2017). In Hong Kong, the health authorities described SARS as an "Asian 9/11" because the coronavirus had spread in a day by aeroplane to a dozen cities, in a reversal of the scenario of the attacks on New York. The metaphor of terrorism is only effective if the moments of spectacular explosion are followed by a routine of surveillance avoiding their repetition. In Hong Kong, health authorities enrolled ornithologists to monitor wild birds and report cases of mortality. In Turkey, such monitoring was not encouraged, and biosecurity measures on farms were instead strengthened.

Süleyman Demirel, who was the Prime Minister of Turkey several times between 1965 and 1993, then President of the Republic between 1993 and 2000, was a former hydraulic engineer. In the 1990s, he defended the policy of conserving wetlands, which had been drained for construction and to combat malaria, notably by getting Turkey to sign up to the Ramsar Convention for the protection of wetlands. This protection movement dates back to 1967, when Turkey hosted an international conference on wetlands in Ankara. The term "wetland" (*sulak alan)* replaced the term "marsh" (*bataklık*). Modern Turkish ornithology, meanwhile, dates back to the work of Ali Vehbi Bey, who published in 1929 a description and classification of the birds he had observed in the forests, lakes and seas around Istanbul. The first protected area for bird watching was Lake Manyas, which became a national park in 1958 after the efforts of Curt Kosswig, founder of the zoology department of the National Museum of Natural History. Tansu Gürpınar conducted ornithological observations on this lake, which he presented at the 1967 conference. He became the curator of this national park in 1970 and represented Turkey at the Convention that brought together 18 representatives from around the world in Ramsar, Iran, for the protection of wetlands. By the mid-1990s, Turkey had eight sites protected under the Ramsar Convention, the two main sites being in the Bay of Izmir (the Gediz Delta) and on the coast of Samsun (the Kızılırmak Delta) (Scaramelli, 2021).

In 2006, Turkish ornithologists were trained by international experts (from the Food and Agriculture Organisation and Wetland International) to catch wild birds in the Kızılırmak Delta, take swabs and release them after ringing them, in order to carry out permanent surveillance of the health of the wildlife. However, they later complained that the Turkish government had not provided them with sufficient resources to detect cases of avian influenza in wild birds. The diagnostic kits that allow samples to be sent to the laboratories of the Ministry of the Environment in Ankara were expensive and in short supply. National park wardens were not encouraged by their superiors to report cases of avian influenza, and ornithologists had to do it with few resources. There was also a lack of coordination between the Ministry of Agriculture and the Ministry of the Environment in the surveillance of domestic poultry and wildlife.

One ornithologist told us: “I know the British Ornithology protocol: everyone who does the banding has to take a particular sample and send it to a particular person in charge. But we don't have the same network. I band birds, I count tens of thousands of birds, but no one comes to ask me anything. They don't want to know, it's better for them because otherwise they will have to publish the results. They don't want to because it could damage their reputation or tourism or the poultry industry. (...) We have to think about how to protect birds, block transmission between wild birds and domestic poultry, and take measures to do so. Then the international institutions will say that Turkey is working well. But we have no organisation.” Another ornithologist observed that in 2022, there were more than 1,000 pelicans dying of avian influenza in Greece and 5,000 cranes in Israel, but that Turkey had not reported any cases of avian influenza in wild birds. In 2020-2021, massive seagull deaths were observed in Tuz Gölü, but the Ministry of the Environment declared that they had been poisoned, even though the dead birds were found in scattered areas. According to these Turkish ornithologists, global warming will lead to an increase in the number of cases of avian influenza because the reduction in wetlands will increase the density of wild bird populations in these areas, and therefore the risk of transmission.

Let us quickly compare with the situation in France. In February 2006, the first case of H5N1 avian influenza was reported in a wetland area near the city of Lyon, in a village called

Joyeux in the Dombes region. The infected poultry farm was slaughtered, as were all the farms within a three-kilometre radius, and the farmers had to remain confined to this area for several weeks. The inhabitants of this area accused the swans of transmitting avian influenza, but it was a duck (common pochard) that was discovered to be carrying the H5N1 virus near the farm (Manceron, 2009). There were very few cases of avian influenza in wild birds and domestic poultry in France until 2015, when outbreaks were reported throughout the southwest, threatening the *foie gras* industry, then in the area of Vendée in 2022, where 20 million poultry were slaughtered and compensation of one billion euros was paid by the Ministry of Agriculture. The vaccination of ducks was launched a year later, which caused a decrease in the number of avian influenza cases, but the export of ducks was interrupted (50% of the chickens consumed in France are imported, notably from Brazil, 40% of the poultry raised in France is exported, notably to Japan and the Arab Emirates). Birdwatchers reported an increasing number of cases of avian influenza in wild birds found dead on the Atlantic coast, particularly in the Sept-Iles national reserve off the coast of Brest, where 80% of the gannets disappeared in 2022. The big news in the avian influenza panzootic, however, is the arrival of the H5N1 virus on the American continent, after remaining on the Asian continent between 1997 and 2005, then on the European continent between 2005 and 2022 (with a few rare incursions on the African continent). It is therefore interesting to observe how the city of New York perceived the risk of avian influenza in 2005.

New York, a traumatised citadel of the West

While Hong Kong experienced SARS as an “Asian 9/11”, New York experienced the possible arrival of the H5N1 virus on the American territory in 2005 as a repetition of the trauma of the attacks on the World Trade Centre on September 11, 2001. The government of George W. Bush, which managed these attacks, was heavily criticised by the population for its lack of responsiveness after Hurricane Katrina, which devastated the city of New Orleans in the summer of 2005 and revealed its vulnerabilities and inequalities (Huret, 2010). George W. Bush therefore declared that he was going to prepare America for the next disaster, and his advisors told him that it was probably a flu pandemic that would

come from Asia via migratory birds. Some observers criticised this decision, noting that the Secretary of Defence, Donald Rumsfeld, had a conflict of interest because he owned $5 million worth of shares in Gilead, the company that produces the antiviral Tamiflu (https://usa-menace.over-blog.com/article-2178381.html).

There is no risk of transmission of the H5N1 virus to humans in New York, contrary to Hong Kong, because the poultry consumed by urban citizens are raised on factory farms situated far from the city and not sold in "wetmarkets". Migrant workers employed on these farms and in the slaughterhouses are, however, at risk, as they have to work at a fast pace and in precarious health conditions (Silbergeld, 2016). Openly racist behaviour has been observed in relation to live chicken markets in New York's Chinatown, no doubt because this Chinese tradition is perceived as dangerous in a country that was the first to industrialise poultry farming in the 1960s (Zhan, 2005).

The New York intellectual elite expressed a high degree of scepticism regarding the apocalyptic scenarios that emerged in Hong Kong and that were then relayed by the World Health Organisation in Geneva as well as the federal administration in Washington. Peter Palese, an Austrian microbiologist specialised in influenza at Mount Sinai Hospital, was part of Jeffery Taubenberger's team that reconstructed the 1918 H1N1 pandemic influenza virus from frozen corpses in the Far North. He showed that the genetic sequence of this virus did not sufficiently differ from those of other influenza viruses to explain its lethality, and that it rather came from the ecology in which this virus appeared (undoubtedly on a pig farm in the United States) and from the immune reaction of human organisms (weakened by trench warfare). In September 2005, the publication of this research in *Science* sparked a public scandal: Taubenberger was accused of providing terrorists with information that would enable them to manufacture a biological weapon. Palese supported Taubenberger, stating that it was very difficult to go from genetic information about a virus to its biological construction, and that if the H1N1 virus re-emerged, it would be possible to make vaccines to protect the population (Caduff 2015: 116). Palese was also highly critical of the positions of Kennedy Shortridge and his Australian colleague Robert Webster, who warned of the pandemic potential of the H5N1 virus; he emphasised that

despite its high lethality, it had very rarely been transmitted from poultry to humans, and that its transmission between humans remained controversial (Caduff 2015: 147).

Palese relayed a widespread scepticism among New York's educated elite regarding avian influenza pandemic preparedness strategies, as expressed in the *New Yorker* cartoons. Alongside images of birds accused of spreading panic in the city, readers could see the President of the United States, George W. Bush, declaring that he was prepared to use military force to prevent the H5N1 virus from reaching the American territory. The *New Yorker* poked fun at Bush's ignorance of geography, reporting that he allegedly declared, "We're going to bomb Turkey!", thus confusing the country "Turkey" and the bird "turkey". The newspaper also denounced the lies of the American army who had invaded Iraq to prevent the manufacture of biological weapons : a cartoon was published with an American soldier finding a chicken at the bottom of a cellar, an image reminiscent of the discovery of Saddam Hussein in a cellar in Iraq in 2003 before his execution.

Yet the people of New York have very real problems with birds. The breeding of pigeons on the rooftops of New York by marginal individuals, in highly codified practices bordering on deviance, has been well documented by filmmaker Jim Jarmusch in *Ghost Dog*, a film in which an African-American man who claims he is a samurai raises pigeons on a rooftop. Pigeons do not transmit avian influenza to humans, but the authorities in charge of the city of New York are fighting against pigeon droppings, which they consider pests. Despite the infrastructure that makes interactions between humans and birds difficult in an urban context, ordinary citizens are passionate about pigeons, feeding them, raising them in cages, organising pigeon racing competitions. While the pigeons seen in the streets of New York descend from those imported two centuries ago and not from wild pigeons, which have largely disappeared from the United States due to excessive hunting, and while these practices in the heart of New York are in decline because they are mainly shared by the Caucasian, Latino and African-American working classes fleeing the increase in the cost of real estate, these 21st-century humans have built new relationships with pigeons and produced a unique species called the "New York flight". Carmine, an Italian-American veteran of the Second World War, kept about fifty of these pigeons in his house in Brooklyn,

and in May 2005, he criticised one of his neighbours who kept German owls: “Those birds should not be in the city! This is New York, for Christ's sake, we keep flights!” (Jarolmack 2013: 85) Carmine and the members of his bird club were able to recognise one of his pigeons as it flew through the New York sky, and he took part in races where his pigeons competed with those of his colleagues.

In 2005, more than bird flu, New Yorkers feared the West Nile virus carried by crows. The first cases of this new infectious disease were identified in the Bronx and Queens zoos in 1999. A mosquito probably stowed away on a plane from the Middle East and brought this virus, previously known for its devastation in the West Nile region. The virus spread rapidly from the Bronx and Queens to the whole of New York City, then to the East Coast of the United States and then to the entire North American continent through the flight of birds, which travel much further than mosquitoes. This virus, causing paralysis and fever in humans, leads to death in a small proportion of cases: it is estimated that 3 million people have been infected in the United States and that just over a thousand have died from it. The birds that transmit it to humans through their bodily fluids are also much more vulnerable: half of the bird species living in the United States experienced a sharp decline between 1999 and 2010, and the population of vireos fell from 130 million to 90 million because of the West Nile virus (George et al., 2011).

Thus, we can understand why the Wildlife Conservation Society, based at the Bronx Zoo in New York, mobilised extensively in 2005 to explain that the H5N1 avian influenza virus was a problem for birds as well as for humans. The Wildlife Conservation Society is the name given since 1993 to the New York Zoological Society, founded in 1895, managing, in addition to the Bronx zoo, those of Central Park, Queens and Prospect Park. On the initiative of the veterinarian William Karesh, they brought together in September 2004 experts from the WHO, the World Organisation for Animal Health and the Food and Agriculture Organisation of the United Nations (FAO). They claimed that the reduction of areas in which birds can feed along their migratory routes was a favourable condition for the spread of the H5N1 virus, and that access to water and land for animals must therefore be an

essential dimension of global health. This declaration became famous as the Manhattan Principles or "One World, One Health". It states in particular:

> A broader understanding of health and disease demands a unity of approach achievable only through a consilience of human beings, domestic animal and wildlife health—One Health**.** Phenomena such as species loss, habitat degradation, pollution, invasive alien species, and global climate change are fundamentally altering life on our planet from terrestrial wilderness and ocean depths to the most densely populated cities. The rise of emerging and resurging infectious diseases threatens not only humans (and their food supplies and economies) but also the fauna and flora comprising the critically needed biodiversity that supports the living infrastructure of our world. The earnestness and effectiveness of humankind's environmental stewardship and our future health have never been more clearly linked. To win the disease battles of the 21st Century while ensuring the biological integrity of the Earth for future generations requires interdisciplinary and cross-sectoral approaches to disease prevention, surveillance, monitoring, control and mitigation as well as to environmental conservation more broadly.[1]

This declaration was updated in 2019 with the same actors in Berlin, adding industrial livestock farming, antibiotics and global warming as factors in the emergence of new, potentially pandemic viruses. The stakeholders at the "One World, One Health" summit, such as William Karesh, who were primarily concerned with the health of domestic animals and wildlife, then joined forces with other stakeholders, such as the ecologist Peter Daszak, to protect species threatened with extinction, such as bats, through an initiative called Ecohealth. This initiative funded research programs conducted at the Wuhan Institute of Virology on coronaviruses circulating in bats in southern China.

[1] https://www.oneworldonehealth.org/sept2004/owoh_sept04.html

The H5N1 virus arrived on the American continent in 2022, where it is wreaking havoc on wildlife. A large number of dead birds (eagles, hawks, etc.) and mammals (seals, foxes, etc.) have been discovered carrying the H5N1 virus on the Pacific coast of the entire American continent. Poultry and cattle farms were infected in the United States, possibly because poultry straw is recycled in cattle farms. More than 150 million poultry have been slaughtered to contain this panzootic disease, as Donald Trump's government refuses to vaccinate poultry, especially since the health minister Robert F. Kennedy is opposed to vaccination and promotes raw milk consumption. The US health authorities have declared 66 human cases, most often with mild symptoms, but these figures are underestimated in a context where health surveillance is disrupted by President Trump's interventions. In Brazil, where poultry farming is highly concentrated by the industrial sector in the state of Santa Caterina, with exports to the whole world, no cases of avian influenza have been declared in either domestic poultry or wild birds.

I thus return in the opposite direction of the journey of cities by Claude Lévi-Strauss: from the "crowded tropics" of Asian cities, where mutations of the avian influenza virus signal transformations in the relations between humans and birds, to the "empty tropics" of Brazilian cities, where the absence of avian influenza more certainly reveals an agricultural industry effectively defending its interests - to the detriment of the health of humans and non-humans.

Through this journey across three global cities, I wanted to reflect on the idea, which has become widespread since the Covid-19 pandemic, that the cities of the future must prepare for future pandemics caused by the acceleration of human activity on the planet. Following the indications of Paul Rabinow, Stephen Collier and Andrew Lakoff have shown that pandemic preparedness techniques, such as sentinels sending early warning signals, disaster simulations using worst-case scenarios, or forms of storage for priority goods (masks, antivirals or vaccines), were set up at the beginning of the Cold War to prepare American cities for a nuclear attack from the Soviet Union, and were transferred to global health at the end of the Cold War to limit the effects of a pandemic caused by an emerging infectious disease (Collier, Lakoff and Rabinow 2004; Lakoff 2017). While taking up this

historical genealogy, I add to it an approach through the anthropology of nature, following the indications of Philippe Descola (2005).

The fear of an avian influenza pandemic is not due to the paranoia of the Bush administration, which, following the attacks of September 11, 2001, would have sold Tamiflu antivirals to the whole world, according to a conspiracy theory of pandemic preparedness. If we start from the way in which each city perceives the beings that populate its environment, and particularly the birds that carry warning signals about the threats that affect them in solidarity with humans, we see that each of these cities interprets differently the threat of a pandemic to which it is exposed, long before the H1N1 flu pandemic in 2010 and the SARS-Cov2 pandemic in 2020. Hong Kong interprets it in terms of the anxiety of the Hong Kong population and Australian experts about the consequences for the British colony to return to Chinese sovereignty. Istanbul interprets it in terms of its unique position at the crossroads between the Christian and Muslim worlds and the glorious memory of its role as an imperial capital. New York interprets it through the trauma of September 11, 2001, but also of the West Nile crisis that largely prefigured it two years earlier.

The idea that birds are bioterrorist threats in major global cities because they discreetly introduce emerging viruses is an idea sufficiently vague and diffuse to be interpreted differently by cities exposed to very real future threats. It is therefore necessary to grasp the mutations of the avian influenza virus in order to analyse the transformations of the relations between humans and birds across the globe, in the same way as Claude Lévi-Strauss analysed the transformations of myths as revealing differences between the ecologies in which humans live with non-humans.

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