
Highly Pathogenic Avian Influenza, again. In the autumn of 2016, several cases of avian influenza H5N8 were detected across Europe (OIE-FAO 2016). Some cases were dead wild birds, others were domestic birds. Several farms had to execute culls in the ten thousands, for instance in Cloppenburg, Germany, were 16,000 birds were killed in November 2016. A few days earlier, the US president Barack Obama visited Germany for the last time during his presidency. During his visit, in a joint paper with German chancellor Angela Merkel, he analysed the importance of transatlantic relations. One line stood out and was repeated throughout media headlines: “we will never return to a pre-globalization economy” (quoted in *Wirtschafts-Woche* 2016). So what has that to do with dead birds?

Everything—if you dare to read Rob Wallace’s new book on infectious disease and agribusiness, *Big Farms Make Big Flu*. His key message is very straightforward. Agribusiness has grown into a fully globalized industrial complex. The ever-growing turnover rates are detrimental to animal health. The few weeks animals live before they are slaughtered provide favourable conditions for viruses that are highly pathogenic and very effective within very short time spans. Natural immunity cannot be developed within the industrially bred and reared livestock. From those industrial farms, disease is exported throughout the world via the routes of globally connected corporations and trade networks. In the case of avian influenza, and against the received wisdom of governmental reports, wild migratory birds have little to do with it and are, if at all, the victims of industrially produced and disseminated viruses. If we are to understand the emergence, evolution, and spread of novel influenzas, we need to develop “more-than-local and nonlinear approaches to the empirical study of human-environment processes” (p.314). We must further acknowledge the responsibility of
agribusiness, science, and the industrial mass production of meat, so far abiding only to the rules of global capitalism.

This is in a nutshell what Wallace tells us in his book over seven parts and 38 “dispatches” that serve as individual chapters. Of course, the book is more complex and much deeper than this preliminary short summary. It is a compilation of blog entries, draft papers, and published articles. Although it has been organised within seven parts, the book is a little difficult to navigate, and while some arguments are explored in great detail, other ideas or concepts are hinted at but not fully spelled out. Reading this book as a human geographer, I am fascinated by Wallace’s eloquence in describing the links between globalized economies and disease emergence. The following five themes are my personal take on Wallace’s dispatches and may help other readers to find their way through this exciting book.

First, factory farming produces ideal conditions for pathogens. This is one of Wallace’s basic insights. He derives that from his work as an evolutionary biologist and epidemiologist. The conditions created by industrial livestock rearing have produced new and unforeseen possibilities for pathogens to such a degree that Wallace is inclined to say that “Big Food has entered a strategic alliance with influenza” and agribusiness “is now working with influenza as much as against it” (p.11). Industrial livestock presents “ideal populations for supporting virulent pathogens” because “[g]rowing genetic monocultures of domestic animals removes whatever immune firebreaks may be available to slow down transmission” (p.56). The recipe for disaster includes large populations, crowded conditions, and a high throughput with a continually renewed supply of susceptible young animals. The quicker the slaughter, Wallace arguments, the quicker the virus must evolve to reach the transmission threshold; the problem is, “quicker” comes with greater virulence (p.57, p.184; cf. Hinchliffe et al. 2013 on “thinning” practices in poultry production that help to breed Campylobacter). In the case of chicken, the sheer scale of the phenomenon needs to be acknowledged. According to Wallace, after years of consolidation, there were, globally, only four companies left acting as primary breeders, and only two companies producing layer lines (p.193). In the United
States, the average flock size has increased from 70 in the 1920s to 30,000 in the 1990s (p.62).

Second, costs are externalized. As is so often the case, cheap products come at a great price. In the case of cheap meat, the costs are, in Wallace’s words, “routinely externalized” (p.65). There are, for instance, low wages and negative impacts on the environment. However, the price tag Wallace focuses on is the actual cost for disease control: “The economics are startling. The world’s governments are prepared to subsidize agribusiness billions upon billions for damage control in the form of animal and human vaccines, Tamiflu, culling operations, and body bags” (p.48-49).

Third, geography and history matter. In the very first dispatch of the book, Wallace makes a strong argument to keep local identifiers in the names of viruses. Within today’s consensus of non-racist and non-discriminating scientific language, this is at first a rather surprising turn. For instance, WHO made great efforts during the H1N1 pandemic in 2009/2010 in decoupling the virus and the disease from the alleged place of origin, a farm in Mexico. No one wanted a “Mexican Flu” (instead we got “Swine Flu”, but that is a different story; see Everts 2013). Now, Wallace argues, the origin of a virus should be part of its name. While he makes every effort to acknowledge the need for destigmatization, he also argues that the origin also discloses responsibilities of states, since “local conditions imposed by public policy and social practices shape viral evolution” (p.28). This is, however, not to dismiss the responsibility of global agribusiness setting up big industrial farms in countries with weak regulations or in economically-depressed regions (p.44). And indeed, it is quite simple to find very large farms, for example in Eastern Europe, that are owned and operated by global corporations from elsewhere (Juska 2010).

Wallace further demonstrates the importance of the historical geography of disease emergence. An interesting example is the duck-rice system in some parts of Asia, including China. Wallace refers here to a series of changes that have occurred over time in agricultural practice. The ancient practice was the cultivation of rice. In late Imperial China, ducks were
introduced into the rice fields mainly as pest control but also for meat. The third change is the present-day intensification of poultry production. This assemblage of crops, animals, and humans provides unique conditions for the evolution of multiple influenzas (p.97). These geographies and histories of disease add to more recent geographical understandings of the “topologies of disease” (Hinchliffe et al. 2013) where things distant and near interact and co-evolve within “disease situations” (Hinchliffe et al. 2016).

Fourth, *influenza is multidimensional and we cannot outsmart it*. All the evidence collected and presented by Wallace points to one conclusion. Whatever the industry does, it helps rather than hinders viruses to evolve faster and become more virulent. Wallace refers, for example, to the case of the hog industry. The evolution of H1N1 in pigs gathered pace in the 1990s. This is a direct consequence of the reorganization of the industry from family farms to immense herds. Within these large populations, infections are so frequent that influenza occurs year-round—it’s no longer seasonal. The frequent introduction of young swine susceptible to pathogens into the herds also helps the spread of the virus (p.133). Biosecurity practices such as culling can have similar detrimental effects; amongst competing viral strains, only those spread that evolve faster than the cull. These highly pathogenic viruses are often carried elsewhere through contaminated material. All of these practices select for more virulent pathogens. The international trade of livestock and meat products allows pathogens to quickly travel from one corner of the globe to the other. The problem, as Wallace points out, is inherent to the industrial and global organization of agribusiness.

Fifth, *we need a change in agriculture*. Wallace identifies the intensified and globalized industry as the root of the problem. So what now? Should we return to other, more “traditional” forms of agricultural practice? Wallace clearly isn’t so naïve. Instead, he repeatedly refers to the work of the late Marxist biologist Richard Levins, who advocated a third approach beyond the dichotomy of labour intensive and capital intensive agricultural practices. Levins (2005) called this third way “knowledge and thought extensive agriculture”. His case in point is Cuba, where agriculture was profoundly reorganised in the 1990s.
following the collapse of the Soviet Union. Sugar cane farms and other farms with monocultures where given to local cooperatives who began a project of diversification while adhering to many ecological principles. This “agro-ecology” became the role model for Levins’ ideas about a future-, or growth-, oriented but sustainable development of agriculture. Wallace agrees and sees benefits in a spatially diverse pattern (a “planned mosaic”, in Levins’ words) of land uses geared towards the regional particularities of soil, vegetation, climate, population density, and so on. In terms of disease emergence, these cooperatives help to limit the amount of transmission through local production and consumption as much as through biological and natural pest control which makes use of predators and other beneficial animals and plants. In general, the idea of integrated pest management appears throughout Wallace’s book as one of the strategies needed to solve the problems created by current agricultural practices. However, one should probably add, the agro-ecology of Cuba is under threat and may soon be rolled back by politics more open to intensification and industrialisation. Much of the Cuban third way came into being out of necessity. The import of food has always been very high (with numbers around 80%); with cheap oil and fewer regulations, the country may head in the direction of industrial agriculture (Patel 2012).

Wallace’s approach to influenza and agriculture pushes researchers to ask more questions. Towards the end of the book, Wallace (with colleagues)\(^1\) develops the framework of “Structural One Health”, which sums up his endeavour to capture the context and complexity of disease evolution. It is with this concept that he brings together the many insights into global farming and pathogens within a research framework that takes the “more-than-local” and “nonlinear” lives of pathogens seriously, and turns the context, rather than the isolated virus, into the proper focus for research. From the point of view of critical geography, Wallace’s frequent references to David Harvey’s work (e.g. Harvey 2006) are intriguing. Concepts such as the “spatial fix” are effectively put to use when he describes the location

\(^1\) The most important chapter here stems from a journal article co-authored by Rob Wallace, Luke Bergmann, Richard Kock, Marius Gilbert, Lenny Hogerwerf, Rodrick Wallace and Mollie Holmberg (2015).
and relocation of agricultural businesses. Wallace also touches upon the critical literature connecting the neoliberal meat industry with public health issues. The meat industry has succeeded in increasing surplus value by introducing mass production while externalizing costs. The looming crisis of overaccumulation was and is solved by introducing new meat products such as chicken nuggets. The potential crisis of overproduction of meat is solved by making consumers eat more meat. The spatial fix here becomes literally visible in consumer’s increased body sizes (Guthman and Depuis 2005).

The emergence and evolution of influenza is clearly intertwined with neoliberal economic practices that put surplus value over use value. After reading Wallace’s book, one cannot be surprised any longer. However, while the effect of neoliberal thought and practices on cities or natural resources is well known, it is perhaps less acknowledged how the various kinds of “local neoliberalisms” (Peck and Tickell 2002) bring us to the brink of a series of global public health crises. In that respect, one might read Mohan Dutta’s (2015) book, Neoliberal Health Organizing, alongside Wallace’s. Dutta explains how prioritizing technological interventions in public health shifts the focus away from the underlying causes of health inequalities, i.e. social and economic inequalities or unequal access to basic services and infrastructure (e.g. water, food, doctors). Within the neoliberal framework, health challenges are discursively reframed as challenges for technological innovations in fields—profitable for transnational corporations and start-up entrepreneurs alike—such as agriculture (e.g. GMOs), medicine (e.g. vaccines), or communication (e.g. health “apps”). Of importance here is the acknowledgment of the military-industrial complex, which adds to the problems described by Wallace. Instead of recognizing the distributed responsibilities within complex capitalist organized societies and the absence of basic health care in many regions, infectious disease is conceptualised as a national security threat: “the reframing of disease in military terms privileges geosecurity with an emphasis on quarantine and segregation” (Dutta 2015: 191; cf. Davies 2010).
Wallace’s analysis of *pathogen farming* could perhaps be fruitfully expanded further by making use of theories of risk. For instance, the problems created by an expanding meat industry could be understood through the lens of Ulrich Beck’s (1992) “risk society”. Modern societies, Beck argues, solve their problems through technological fixes. These fixes, however, do not so much solve problems as displace risks on higher planes. The risk of suffering from energy shortage, for example, is thus displaced by the risk of nuclear fallout. Similarly, the risk of having to little meat to eat is displaced by the risk of spreading disease. Frustratingly, the world’s “capitalocentric” (Gibson-Graham 1996) leaders do not see the need for change and instead encourage further intensification of agri-industrial practices and the unchecked global flow of capital and commodities (Merkel and Obama’s “we will never return…”). A personal anecdote, to close this review, corroborates this. When I interviewed scientists at a major public health agency, they explained to me in great detail how they discovered the routes of avian influenza in 2005/2006 following the train lines of the poultry trade rather than migratory bird routes. Yet when they presented their findings to their government, the politicians did not want to hear about this. The case was closed and the evidence lies unused and classified in the archives. This is scandalous and it needs to be talked about. This is why Wallace’s book is so important. *Big Farms Make Big Flu* is one crucial step forward in disclosing what is happening in the factories that used to be our barns and deserves a wide readership from all backgrounds.

**References**


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2 I am referring here to Wallace’s blog: https://farmingpathogens.wordpress.com (last accessed 15 December 2016). See also Wallace et al.’s (2009) *Farming Human Pathogens*. 

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