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Ce que fait la biosécurité à la surveillance des animaux
Cómo la bioseguridad redefine la vigilancia de los animales

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Over the last twenty years, the number of health crises caused by zoonoses (animal diseases which can be transmitted to humans) has led to changes in the norms governing the control of animal populations. In Europe, BSE or "mad cow disease" changed the ways in which epidemiological studies are conducted (Barbier, 2006; Granjou and Barbier, 2010). New methods of monitoring animal products, which we might bring together under the heading of traceability (Torny, 1998; Granjou, 2003), have made it possible to secure the food chain through a series of written traces. A few years later, "avian flu" provided the opportunity to set up a global mechanism for monitoring mutations of the influenza virus in domestic poultry and wild birds. This mechanism is essentially based on the definition of sentinel populations, so that the alert can be sounded when new pathogens emerge (Keck, 2010).

In social science research, the concept of biosecurity (Collier, Lakoff and Rabinow, 2004) makes it possible to describe this transformation in scientific and political techniques, as they relate to the management of "emerging and re-emerging infectious diseases" (King, 2002). The concept appeared at the intersection of health and military logics, and designates a new rationality of risk in relation to the management of the living resources. Whereas previous forms of biopolitics were based on statistical models which made it possible to predict and measure risks, biosecurity is about preparing for a catastrophe the probability of which is incalculable and the occurrence of which is deemed to be imminent (Lakoff and Collier, 2008). The emergence of a new pathogen is thus perceived to be an event for which health authorities must be prepared, by imagining its yet uncertain consequences for the human population.
In addition, unlike forms of risk management such as vaccination, quarantine or slaughter, biosecurity is not intended to create watertight boundaries between healthy and unhealthy, but to deploy methods of controlling a pathogen at the very heart of the living entity (Hinchliffe et al., 2013; Hinchliffe and Ward, 2014), in this respect echoing forms of biopolitics such as traceability. The corollary of this reconfiguration of public health from a biosecurity standpoint is the development of global monitoring mechanisms which are now becoming the principal tool for this new “style” (Fearnley, 2008) of risk management. Even if the threat cannot be determined with any certainty, recognition of the different signals is becoming the main tool of a policy which no longer looks so much to predict as to prepare for the next crisis, and whose conditions for emergence already exist, one way or another.

Several works have already looked at how this new biosecurity imperative has transformed public health policies. Drug stockpiling and scenario building (Lakoff, 2008) have brought fictional logics into the field of public healthcare (Zylberman, 2013), and through the mechanisms for triaging populations in emergency situations, they have also impacted humanitarian policies (Lachenal, Lefève and Nguyen, 2014). Although these new methods of preparing for health crises have been studied in relation to public health, in the field of animal disease management –which was nevertheless one of the starting points for thinking about biosecurity, not to mention the exemplary case of international mobilisation in relation to avian flu– there has so far been little research to test the concept of biosecurity. To this end, this issue of the Revue d’Anthropologie des Connaissances offers a three-dimensional approach.

The first is a thematic orientation which concerns an instrument central to biosecurity policies in this era of zoonotic threat: the surveillance of animal disease. With the global alert for a pandemic of avian origin, surveillance was examined from the angle of the rearrangements required in health networks at a global level, particularly that of the coordination of animal and human health data implied under the “One Health” watchword (Hinchliffe and Craddock, 2015). Field epidemiology thus takes a new turn when it shifts from retrospective research on causes to real-time surveillance of disease, especially when these mechanisms are essentially oriented towards the detection of new cases. This constant attention to “emergence” has been thoroughly examined with respect to the military logic of American epidemiology, for example through the development of monitoring tools which have now shifted from the traditional medical census of “cases” towards a “syndromic surveillance” which looks at far broader signals, such as social exchanges on digital networks (Fearnley 2008; Caduff, 2014). The role played by international organisations –particularly the World Health Organization (WHO) and the World Animal Health Organization (OIE)– in the development of these global surveillance devices is also well documented (figuïé, 2013; Chien, 2013). Participating to a shift from “international threat management” to “global risk governance”, they set themselves up as key actors in the standardisation and coordination of the global management of emerging infectious diseases, the surveillance of which constituted the backbone of their intervention and hence of the legitimisation of their action.

However, whilst these works document the transformations of these global surveillance devices, they tend to analyse them solely from the public health standpoint and pay little attention to their specificity when they relate above all to animal populations. Animal surveillance brings with it particular challenges, mainly of an agricultural and
veterinary nature, along with specific knowledge, techniques and actors. Furthermore, as other kind of “hotspots” (Brown and Kelly, 2014), these surveillance devices bring into play relationships between humans and animals, for which they are a ground for both expression and transformation (Nading, 2013). The notion of “animal reservoir”, which was constructed in relation to the development of flu surveillance and which designates the ecosystem in which interspecific pathogen mutations take place (i.e. which may be transmitted between humans and/or animals) thus implies an entire recomposition of the continuities and discontinuities between species, of the boundaries between wild and domestic (Fearnley, 2013). The definition of “sentinel” populations or species, which would be the preferred terrain for these mutations and which would therefore constitute a hub for surveillance, supposes sociotechnical mechanisms into which animals are enrolled due to their sensitivity to invisible threats affecting human beings (Keck and Lakoff, 2013). What interests us here are the specific forms of this enrolment, with the range of techniques and knowledge that make it possible and the transformations in human-animal relations that it conveys.

The second orientation, which stems from the first, is methodological. In order to understand what biosecurity is and what it does, one needs to study surveillance practices “from the bottom up”, instead of starting from the directives or principles which orient them “from the top down”. There are a certain number of works which retrace the origins of epidemiological surveillance (Fearnley, 2010; Youde, 2011; Buton and Pierru, 2012). But whilst this focus on processes of reforming or developing public policies reveals the institutional configurations and political-administrative issues that guide the development of these new public health instruments, it does not allow us to grasp how surveillance functions ordinarily, or the actual operations that surveillance performs on an everyday basis (especially with regard to animals). Other works (Barbier, 2006; Prete, 2008; Law and Mol, 2010) have demonstrated the utility of taking a closer look at field practices and at the types of work that shape surveillance devices and enable them to exist within complex social universes which are not necessarily organised (or at least essentially organised) in relation to animal surveillance. In this respect, it is important to consider the actors whom we might consider to be the “surveillance mediators” and who “to some extent and not without tension, accept to adjust the formal rules of health surveillance so as to work towards a solution for overcoming the blockages that they create” (Prete, 2008: 501).

This issue thus explores ordinary surveillance practices, whether they are part of domestic husbandry and the management of wild fauna, or embedded in veterinary practices for livestock health management. We look at how surveillance is perceived, accepted or rejected by the actors who implement it on an almost daily basis, in relation to other modes of risk perception and management. For example, how do surveillance devices shift the boundary between wild and domestic, so as to manage a wild population as if it were livestock? In what way do they help form new professional identities or new forms of involvement? How do they redefine links between the different actors, both human and non-human, who are de facto involved in surveillance?

However, at this level, surveillance practices do not just lead to new forms of knowledge and understanding in relation to animal disease; they also foster the production and/or maintenance of ignorance (Kleinman and Suryanarayanan, 2013; Jouzel and Dedieu, 2013). Whilst animal surveillance devices throw light on what are
sometimes highly controversial issues (such as the role that wild fauna play in the emergence of new diseases, especially in the case of vector-borne diseases such as Lyme Disease or Chikungunya), they also fudge certain aspects which are more difficult to document (such as the impact of the circulation of domestic populations within integrated sectors, particularly with regard to so-called “production” diseases, which are often not fatal). Surveillance thus focuses the attention of public authorities on zoonoses that have a strong emotional impact (such as avian influenza), to the detriment of other more confidential animal diseases (such as brucellosis) which whilst they can be transmitted to humans, have an invisible effect on animals. Yet rather than deductively suggesting that surveillance devices only make visible the “major” zoonotic diseases which receive mediatic and political attention, we believe on the contrary that it is by an attention to the know-how and techniques employed on a daily basis by surveillance actors that we will gain a better understanding of the mechanisms of the social production of (non)knowledge on animal diseases. Indeed, observation of concrete situations where actors must resolve the practical dilemmas and uncertainties with which they are regularly confronted, allows us to decipher the multiple assemblages of biosecurity: must surveillance follow the model of post-infection eradication or can it tolerate a certain endemicity of disease? Must it detect early alarm signals or should it identify diseases which are circulating under the radar? Each device thus has its own specificities relating to the diversity of social activities (and therefore not only to surveillance) taking place within it.

This methodological bias of apprehending surveillance devices “from the bottom up”, i.e. the ways of actually managing the tensions and uncertainties expressed within them, is fed by a third orientation, which is theoretical. This orientation consists in seriously putting into perspective the assertion whereby biosecurity in general and surveillance in particular are new forms of risk management. Often expressed through the idea of a significant “breakdown” or “transformation” of health and environmental policies since the 1990s, the concept of biosecurity is deemed to be a set of fundamentally new types of knowledge, techniques and policies, the two pillars of which are surveillance and preparation (Keck, 2013a), which replace the old forms of risk management such as vaccination, slaughter or quarantine which have always been used to manage animal disease such as bovine tuberculosis or foot and mouth disease (Berdah, 2010; Woods, 2004, 2011). In reality, certain forms of surveillance have been instruments of animal disease (zoonotic or otherwise) management for some time, particularly when statistical tools are required to study or map a population’s state of health, as in the classic case of bovine tuberculosis (Enticott, 2001; Jones, 2004). It is then no longer innovation which must be taken into account, but the forms of assemblage which reinvent animal disease management (in this case, surveillance) in the name of biosecurity.

The works brought together in this issue show that animal surveillance is made up of a heterogeneous assemblage of devices, knowledge and techniques which, whilst reorganising themselves around biosecurity, nevertheless predate it. This is reflected in the idea that the implementation of biosecurity reconfigures a whole set of boundaries –biological, geographical, social and political (Enticott, 2008; Hinchliffe et al., 2013): “The complexity of this disease ecology and the attendant knowledge practices makes scanning surveillance less a matter of detecting known enemies and more a procedure of piecing together evidence from a variety of tests, learning to respond with various epistemic objects” (Hinchliffe, 2015: 33). Biosecurity could not in fact set itself
up as such a performative watchword if it did not incorporate a whole range of pre-existing practices that follow their own normativities and temporalities. In the case of avian influenza for example, surveillance, through joint funding, made it possible to bring together activities which had until then been separate (Scoones and Forster, 2008). Preparation for an imminent catastrophe caused by inter-species transmission must therefore be compatible with longer-term objectives, such as the preservation of species or the development of academic networks. It is therefore important to grasp the different facets of animal surveillance, from the perception of background signals to health crisis management and the creation of groups to deal with everyday animal disease matters. This allows us to understand how surveillance crystallises around certain metrological devices, such as censuses, alerts, the creation of databases, etc. whilst at the same time deploying technical and cognitive tools, along with very different modes of organisation, cooperation and competition between actors.

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We asked contributors to this volume to examine the multiple assemblages of biosecurity devices in order to describe different modes of animal surveillance. Above and beyond the purpose of surveillance, in its strictest sense and as defined by biosecurity principles to prepare for global threats, the works collected in this issue throw light on at least five types of activity which integrate surveillance devices.

First of all, for biosecurity purposes the aim of animal surveillance is to intersect in several ways with the monitoring of biodiversity (Manceron, 2013; Granjou and Mauz, 2012). Between the threat of an imminent health crisis and that of a species becoming extinct, there are different levels of mobilisation. The conception of nature as a diversity reserve is undoubtedly just as normative as the protection of human health, but the tension between these two norms, which may well orient the same surveillance networks, makes it possible to grasp a range of practices at work in socio-technical devices. Animal surveillance allows us to do something quite different from predicting and preparing for an emerging infectious disease. For example, it might lead to the development of devices for tracking wild fauna with a view to protecting the latter for its own sake rather than protecting it for human benefit alone (Benson, 2010, 2012). Birdwatchers now contribute towards avian flu’ surveillance by using their knowledge of migratory trajectories to help prepare for pandemics; in return, they benefit from media coverage of the alert to defend the cause of wild birds (Keck, 2013b). In this issue, Sandrine Dupé shows how the introduction of sterilized mosquitoes to control the Chikungunya epidemic in Reunion Island is caught in a tension between the protection of human populations and the management of vector diversity. Frédéric Vagneron studies the emergence of an ecological approach to infectious diseases which has developed as a corollary to the WHO’s implementation of a comprehensive influenza surveillance device, thus turning man’s attention away from health concerns and more towards the environment (of which the “animal reservoir” is an essential component) in the etiology of zoonotic diseases.

Yet imperatives other than the protection of biosecurity can also orient animal surveillance. So secondly, on the pretext of monitoring the health of livestock, methods of monitoring human populations might be deployed. Whilst this operation is sometimes related directly to public health concerns, especially when threats emerging
from the animal reservoir are linked to human behaviour towards them (Serna, 2014), it also very often relates, in the southern hemisphere in particular, to a post-colonial aspect of animal disease management, or to biosecurity in general (King, 2002). Indeed, whilst historically speaking we know that tropical veterinary medicine has constituted a preferred area for research on infectious zoonotic diseases, and that in this respect it has helped build a “colonial” knowledge base (Gilfoyle, 2005; Gradman, 2010), epidemiological surveillance of animals still remains a way of “domesticating” their owners, by ensuring that their behaviour (farming and hunting practices in particular) comply with existing biosecurity norms. Epidemiology thus constitutes knowledge which makes it possible to disqualify certain forms of relationship with animals, such as the marmot-hunting “coolies” accused of causing the great Manchurian pneumonic plague at the beginning of the 20th century (Lynteris, 2013). Surveillance is then no longer just a health monitoring device, but also a political tool for organising social relationships, or even a policy instrument in the widest sense, as is the case with the fight against malaria-carrying mosquitos in Tanzania (Kelly and Lezaun, 2014). In the relations between the French mainland and its overseas territories, or between western importing countries and (southern-hemisphere) foodstuff-exporting countries, the articles by Muriel Figuié, Aurélie Binot and Alexandre Caron on the one hand, and by Sandrine Dupé on the other, show the extent to which animal disease management comes with a moralising undercurrent which aims to domesticate not only animals, but also the human beings who live nearby.

Thirdly, surveillance can also lead to the development of academic and/or industrial research activities which broaden the scientific networks and object fields that they inhabit. Antoine Doré and Marc Barbier show how entomological research has been one of the main driving forces for locust surveillance in Mauritania. Nicolas Fortané describes the surveillance device for resistant bacteria of animal origin as a microbiological research network which essentially—or at least during its first years of operation—targets the circulation of strains of bacteria which are deemed to be of scientific interest. Frédéric Vagneron shows how the WHO’s introduction of the notion of “animal reservoir” is embedded in the epistemological context of the increasing popularity of an ecological approach to infectious disease, which reconfigures the relationship between virologists and epidemiologists. In this specific case, it should also be noted that industrial research is never far away, as the flu virus constitutes a major challenge for the manufacture of vaccines aimed at the human population (Aranzazu, 2013). Because the animal reservoir is considered to be where the next flu strain will emerge, pharmaceutical laboratories can relieve international authorities in the constitution of surveillance centres and, more particularly, help standardise the techniques and devices that are implemented.

However, the economic and business interests linked to surveillance practices do not concern the pharmaceutical sector alone. Fourthly and more broadly, it is the overall management of the agri-food sector and of the global circulation of foodstuffs that is linked to the development of these biosecurity devices. Muriel Figuié, Aurélie Binot and Alexandre Caron show how the surveillance of animal diseases in Zimbabwe is linked to the food safety imperatives of international trade and to the exportation of animal products to northern-hemisphere countries in particular. More broadly, we know that since the 1950s, the development of animal health policies in Europe is linked to the creation of the common market (Ollivier, 2013), and that the steps taken to manage avian influenza in south-east Asia were designed just as much to control the inter-
species transmission of the disease as to ensure continued food production in countries
where poultry is an important resource (Figuié et al., 2013; Porter 2013; Forster and
Charnoz, 2013). In the same way, surveillance has an affinity with biosecurity logics of
preparedness and resilience (Gilbert et al., 2010; Torny, 2012) in that it maintains the
continuity of economic and social relations throughout long-lasting risks and,
sometimes, crises. It thus has links with the deployment of the neo-liberal paradigm in
the field of agricultural production and trade, as driven in particular by the World
Trade Organization in as much as it aims to redefine local practices in the light of
global economic, health and security issues (Enticott, 2014).

This aspect intersects with a fifth register around which variations and
accommodations of animal surveillance devices emerge: the logics behind the technical
framing of agricultural practices (more specifically, in this case, farming practices). The
historical construction of epidemiological surveillance networks in the field of animal
health has to a large extent been left to the farmers and veterinarians who are in daily
contact with the animals (Fortané, 2017). These are the people who do the small tasks,
the aggregation and overlapping of which make it possible to produce surveillance
data. For example, information about a case of bovine brucellosis could not be passed
on without farmers keeping a careful eye on their herds and spotting the tiniest
suspicious signs, or without veterinary surgeons who, once alerted, come to carry out a
clinical examination of the animal in question and who decide whether or not to take
biological samples to confirm their suspicions (Bronner et al., 2013). So as Sandrine
Ruhlmann and Nicolas Fortané show, these two professions are at the forefront of
animal surveillance. In Mongolia, the partnerships between farmers and non-
governmental organisations such as Agronomes et Vétérinaires Sans Frontières (AVSF)
bring the figure of “sentinel-farmers” into a context where public health
infrastructures are being disintegrated, thus causing the government to hesitate
between contradictory animal health management policies (vaccination and slaughter
in particular). In France, after the mobilisation on antibiotic-resistant bacteria,
networks monitoring these bacteria in animals give a major role to farmers and “field”
veterinarians who, by virtue of their everyday animal health management practices,
constitute the first link in the epidemiological surveillance chain.

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One of the challenges of the concept of surveillance is to integrate certain practices
into health crisis preparation devices: practices for managing agricultural production,
business practices, academic practices and practices for monitoring human populations
or for maintaining biodiversity. These are redefined as biosecurity practices the
purpose of which is to produce surveillance data. A whole range of skills and
perceptions is thus remobilised in accordance with modalities which might give rise to
forms of resistance and develop new areas of ignorance. Biosecurity is now globalising
that which has already been observed in relation to traceability: the signs which alert
us to new diseases would have no meaning if they were not embedded in pre-existing
practices. Biosecurity therefore only exists through the assemblages that it is able to
create between the knowledge, techniques and activities which can simultaneously
meet other objectives, often complementary but sometimes contradictory.
In the most contemporary and globalised forms of biosecurity, animal surveillance thus expresses the variable relationships between humans and animals. It may be that all surveillance involves this ambiguous mix of domination and proximity that connects the human race to the species it has domesticated, and that the surveillance practices most equipped with knowledge and socio-technical tools prolong forms of pastoral care. The idea that new pathogens emerge from the animal reservoir demonstrates the distance that now exists between these domestic species and mankind; no longer evolving in close proximity, we have lost our shared immunity (Digard, 1990; Gualde, 2006). It is therefore up to the social sciences to reveal all of the practices which cause human beings to pay more attention to the signs that animals send them, concerning the diseases that affect them in common.

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Several works have already looked at how the new biosecurity imperative has transformed public health policies. Although the new methods of preparing for health crises have been studied in relation to public health, in the field of animal disease management there has so far been little research to test the concept of biosecurity. To this end, this issue offers a three-dimensional approach. The first is a thematic orientation which concerns the central instrument of biosecurity policies in this era of zoonotic threat: the surveillance of animal disease. The second orientation is methodological; one needs to study surveillance practices “from the bottom up”. The third concerns the new forms of knowledge in relation to animal disease and the production and/or maintenance of ignorance.

De nombreux travaux ont déjà porté sur la façon dont le nouvel impératif de biosécurité a transformé les politiques de santé publique. Si les nouvelles formes de préparation aux crises sanitaires ont bien été étudiées dans le domaine de la santé publique, en revanche, dans le domaine de la gestion des maladies animales, peu de travaux ont pour l’instant cherché à mettre à l’épreuve le concept de biosécurité. Face à ce constat, ce numéro propose une triple inflexion. La première concerne l’instrument central des politiques biosécuritaires : la surveillance des maladies animales. La seconde est méthodologique ; il s’agit d’étudier « par le bas » les pratiques
de surveillance. La troisième concerne les formes de connaissances sur les maladies animales et la production et/ou le maintien d’ignorances.

Un gran numero de trabajos ha analizado cómo el nuevo imperativo de bioseguridad transformó las políticas de salud pública. Si bien es cierto que las nuevas formas de preparación frente a una crisis humanitaria han sido estudiadas desde la perspectiva de la salud pública, existen pocos trabajos que les hayan cuestionado en la óptica de la gestión de las enfermedades animales. Éste número propone ante ello una inflexión triple. La primera es de orden temático y se focaliza en el instrumento central de las políticas de bioseguridad frente a la amenaza zoonótica: la vigilancia de enfermedades animales. La segunda orientación es metodológica: se necesita estudiar «desde abajo» las prácticas de vigilancia. La tercera se enfoca en las nuevas formas de conocimiento de las enfermedades animales y en la producción y/o mantenimiento de la ignorancia.

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