Routledge Studies in Health and Medical Anthropology

THE ANTHROPOLOGY OF EPIDEMICS

Edited by
Ann H. Kelly, Frédéric Keck and Christos Lynteris

The Anthropology of Epidemics

Over the past decades, infectious disease epidemics have come to increasingly pose major global health challenges to humanity. *The Anthropology of Epidemics* approaches epidemics as total social phenomena: processes and events which encompass and exercise a transformational impact on social life whilst at the same time functioning as catalysts of shifts and ruptures as regards human/non-human relations. Bearing a particular mark on subject areas and questions which have recently come to shape developments in anthropological thinking, the volume brings epidemics to the forefront of anthropological debate, as an exemplary arena for social scientific study and analysis.

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5 Photography, zoonosis and epistemic suspension after the end of epidemics

Christos Lynteris

In the open steppe, somewhere in the lands spanning the Northeastern frontier of Qing China and the Russian Empire, against an unending horizon, a carefully arranged stack of numbered cages basks in the sun (Figure 5.1). Pilled in rows before the mouth of an expedition tent, the two most prominent cages bear glass fronts. In one of these odd boxes, crouches a sleepy-looking, furry animal; in the other, a standing creature seems to be touching the glass with its front paws, its gaze fixed upon us. These are Siberian marmots also known as *tarbagan*. But what are they doing there? We are so accustomed to seeing photographs of guinea pigs, rats, and other experimental animals as icons of laboratory science and its achievements, that the answer seems obvious: What else, but waiting to be taken to a lab to be tested, so as to improve human health? This, however, would be to mistake the question. For *there*, in this case, does not refer to the cage, or to the steppe, but to the photograph. What are these animals doing *in this image*? What is it that they bring into effect in and through this photograph? What is the work of their photographic presence?

Positioned within a recently emergent interest in developing visual approaches in medical anthropology (Lynteris and Prince 2016), this chapter will examine the photographic corpus where this image is embedded: the photography accompanying the Chinese-Russian plague expedition to South Siberia and Mongolia in the aftermath of the devastating plague epidemic that struck Manchuria between the autumn of 1910 and the spring of 1911. The aim of the chapter is to show how the examination of photography can help us explore a crucial subject in the anthropological and historical study of epidemics: epidemiological reasoning in the aftermath of infectious disease outbreaks. Assuming no prior knowledge of the events by readers, the chapter will proceed by briefly providing the historical context of this photographic production before launching a close examination of post-plague photography. This will be shown to embody and foster a state of epistemic suspension, which often follows the closure that characterises epidemiological knowledge in the context of infectious disease outbreaks and the public health response that they necessitate.

Plague on the Chinese-Russian frontier

Up until 1911 the main bulk of research concerning plague on the Chinese-Russian northeastern frontier was conducted under the auspices of the Russian Plague

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Figure 5.1 'The Animal House (Mongolia). Note the Glass Cages'
Courtesy of the University of Hong Kong Libraries

Commission, founded by Prince Oldenburg in St Petersburg in 1897 (Golikov and Sapronov 2010). Coinciding with the devastating bubonic plague outbreak in Hong Kong in 1894 and international fascination over the discovery of the bacillus (now known as *Yersinia pestis*) by the Pasteurian doctor Alexandre Yersin (1894), research on the Chinese-Russian frontier led to the first systematic scientific study of plague as a zoonotic (animal to human) disease of sylvatic (i.e. 'wild') origins. This research fostered the theory that plague was carried in the particular region of the world by marmots, which in turn served as sources of human infection. After the publication of two short reports on 'tarbagan plague' in 1895 (Beliavsky 1895; Reshetnikov 1895), plague research flourished in Transbaikalia, and to a lesser extent in Mongolia, where Russian Plague Commission experts flocked to study the disease (for detailed discussion see Lynteris 2016). As plague spread from Hong Kong across the world, forming the third plague pandemic, international scientific interest in the disease peaked. By 1910, Russian-led plague research in South Siberia, Mongolia, and Manchuria had led to dozens of scientific papers, which were systematically translated and summarised in the English, French, and German speaking medical press (ibid.).

The two pillars of this scientific production were what I have elsewhere coined the tarbagan and the native knowledge hypotheses (ibid.). The first hypothesis held that the Siberian marmot carried plague and was the source of human

infection in the region. Following studies in India confirming the important role of the black rat (*Rattus rattus*) and its flea (*Xenopsylla cheopis*) in plague transmission, the epistemic value of the tarbagan hypothesis gradually shifted, becoming more credible to some but also obsolete to others, who held the rat to be the sole zoonotic source of the disease. At the same time as defending the tarbagan hypothesis, plague research in Inner Asia developed a second set of ideas, which became ever more embellished and complex as the years passed. This hypothesis supported the notion that native groups, Mongols and Buryats in particular, possessed a traditional knowledge of plague, which allowed them to identify marmots as its source (ibid.). Native hunters in particular were not only said to know plague, but also how to prevent its spread to humans. According to this theory, they could hunt marmots for their fur, meat, and fat (the targaban was an important daily resource, especially for poorer families) with impunity, as they knew how to identify a plague-infected animal by means of distanced observation and proto-hematological tests (ibid.).

The outbreak of Manchuria in 1910 had been anticipated by over fifteen years of research. And yet, those accumulated studies and insights did little to prepare the region for the extent and force of the epidemic's impact. Plague was first recorded in mid-October 1910 at the Manchurian border town of Manzhouli. The disease manifested itself in its pneumonic clinical form and was transmitted between humans in an airborne manner with no intermediate hosts or vectors.[1] Spreading fast along the rail tracks of the Chinese Eastern Railway and the South Manchurian Railway, it quickly reached to the great cities of Harbin, Mukden, and Changchun. By the time it finally waned, in April 1911, it had killed approximately 60,000 people, with a recorded mortality rate of one hundred percent. As historians of the epidemic have stressed, this catastrophic event fuelled geopolitical strife in the region (Nathan 1967; Gamsa 2006; Summers 2012). In particular, it functioned as a platform for playing out a long-standing antagonism between China and Japan in the area. Following the Russian–Japanese war of 1905, the Japanese sought to demonstrate their scientific and administrative supremacy by imposing draconian anti-plague measures by targeting the Chinese population. Applauded in the treaty-port press and emboldened by international reception of its anti-plague policy, Japan's agents in the region, spearheaded by the South Manchurian Railway's medical police, assumed control of disputed territories (Nathan 1967). Faced with such escalating challenges, the last resort of China's anti-plague leader, Dr Wu Liande, was to call for international scientific arbitration. This took the form of the First International Plague Conference, convened in Mukden (Shengzhen today) on April 3, 1911. Held only a few weeks after the sudden cessation of the outbreak, the conference was chaired by Wu and further composed by leading plague experts from eleven countries around the world.

In the course of this much-publicised meeting, Wu adopted a risky yet ultimately successful strategy.[2] Expressing his gratitude and dept to the Russians, he claimed that the source of the epidemic was not the rat, as Japanese doctors insisted, but the Siberian marmot, furthermore adding that this animal source of plague had been known to the indigenous inhabitants of Mongolia and North-western Manchuria

(Wu in Strong 1912: 19). Wu thus endorsed both the tarbagan and the native knowledge hypotheses developed by Russian plague researchers since 1894, in a move which, with the joined forces of Russia's chief delegate and plague expert of international repute, Danilo Kirilovich Zabolotny (b.1866), carried the day. By the end of the conference, the two hypotheses and their reconfirmed interdependence had become the staple of the international medical and lay press, joined together in a tight cluster of epidemiological reasoning.

The Chinese-Russian plague expedition

What is often forgotten in historical accounts of the Manchurian plague is that besides a brief visit by Wu's assistant, Dr Ch'uan Shao Ching, to Manzhouli in the winter of 1911, Chinese doctors had not had the opportunity to examine plague in the region believed to be the origin of the disease. Moreover, as Ch'uan visited Manzhouli during a period of the year when Siberian marmots are hibernating, Chinese scientists had no first-hand empirical experience of the purported zoonotic source of the disease. If Wu supported Russian claims regarding the disease originating in marmots rather than rats, this formed part of an epistemic alliance with Zabolotny in a time of biopolitical and geopolitical urgency. The latter's international prestige as a plague expert acted as a counterweight against rat-theory-proponent Kitasato Shibasaburo (b.1853) – the head of Japan's delegation to the conference, leading Japanese bacteriologist, and (as Yersin's arch-rival in the discovery of the plague bacillus in Hong Kong) a dangerous opponent for Wu (b.1879).

Medical historians and anthropologists have studied the ways in which decisions over disease aetiology, transmission pathways, and other key epidemiological traits regarding a given outbreak are influenced by social, economic, and political factors. To the extent that outbreaks function as events necessitating the rise of new conceptual frameworks and indeed of new biopolitical subjectivities (Lynteris 2014b), the challenge they pose both to scientific frameworks of understanding disease and to governmental responses to the latter more often than not results in epistemological closure. By this I mean the development and defence of a limited and largely non-reflexive set of explanations, which can form the basis for concrete, unambiguous epidemic-control intervention on the ground, and, to follow Charles Briggs and Clara Martini-Briggs' recent work, to simplified, unidirectional communication about the supposed true nature of the epidemic (2016). This has already been shown to be the case in the Manchurian plague epidemic (Lei 2011; Lynteris 2014a). What is less examined is what transpires with regard to these hastily crafted epistemological positions after the end of epidemics when the quarantines are lifted, the dead buried, the pits closed, and the journalists gone home. In a recent reflection on the 'end of disease' historian Dora Vargha (2016) stressed the importance of thinking 'after' the dramaturgical timeline of the outbreak narrative to which readers of Charles Rosenberg (1989) or Priscilla Wald (2008) are habituated: 'endings are often messier than any international, national or local governing body would care to admit, and most diseases do not map onto

neat narratives. Endings hardly mean that the story is finished'. In the case of the plague, the observation that the disease tended to disappear in a given location only to reappear the following year, with a certain seasonality, was a formative part of scientific experience. In this sense, the end of an outbreak was but a temporary one. What was then the epistemic and biopolitical significance of these inter-epidemic intervals? If every 'after the end' period is also one 'before the return' of an epidemic, in which ways is this interval institutionalised and instrumentalised both scientifically and governmentally?[3] In the case of Manchuria, where the 1910–11 outbreak was perceived to be the first of its kind, the question then arose: how could scientists, fresh from the battle against plague, take advantage of the time that remained before its potential return, so as to check and verify the conclusions reached at the Mukden conference?

What triggered the Chinese-Russian expedition following the Mukden conference was the discovery of a plague-infected tarbagan by a protégé of Zabolotny just north of the Chinese-Russian border on June 24, 1911. Taking samples to Harbin, Zabolotny demonstrated the preserved plague-marked organs of the animal to Wu. This discovery and news of an epizootic among marmots in Kerulen, north of the Borzya River, were crucial factors in forging an expeditionary collaboration between the two scientists.

The Russian party was led by Zabolotny, while the Chinese by Wu, who arrived in Manzhouli on July 21. After arranging for the construction of huts and a microbiological laboratory, Wu and his assistant, Dr Chen Shipang, crossed the border for the Russian railway town of Borzya, where Zabolotny had his base. The scientists issued tarbagan-hunting permits to Russian hunters and offered one ruble per healthy animal and five per sick animal (Wu and the Hulun Taotai 1913: 27). Harvesting eighty marmots in total, they were perplexed by their inability to find any testing positive for plague. The expedition similarly failed to find any plague-infected marmots in either Arabulak or around Borzya itself. Thus, empty-handed, the parties broke ways on July 29. The Chinese team crossed the border back to Manzhouli, where it remained for five days, during which it investigated more marmot carcasses in the area, once again with no results. On August 4 it moved into Mongolian territory where it stayed for nine days. It first reached the twenty-family-strong Mongol 'village' of Charbada, sixty-three li southwest of Manzhouli, on August 5; a settlement surrounded by marmot mounds. The Mongols were described as eating 'besides mutton, a good deal of Tarbagan flesh which is only half roasted before the primitive fire' (ibid.: 31). Upon Wu's enquiries, they however claimed that, 'there had never been any outbreak of disease resembling human plague in their midst. Nor could I obtain any word of disease among the Tarbagans: the country in which they had lived for many years past abounds in Tarbagans, yet they had never noticed the animals dying' (ibid.: 30).

In the meantime, trapped marmots tested negative for plague and the party moved on, along the banks of Kerulen River, where, after camping at another Mongol settlement, Wu was again unable to trace any evidence of plague among beast or human. Rich in ethnographic information regarding marmot hunting, yet empty-handed as far as plague was concerned, the Chinese party was then forced

to return to Manzhouli, as the road to the plague-famous village of Abagatui was deemed too demanding for the expedition's water supplies. Wu thus reached the bustling border town on August 14, having achieved very little in terms of establishing the relation between marmots and plague.

The lack of evidence regarding the existence of plague among both tarbagan and humans (or the relation between the two) during the expedition had a decisive effect on Wu, who after a 24-month silence finally aired his scepticism in a public denouncement of the Russian hypothesis about the zoonotic origins of plague in the region. In the conclusion of an article published in October 1913 in the London-based *Journal of Hygiene*, Wu declared:

> Not only did the expeditions fail to discover a single diseased Tarbagan, but enquiries made by us directly from the hunters showed that they knew nothing of the alleged epidemic. In the experience of these hunters not only had no epidemic ever occurred among the Tarbagans but they had never even seen sick ones. In Mongolia, the Chinese expedition had similar results nor could any news be obtained of disease, past or present, from the Mongol hunters.
>
> (Ibid.: 48)

Completing his aetiological *volte-face* Wu gloated in his role as the demolisher of medical error: 'To conclude that a man whose occupation is that of a Tarbagan hunter and who takes plague has been infected from a Tarbagan is comparable to concluding that a man who sells rice and who develops plague has been infected from rice' (ibid.: 47). This pronouncement was readily adopted by the international medical community, with Russian research procuring evidence to the contrary being severely isolated and ignored over the next decade. That is, until the second Manchurian pneumonic plague epidemic in 1920–21 eventually forced Wu to once again undertake a joint Chinese-Russian (Soviet this time) expedition in 1923 and accept the tarbagan origins of the disease; a move that led him to rehabilitate the native knowledge hypothesis as an indispensable partner of the former (Lynteris 2016).

The epidemiological reasoning evident in this epistemic entanglement is a rich field for medical anthropological and historical investigation into the 'ethnographic configuration of plague' (ibid.). When we look at the photographic production accompanying the summer 1911 plague expedition, however, we are allowed a vantage point into the way in which the end of the epidemic did not directly result in a new certainty (the non-relevance of marmots, or the rejection of the tarbagan and native knowledge hypothesis) but, instead, to a return to epidemiological uncertainty. Although the expedition took place in the summer of 1911, Wu expressed his rejection of the two hypotheses that had underscored his outbreak narrative during the course of the epidemic only in 1913.[4] Though publishing delays and the intervening Revolution may certainly have played a role in this, his photographic albums also point out that Wu did not immediately shift from one kind of certainty to its exact opposite. Visual evidence thus reveals what textual ones occlude: how the end of an outbreak marks a time when epistemic

frameworks, which had been developed in the course of the outbreak so as to meet the needs of a particular crisis and lead to its resolution become suspended. To understand this dialectic it is important to contrast this case of post-epidemic photography with epidemic photography per se, as this was developed and deployed in the course of the Manchurian plague outbreak.

Photographing the Manchurian plague epidemic

In the course of the 1910–11 epidemic, photography was employed extensively to cover the events unfolding in Manchuria. Hundreds of photographs were produced, the vast majority of which reflected the viewpoint and interests of different, antagonistic agents in the region. This production followed to a great extent the conventions of epidemic photography as it had been developed globally following the Hong Kong outbreak of 1894. Being the first time that the photographic lens was used to record infectious disease outbreaks in a systematic manner, the photography of the unfolding third plague pandemic brought together methods, aesthetics and norms of criminological, ethnographic, medical, war and survey photography in what we may call 'epidemic photography' (Lynteris 2016b). Numerous photographic corpuses on the outbreak survive, from American, French, Russian, Japanese, German, and Chinese sources. What is important for our discussion is the official Chinese viewpoint as encapsulated in the album produced and published by Wu Liande: *Views of Harbin, Fuchiatien, taken during the plague epidemic, December 1910March 1911* (Wu 1911). This bilingual (Chinese and English) album was presented to the delegates of the Mukden conference. Through its sixty-one of photographs, each occupying a single right-hand page, the work is unique in the way in which it engages with the epidemic in the great Manchurian city. The lens establishes a narrative that spatialises plague, rendering the disease a structural problem of working-class living space. This image rhymed with Wu's explanation of the epidemic as a result of coolie ignorance and ineptness; an aetiology that traced the outbreak to the supposedly unskilled marmot-hunting practices of migrant workers from Shandong, employed in the procurement of tarbagan fur from around Manzhouli, but also to the supposedly insanitary habits and living conditions of this class. As Wu's visual narrative unfolds, we find ourselves immersed in the dirty, dark streets of the coolie neighbourhood of Fujiadian. Then science intervenes: quarantine is imposed, contacts are isolated in immobilised train wagons, disinfection squads cleanse houses and streets, and, finally, fire is employed to torch pestilential coolie abodes. This is a narrative of order through science. The Chinese anti-plague operation is depicted as orderly and methodic – a far cry from reports of confusion, internal conflict, and popular resistance circulating about Wu's anti-plague efforts at the time (Nathan 1967). Marmots are noticeably absent. Instead the album concludes with an image of Chinese researchers examining rats in a laboratory: 'In the Laboratory: searching for infected rats'. This may appear perplexing and out of tune with Wu's hypothesis on the marmot origins of the disease and the irrelevance of rats in the outbreak. However, it is probable that this last photograph was meant to

show that Chinese researchers had not neglected the potential implication of rats, but, having examined them in a scientific manner, had dismissed it as non-factual. The absence of marmots from the album is not itself surprising. On the contrary, it is exactly what should be expected, as marmots were in hibernation in the course of the human epidemic and their photographic depiction was simply impossible.

Wu's *Views of Harbin* thus provided a concise, and indeed, panoptical gaze of the epidemic: moving from the opening birds-eye-views of the afflicted city, to close-ups of coolie streets and alleys, to epidemic-control measures, and, lastly, to images of 'purification' by fire, it fostered an image of revelation and containment. This involved both what Carlos Mondragón (2015) calls a 'controlled revelation' and, I would like to argue, a 'revelation that controls' insofar as photography deployed its demonstrative faculty (Lynteris 2016b) so that the disease could be politically contained and Chinese sovereignty over Manchuria preserved in the face of Japanese challenges. By contrast, as we will now proceed to see, the albums produced by Wu Liande during the Summer 1911 plague expedition to South Siberia and Mongolia shifted attention not simply from the urban site of affliction to the rural site of origin of the disease, but also from a field of vision that fostered epistemic certainty to one that harboured epistemic doubt.

Obscuring the coolie

By contrast to *Views of Harbin* the two albums produced by Wu in the summer of 1911 were not meant for publication or distribution. We do not know the exact purpose of these albums, but they are both in form and quality very different from Wu's photographic scrapbooks currently held by the National Library of Singapore (see bibliography). The latter, whose dates of production are unknown but appear to be works-in-progress over long periods of time, contain a large number of photographs from various periods of Wu's work and career. Whereas in the Hong Kong albums each sheet carries one, centrally framed photograph, in the Singapore scrapbooks numerous, smaller format photographs are carried in each leaf, with diverse orientations and often partially overlapping. Moreover, whereas the Hong Kong albums cover a distinct time-bound event, the Singapore scrapbooks represent a mélange of photographs of events from different periods. Judging from the annotation on the margin of the photographs, in the case of the two Hong Kong albums examined here, these were used not as simple reference, but as visual objects for systematic scientific scrutiny.

The first album compiled by Wu (mis-dated 'Joint Sino-Russian Plague Research Expedition in Siberia and Mongolia 1912') concentrates on the first, joint phase of the Summer 1911 plague expedition to the Chinese-Russian frontier, in July 1911. The photographer is unknown and is nowhere identified in Wu's published or non-published works. Composed of sixteen images mounted on thick deep-purple paper, bearing hand-written annotations by Wu, the album reproduces expeditionary visual tropes that were by that time well-established in colonial photo-album practices. However, rather than simply depicting a scientific expedition, the album in fact re-enacts it in a way that institutes a visual narrative

thick with hierarchies concerning skill and knowledge. These are hierarchies as much between the expeditionary force and the native subjects photographed in the field, as between the Chinese and the Russian expeditionary parties. What the album visualises is a tripartite distinction between, a) modern scientific agents (Wu's and Zabolotny's teams), b) nature-bound native subjects (Mongols and Buryats), and c) Chinese 'coolies', as a category that belongs neither to nature nor culture, but in some abominable, degenerate state of barbarism. The way this is achieved is the following.

The album opens with a photograph of the Wu Liande riding a troika with Zabolotny 'on the way to Tschintansk (Siberia)' (Figure 5.2). The photograph both brings together and separates the two plague experts. While, on the one hand, it portrays them as united in the quest for the truth of plague, in a seemingly epic journey through the vast steppes of the Chinese-Russian frontier, the way the photograph is composed accentuates a difference between the two men. Zabolotny is seated inside the horse-drawn cart, with his back turned towards the front, looking at the camera with a melancholy expression. By contrast, Wu is seated on the edge of the cart, with his feet hanging on the side, as if he were about to jump onto the grassland; his body is furthermore positioned facing the front of the cart. Zabolotny is hence depicted as old and distinguished but in a rather 'armchair' position with his back turned to the 'future' and all the discoveries it may hold. Wu, by contrast, is youthful, with beret and fashionable round shades to match, ready to set his shiny boots on the ground, explore and discover. This contrastive image between 'authority' and 'path-breaker' is further reinforced by the second

Figure 5.2 'On the way to Teshintansk (Siberia). Zabolotny and Wu July 1911
Courtesy of the University of Hong Kong Libraries

photograph of the album, featuring again the two men, this time standing on the grassland next to a 'tarbagan hole'. Here the sportive-looking Wu seems to be supporting with his arm the striped-suit-clad Zabolotny. The latter is posited further away from the marmot hole, apparently burdened by instruments he is carrying, and supporting himself on his walking stick.

Having thus established a hierarchy of knowledge between the Chinese and the Russians, the album proceeds to provide a number of ethnographic images, consisting in 'a Cossack family', a group of 'Cossacks and Buriats [sic]', the latter on horseback carrying long lasso-bearing sticks known as *uurga*, a Buryat girl on horseback and a 'Mongolian hut' with a smiling person standing at its entrance.

These images should be considered as operators of a wider imaginary of native populations as embedded in the environment they inhabited, possessing a deep knowledge of it and its features. There is little doubt that in the process of shooting these photographs, Wu and his assistants were aiming to capture nothing less than the ethnographic coordinates of plague, and in particular to provide a portrait of the people who were the supposed original savants of the epidemiology of sylvatic plague. What made this all the more important were the perceived special conditions on the steppes. Their perception as harsh, frozen, or generally wintry constituted the steppes as an environment of survival. This harsh environment was imagined not simply as key to the shape of the national or racial 'character'. More importantly, native populations were seen as necessarily more tightly enmeshed with the environment, with native 'culture' being particularly attentive to 'nature', following the dichotomy prevalent at the time. As a culture of survival, this was then a legitimate and important object of study for scientists, as it could be used as an index of underlying natural phenomena or forces, such as plague.

What brings the *plein air* vision of these photographs into focus, and comes as a visual support of the anthropological divide between native and coolie hunters, however, is the final image of the album (Figure 5.3).

This is a blurry and very dark photograph captioned 'An inn (Manchoulie)', which portrays, we may safely assume, the lodging of migrant 'coolie' marmot hunters, accused by Wu of contracting and spreading plague across Manchuria. It is hard to see anything in this image besides rough contours of wooden columns and bunk-beds, as well as an oil lamp hanging in the midst of the room. Yet perhaps it is precisely the obscurity of this photograph rather than its ability to carry or convey any identifiable data that is the intended operator here. For more than the two other images of marmot-hunting coolie inns in Manzhouli attributable to Wu (one published in the first report of the North Manchurian Plague Prevention Service (1913), the other an image in my personal possession, which was, to my knowledge, never published) this image communicates with unparalleled force an experience of darkness, crampedness, and premonition. These traits, I would like to argue, functioned antithetically to the previous fifteen photographs from the open steppes. By placing this image as the concluding photograph of the album, it could be argued that Wu created a 'surprise ending' plot reversal. This image, in its specific location and inter-relation with the proceeding photographs, seems to operate like a visual vortex of epidemiological uncertainty and doubt.

Figure 5.3 'An inn (Manchoulie)'
Courtesy of the University of Hong Kong Libraries

The darkness and blurriness of the photographs must not be here dismissed as technical errors of exposure, but following Douglas Nickel (2017) as operators of photographic indeterminacy. Where open fields and visual clarity reigned in the fifteen images preceding it, darkness, chaos, and a nauseating blurriness dominate this photograph. The viewer of the album is thus drawn back from a hitherto well-established feeling of knowledge and certainty into the unknown; from the open-horizon of the steppes, where the panoptical visual trope of the *Views of Harbin* is replicated in *plein air*, to the obscure and unintelligible interior of the migrant coolie sub-proletariat. From pan-visibility to invisibility.

Whereas initially the photographs of this album appear to have been shot as a means of visualising both the ethnographic context of plague and Chinese scientific superiority in deciphering it, in being arranged so that they lead up to the final image of the coolie inn, they assume a reverse function. Read in light of their 'surprise ending', while they do maintain the previously-mentioned Chinese-Russian hierarchy, they only do so in order for Wu to be able to disclaim the Russian plague-related hypotheses to himself and to colleagues who may have had access to this album. And, in turn, if this photographic sequence does maintain a native-coolie hierarchy it is only insofar as what is problematised is no longer the knowledge and skill involved in marmot hunting but rather the very being of the two groups: on the one hand, an originary, autochthonous being, a being-in-nature, indeed a natural being, of the natives, and on the other hand, a degenerate being, a being outside both nature and culture of the coolies. This anthropological dichotomy

was already present in the native knowledge hypothesis (Lynteris 2013), but here, freed of its marmot-specific particulars, it assumes a truly ontological character. In light of this visual narrative, plague appears no longer to derive from marmots or from observable, visualisable practices or malpractices with regard to them, but instead from ignorance, as in this case embodied by the obscure and impenetrable being-in-the world known as the 'coolie'. The coolie abodes thus stand for far more than the imagined stupidity of a manual-working class – metonymically they become an icon of ignorance about plague which in turn leads to its propagation; an ignorance shared by scientists who are, in this pessimistic image, groping in the dark for some answers about humanity's ancient enemy.

To fully grasp the force and meaning of this visual operation as it unfolded after the end of the epidemic, we need to look at the previously-discussed album alongside the second album resulting from the expedition. Judging from the fact that it replicates the material culture and technique of the first, we can safely assume that this was compiled simultaneously with the first. Composed of seventeen photographs, the album focuses on the second leg of the expedition, where, having left their Russian companions, the Chinese move into Mongolia in order to continue their search of marmot plague evidence. The album opens with an evocative photograph that, as it were, bids farewell to Manzhouli through a dark, landscape vista of the steppes with the border town in the distant background. Then it proceeds by providing what we may call two action-sets of plague field investigation: exploring marmot burrows, and conducting tests on marmots in an impromptu field-lab made out of a wooden cabin and tents pitched in the grassland.

The first set of photographs does not depict the digging out of the famously deep and complex burrow of the tarbagan – what must have been a formidable operation. Indeed it is not clear when and who dug out these burrows, with a note in one of the photographs suggesting this might have been performed previous to the arrival of the expedition. The photographs concentrate on depicting the already excavated burrows with Wu's notes on the mounting paper (exactly the same as the first album) giving details on different aspects of these expansive subterranean nests. This information is mostly of topographic nature, such as their orientation, dimensions, and measurements. Besides two mainly commemorative photographs, which feature Wu inside a burrow surrounded by soldiers, the majority of the 'burrow exploration' images were supposed to have a scientific value as regards the study of the suspected relation between marmots and plague. Though a large part of Wu's hand-written notes on the margin of the photographs are too faded to be make sense of, the ones we can still read make clear that the scope of this series of survey images was related to the question of the persistence or attenuation of plague in the marmot burrows. Especially underlined are areas in the excavated burrows where grass or fecal matter was deposited; material believed to potentially be able to sustain plague bacilli or at least fleas carrying it. We can thus see that the question of the 'interval' discussed at the beginning of the chapter was one of pressing importance for Wu, and a key subject of his investigation in the summer of 1911.[5]

The second set of photographs in this album depicts what Wu coins his 'camp laboratory'. This series begins in a commemorative mode, depicting Wu colonial-style, languishing, in pith helmet and white high-necked jacket, on a deck chair, surrounded by his Chinese guard and two lab-coated assistants, one of whom is seen staring at a glass cage containing a marmot. The open-air ambience of this image is amplified by the positioning of the camera so that it takes a slightly upward shot, creating a mis-en-scène of 'exploration' with the grasslands and hills rolling into the background. Only by magnifying the image can we actually discern that the caption ('camp laboratory in Manchoulie') should be taken at face value, as houses of the border town are faintly visible in the background.

The visual mimicry of colonial expeditions is consummated in another image of Wu, showing him taking 'afternoon tea at the lab' with his colleagues next to marmot-carrying glass cages; the first instance of these gadgets to appear in the album. The Cambridge-educated doctor is wearing his lab-coat and high, shiny leather boots, staring at the camera in a self-assured manner. Following the well-trodden colonial visual regime of 'taming the wild', to which he was certainly exposed both as a native of British Penang, and as a student at Emmanuel College, this framing of Wu as the explorer and conqueror of the steppes is equally evident in the previously mentioned marmot burrow sequence where he can be seen seated on the edge of the excavated nest clad in pith helmet and white costume with his trousers tucked into his ubiquitous leather boots as the grasslands roll in the background. At the same time, where Qing imperial imaginary had been productive of visualisations of the Northeastern steppes as a dynastic homeland, Wu's essentially European colonial gaze sought to re-configure the environment of the Chinese-Russian frontier as a landscape revealed by science. The photograph that best encapsulates this is the one titled 'Taking the Temperature of the Tarbagan'.

Here we see Wu in lab-coat taking notes as another man is taking a Siberian marmot's rectal temperature; one more individual is squatting next to them with a notepad on his lap. The photograph is composed in such way as to put the three researchers in the top right-hand quarter of the frame. What lies at the centre of the composition is a sentinel, standing to-attention, in guard of the temperature-taking operation.[6] This armed figure separates the researchers from the receding, rolling steppes, as a 'camp laboratory' tent dominates the greatest part of the composition. The juxtaposition between these three elements (researchers, sentinel, and tent) create a visual structure where it would be easy to miss what is perhaps the most important component of the photograph, and, I would like to argue, the overall subject of the album as such. This component is no other than the steppe captured between the inter-positioning of the three elements (and the 'lines', composed both by their contours and shadows) discussed previously. Rather than being a blank or a signifying backdrop of the image, the grassland is framed by this linear, almost survey grid-like, inter-position so that it is rendered a visibly controlled milieu, which is ultimately metonymised in the shape of the marmot subjected to examination.

In support of this reading comes the photograph with which I began this chapter: the oft-published image annotated by Wu as 'The Animal House, Note the

Glass Cages'. What is most striking about this image is how it visually captures the steppe. This is not done only through the expeditionary character of the photograph, by the 'extractive' ambience of the cages, or by the presence of two carefully placed pincers – instruments with which marmots were caught and subdued. The feeling of conquest, of almost packing the steppe up and taking it away for examination, is accentuated primarily by the fact that in the case of the standing marmot's cage, a faint reflection of the grassland on the glass makes it seem like the cage was see-through. The result of this *trompe-l'œil* is striking, as through it the marmot appears to be miraculously trapped within a glass cage alongside its natural environment. Marmot and steppe are by this chance effect tied together in a unique way: not simply as an animal and its habitat, but one could say as a natural continuum where plague can be examined, ascertained, and verified. This, in all probability inadvertent effect, should be considered within the history of photography's relation to chance, as recently explored by Robin Kelsey (2015: 32), who stresses that rather than compromising its scientific capacity (for its inventor, Talbot) 'the stray detail thus confirms and augments . . . the evidentiary promise of photography'. So, to return to my opening question, what is the marmot doing in this photograph, and what does it bring into effect in and through it?

A straight-forward reading, taking into consideration the album in which this image is positioned and the overall photographic production surrounding it (the two albums put together and in relation to each other), could conclude that the visual illusion of the marmot being trapped alongside the steppe in Wu's glass cage encapsulates the ability of photography to reduce not simply given hosts of the disease but the entire landscape into an experimental field for scientific examination. Seen in this manner, photography, as applied to the summer 1911 plague expedition, could be said to act so as to sustain the evidentiary promise of plague science itself, in face of Wu's failure to make any significant discovery regarding the tarbagan's relation to the disease in the region. Simply put, the particular way of framing marmots and their nests would then be said to have acted so as to assure that, having put nature under the microscope, as it were, Wu found no trace of plague among the hitherto accused marmots. In this sense, the photograph would be carrying the same function as the final, rat-examination, image of Wu's *Views of Harbin*: we have done all we could to investigate whether plague originated in this animal, and all evidence point to the fact that it did not. However, I would like to argue here, this would be to read this album from the viewpoint of the 1913 counter-thesis by Wu – that is to say with a two-years hindsight, and thus anachronistically.

Rather than closure (marmots being decided as unrelated to plague) what the photographs of the second album bring into effect is another turn in epistemic uncertainty. Both the gutted marmot burrows and the images of the marmot-investigating field-lab foster doubt regarding the relation between humans and marmots. Take the image of the glass-caged marmot: whereas on its own it could function as an image of the scientific knowledge (and control) of nature, when paired with the reflection of the steppe on the glass pane, it generates an altogether different visual effect. Not to capture, fix, or frame marmots or plague as scientifically knowable

and actionable categories, nor, however, to affirm or reproduce human mastery over these animals or on 'nature' as a whole – but, rather, to situate all of the above within an aporetic visual field; a field where marmots' disease status and their role in human plague remain unstable, undecidable, and uncertain.

Conclusion

If in the realm of medical science human mastery over human-animal relations generally proceeds from human knowledge of the latter, the role of marmots in the photographic production accompanying the summer 1911 plague expedition to the Chinese-Russian frontier acts as a case where the visualisation of animals by scientists fosters a vision of epistemological suspension. Visible yet unseen, knowable but unknown, ascertainable and yet elusive, the zoonotic transmission link was not established, reproduced, or stabilised, nor, on the other hand, negated or debunked through photographic practice. Instead it was rendered irresolute, indefinite, and suspect. The vision of plague produced after the end of the epidemic, in the imagined interval before its recrudescence, undid the epistemic closure so carefully crafted in the course of the First International Plague Conference in Mukden a few months earlier without leading yet to another closure, a formulated antithesis of the original thesis. Examining the photographic archive of epidemiological work thus allows us a rare glimpse of the suspended step of epidemiological reasoning in the time after the end of epidemics – a step that, whether methodic or not, is often erased or silenced in written documents but whose study may allow for greater phenomenological clarity on the work of epidemiological judgement.

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Notes

1 Pneumonic plague is one of the three principal clinical forms of plague in humans; it is a condition that may develop from an initial infection of the lymph nodes or directly if contracted in an airborne manner from humans, cats, or other animals.

2 The minutes of the conference would be later published, with some omissions, in Manila under the editorship of Richard Pearson Strong (1912), covering 500 pages of dense reports and discussion; the published report also contained images of marmots.
3 I have elsewhere examined how, in Hong Kong and British India, scientific focus and governmental anxiety over this interval fostered ideas about the invisibility of plague, leading to what we may call plague's crypto-topologies: situated materialities where plague could become attenuated before it was able to strike again (Lynteris 2017; Lynteris in print).
4 The fact that no diaries by Wu survive from the months immediately following the end of the epidemic makes these photographs a unique historical source. As is often the case, this is also a source riddled with problems. We do not know who took the photographs, or how many photographs were taken, with what sort of camera or film. We do not know how the photographs in the albums were selected, who mounted the albums and who used them after they were created or to what purpose. All that remains is the visual objects themselves, including a few notes taken on the paper on which the photographs were mounted, and the reproduction of some of these photos in the publications of the North Manchurian Plague Prevention Service and of Wu Liande.
5 The final three photographs of the album do not depict the expedition but are copies from *Views of Harbin*. The first two are of plague burials. They first depicts 'Coffins scattered in the open fields of Fuchiatien, Harbin, during pneumonic plague epidemic, Jan. 1911'), while the second 'Dr. Graham Aspland (C.M.S. Mission) during service on the occasion of cremation of Roman Catholic converts, Pneumonic Plague Epidemic, March, 1911, HARBIN'. The third and final photo bears no caption and depicts the torching of the first plague hospital in Harbin, which was considered by Wu to be so infected that it had to be destroyed even as the outbreak was raging. We may assume these were added later, as they do not bear the characteristic hand-written caption by Wu.
6 For the broader importance on sentinels in epidemiological thinking, see Keck (2014).

Bibliography

Unpublished sources

Extra Plague Scenes, Principally 1910–11 and 1920–21 and Cholera; Chronological Record of Anti-Plague Work in Manchuria and China 1910–1937 [National Library Board, Singapore B20062870C].

Joint Sino-Russian Plague Research Expedition in Siberia and Mongolia 1912 [Hong Kong University Library Special Collections U 614.4957 J7].

Plague and Medical Sciences, Manchuria and China, 1911, 1921 up to 1936 [National Library Board, Singapore B20062869K].

Views of Chinese plague epidemic expedition in west Manchuria, 1911 / headed by W.L.T; [Hong Kong University Library Special Collections, U 614.49518 W9].

Primary published sources

Beliavsky, M. E. 'O chumê tarbaganov: Zapiska po povodu 7 smertnuikh sluchaev ot upotreblenïya v pishchu surkov, porazhennuikh chumoyu v poselkê Soktuevskom', *Vestnik obshchestvennoĭ gigienui, sudebnoĭ i prakticheskoĭ meditsinui* 23 (2) (1895), 1–6.

Reshetnikov, A. 'O chumê tarbaganov, perenesennoĭ na lyudeĭ', *Vestnik obshchestvennoĭ gigienui, sudebnoĭ i prakticheskoĭ meditsinui*' 23 (2) (1895), 6–9.

Strong, Richard P., ed. *Report of the International Plague Conference (held at Mukden in April 1911* (Manila: Bureau of Printing, 1912).

Wu, Lien-Teh *Views of Harbin, Fuchiatien, taken during the plague epidemic*, December 1910–March 1911 (Shanghai: n. p., 1911).

Wu, Lien-The, and The Hulun Taotai, 'First report of the north manchurian plague prevention service', *The Journal of Hygiene* 13 (3) (October 1913), 237–290.

Yersin, Alexandre 'La peste bubonique à Hong Kong', *Annales de l' Institut Pasteur* 8 (1894), 662–667.

Secondary published sources

Briggs, Charles L., and C. Mantini-Briggs *Tell Me Why My Children Died: Rabies, Indigenous Knowledge, and Communicative Justice* (Durham, NC: Duke University Press, 2016).

Gamsa, Mark 'The epidemic of pneumonic plague in Manchuria 1910–1911', *Past and Present* 90 (2006), 147–184.

Golikov, Yu P., and N. S. Sapronov *Popechitel' Imperatorskogo Instituta Eksperimentalnoĭ Meditsinui prints Aleksandr Petrovich Oldenburgsky* (St Petersburg: Rostok, 2010).

Keck, Frédéric 'From purgatory to sentinel: "forms/events" in the field of zoonoses', *The Cambridge Journal of Anthropology* 32 (1) (2014), 47–61.

Kelsey, Robert *Photography and the Art of Chance* (Cambridge, MA: The Belknap Press of Harvard University Press, 2015).

Lei, S. H. L. 'Sovereignty and the microscope: Constituting notifiable infectious disease and containing the Manchurian plague (1910–11)', In A. K. C. Leung, and C. Furth (eds.), *Health and Hygiene in Chinese East Asia: Policies and Publics in the Long Twentieth Century*, pp. 73–106 (Durham, NC: Duke University Press, 2011).

Lynteris, Christos 'Skilled natives, inept coolies. Marmot hunting and the great Manchurian pneumonic plague (1910–1911)', *History and Anthropology* 24 (3) (2013), 303–321.

Lynteris, Christos 'Introduction: The time of epidemics', *Cambridge Anthropology* 32 (1) (2014a), 24–31.

Lynteris, Christos 'Epidemics as events and as crises: Comparing two plague outbreaks in Manchuria (1910–11 and 1920–21)', *Cambridge Anthropology* 32 (1) (2014b), 62–76.

Lynteris, Christos *Ethnographic Plague: Configuring Disease on the Chinese-Russian Frontier* (London: Palgrave Macmillan, 2016a).

Lynteris, Christos 'The Prophetic faculty of epidemic photography: Chinese wet markets and the imagination of the next pandemic', *Visual Anthropology* 29 (2) Special Issue: Medicine, Photography and Anthropology (2016b), 118–132.

Lynteris, Christos 'A suitable soil: Plague's breeding grounds at the dawn of the third pandemic', *Medical History* 61 (3) (June 2017), 343–357.

Lynteris, Christos 'Pestis minor: The history of a contested plague pathology', *Bulletin of the History of Medicine* (in print).

Lynteris, Christos, and Ruth J. Prince 'Anthropology and medical photography: Ethnographic, critical and comparative perspectives', *Visual Anthropology* 29 (2) Special Issue: Medicine, Photography and Anthropology (2016), 101–117.

Mondragón, Carlos 'Concealment, revelation and cosmological dualism. Visibility, materiality and the spiritscape of the Torres Islands, Vanuatu', *Cahiers d'anthropologie sociale* 11 Montrer/Occulter. Visibilité et contextes rituels (2015), 38–50.

Nathan, Carl F. *Plague Prevention and Politics in Manchuria 1910–1931* (Cambridge, MA: Harvard East Asian Monographs, 1967).

Nickel, Douglas R. 'Three or four kinds of indeterminacy in the photograph', In Sabine T. Kriebel, and Andrés Mario Zervigón (eds.), *Photography and Doubt*, pp. 10–25 (London and New York: Routledge, 2017).

Rosenberg, Charles 'What is an epidemic? AIDS in historical perspective', *Daedalus* 118 (2) Living with AIDS (Spring 1989), 1–17.

Summers, William C. *The Great Manchurian Plague 1910–1911* (New Haven, CT: Yale University Press, 2012).

Vargha, Dora 'After the end of disease: Rethinking the epidemic narrative', *Somatosphere* (May 17, 2016). http://somatosphere.net/2016/05/after-the-end-of-disease-rethinking-the-epidemic-narrative.html

Wald, Priscilla *Contagious: Cultures, Carriers, and the Outbreak Narrative* (Durham, NC: Duke University Press, 2008).