CHAPTER 9

Clandestine Agents in Meadows: Ticks, Cattle and Redwater Fever in Finland, 1860s–1930s

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1 Introduction

A notable outbreak of Redwater fever was registered in central Finland in the summer of 1869. According to a newspaper published by the financial section of the Senate of the Grand Duchy, not only had cattle fallen ill in a number of villages in Kuopio province, but the disease had also killed well-kept cattle.[1] Consequently, discussion of the disease, as well as its spread and the potential ways to combat it, was inserted into the agenda of a provincial agricultural meeting and the governor gave orders to the provincial veterinarian to examine the situation.[2] From the perspective of posterity, it is uncontroversial that the sheep tick (*Ixodes ricinus*) triggers Redwater fever by transmitting Babesia protozoans, which destroy red blood cells in the body of a bovine.[3] At the time, however, the potential causes of the disease were unknown and was a major cause of perplexity among the peasantry, as well as estate owners, the authorities and scientists. Many potential causes were considered and a plethora of potential remedies were administered, but at no point were ticks suspected of transmitting the disease.

In this chapter I examine the relations between ticks, bovines and humans through the prism of Redwater fever. I explore an early stage of tick – human relations when the ticks gradually became seen a dangerous threat, not yet to human health, but to animal health and consequently human wealth. This process, which I explore from the 1860s to the 1930s, is not solely a question of

1 "Kuopiosta," *Suomalainen Wirallinen Lehti*, July 29, 1869.

2 Johtokunta, "Kuopion läänin maanwiljelysseuran kokous ja näyttelö w. 1869," *Tapio*, August 21, 1869; "Mainittavia tapauksia kuwernööreiltä tulleiden ilmoitusten mukaan," *Suomalainen Wirallinen Lehti*, September 9, 1869.

3 On the current definition of bovine Rewater fever, see Finnish Food Authority, "Punatauti," accessed November 29, 2023, https://www.ruokavirasto.fi/elaimet/elainten-terveys-ja-elaintaudit/elaintaudit/naudat/punatauti/; World Organization for Animal Health, "Bovine Babesiosis," Accessed November 29, 2023, https://www.woah.org/fileadmin/Home/eng/Animal_Health_in_the_World/docs/pdf/Disease_cards/BOVINE_BABESIOSIS.pdf.

human perception and understanding vis-à-vis what ticks were supposed to be like. Instead, it is closely connected to practices and daily actions in a shared and lived multispecies environment.

I focus on Redwater fever in order to grasp the interactions of ticks, cattle and humans, while also some other actors or suspected actors, such as redstarts and alders. Tick-borne cattle disease, which received its name from the reddish discoloring of urine that is a symptom of the illness, was an annual and widespread threat in Finland. It could kill the sole cow of a poor peasant family as well as a great number of pedigree cattle belonging to the affluent owner of a manor house. The spread of the disease in the Finnish context coincided with the gradual growth of animal husbandry, especially of dairy farming.[4]Redwater fever was a known disease in Europe from the mid-nineteenth century and it had a wide geographical distribution from France to Romania and from Southern Europe to the Nordic countries. Similar tick-borne diseases were also a menace in other continents.[5] Especially notorious – in terms of its economic consequences – was the so-called Texas fever as it took hold in the context of the massively industrialized North American meat industry, which required transportation of millions of bovine over long distances.[6] The era was characterized by scientific breakthroughs in discovering micro-organisms.[7] Research on the causes of bovine haemoglobinuria, for example, proved to be an important step in the novel field of veterinary epidemiology.[8] Numerous scientists in the United States and Europe were employed in this field and they advanced diverse results and hypothesis. The existence of Babesia protozoans and the role of ticks as vectors was gradually established by scientists in the 1880s and 1890s.[9] This, however, did not signify an immediate change in everyday practices and conceptions, as we will see in this chapter.

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4 On Finnish agriculture and the intensification of animal husbandry, see, for example, Teppo Vihola, *Leipäviljasta lypsykarjaan. Maatalouden tuotantosuunnan muutos Suomessa 1870-luvulta ensimmäisen maailmansodan vuosiin* (Helsinki: SHS, 1991).

5 Michael Köhler and Werner Köhler, "Zentralblatt für Bakteriologie – 100 years ago. Victor Babeş and enzootic haemoglobinuria of cattle," *International Journal of Medical Microbiology* 293, no. 4 (2003): 233.

6 Joshua Specht, *The Red Meat Republic: A Hoof-to-Table History of How Beef Changed America* (Princeton University Press, 2019), for example, 166; Cecil Kirk Hutson, "Texas Fever in Kansas, 1866–1930," *Agricultural History* 68, no. 1 (1994); Norman F. Cheville, *Pioneer Science and the Great Plagues: How Microbes, War, and Public Health Shaped Animal Health* (West Lafayette, IN: Purdue University Press, 2021), 47, 80–81.

7 Bruno Latour, *The Pasteurization of France* (Cambridge, MA: Harvard University Press, 1988).

8 Cheville, *Pioneer Science*, 47.

9 Köhler and Köhler, "Zentralblatt für Bakteriologie".

The essential theoretical premise of this research has been an overarching comprehension of the inevitability of continuous human – non-human interaction and consequent relativity of all agency, whether human or more-than-human.[10] Small ticks and even smaller Babesia have had a major influence on cattle and humans and have directly and indirectly impacted a number of other species that shared the same environment. They have forcefully shaped, for example, human – cattle practices. It is also important to bear in mind that this occurred over the course of many decades when their agency was unknown to humans.[11] This research is inspired by the Latourian actor-network theory, which highlights more-than-human agency and the interdependency of all actors in a network.[12] However, I emphasize that it is only an inspirational starting point. I will not carry out a Latourian analysis of how a network is constituted. Indeed, I find Latour's equation of animate and inanimate actors to be very problematic. Here, my emphasis is on animate actors. Methodologically, this study represents a contextualizing and qualitative form of historical research, with an emphasis on the history of the everyday life of multispecies. I refer to current bioscientific research in regard to the physiology of ticks.

In this study I mainly examine three types of historical source: newspapers, other print media and oral history sources. The outbreaks of Redwater fever were newsworthy and the rapidly expanding press sector in Finland hurried to inform the public of the emergence of the disease. Newspapers also reprinted reports produced by agricultural associations and other organizations, as well as the communiques and recommendations of the authorities. Furthermore, they enhanced public discussion on animal husbandry and cattle diseases by publishing the contributions of those who wanted to share their views and expertise, whether this was professional or based on practical experience. Other print media examined in this chapter consists of the annual reviews of the National Board of Health, as well as booklets published by veterinarians to

10 Donna Haraway, *When Species Meet* (Minneapolis: University of Minnesota Press, 2008); Susan Nance, "Introduction," in *The Historical Animal,* ed. Susan Nance (Syracuse, NY: Syracuse University Press, 2015); Vinciane Despret, "From Secret Agents to Interagency," *History and Theory* 52 (2013); Chris Pearson, "Dogs, History, and Agency," *History and Theory* 52, no. 4 (2013); Tuomas Räsänen and Taina Syrjämaa, eds., *Shared Lives of Humans and Animals. Animal Agency in the Global North* (London: Routledge, 2017).

11 On multispecies practices, see, Nora Schuurman and Taina Syrjämaa, "Shared Spaces, Practices and Mobilities: Pet–Human Life in Modern Finnish Homes," *Home Cultures* 18, no. 2 (2021), doi:10.1080/17406315.2021.1963611.

12 Bruno Latour, *Reassembling the Social: An Introduction to Actor-Network-Theory* (Oxford: Oxford University Press, 2005).

advise farmers and popular science publications designed to present fauna to the general public.

Oral history collections also form an important source as they contain descriptions of unwritten daily practices and beliefs. The Finnish Literature Society Archive hosts a remarkable collection in which material on folk healing includes numerous references to cattle, grazing, herding and explicitly to Redwater fever. The oral history material used in this research was collected between the 1880s and the 1950s. It reveals quite a diversity in the conception of nature and non-human animals as well as practices to treat and mitigate cases of Redwater fever.

In this chapter, I first trace the presence of ticks – unknown agents – and their interactions with humans and other animals. Written and oral descriptions of outbreaks of Redwater fever indicate and reveal practices and spaces – to use Donna Haraway's concept of contact zones – of multispecies co-living. They also show human attempts to defend the cattle by methods that range from modern medicine and technologies to traditional folk healing and magic. I then explore the search for the cause of the disease in the context of daily life and subsequently among scientists, which eventually initiated the process of uncovering the agency of ticks. This chapter shows the complexity and hybridity of the long road in human understanding of ticks, whereby they were initially viewed as a mere nuisance to humans and their livestock to the more recent comprehension of the arachnids as a menace to a modernizing society.

2 Impact of Tick Bites

Ticks have probably lived for centuries in the territory that today is Finland. However, their exact distribution was not mapped before the 1950s.[13] Sheep ticks can attach to almost any warm-blooded vertebrate and usually attach to hosts of different species in their three different life stages. In each stage they need blood. Ticks quest for potential hosts among plants. In the second and third stages nymphs and adults ascend higher in thick undergrowth where they react to odor, exhaled carbon dioxide and movement. Adult ticks prefer larger hosts and when on them they are able to crawl around looking for a

13 Niko Kulha et al., "Does Environmental Adaptation or Dispersal History Explain the Geographical Distribution of Ixodes Ricinus and Ixodes Persulcatus Ticks in Finland?," *Ecology and Evolution* 12, no. 12 (2022), doi:10.1002/ece3.9538.

thinner spot of skin on which to attach.[14] With the increase of animal husbandry during the latter part of the nineteenth century, a growing number of cattle – as well as their human herders – walked in Finnish meadows, an environment shared with ticks, from spring to autumn thereby multiplying their mutual encounters.

Animal husbandry at this time was intensifying internationally and was being transformed into a large-scale business. In Finland, animal production was very limited in comparison to many other countries, but it was seen as a promising way to break out of the prevailing poverty. It was thought that animal husbandry offered a more stable livelihood than traditional agriculture, which was heavily reliant on grain production and was notoriously risky as ground frost often destroyed crops and led to famine. In fact, when the abovementioned outbreak of Redwater fever occurred in Kuopio province in the summer of 1869, Finland was just coming out of a disastrous famine that had killed approximately eight per cent of the human population over the course of three years.[15] Yet, animal husbandry alone was not expected to offer nourishment to the population. It was also hoped that Finland would be able to join the growing international animal business markets and that it would export animal-based products.[16] Indeed, dairy products did become an important sector of the Finnish economy.[17]

Until the 1870s, Finnish animal husbandry was, however, still in its infancy. Finland was pre-eminently a country of smallholders, who concentrated on growing of grain for home consumption and whose sparse resources limited the opportunity to invest in the modernization of agriculture. It was quite common, for example, that the scarce farm animals were not properly fed. It was not customary in Finland to cultivate foraging. Animals were given leaves and branches that had been gathered in woods and as soon as the weather

14 Jani Sormunen, *Questing Ticks, Hidden Causes: Tracking Changes in Ixodes Ricinus Populations and Associated Pathogens in Southwestern Finland* (Turku: University of Turku, 2018), 7–9.

15 Antti Häkkinen and Henrik Forsberg, "Finland's Famine Years of the 1860s: A Nineteenth-Century Perspective," in *Famines in European Economic History: The Last Great European Famines Reconsidered*, ed. Declan Curran et al. (London: Routledge, 2015), 99, 108–109.

16 Taina Syrjämaa, "Eläimet, eläinperäiset tuotteet ja edistysusko," *Tunteva tuote. Kuinka eläimistä tuli osa teollista tuotantoa?*, ed. Taija Kaarlenkaski and Otto Latva (Tampere: Vastapaino, 2022); Taina Syrjämaa, "Multispecies Mobilities and Human Belief in Progress," in *Animal Industries. Nordic Perspectives on the Exploitation of Animals since 1860*, ed. Taina Syrjämaa et al. (Berlin: De Gruyter 2024).

17 Matti Peltonen, "Uudet kaupallistumisen muodot," in *Suomen maatalouden historia II*, ed. Matti Peltonen (Helsinki: SKS, 2004).

FIGURE 10.1 A smoky fire expelling flying insects when cows are milked in the evening, Northern Savonia, 1917. Unknown photographer.
SOURCE: PRESS PHOTO ARCHIVE JOKA/FINNISH HERITAGE AGENCY. HTTPS://FINNA.FI/RECORD/MUSEOVIRASTO.71620E24-D405-4582-A9F9-D1E9DD427A7B%20, CC BY 4.0

permitted it in the spring, the pinched cattle were taken out to eat whatever they could find by themselves in meadows and woodland.[18] Ticks were waiting for them in these places and could also relocate to new locations should the cattle move.

18 Ann-Catrin Östman, "Mekanisoinnin ensimmäinen aalto," in *Suomen maatalouden historia II*, ed. Matti Peltonen (Helsinki: SKS, 2004); Teppo Vihola, "Pärjääkö pienviljelys?," in *Suomen maatalouden historia II*, ed. Matti Peltonen (Helsinki: SKS, 2004), 164.

Human and non-human animals usually react to skin injuries and irritations, but the saliva of ticks suppresses such reactions. As tick bites do not cause immediate pain or itchiness, the arachnids can continue to feed for days without being interrupted by their hosts.[19] In this respect, many other small creatures in meadows, such as horseflies and other midges could be perceived as worse pests.[20] Horseflies were especially persistent in their manner of assault and their bites hurt immediately. Indeed, it was customary to light a smoky fire in the evening when cows were milked, which was meant to keep flying insects away from both cows and their milkers.[21]

Tick bites can also become inflamed over time and when large numbers became attached to the muzzles, udders and genitals of grazing cattle, they became an irritant. Definitely, humans at this time also experienced unpleasantness from tick bites. Yet, not much attention was paid to ticks as they were not considered to be particularly harmful. However, ticks that carried the invisible Babesia protozoans caused for much more severe illness for cattle than mere local inflammations.

Bovines who fell ill because of ticks and Babesia protozoans became tired and they lost their appetite. Walking to the meadow in the morning could become difficult and they fell behind other members of the herd. At this point, a sharp-eyed herder could suspect that a cow was suffering from Redwater fever and let it rest. After the first symptoms became noticeable, the health of a diseased cow could rapidly decline over the course of a few days: urine – and milk if any was still being produced – would turn red and the animal would suffer from fever, diarrhea and later constipation. Descriptions of the main external symptoms are highly consistent whether described by persons with practical experience or by those with veterinary education throughout the time period under investigation in this study.[22]

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19 Ladislav Šimo et al., "The Essential Role of Tick Salivary Glands and Saliva in Tick Feeding and Pathogen Transmission," *Frontiers in Cellular and Infection Microbiology* 7 (2017): article 281, doi:10.3389/fcimb.2017.00281.

20 "Asikkalasta," *Suomalainen Wirallinen Lehti*, July 6, 1872.

21 Antti Vallius, *Kaunis Suomi. Maaseutumaisemakuvaston historiaa 1800-luvulta EU-Suomeen* (Helsinki: Tammi, 2015), 144–154. See also, for example, Porajärvi. Helmi Helminen 1496. 1943 – Ivan Hermonen, aged 75. FLSA (Finnish Literature Society Archive), 76. Folk religion II, cattle raising 11, cattle diseases, bovine diseases (FR, CA, CD).

22 J.A. Wegelius (Häm), "Helppo keino punatautia ja werenkusemista wastaan elukoissa," *Suomalainen Wirallinen Lehti*, August 16, 1867; "Karjarutosta," *Suomalainen Wirallinen Lehti*, May 20, 1873; O.B., "Raawaskarjan punataudista," *Tampereen Sanomat*, February, 7, 1884; Oskar von Hellens, *Verenheitosta* (*punataudista*) *raavaseläimissä* (Helsinki: Lääkintöhallitus, 1906), 7–8; Kaarlo A. Zinck, *Nautakarjan tarttuva punatauti. Toimenpiteet sen levenemisen ehkäisemiseen* (Kuopio: Itä-Suomen karjanjalostusyhdistys, 1929), 6–7.

It was difficult for humans, including veterinarians, to evaluate whether a bovine would recover or whether the illness would be fatal. The interests of cattle owners could lead to a desperate attempt to slaughter an animal in order to also avoid losing the meat and hide of the livestock.[23] Farmers were officially obligated to inform the authorities when any epidemic was suspected and had to bury the corpses of diseased animals. Failure to comply with these regulations could result in a fine.[24] Redwater fever was not among the most catastrophic diseases that affected livestock, such as cattle plague or rabies.[25] Nonetheless, Redwater fever had a major negative impact at a regional level, not to mention on individual farms and families, as it could break out every summer. It is also important to note that it was quite difficult for farmers to be sure of any diagnosis and to exclude other diseases. Moreover, it was not clear how contagious Redwater fever actually was as long as the mechanism of the infection was not known. However, in general, it was noted that bovines did not directly infect each other.

The distribution of ticks and Babesia seems to have expanded during the last decades of the nineteenth century. Whilst there were annual differences in the intensity of Redwater fever outbreaks, there were numerous localities that regularly suffered from the disease. Heinävesi, in the Finnish lake district, for example, became notorious for its outbreaks. By the mid-1880s the disease had already been prevalent in the region for approximately thirty years.[26] Every now and then new outbreaks were reported in villages where the disease had previously not been experienced, thereby providing evidence of the gradual spread of Redwater fever.[27] In the early twentieth century, cases of the disease were reported almost each year in all Finland's provinces. The highest concentration of Redwater fever continued to be in Kuopio province and in other

23 "Karjan-rutto," *Karjalatar*, July 27, 1877; "Lyhykäisiä kirjoituksia maataloudessa, toimittanut Uudenmaan ja Hämeenläänien maanwiljelysseura," *Hämäläinen*, June 11, 1881.

24 Keisarillisen Majesteetin Armollinen Julistus, koskewa mitä tarttuvain eläintautien estämiseksi ja häätämiseksi pitää waariin otettaman. Annettu Helsingissä, 6 p:nä kesäkuuta 1864. *Suomen Suuriruhtinanmaan Asetus-Kokous* (Helsinki: Keisarillisen Senaatin kirjapaino, No. 18, 1864), 1–7. Redwater fever is not mentioned but the statute has a generic comment that includes also other than named diseases.

25 On cattle diseases, see, Anneli Mäkelä-Alitalo, "Karjataudit ja eläinlääkintä," in *Suomen maatalouden historia 1*, ed. Viljo Rasila, Eino Jutikkala and Anneli Mäkelä-Alitalo (Helsinki: SKS, 2003).

26 "Punatauti," *Savonlinna*, June 17, 1886.

27 "Punatauti raivoaa Oriwedellä," *Hämeen Sanomat*, July 13, 1895.

FIGURE 10.2 Grazing cattle on a lake shore in Viitasaari, central Finland, 1900–1915
SOURCE: UNKNOWN PHOTOGRAPHER, THE MUSEUM OF CENTRAL FINLAND, HTTPS://FINNA.FI/RECORD/KSM.158386785528900, CC BY-ND 4.0

areas in central Finland and Karelia with hundreds of cases. Only a few cases were recorded in the most northerly province.[28]

This is logical as more favorable conditions for ticks in Finland were to be found near the water systems in southern and central Finland. The climate in the north was less propitious for ticks. Yet, the greater prevalence of the disease in central Finland than in coastal areas of western Finland, for example, may be partly explained by differences in agricultural practices.

The need for a veterinarian was often cited during outbreaks, but in most cases no-one was available. The number of veterinarians in Finland was extremely small: in 1882 there were only thirteen in the entire country and there were still only thirty-five in 1892.[29] Another obstacle faced by farmers was that the administrative procedure to commission a veterinarian was slow.

28 See, for example, *Bidrag till Finlands officiella statistik XI. Medicinalverket, Medicinalstyrelsens berättelse för år 1900* (Helsingfors, 1901), 146. [1901: 154; 1905: 270; 1908: 458; 1909: 458; 1910: 482].

29 Katri Helminen, *Eläinlääkärinä kolmella vuosisadalla. Suomen eläinlääkäriliitto 1892–2017* (Helsinki: Fennovet, 2017), 7, 84.

Only after a regional governor provided authorization could a provincial veterinarian set off on what was likely a cumbersome journey to the disease hot spot.[30] Thus, many bovine patients either succumbed to Redwater fever or had recovered by the time a veterinarian finally arrived.

The treatment offered by veterinarians could not save all of the bovine patients that had been bitten by ticks. Veterinarians could assist in handling symptoms and in sustaining some bodily functions, but they did not have a patent solution regarding how to save diseased animals. It is therefore hardly surprising that peasants were often disappointed in the treatment offered by veterinarians and their medicaments. Furthermore, some highlighted significant social differences, including linguistic problems: Finnish-speaking peasants could not understand the instructions given to them by Swedish-speaking veterinarians.[31]

Various remedies were used to try and cure diseased animals in the 1870s, many of which must have been quite an ordeal for the patient. Here diverse human conceptions of how to react to illnesses – and to challenges posed by nature in general – collided, but also co-existed: from the scientific approach of veterinarians to the pragmatic experiments carried out by cattle owners and even to traditional magical practices.[32] In subsequent decades many medicinal formulas were utilized, often consisting of vinegar, linseed oil, certain kinds of lichen and a watery sort of gruel. Sometimes plants and herbs, such as marsh tea and juniper berries, were used. Some formulas also contained red ochre, spirits, various acids and salts. These remedies constituted a balance between what was considered as being potentially useful and what was at hand.[33] The resulting mixture was forced down the throat of a sick cow, who hopefully swallowed it rather than it getting caught in the trachea.

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30 "Kovin hankalaa," *Uusi Suometar*, August 9, 1889; "Punatauti lehmissä," *Keski-Suomi*, July 7, 1896. This much-criticized system prevailed until 1937. Helminen, *Eläinlääkärinä kolmella vuosisadalla*, 54.

31 "Mikkelin läänin maanwiljelyskokous Heinäwedellä 2 ja 3 päiwä Syyskuuta 1886," *Wiipurin Sanomat*, September 25, 1886; A.L., "Hätähuuto Heinävedeltä!," *Uusi Suometar*, July 11, 1888.

32 Cf. co-existence of human medicine and folk healing: Ulla Piela, "'Konsti elää kauwwan.' Parantaminen Suomessa varhaismodernilta ajalta nykypäivään," in *Kiistellyt tiet terveyteen. Parantamisen monimuotoisuus globaalihistoriassa*, ed. Markku Hokkanen and Kalle Kananoja (Helsinki: SKS, 2017).

33 J.A. Wegelius (Häm), "Helppo keino punatautia ja werenkusemista wastaan elukoissa," *Suomalainen Wirallinen Lehti*, August 16, 1867; "Asikkalasta," *Suomalainen Wirallinen Lehti*, July 7, 1872; "Kuopiosta 20 p. heinäk.," *Suomalainen Wirallinen Lehti*, July 26, 1873. See, for example, J.W. Kotikoski, Korpilahti (1908) and J.E. Tuomala, Porvoo parish (1890) FLSA, FH, RF (Folk healing, Redwater fever in animals).

Newspapers rarely hinted that magical techniques were employed and when they did so the tone was instructive. Such remedies were presented as old-fashioned superstitions.[34] Yet, the brief mention of such treatments reveals the existence of locally-known and respected individuals who were invited to treat diseased animals by means of folk healing. What was deemed to be an obsolete set of beliefs and practices in newspaper articles appear in a totally different light when one examines oral history sources. These sources reveal a lively variety of folk practices, rituals and spells. An oft-repeated cure was to force a diseased cow to swallow a living frog, frog spawn, a dor beetle or a tarred roach.[35] Other complicated and detailed rituals were also performed. In 1889, for example, a man in his sixties in south-eastern Finland related that a nog, made of rowan, should be driven into the ground at the spot where a cow is seen to urinate for the first time after she has fallen ill.[36] This must refer to red urine as an evident symptom of disease. This interviewee, as well as many others, describes various magic rituals and gives the impression that such practices were common and that they themselves had first-hand experience of using or witnessing their use. However, people did not only try to heal animals, but there were also attempts to ward off sickness altogether. This required a more precise diagnosis in terms of suspected culprits.

3 In Search of Culprits

In September 1890 – twenty-one years after the agricultural meeting in Kuopio province mentioned at the beginning of this chapter – the same issues continued to puzzle the attendees at a similar gathering: what caused Redwater fever and how could it be stopped? Participants at the meeting informed others of their personal experiences. For example, Adolf von Wright, a state dairyman, explained how he had previously suffered losses due to Redwater fever every summer, but when he kept his cattle inside a corral on an open upland area none of his herd fell ill.[37] Von Wright's method pointed to the most widely accepted explanation for the cause of Redwater fever: damp meadows.

34 "Taikausko ja taikatemput," *Savo* June 27, 1883; "Punatauti," *Aamulehti,* July 8, 1890.

35 J.E. Tuomala, Porvoo parish (1890); The farmer Teuteri Laitinen, aged 63, Rauhajärvi 1932–1933. FLSA, FR, CA, CD.

36 Kymi. Vihtori, Alava. IV. A. 39. 1889 – Otto Matinpoika, aged 59, native of Sysmä, FLSA, FH, RWF.

37 "Kuopion läänin Maanwiljelyskokous Suonenjoella," *Savo*, September 9, 1890.

Over the decades, countless references were made to wet pastures by cattle owners, veterinarians and by peasant interviewees. Such meadows were described as consisting of thick bushes and fast-growing trees, such as alders, willows and aspens.[38] The theories regarding the dangers of meadows coincide perfectly with the favorite habitat of ticks. Hard ticks, including the sheep tick, require a relatively high degree of humidity and suffer from desiccation if there is not enough water vapor in the air. They do not prosper in strong sunlight and in windy locales. Furthermore, ticks need moss or dead leaves on the ground to develop when they are not feeding and over the course of winter. They also need grass or other suitable plants to climb when questing potential hosts.[39]

While contemporaries agreed on the dangerous nature of moist meadows, it was rarely possible to avoid them. Cattle owners rarely possessed better quality pastures. Drainage was another oft-suggested solution. This was a technique also applied to low-lying fields that were prone to high levels of frost. Such initiatives, however, required notable labor resources. It continued to be unavoidable for many farmers to take their cattle to the same meadows in the spring despite the known risk of Redwater fever.[40]

Ticks were not suspected of being carriers of Redwater fever for a long time. Other species that lived in the same environment bore the brunt of blame for outbreaks of the epidemic. It was recognized early on that the outbreaks of the disease occurred between spring and autumn and the first cases could be expected soon after the cattle had started to graze in meadows.[41] Indeed, contemporary biologists have ascertained that sheep ticks require a temperature of +7c to be active.[42]

In the nineteenth century, blame was understandably cast upon animals, plants and conditions that were connected with meadows and grazing. On occasions it was suspected that hungry bovines had eaten unsuitable plants and weeds that thrived in humid areas, or that they had drunk unsanitary water.[43] Miasmas were also cited following the widely believed idea that

38 "Punatauti," *Keski-Suomi*, July 23, 1891; "Maanwiljelys- ja talousosasto," *Keski-Suomi*, July 6, 1901.

39 Sormunen, *Questing Ticks*, 8–10.

40 See, for example, "Punatauti karjassa wedessä kulkemisen seurauksena," *Uusi Suometar*, March 1, 1890.

41 O.B., "Raawaskarjan punataudista," *Tampereen Sanomat*, February 7, 1884.

42 Sormunen, *Questing Ticks*, 7.

43 For example, "Lyhykäisiä kirjoituksia maataloudessa, toimittanut Uudenmaan ja Hämeenläänien maanwiljelysseura," *Hämäläinen*, June 11, 1881; "Muutama sana pernataudista," *Hämäläinen*, August 6, 1881.

gases emanating from putrid soil were harmful.[44] Cowherds who worked in the meadows on a daily basis had their own suspects. Redstarts, for example, were mentioned in numerous oral history recollections. It was believed that if a redstart flew beneath the belly of a cow, the latter would be contaminated. Redstarts were consequently killed and their nests were destroyed.[45]

The reason why these birds were blamed seems to depend on a logic of equivalence in folk healing.[46] As Redwater fever turned urine and milk red, anything red was seen to be connected with the disease; either as a cause or as potentially being capable of preventing contamination. Hence, cloths stained with women's menstrual blood were also utilized. The longevity and dynamicity of such beliefs can be seen in the curious hybrid practice of giving red lemonade, instead of red ochre, to cows.[47] While many traditional practices continued to exist – for example, making a cow swallow a living frog was still attested in the 1930s – it can be noted that these traditions gradually became less widely employed. Younger interviewees of ethnographical surveys seem to refer to magical practices as rarities or as traditions that had already ended and of which they only had indirect knowledge. A woman born in the late 1890s and interviewed in 1936, for example, explained that bovines who had died of Redwater fever in the center of Heinävesi had their heads taken to a nearby sacred spring. Apparently, she had not witnessed it herself, but as a proof she described how a pole thrusted in the spring clattered into the skulls of the dead cattle.[48] Such a story connects with age-old beliefs in sacred places in nature that had their roots in pre-Christian culture. This story hints that such a practice may have existed in the late nineteenth century in Finland but had become obsolete in the early twentieth century.

4 The Slowly Exposed Agency of Ticks

In the late nineteenth century scientific theories relating to the cause of Redwater fever and Texas fever were thoroughly transformed. This was an era that witnessed remarkable changes in how the natural environment was perceived.

44 O.B., "Raawaskarjan punataudista," *Tampereen Sanomat*, February 7, 1884; Peter Thorsheim, *Inventing Pollution: Coal, Smoke, and Culture in Britain Since 1800* (Athens, OH: Ohio University Press, 2017).

45 See, for example, Sortavala, Otsoinen. Matti Moilanen 3187. 1937. Jaakko Patja, aged 74, FLSA, FR, CA, CD.

46 Cf. humans suffering from jaundice ate yellowhammers to recover. Piella, "'Konsti elää kauwwan'," 120.

47 Koivisto, Lauri Laiho 1935, FLSA, FH, RWF.

48 Heinävesi, L. Karhu 128. 1936. – Ida Koponen, aged 39, FLSA, FR, CA, CD.

Louis Pasteur's discovery of a new actor – the microbe – is the most notable example. It was soon turned into a heroic narrative of a supposedly lonely scientific genius, which was not the case, as Bruno Latour has shown. Nonetheless, the revelation of the existence of microbes not only dramatically transformed human conceptions of more-than-human networks, but also offered new means to treat diseases.[49] The quest for the cause of Redwater fever formed part of the booming field of research into micro-organisms. This was not a straightforward process. It included several changing hypotheses, for example, as well as practical experiments in laboratories and in pastures in different continents. It also involved academic publications and a good amount of scientific rivalry in the late 1880s and the 1890s. American researchers, of whom Theobald Smith is the most widely known, tried to uncover the cause of Texas fever, which was fatal to northern cattle herds grazing in pastures traversed by southern cattle. Concurrently, the Romanian researcher Victor Babeş sought out the cause of endemic Redwater fever that menaced the lowlands near the Danube. His efforts led to the discovery of the microscopic parasites that caused haemoglobinuria in cattle. These parasites came to be named after Babeş, although his initial identification of them as bacteria in 1888 proved to be an error and they soon became classified as protozoans.[50]

The need for scientific knowledge in Finland was increasingly emphasized. In September 1890, for example, the participants of the Kuopio provincial agricultural meeting proved to have their fingers on the pulse as they decided to ask the Senate to hasten Finnish research into Redwater fever.[51] During the summers of 1893 and 1894 two young researchers – Oscar von Hellens (1867–1948) and Ali Krogius (1864–1939) – studied the disease and focused on the Kuopio province and Heinävesi. Von Hellens also visited Parainen on the southwestern coast and Impilahti and Salmi in Karelia.[52] At the time, von Hellens was a recent graduate in veterinarian science and was employed at the National Board of Health, where he was able to continue his studies in medicine, while Krogius had already completed his doctorate in medicine and surgery.[53] Their

49 Latour, *The Pasteurization of France*.

50 Köhler and Köhler, "Zentralblatt für Bakteriologie"; Mircea-Ioan Popa, "Where Pathology, Microbiology and Virology Converge: Professor Victor Babeş," *Romanian Archives of Microbiology and Immunology* 80, no. 2 (2021).

51 "Kuopion läänin Maanwiljelyskokous Suonenjoella," *Savo*, September 9, 1890.

52 F., "Blodstallningssjukdomen," *Nya Pressen*, July 1, 1896.

53 Ilkka Alitalo, "Hellens, Oskar von," Kansallisbiografia online publication, *Studia Biographica* 4 (Helsinki: SKS, 1997), accessed March 20, 2023, http://urn.fi/urn:nbn:fi:sks-kbg-006842; Theodor Mikael Scheinin, "Ali Krogius," Kansallisbiografia online publication. *Studia Biographica* 4 (Helsinki: SKS, 1997), http://urn.fi/urn:nbn:fi:sks-kbg-006168.

observations reinforced recent results of international researchers, who had demonstrated that small parasites were able to destroy the red blood cells of diseased bovines.[54]

Another crucial question concerned how the parasites were transmitted to bovines. In America, some stockmen and veterinarians had noted as early as the 1860s that Texas fever was only prevalent in areas inhabited by ticks, but for a long time these observations were disregarded.[55] However, various scientific experiments began to support the connection between ticks, parasites and the disease. This claim was supported by the studies of Theobald Smith and F.L. Kilborne from the 1880s to the 1890s,[56] and promulgated, for example, in a talk at a biological society meeting in Washington D.C. in February 1890.[57] Yet, it took years before a scientific consensus was reached vis-à-vis the role of ticks as vectors. In this regard, Robert Koch's experiments in East Africa in 1897 proved to be essential.[58]

When the Finnish National Board of Health published a booklet by von Hellens on Redwater fever in 1901, the readers were offered a detailed description of the parasites and their actions. It was demonstrated how they penetrated red blood cells and destroyed them, thereby causing haemoglobin to dissociate and exit from the body in urine. Even the appearance of the microscopic parasites was described: they were said to resemble roundish cysts or to be the shape of a pear. Thus, readers were able to have a visual image of the microscopic creatures that they could not see. With some caution, von Hellens informed his readers that ticks probably infect bovines. It was well known that cows often had a great number of ticks that sucked their blood. Now scientific experiments confirmed that the bodies of ticks contained similar parasites as in the blood of diseased cows.[59] Thus, the agency of ticks was gradually revealed – in principle – as not only was new knowledge disseminated in booklets published by the National Board of Health, but also newspapers and journals circulated abbreviated versions of this information. Yet, in many instances the menace of ticks went undetected and they were able to continue their lives undisturbed for decades.

54 F., "Blodstallningssjukdomen," *Nya Pressen*, July 1, 1896.

55 Cheville, *Pioneer Science*, 80–81.

56 Hutson, "Texas Fever in Kansas," 93.

57 Cooper Curtice, "The Biology of the Cattle Tick," *The Journal of Comparative Medicine and Veterinary Archives* 12, no. 7 (1891): 317, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC9261720/pdf/jcmvetarch132938-0001.pdf.

58 Köhler and Köhler, "Zentralblatt für Bakteriologie," 237.

59 Oskar von Hellens, *Verenheitosta*, 5–7; O. von Hellens, "Verenheitto eli punatauti raawaseläimissä," *Mikkelin Sanomat*, August 10, 1901.

For example, when the agronomist and teacher of agriculture Evert von Konow summarized the content of von Hellens' booklet in *Pellervo*, the journal of a society promoting cooperative action, he listed the two established explanations for the cause of the disease: namely, grass in wet meadows and puddles of water in swamps and bogs. Only after these factors did he briefly mention ticks. It seems that he was not totally convinced of von Hellens' views regarding ticks or the requisite medicines needed to treat Redwater fever. Von Hellens recommended modern quinine, but von Konow preferred old medicinal solutions. He justified his views by recourse to practical experience: he had taken care of a herd of 180 bovines for seven years in a disease-stricken region.[60] Thus, he placed more value on his own experience than in von Hellens' scientific experiments and preferred long-time suspects, that is, damp meadows and unfit water, to ticks.

There is no reason to belittle the practical experiences and observations of contemporaries. They may often have led to conclusions that were later reversed with the help of new research instruments and methods. Yet, the validity of some older beliefs are still being confirmed. For example, the perception that young animals suffer less severely from Redwater fever and were subsequently more resistant than those adult individuals who arrived from disease-free regions was often repeated in contemporary texts and is nowadays part of the confirmed characteristics of the disease.[61]

If a teacher of agriculture was slow to accept the role of ticks as crucial vectors, then maybe it should not be surprising that smallholders did not readily accept the idea. Among dozens of references to Redwater fever in the oral history collection of the Finnish Literature Society, only one points to ticks. In 1910, a collector of folk culture was told in Korpilahti, in central Finland, that Redwater fever appears only where there are ticks.[62] In the following decades, more information regarding ticks as vectors was directed to the population in numerous newspaper articles and booklets,[63] but with a limited degree of success. Still in 1929, decades after scientific consensus on the topic had been established, Kaarlo A. Zinck, a veterinarian of the breeding association of Eastern Finland, complained that many cattle owners believed that

60 E. v. K-w. [Evert von Konow], "Punatauti nautakarjassa," *Pellervo* 2, no. 6 (1901): 179–183.

61 Finnish Food Authority, "Punatauti."

62 Korpilahti, J.W. Kotikoski 755. 1910. FLSA, FH, RWF.

63 See, for example, Ingvald Lieberkind, *Vaarallisia vieraita. Eläimet tartunnanlevittäjinä ja taudinaiheuttajina*, trans. Heikki Väänänen (Helsinki: Otava, 1929), 151–153; J.E. Aro, *Kuvauksia eläinten elämästä* (Helsinki: Valistus, 1922), 37–39.

Redwater fever was caused by poisonous plants, putrid drinking water or poison used to kill foxes.[64]

Alder trees serve to show the complexity and hybridity of the search for culprits. In assessing their role, quite different theories merged. In Finnish folk culture, alders had traditionally been connected with Redwater fever because of their reddish color. Professionals who did not share a belief in folk healing also suspected alders, but for different reasons: in the watery places in which Redwater fever appeared, there were often plenty of alders. It is not always clear whether it was the alder itself that was considered to be dangerous, or whether the tree merely signaled a hazardous environment. Whatever the case, there was long-lasting suspicion and a dislike of alders. When scientists and veterinarians began to trumpet the key part played by ticks in Redwater fever infections, a new reason to abhor alders appeared as it was believed that the ticks were especially fond of living in alders.[65] Nowadays, scientists point to tall grass and bushes as the environments in which ticks quest a host, not trees. However, the Finnish word for ticks used to be *puuntäi*, which literally means "a louse from a tree." Furthermore, there was yet another reason to dislike alders. They were accused of destroying meadows as they are particularly fast-growing and produce large quantities of suckers. They are also capable of surviving quite extreme cutting, which made it laborious to maintain open meadows. Model state pastures were used as encouraging examples of how to dispose of alders.[66]

Zinck crystallized the conceptions of veterinarians and the authorities when he demanded that cattle owners should pay more attention to ticks. He maintained that it was the fault of farmers if their cows fell sick. He instructed them to drain meadows and to "destroy willows and alders," thereby making the terrain uninhabitable for ticks. When the ticks were eradicated, he argued that Redwater fever would also disappear. Zinck also referred to the modernization of animal husbandry practices as the safest solution: to avoid meadows altogether and to feed cows in cowsheds or to keep them tethered. In the meantime, when both ticks and Redwater fever still appeared, Zinck recommended the careful removal of all ticks from cows and that that the former

64 Zinck, *Nautakarjan tarttuva punatauti*, 2–5.

65 "Punatautiin sairastuu maassamme vuosittain," *Uusi Suomi*, August 21, 1935; "Eläintauteja on tänä kesänä ollut Satakunnassa vähän," *Satakunnan Kansa*, August 20, 1939; Ällä Pee, "Kellotkin," *Maaseudun Tulevaisuus*, August 26, 1923; E.K. Keränen, "Punatautiin on kuluvana kesänä kuollut erittäin paljon nautaeläimiä," *Suomen Sosiaalidemokraatti*, July 26, 1935. See also the chapter by Otto Latva in this book.

66 "Laitumen raivauksesta," *Liitto*, April 30, 1927; F.J.T., "Laitumen raivauksesta," *Loviisan Sanomat*, July 5, 1929; "Valtion näytelaiduntilat," *Savo*, November 23, 1930.

should then be incinerated.[67] In this authoritative view, ticks were the downright enemies of cows and humans and his exhortation was to eliminate them and their supposedly favorite habitat – alders.

5 Conclusion

An examination of Redwater fever in Finland permits us to discover the presence of ticks and their agency in the past at a time when humans were not very interested in them. Before the role of ticks as vectors of Redwater fever became known, they were not considered perilous and explicit references to them were rare. However, their presence and their actions are disclosed by outbreaks of Redwater fever, which, in turn, have been documented. Despite human authors not placing blame on ticks, these descriptions open a view to multispecies co-living at the time when ticks were clandestine agents in meadows.

In the late nineteenth- and early twentieth century, ticks had an excellent opportunity to latch on to large mammals as the number of cattle increased and they tended to be fed in meadows, which were often wet. Countless things happened because of tick bites. If ticks became infected by Babesia parasites they could subsequently kill cows if they became attached to them. Their influence on humans was also notable, although less direct. No doubt humans could also suffer from troublesome inflammations, but Redwater fever was a bovine disease. Nonetheless, ticks also affected human lives in many ways as the loss of cattle could be disastrous for a farmer. Ticks made humans act. This could take the form of casting spells in the cowshed, treating cattle with different mixtures, draining meadows, reporting on outbreaks of the disease to governors, writing newspaper articles and arranging meetings, as well as undertaking scientific research in laboratories and in the field.

In the history of the interaction between ticks, cattle and humans, there are no straightforward, simple paths. Even though the mechanism of Redwater fever infection was discovered by scientists in the 1880s and 1890s, thereby revealing the agency of ticks and Babesia protozoans, other assumptions and practices continued to exist for decades. From the point of view of everyday history, uncovering the agency of ticks was a slow process with intriguing hybrids of beliefs and conceptions that derived from divergent ways of perceiving the world. Giving red lemonade to a cow bitten by a tick resonated with age-old traditions in a modernizing world.

67 Zinck, *Nautakarjan tarttuva punatauti*, 7, 11.

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