Who Is the Parasite? On Balance and Resignation with Ticks, Pathogens and Woods in some Italian Mountains.

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Tick-borne diseases are increasing in many parts of the world, including the Belluno province in Italy. This paper analyses ethnographic materials in dialogue with Serres' reflections on who the parasite is and what it means to find balance in a relationship with it. Amidst local discussions on whether and what people could do to limit the expansion of ticks and infection risk, communities are well aware that how these two species act upon each other is a matter that involves many others too, as well as old and new ecological, economic and social dynamics. A dual realization is in the making: that disease control depends only on the possibility of finding a point of equilibrium between the lives of humans, sheep, red deer, mice, ticks and forests and—at the same time—that this possibility comes with a certain amount of resignation that, I argue, is intrinsic in the relationship with parasites.

Keywords: ticks; Italian Dolomites; balance; resignation; Michel Serres

The parasite

Together with leeches, ticks are probably considered the parasites par excellence. In the common language, for example in Italian, to tell someone that they are like a tick is to jokingly point out their pestering presence and relentless clinginess. In the literature of the social sciences and the humanities, the recent revival of von Uexküll's (1957) *A Stroll through the Worlds of Animals and Men* has made ticks more famous than ever outside of parasitology. In my personal experience before this research, I encountered ticks thrice.

The first time, in the late Nineties, my dog used to occasionally come back from his strolls in the fields around my house (in the countryside of Veneto, Northeast Italy) with a good number of pea-sized adult ticks feasting on his ears. At the time, gruesome stories circulated of local dogs bleeding to death after contracting ticks allegedly brought to the area by mountain shepherds' sheep during transhumance. The second time, ten years later, I returned from a walk in the hills some forty kilometres north of my village with a nymph tick stuck in the back of my knee. Since she[1] had been there only for a couple of hours, I removed it without too much concern about a possible infection. The third time, six years ago, in the Highlands of Scotland, I woke up one morning to the discovery of some thirty little larvae attached to the upper body of my 3-year-old daughter. I immediately started to unplug and squeeze them one by one, not so much to kill them as to check how much blood they had already sucked, to try to estimate the risk of pathogenic transmission. That was the easy part, practically and emotionally. The hard one lasted a few weeks more, during which, daily, I inspected her head, full of dense brown hair, hoping not to feel an engorged body under my fingers. The idea that that very tick, the missing one, was the infected one tormented me for months.

On each of these occasions, I thought of this parasite in a different way: respectively, as one that drains you out, grabs just a bite and gives you way more than it

takes. This is an interesting peculiarity of ticks. In situations of infestation (e.g., 70,000 ticks on a moose – Samuel, 2004), ticks do what parasites are mostly believed to do: slowly consume you. Yet, in contexts of tick-borne disease endemicity, they unintentionally break the first rule of parasitism, that is, taking without giving anything back. If, during one of the few meals a tick has in her life, she feeds on a host whose blood carries a certain pathogen, she will likely suck it up and pour it into her next host during the very specific circulation of bodily fluids that is tick feeding. At various stages of the meal, saliva containing anaesthetics and anticoagulants, as well as gut content, are introduced in the body of the host. Potentially dangerous to humans are pathogens like the *Borrelia burgdorferi* bacterium that causes Lyme disease (LD), an infection that can result in arthritis, carditis, meningitis and neuritis, if untreated; as well as the Flavivirus-genus virus that causes tick-borne encephalitis (TBE), an acute disease which can lead to long-term neurological sequelae or even death. Both diseases are an endemic public health concern in the study area.

Moving from my preliminary understanding of ticks and grounded in two years of ethnographic research[2] in the mountains of the Belluno[3] province in the Veneto region, this paper has two objectives. The first one is to analyse who, from the perspective of the participants in this study, the parasite is: *Ixodes ricinus* ticks (in their local identity as "wood ticks" and "sheep ticks"), disease pathogens (LD bacterium and TBE virus) or the woods. The latter calls for some explanation, because forests are not conventionally thought of as parasites and, when people feel preoccupations in relation to them, it is very likely to be about their disappearance due to deforestation. Yet, there are also places where the opposite phenomenon—of reforestation—is underway, at a rapid rate and with unknown consequences (FAO, 2020). This paper explores the possibility that, especially where such reforestation is spontaneous and happens in the direction of human-occupied

territories, what is technically described as "woody plant encroachment" could be perceived by locals not only as a physical approach and intrusion, but as a new socio-biological relationship between the encroaching organism and the host, in which the latter feels damaged by the first, as in a parasite-host relation.

To reach the first objective of this paper, I will put ethnographic data in dialogue with the key features of the parasite that French philosopher Michel Serres proposes in his *The Parasite* (2007 [1982]). As mentioned in the introduction to this special issue, Serres identifies three types of parasites: the biological (an organism that lives in or on the body of a host), the social (a person who drains resources from a society), and the informational (a noise in a system or an interruption in a signal). Not mutually exclusive, these different parasites have five key features (Serres, 2007).

First, the parasite is 'an inclination toward trouble, to the change of phase of a system' (196): 'a little troublemaker' that transforms the state of things. Profound changes have occurred in the Dolomites over the past 80 years and new variables, first and foremost climate change, emerged and raised crucial questions about the future of the mountain as a system. Second, the parasite 'tries to become invisible' (217-218), by becoming small, hiding, making a lot of noise, or even 'being impossible, absurd, outside reason and logic'. Even more so than in the case of the invisibilities considered by Girard (2013)—viruses, natural gas, the Holy Spirit, radioactivity, and the market—the anthropology of parasitism must think and engage with invisibility in all its forms: who is the invisible the host is 'becoming with' (Haraway, 2008)? Is the parasite really invisible, or is it the host who does not want to see it? Does the parasite become visible—and spoken of, written about, etc—only when the (usually negative) consequences of its presence become evident only because hosts do not consider a possible positive side in this relationship? Moving to the third key feature of Serres' parasite, would our

relationship with it change if we acknowledged its visibility and accepted the 'permanent or semipermanent contact with him [the host] […]. Not only living on but in—by him, with him, and in him' (6)? This question easily leads to another one: must closeness and contact (on, in, by, with) be necessarily there to define a parasite, or is it the host's perception that does it? Moving on, Serres' parasite is '[…] the one eating next to, soon eating at the expense of, eats the same thing, the host, and this eternal host gives over and over, constantly, till he breaks, even till death, drugged, enchanted, fascinated' (7). As this paper will show, this range of options, from death to fascination, applies equally well to the three candidates under consideration (ticks, tick-borne disease pathogens and woods). Finally, parasites' 'small effects are usually well-tolerated by the organisms, which quickly rediscover their health, that is to say, their silence […]. The generous hosts are therefore stronger than the bodies without visits' (193). Over the years, literature on the Anthropocene and doomsday scenarios has progressively made room for explorations in hope, resilience and determination (e.g., Kirksey, 2015; Pandian, 2019), showing that a third way is possible between the extremes of denial and desperation. Our relationship with parasites, whomever they are, can benefit from and, at the same time, contribute to the imagination of the nuances, alternatives, acceptances and bricolages necessary to live in this complex world.

The second goal of this paper is to explore whether life can be negotiated with the identified parasite, and how. Can balance be reached? How many species are involved in the process? How much friction and tolerance, resistance and resignation are to be expected? What compromises and calculations do the art and science of multispecies assembling involve? Serres (2007: 12) famously wrote that 'everything works because it does not work', for the harmony that defines a system has, in reality, some amount of disharmony—or propensity to disequilibrium—in it. While this can be true, it somehow

implies that harmony and equilibrium are eventually found, because even the parasite, 'the little troublemaker' par excellence (Serres, 2007: 196), needs them. But what happens when multiple parasites are there, animal ecologies are particularly intricated and the future of each species—let alone of whole multispecies assemblages—is made unpredictable by Anthropocenic climate change?

The context

The province of Belluno occupies an area of 3,610 square kilometres in the Alpine belt of Northeastern Italy. It is a space that somehow has a double identity. External people see these mountains as a top tourist destination, while residents look at them with affection but also concern. There are many factors—economic, political, demographic, ecological—that, in the past seventy years, have co-produced the current state of crisis in which this mountain territory, like many others (e.g., Dax et al., 2021; Zanini and Viazzo, 2020), is considered to lie. Nowadays, small mountain communities often struggle with the vicious cycle of an ageing population, the scarcity of high-qualification jobs, the lack of long-term political and financial investments, the closure of basic services, and the weakening of cultural identity (Varotto, 2020). For local people, this contributes to the sad feeling of a place that makes less and less sense to live in, as the Latvian villages where post-Soviet capitalism has irreversibly emptied houses and roads, as well as imaginations of the future and the very purpose of sense making (Dzenovska, 2020). Although not the first reason for this loss of sense, ticks, tick-borne diseases (TBDs) and forests are also part of it. Let us see how this loss is experienced from the perspective of the locals who shared their reflections around ticks with me.

Tick taxonomy currently identifies 907 species (Bowman and Nuttall, 2008). The one thing that they all have in common—which is what biologically qualifies them not

only as a parasite, but as an obligate one—is that they cannot advance in their life cycle if they do not feed on blood of other animals (including humans and other ticks as well). If biologists can tell tick species apart by details as tiny as their anus, this is not an easy task for the eye of ordinary people. In the Belluno area, where *Ixodes ricinus* is the most common tick species, its scientific name does not say much to most. On the contrary, "zecca dei boschi" (wood tick) is more frequently used. It was in the woods that people first encountered it and, until some fifteen years ago, only met it there. A middle-aged woman I often meet remembers well that 'my dad used to tell me that when they worked there, at the end of the workday they would take off their overalls and set them on fire. They were covered in ticks […]. So, for us, that place was Zeccolandia [neologism, "the land of ticks"]. And I still call it that way'. Her father was part of the maintenance staff of the Ente Nazionale per l'Energia Elettrica, a nationwide manufacturer and distributor of electricity with a wide infrastructural network in the most remote areas of the Belluno territory. It was in the 1970s that he started to meet the first ticks, during inspections of pylons and power lines. Yet, it was only at the end of that decade and in the steep woods of Mount Schiara, over the power plant situated in La Stanga locality, that encounters with these parasites became certain, abundant and intense to the point that usual measures like shaking them off clothes before heading home became useless. There, ticks had to be burnt, and overalls with them.

For the next fifteen years, wood ticks remained in the woods and, if they latched onto passing humans, the latter did not notice or worry. Things changed in 1993 when, I was told, the first medically confirmed case of LD was registered at the hospital of Pieve di Cadore, thirty kilometres north of La Stanga as the crow flies. The patient in question was a girl, likely bitten in the playground of the village. The tick was found attached to her skin only the day after, when her father took it off thinking it was a squashed midge

that had stuck to the skin. Yet, some weeks later, the girl started feeling sick and the infection was confirmed. ‘Nobody here [in the village] knew what Lyme disease was’, her father narrated to me, ‘It was the first time we had heard this word, but to tell you the truth, we hadn’t even heard much about ticks either. Then out of the blue: Lyme, Lyme, Lyme...’

This man’s account of the shock his family went through at the time reminds us that we often come to know about parasites only when they make us sick (Drisdelle, 2010). As Serres might put it, it is the host that raises the alarm of silence being broken by the parasite-as-noise: ‘Could health be the silence of organs? And sickness makes noise’ (Serres, 2007: 78). If so, ‘What really is this system which collapses at the slightest noise? Who or what makes this noise?’ (Serres, 2007: 11). And then, ‘from this noise comes the story’ (Serres, 2007: 16), for example, of ‘Lyme, Lyme, Lyme…’. The whole local (Trevisan et al., 2023) and global (Bulled and Singer, 2016) story of LD and TBE cannot be covered here, but a few key dates are necessary. The first case of LD in Italy was diagnosed in 1983 (Crovato, 1985) and in 1991 in the Veneto region (Trevisan et al., 1991). Between 1993 and 1998, the hospital of the city of Belluno treated 119 LD patients, most of whom had been infected locally (Ciceroni et al., 2001). Since then, LD has rapidly become endemic in the Belluno area (Trevisan et al., 2023). The first cases of TBE in Italy were identified in Tuscany in the 1970s (Amaducci et al., 1976) and in the Belluno area in the 1990s (Caruso et al., 1996). Italy is considered a low-incidence country for TBE in Europe, but geographical clusters in the Northeast, including the Belluno area, are high-risk foci of infection (Tagliapietra et al., 2023).

In the study area, after two decades of apparent calm, things changed considerably since the late 1990s. First, tick awareness increased considerably, especially after 2019 when TBE vaccination became available for free to residents. Second, tick-related

concerns took some new turns. While tick encounters are still a source of panic for many, most are somehow less worried now about tick-borne diseases than they were when ticks entered the scene of local preoccupations. ‘Maybe I have it [LD] now; maybe I had it in the past and I didn’t feel sick; or maybe I had it but I blamed something else… What do you do anyway?’, asked me a middle-aged woman who, she says, ‘has learned to take it philosophically’. Here she refers to the difficulty in diagnosing and treating LD, which clinicians call “the great imitator” due to its ambiguous symptoms, but she also understands LD as a widespread sickness: ‘I think that if they [clinicians] tested our [Belluno residents’] blood, they would find that 80% have had Lyme’. No matter how accurate this estimation is, the main reason for this perceived high incidence of tick-transmitted infection is the third change that has increasingly manifested itself in the past two decades. Wood ticks have not only increased in the woods, but they have also gradually moved out of them, with the result that now the chance of encountering them does not apply only ‘to those who go to the mountains [e.g. for hiking in forests and pastures], but to every one of us’, told me a young man who spends most of his time between his office, his house and his village. Ticks are now regularly found in vegetable gardens, patios, and ‘even inside a house that had been uninhabited and closed for ten years! I found it crawling up my arm as I was taking measurements’, reported a person who works in real estate.

Often referred to as ‘a ticking bomb hidden in plain sight’ (Narasimhan, 2023), ticks have gradually expanded in the Belluno area as they have in other parts of the world (e.g., in Canada – Ogden, 2009). In the study area, however, it seems that it was not the initial “epidemic detonation”, when ticks were first noticed in the 1970s, that caused the greatest shock. This has mostly derived, in the past two decades, from the mounting realization of ticks’ tenacious ubiquity (‘I had the baby in the stroller and was walking on a paved road

in Vigo di Cadore; in the evening I found a tick on her!') and perceived numerosity ('it's an avalanche', 'we are at an indecent level'), as well as the difficulty of understanding how to live with all of this.

Imbalances

Of course, ticks did not move out of the woods on their own, but as part of an ever-changing multispecies assemblage. In this section, I will briefly describe the main elements of this assemblage (the "monoculture" of the eyewear manufacturing sector, the decline of agriculture and animal husbandry, the expansion of forests and the growth of the deer population) and why each of them—both in isolation but especially in an entangled manner—contributes to the crisis that this mountain area is going through (Reolon, 2016). Following Craig (2021), the elements of the crisis will be described in an 'interprobleminary' manner, or 'an approach that examines the interactions and implications of multiple problems occurring simultaneously in a place or population'. A first preliminary clarification is necessary: "interprobleminarity" clearly implies correlation between different factors, but not necessarily causation (especially a linear, direct and immediately consequent one). This point should be kept in mind as the collective local memory of when, where and how ticks and TBDs become more evident in the Belluno area is traced in the next pages.

Moreover, one could say that it is also useful to keep in mind Peretti-Watel et al.'s (2019) suggestion to look at TBD risk as a 'manufactured risk', that is, a risk that is generated by technologies and human activities (Beck, 1992; Singer, 2016). While I agree with the potential helpfulness of this concept, a second clarification is needed: humans certainly play a role in the diffusion of ticks and TBDs (Barbour et al.,1993) but—if we imagine ticks and TBD ecology as a complex equation—many other beings are crucial

elements as well. Briefly, *Ixodes ricinus* ticks eat just thrice in their 4 to 6-year-long life and, being a non-specific tick species, they can feed on a very wide range of animals: larvae generally prefer little hosts like hedgehogs, birds or mice; nymphs can target cats, hares or badgers; adults may favour bigger animals like foxes, sheep or red deer. In Northeastern Italy, mice and red deer are of particular relevance, for two different yet related reasons. Mice are the competent reservoir hosts for the LD bacterium, so they can get infected by a tick, harbour the disease pathogen in their bodies, and infect the next tick that feeds on them (Hudson et al., 2001). Unaware of their role as disease-spreaders, mice are also effective at bringing ticks close to people, as thanks to their small-to-spot presence, they frequent not only woods and grasslands but also gardens and houses. Red deer are fundamental reproduction hosts for *Ixodes ricinus*, sustaining through their blood and large body surface the population of ticks, as well as their long-range diffusion in a territory. Finally, a brief mention of ticks' predators, which in the Belluno area include mostly insects and wild and domestic ground-feeding birds. Research is underway to understand whether and how changes in the population dynamics of these predators have an effect on the tick population of a given area. For example, while free-ranging chickens can help limit the presence of ticks in houses' backyards, the presence of their leftovers attracts mice, which can carry LD-infected ticks close and in people's houses (Caroline Millins, personal communication).

A research participant suggested that I start tracing the history of the process that led to the current tick abundance and TBD infection by going to Rio Molinà in Calalzo di Cadore. There, in 1878, three young men bought a disused mill and turned it into the eyeglass factory that, purchased in 1934 by Guglielmo Tabacchi, became the renowned Safilo (De Lotto, 2023). The building that still stands in Calalzo di Cadore is the seed of a manufacturing sector that now employs 13,000 people in the Belluno province (out of

a population of 203,000) and makes up 70% of the world's high-end eyewear production (Franini, 2022). At the local level, the period 1970s-1990s represented the golden years of this manufacturing sector, also thanks to a 3-minute-long event that happened on the night of 9 October 1963 in the then-agricultural village of Longarone. In what definitely was a manufactured risk, a piece of Mount Toc collapsed inside the reservoir created by the Vajont dam and the resulting 250-meter-high wave razed several villages in the valley below and killed about 2,000 people (Merlin, 2008). In the process of social, demographic, and economic reconstruction that followed, large incentives were made available to those who wanted to invest in what soon became the large industrial area of Longarone. This created a significant migration process from the upper Belluno province that moved people away from their native villages and previous economic activities. Nowadays, the native house of one of Safilo's founders is on sale, along with many other buildings, in the isolated village of Rizzios: forty residents, two dozen houses built in the seventeenth century—many abandoned—the tourist label of "traditional hamlet", and woods all around.

Looked at in isolation, the expansion of the eyewear manufacturing sector is, of course, not negative per se[4]. Yet, if we put it into context some frictions emerge.

> Everybody wants to work in these factories now. They pay well, they treat you well, they are solid. You know when you start and you know when you end [the workday]. It's a good job and it's the best chance for many people here […]. But when you finish at five [pm], you don't want to go to your fields or your woods, if you still have them. Some people do it, but they do it out of passion. It cannot be a job. You don't have time for it to be a job. And if it is a passion, you do what you can […]. Let's say that you have some

> fields. You need a tractor but what do you do, do you buy a tractor just for your passion? It's expensive! You can buy it together with other people, but there are not many people who want to do it. And then you have problems during droughts, problems with hail, problems with wild boars […]. Yes, many people still have their piece of forest, but it takes time to make firewood by hand. And if you want to save time, you have to spend money to buy machines. Who makes you do it? It's cheaper to buy it [firewood] and at Luxottica [another big local eyewear factory] they even give you benefits for this.

Moreover, like elsewhere in Italy and beyond, the expansion of the secondary sector after World War II has gone hand in hand with the decline of the primary one. In the period 1951-1971, the percentage of Belluno province residents working in farming decreased from 55 to 14 (and to 2 in 2011) (Cason, 2011). Accompanying a landscape picture of the two villages of Vallesella and Grea taken in the 1950s is the caption: 'Between one village and the other stretches a vast and compound geometry of fields. One sows and harvests as far as possible'. Nowadays, between Vallesella and Grea, no more than a few fields are there and the land that is not occupied by roads or buildings is taken up by grassland or forest.

Several local books on the social history of these mountains tell a similar story about animal husbandry in the period 1950s-1970s. Browsing through their pages, two points emerge clearly. First, the idea of "before and after": 'Before Vajont. Cows in the highland barn of Cajada' (Rossi, 1976: 162) is the caption of a picture showing a cow shed that, like many others, does not exist anymore. Second, the idea of something old that could still be saved and brought into the new: 'Alpine animal husbandry can still

have a valuable productive and experimental role even inside the proposed Park' (Rossi, 1976: 23), says the caption of a picture depicting the past in a book dated 1976, which author proposed the creation of the park now known as Parco Nazionale Dolomiti Bellunesi. Photographic books on 'the way we used to be' and the photographic exhibition "Gente di montagna" ("Mountain people")[5] installed in Pozzale celebrate haymaking and leaf collection as pleasant moments of social aggregation that became increasingly rare after World War II. Nowadays, cutting grass manually, using a brush cutter or a traditional scythe, is only occasionally taught as an extracurricular activity in the only agricultural high school in Belluno Province.

A local book dated 1890 explains of pastoralism that in the seventeenth and eighteenth centuries, this activity was very common in the area because the combination of people's poverty and sheep's frugality made it easy and convenient for any family to keep sheep. Eighty years later, sheep are spoken of in the past tense. Pastoralism is described as a disappearing source of business and wealth and a picture commemorates 'the last shepherd of Mount Schiara cuddling one of his sheep' (Rossi, 1976: 15). That picture was taken in the same place and at the same time—the 1970s—where power plant workers met ticks for the first time, and burned them. All over the province, small- and medium-sized enterprises engaged in agriculture, animal husbandry and forestry decreased from 14,591 in 1982 to 2,381 in 2010 (ISTAT, 2022). In the last decade, only forestry has slightly inverted this trend (L'Amico del Popolo, 2023).

One of the perceived consequences of all these factors combined is that 'you can see everywhere that woods are taking up all the space. […] The forest began to approach Valmorel from there [left]. Before, there were three mountain dairy farms in the middle of pastures. Look at them now. You hardly see the three buildings' (Fig. 1). I have collected dozens of similar accounts of how 'woods walk' towards villages due to the

decline of traditional economic activities and the process of land abandonment that has followed. The common narrative tells of mountain dairy farms being the first outposts to be ‘invaded by woods’ or, in the perception of my interlocutors, parasitized by them. Then, the same has happened to the backyards of the houses located on the outskirts of villages, which become a bit smaller every year when new saplings cross the threshold that, in the local collective memory, has “always” been there between the forest and the village, or between the energy of wilderness and the efforts of farmers at keeping it at bay.

Figure 1: The woods around Valmorel which have taken over the pastures around mountain dairy farms (the hard-to-see white building on the mountain slope), in the municipality of Limana, Belluno, Italy. Photo by the author.

This slow, multifactorial expansion of woods has invariably enlarged the home range of wildlife, for example red deer. In the eighteenth century, intensive hunting and agriculture expansion eliminated these animals from the Belluno province, where they returned only in the Eighties and, between 2003 and 2018, their population grew by 12% each year (Vettorazzo et al., 2018). Unlike fifteen years ago, having red deer graze in gardens is now the norm for the people I met, all over the province, who live at the edge of villages. In the fall of 2023, the media closely followed the story of Bambotto (from the fictional Bambi), a red deer in San Tomaso Agordino (Corriere delle Alpi, 2023). He used to seek human contact in people's gardens and house balconies, 'hunting for caresses and, in winter, even a little food' (Il Gazzettino, 2023). The story of Bambotto was recommended to me by a research participant as particularly representative of 'why everything gets so complicated these days'. As the story goes, seven years ago, newborn Bambotto was brought to the doorstep of a house in Pecol by his mother. Soon he became the village mascot, eating from the hands of those 'who loves him as much as we do' (Il Dolomiti, 2023), until he was killed in October 2023 (Il Dolomiti, 2023).

The person who killed him acted within the limits of the law, yet in the middle of a heated public debate on what the local human-wildlife relationship should be. Some people appreciate such intimacy with (some) wildlife; some disapprove of human feeding of wildlife because of the health risks to animals in terms of improper diet and the consequences of them losing their instinctual fear of humans; some dislike it because of zoonotic health risks to humans. Many complain, in general, about red deer overpopulation and the side effects of lethal (for both species) car accidents. Local institutions responded to Bambotto's death with an awareness campaign about the above-mentioned risks involved in feeding wildlife (Provincia di Belluno, 2023). Meanwhile, Confagricoltura, the association of agricultural enterprises, blamed the expansion of

woods over grazing lands as the root cause of wildlife getting closer to humans. ‘Instead of thinking about making underpasses and overpasses [to prevent car accidents], we need to take land management back, making sure that meadows from 600 to 1,000 meters become meadows again’ (Il Gazzettino, 2023, translation mine), proposed the association president criticizing the failure of Italian politics to support mountain farmers:

> Until a few decades ago, it was farmers who were in charge of mowing the meadows and taking care of the forests but, as this was no longer profitable, they abandoned the activities, and the subsequent generations who inherited the land changed their ways. Young people thus lost the culture of land management and dedication to rural activities. Hence, the forest has taken over our mountains. […] But beware: if high-altitude farming disappears, wildlife will descend more and more into the valley and problems will increase (Il Gazzettino, 2023, translation mine).

One of the consequences of the approach of wildlife—especially red deer and roe deer, but also less-evident mice—is the increased possibility of meeting ticks in places that people have never considered risky in this regard. This does not mean that, before red deer reappeared in the province in the Eighties, no tick was present in the area. Yet, the absence of red deer as key reproductive hosts did not allow the tick population to be as numerous as it is today. Examples of places where tick-human encounters through wildlife currently occur come from real histories of tick bite *and* consequent TBD include bike lanes in villages, compost pits in backyards and the wooden benches by the front door of houses on which elderly people like to sit to enjoy the hustle and bustle of village life.

Attempts at rebalancing

Tick-borne diseases are a vast and complex public health issue, because they involve different tick species, different reproduction hosts for ticks, different pathogens, different reservoir hosts for pathogens and, with regards to humans, several difficulties in the prevention, diagnosis, and treatment of the many pathologies transmitted by ticks. In areas, like Europe and North America, where TBDs mostly affect human health, disease control[6] is mostly performed through individual protective measures such as covering clothing, tick repellents, skin checks, safe behaviours and vaccination (which currently exists for TBE but not for LD). Taking action at a deeper level, at the core of the tick-animal-human-environment assemblage, presents several challenges linked to the ecology of TBDs, which is not only complex per se (Wikel, 2018) but also fast-changing and uncertain because of the volatility of climate change. While the impact of climate change on the survival, movement and distribution of ticks and TBD pathogens is being widely studied, definitive answers are still to be found because of the number and complexity of the climatic variables, environmental determinants, and ecological relationships involved (Nuttal, 2021).

In the Belluno area, an interesting TBD control attempt was proposed in the early 1990s. In Grea, the village in Cadore that lost most of its fields, the farming cooperative "Val di Toro" was created to maintain public and private land around villages by mowing grasslands on mountain slopes as well as near settlements, such as in uncultivated fields, roadsides and public parks. This project was conceived because locals 'recognized a negative evolution of the landscape that was no longer sustainable' and wanted to avoid the 'negative consequences [of woods expansion] for health (e.g., the spread of vipers and ticks), landscape, and the environment (e.g., the loss of biodiversity)' (Scotton, 2002, translation mine). Nowadays, this project is more or less regularly implemented with

some cows rented for the purpose, who can reach the small grassland compartments that mowing machines cannot physically access, or are too expensive to access. Yet, in the initial plan of this cooperative, the task was assigned to sheep. Because of the low operating costs of having sheep, the cooperative bought 200 of them, kept them in a stable during winter, and, during the rest of the year, took them on a guided itinerary through the grasslands to graze, made freely available by the 150 landowners and cooperative members involved.

> The results obtained consist of the halting of wood advancement and the improvement of grassland colour due to sheep's natural mowing and fertilization. Also worth noting is the employment opportunity offered to people who are unable or unwilling to work in the eyeglass industry. Difficulties include the occasional damage caused by sheep to gardens or vegetable gardens in the village. Animals are also blamed by some for the spread of ticks and the unpleasant odour emissions caused by their droppings (Scotton, 2002).

The proposed solution of resorting to sheep to rebalance the apparently out-of-balance human-animal-environment equilibrium came with a problem attached, literally. According to the son of the first president of the cooperative, public concern about the sheep-tick dyad was immediate and high, leading many people to look with suspicion at this multispecies project. This resistance could be ascribed to the fact that the first case of LD recorded at the hospital of Pieve di Cadore, which is five kilometres away from where the cooperative's sheep were active, occurred in 1993, coinciding with the launch of this initiative. Yet, it could also be linked to the fact that while in scientific language,

wood ticks and sheep ticks are the same, *Ixodes ricinus*, in the common imaginary, they are often different ones: wood ticks are in woods, attached to red deer, and sheep ticks are in grasslands and farms, attached to sheep.

When I started fieldwork, I was surprised to notice that this strong association of ticks with sheep, which I thought belonged mostly to lowland people like me, was common in some parts of the Belluno area as well. According to tick ecology literature, sheep do not have an association with ticks stronger than other animal species. Similarly, all the shepherds I met, who expressed no concern about TBDs being a potential occupational hazard for them, claim that the odour and consistency of lanoline make sheep less hospitable for ticks than the other animals in the herd, such as goats, donkeys or sheep dogs. That said, due to the large size of sheep, it is more likely for adult female ticks to have their last meal on them and then lay their eggs in the places where these animals station, such as where they graze or sleep. From here probably comes the idea of a ground infestation with ticks as a result of a flock of sheep passing through. But it also comes from the very physicality of sheep; to humans, sheep's fleece looks perfect for ticks to latch onto and hide in, so much so that TBD scholars have found sheep to be more efficient than the usual blanket-dragging method to pick up ticks from a patch of landscape (van Wieren, 2016).

In Belluno, ticks are in a relationship with the very few domesticated sheep that are still in the area, but also and especially with the already mentioned mice and red deer, the two species that play the biggest role in shaping the local tick ecology. Mice sustain the presence and diffusion of the LD bacterium, while red deer of the *Ixodes ricinus* ticks that spread it. Interestingly, red deer are not vulnerable to LD so, should a non-infected tick feed on their body, the tick would not become infected. For their complex role in TBD ecology, red deer are being widely studied to understand how changes in their population

impact disease transmission dynamics (Gandy et al., 2022). A decrease in the red deer population could both reduce the incidence of TBDs by diminishing the key host species for ticks and therefore tick populations, and increase the incidence of TBDs by augmenting the chances that, with fewer red deer around, ticks will feed more on competent hosts such as mice. An increase in the red deer population, on the other hand, could both amplify the tick population, but also dilute tick infection by wasting—from the perspective of the pathogen—the meal of the tick on non-competent hosts (Bolzoni, 2012).

While eco-epidemiological research is underway, the hypothesis that biodiversity decreases—instead of increasing—TBD risk is gaining value (Dagostin, 2024). This is a somewhat counterintuitive plot twist, and one that is more complicated than it sounds. The Belluno area has a high Habitat Richness Index (Dagostin, 2024) and for at least a portion of Belluno residents, this is more of a worry than a joy. To recap, sheep are generally not welcomed, as suggested by the concerns raised about the multispecies strategy adopted by the cooperative in Grea as well as the experience of some of the shepherds who have participated in this study. With reference to red deer, some people actively and regularly feed them by leaving food for them in their gardens, while many others lament the increased size of their population and the consequence of this on road safety and vegetable garden cultivation. Similar biodiversity-related preoccupations involve wild boars and, more recently, wolves. For multispecies thriving, it may be that boundaries are just as important as entanglement.

At the same time, the expansion of forests is experienced as a kind of unwelcome homogenization of landscape diversity, which includes or partially overlaps with (animal) biodiversity. Many research participants look at this continuous expansion as the most tangible symptom of a mountain that makes no sense—to them—anymore, where local

communities have let go of what used to anchor them to the place they were born. Progressive land neglect, caused by the abandonment of traditional farming and forestry activities, is perceived as a painful defeat not only in terms of economic stability, but also of the pride of being able to successfully live in a place where life can be harder than elsewhere, similarly to what Burger (2023) describes in the Azores. A mountain where 'woods are everywhere' is considered by many a mountain that has lost its balance, where 'noi montanari' ("we mountain people") have no more a key role to play, hence no role to play at all. It is a territory where, according to its human inhabitants, too many things are off balance, crossing the point of no return: too many woods, wild animals, ticks and TBD cases (among other things); too few residents, resources and shared ideas about how to live the present and shape the future of this area, in general (e.g., in relation to climate change and depopulation) and with reference to ticks too. TBD endemicity and a certain amount of exposure to the risk of infection are now a reality that most locals have accepted, because they have become intrinsic to life itself in this area. Yet, this resignation for the present does not automatically exclude apprehension for the future. Worry originates from the complexity of TBD ecology and the difficulty of understanding whether and how a point of equilibrium can be reached in terms of expansion of woods, number of red deer, movement of mice, quantity of infected ticks, presence of predators (of red deer, mice and ticks), role of sheep, options of landscape management and preventive behaviours in humans.

So, who is the parasite?

Before answering this question, it is useful to remember the criteria identified by Serres to define the parasite: it is invisible to the host, lives in the host, eats at the expense of the host and has a measured effect on the host. Based on this, the most obvious response to

the above question would be the tick. By definition, she is not just a parasite, but an obligate one, that is, one that cannot complete its life cycle without exploiting a suitable host. Moreover, she becomes invisible in three of the four ways identified by Serres (2007): by being very small ('Animal parasitism is the work of invertebrates; it stops with the mollusks and the arthropods' – 217), by hiding (the brood of ticks on my daughter's body mostly chose the back of her ears, the scalp and the armpits) and by being impossible ('Impossible, absurd, outside reason and logic. That is what is interesting; that is the point; that is what must be thought about. He becomes invisible in the inconceivable' – 218, e.g., in surviving without food for two years or more). Yet, ticks deviate from the identikit of the parasite in two manners. First, they spend most of their lives in the environment, hence not in nor on their hosts. This is well-known to tick experts but also the people in the Belluno area (1022 of the 1636 survey respondents). Second, while it is true that each tick takes only a very small amount of blood through a bite that brings no pain and leaves no mark (unless the parasite is removed unproperly or a skin reaction develops), in endemic areas it can give one more pathogen back. Truth be told, she does it involuntarily and unconsciously, and this leads us to the second parasite candidate, the disease pathogen.

Out of the 1636 survey participants, 1335 were bitten by a tick at least once in their life. Half of these were bitten one to five times, but 64 received more than a hundred bites. For most of these people, concern about TBDs prevails over more immediate feelings such as disgust, annoyance or panic over a possible infestation on their bodies, animals or homes. After all, life-threatening infestations of ticks on humans are unheard of and, thanks to tick collars for dogs and cats, this event is rather rare in domestic animals (yet not so uncommon in animals like hedgehogs and deer, but this mostly happens away from the sight of humans). When it comes to TBDs, 206 survey participants have had LD and

14 TBE. Since LD infection does not provide life-long immunity (nor does TBE vaccination), the risk of TBDs is there not only for the people who have never experienced them before, but potentially for anyone who encounters and re-encounters ticks in a TBD-endemic area. The LD bacterium and the TBE virus fit the description of the parasite better than ticks in several ways but, before proceeding, are we thinking of them as parasites of the tick herself, or of the human hosts the tick feeds on? Or both, actually, since what matters to these pathogens is ending up in a body that does not act as a dead end for them, and humans and ticks do not act as such?

TBD pathogens have mastered invisibility. They are very small, enough to be able to live in permanent contact with ticks, not just on but in them. In the body of ticks, they do not even leave traces of their passage, so, an infected tick and a healthy tick look exactly the same. The same goes for mice, who can get infected but do not fall sick. Even in humans, except for the characteristic erythema migrans rash that develops in some but not all LD cases, the presence of the LD bacterium can go unnoticed, which is why the diagnosis of this disease is often challenging. After fitting three of Serres' criteria, TBD pathogens fail to meet the fourth, since their effects on the health of humans (and some other animal species) are anything but small, well-tolerated and fast to recover from. As humans vulnerable to TBD pathogens, we cannot claim that 'the generous hosts are therefore stronger than the bodies without visits; generation increases resistance right in the middle of endemic diseases' (Serres, 2007: 193).The third parasite candidate I have proposed are woods. This suggestion, otherwise odd, has emerged from ethnography. Although research participants have never explicitly referred to woods as parasites, they often described them with words that reminded me of them. Forests are not invisible in the immediate sense of this term. For sure, they are not invisible by being small or hiding. Yet, they become invisible in the fourth way described by Serres, which does not apply

to ticks and TBD pathogens. The forest as a parasite 'becomes invisible by making, on the contrary, a lot of noise. One can hide by being too visible or too perceptible' (Serres, 2007: 218). To some extent, woods become invisible also by being impossible, absurd, inconceivable, outside reason and logic. For those locals who strongly identify as 'noi montanari' ("we mountain people"), what seems to be unimaginable in the described scenario is not the fast diffusion of ticks or the increasingly higher risk of TBDs, but the apparently unstoppable expansion of woods, which take over disused pastures, uncultivated fields, the backyards of uninhabited houses and the space around emptying villages. Now, the reader may say that woods are encroachers more than parasites. At a closer look and from the perspective of the people who live in the (mostly) human spaces with which woods are in permanent, expanding and deepening contact, what qualifies forests as parasites is the type of harm unintentionally created. This is the slow but continuous depletion of resources, along two temporal axes. In the present, woods can only use human-occupied areas to expand, "eating up" the peripheral parts (i.e., fields and grazing lands) of the body of the "host" (i.e., human settlements). With an eye to the future, they are also draining the core of said body, such as the ability to see a continuation of the human presence in the mountains.

To this process, human communities seem to be reacting in two, apparently different yet compatible, ways. On the one hand, 'this eternal host gives over and over, constantly, […] enchanted, fascinated' (Serres, 2007: 7). Serenity and enchantment are the two most common feelings experienced by survey participants when they look at the woods around them, followed at some distance by worry and bitterness. On the other hand, while locals perceive the continuous expansion of the forest—tree by tree, year after year—, probably thanks to the emotional attachment to it, they also 'quickly rediscover their health, that is to say, their silence'. It is the proverbial silence of the forest,

but also, on a symbolical level, the silence that matures from the realization that woods have simply started to reoccupy and redesign the landscape when people have restructured their socio-economical organization. When this double process started to accelerate in the first half of the twentieth century, 'the parasite [the forest] intervene[d], enter[ed] the system as an element of fluctuation' […] 'A deviation, minimal to begin with' that did not remain so until it disappeared, but that managed to 'grow until it transforms a physiological order into a new order' (Serres, 2007: 198).

The new order seems to be one of suffocating resignation. On a general level, resignation derives from the understanding that the present is largely the result of past decisions (e.g., investing in the eyeglass industry), which looked advantageous when initially made, and of phenomena like climate change, which are unsettling in their vastness and complexity (e.g., in relation to what will happen to ticks and TBD pathogens in increasingly warmer Alps). With more direct reference to what to do with ticks, the concept of resignation captures well the attitude of the people who will probably continue to do as they have done so far, which is 'either you don't go out anymore, or you go and accept the risk and do what you can with socks, sprays, and showers. But you know that you can never be totally safe', shared a mother who cannot imagine not taking her daughter on their beloved hikes anymore. This attitude of negotiation with resignation reminds me of the Azorean horticulturalists met by Burger (2025), who experience and describe depopulation as a spatial phenomenon but, at the same time and specifically to resist it—at least on a moral level—, continue to cultivate their plots even though they know their land is lost. Similarly, in Valmorel (Fig. 1), the village where woods have parasitized mountain dairy farms by reaching their walls, pushing on their windows and damaging their roofs, the cheese production site in the heart of the little settlement has

recently been save by a team of volunteers from the "void" (Driessen, 2018) it seemed destined to.

Coming back to ticks, resignation also includes those people who, contrarily to the mother-daughter duo who do not want to give up hiking but will accept tick infection risk, prefer to be—or believe to be—totally safe. This is the case of a man in his Seventies who has frequented forests all his life but now 'there's no way I will take any risks. I'm done with them [the woods]'. Suffocation originates from the awareness that the effort of living with such resignation is and will be constant, because the point of multispecies equilibrium is, in this Anthropocenic velocity and volatility, always on the move. Woods, with their relentless approach to villages that brings along ticks and their pathogens, are the most visible symbol of this slow suffocation.

Conclusions

Nowadays, in the study area as well as other mountain territories in Italy and elsewhere, the present and future of the "mountain-as-a-whole"—in its ecological, climatic, social, cultural, economic and political dimensions *combined* (Zinzani, 2023)—is arguably a source of apprehension as never before, at least in recent history. This derives from the increased realization of the complexity and multifacetedness of the challenges to face, as well as of the difficult decisions that facing these challenges requires. Just to mention a well-known example for the Alps, the unpredictability, when not absence, of cold and snowy winters is profoundly shaking the ecological balance of plants and animals and the sustainability of economic activities from farming to ski tourism. The increased diffusion of ticks and TBDs, perceived by local communities and documented by public health authorities, is another case in point.

Whatever the parasite is—ticks, pathogens or woods, or all of them—, it seems appropriate to say that it transformed a physiological order into a new one, to go back to Serres. It is new because of three main reasons. First, in the Belluno area, ticks are not part of collective memory before the Seventies. Of course, this can be due to the fact that LD and TBE were not known yet, but the very experience of finding a blood-sucking being stuck in the skin is absent from the memory of the vast majority of the elderly people I have met. Second, ecology and human and veterinary health sciences have made fast and consistent progress in the past decades, but still many questions posed by scholars as well as TBD patients have not been answered yet. Third, the rapid transformations involved in living in the Anthropocene are intervening in the tick-animal-human-environment assemblage faster than ever, with the consequence that local communities are starting to feel overwhelmed by the unpredictability of this new order. So much so that many of them would probably describe it as a hard-to-accept disorder, like the people who spoke of ticks as ‘an avalanche’ in which ‘we are at an indecent level’.

That said, a feeling of resignation towards ticks-as-parasites and pathogens-as-parasites appears to be in the making locally, originating from the awareness that ticks can be found potentially anywhere (except at very high elevations) and that no easy, fast, absolute “solution” is realistically available to manage the overall risk of encountering them and, in case of pathogens in them, getting infected. On closer inspection, the local ethic of resignation also seems to stem from the understanding that the present situation is just the result of how forests, wildlife, ticks and people have lived alongside each other in the recent past. If woods have become parasites, the process that has led to this has its roots in long-standing multispecies agencies and interdependencies (Ogden et al., 2013):

> If some equilibrium exists or ever existed somewhere, somehow, the introduction of a parasite in a system immediately provokes a difference, a disequilibrium. Immediately, the system changes; time has begun. Change comes from a rupture in equilibrated exchanges. Change is the disequilibrium of exchanges. […] Without a parasite—that is to say, without asymmetry or disequilibrium– there is no irreversible, no change emerges, and time is unknown. (Serres, 2007: 182-183)

And if woods, with their wildlife, expanded without ticks and pathogens, they would actually be woods in disorder and in a ruptured equilibrium, because ticks and pathogens are understood by locals to be part of the ecosystem, even though most have virtually no historical memory of this prior to the Seventies. Yet, this lucid acceptance of woods-wildlife-ticks as an inescapable unit—at least at present—comes with a feeling of disorientation because 'what's the point of continuing to live in a place like this?', summed up a research participant who, anyway, feels that the reasons who keep him there are still stronger than the ones that make him doubt about what space humans should occupy in the mountain environment, to do what, and for what purpose. As Bull (2016) argues, 'the connection to the way that ticks feed on blood, and not exclusively human blood, wakens a whole raft of anxieties about blood intimacies, human exceptionalism and the integrity of bodily boundaries. More than just zoonoses, LD and TBE seem to be, in this socio-ecological context, perivallon-noses, from *περιβάλλον* (Greek, environment, habitat, surroundings) and *νόσος* (Greek, disease)[7]. In fact, it is not just the tick's saliva and the TBD pathogens that enter human bodies, but the whole environment—woods first—with its fragilities, struggles and unbalances. Hope (Kirksey et al., 2013) is now

necessary for finding the sense—with ticks (Beloff, 2022), pathogens and woods—of living with some balance in these, and others, more-than-human mountains.

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The author reports there are no competing interests to declare.

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[1] I use "she" for the tick both because it is so in my native language, Italian, and because the big, greyish, engorged tick we have in mind when we think of this animal is the adult female.

[2] Conducted from 2022 to 2025, this project combines observation, in-depth interviews, research in textual and visual archives and a qualitative-quantitative survey.

[3] In this paper, the name "Belluno" refers to the whole territory of the province of Belluno, the institution "Provincia di Belluno" and the province capital city of Belluno.

[4] I do not support the stereotype of the mountain as an exclusively bucolic, pristine, rustic place.

[5] https://www.gentedimontagna.eu/

[6] Control is different from elimination or eradication. Control involves 'having faith in the tick', while elimination or eradication would mean abandoning faith in the tick: 'abandoning faith in

the tick in this manner would be tantamount to my abandoning faith in the living world itself' (Hatley, 2011).

[7] Environmental infectious diseases are diseases caused by 'agents found in traditional ecological environments, such as air, soil, and water, in addition to vector-borne or zoonotic diseases, and those acquired from built environments (home, hospital, and community)'. https://hopkinsinfectiousdiseases.jhmi.edu/research/research-areas/environmental-id/