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Equine/Human Lyme Embodiments: Towards a Feminist Ecology of Entangled Becomings

"Felix qui potuit rerum cognoscere causas"
(Virgil, *Georgics* II. l. 490)

Living beings are complicated in the sense that they are folded into the world and the world is folded into them. This pleating both defines and sustains our lives. Much as immunology might want (us) to believe that self and not-self oppose one another, whether as friend and enemy or as thesis and antithesis, this framework cannot and does not account for the necessary intimacy that all life maintains with the world from which it arises... (Ed Cohen, "Self, Not-Self..." 38)

1. Preliminary thoughts. I will be proposing that Lyme disease is a phenomenon that puts in relief the limitations of the dominant mechanistic, reductionist, and materialist bias in the life- and medical sciences of our present episteme. I will be making this claim largely through an equine case of Lyme borreliosis and in the veterinary context, with explicit excursions into the human realm, but implicitly always with a view to the relevance of veterinary insights for the human medical setting. For this purpose, this essay will analyze the reductionist logic behind Lyme research in some detail before ending with an alternative veterinary approach. My project comes out of a desire for medicine to reaffirm some of its disavowed investment with healing, which it began to shed when it espoused scientific, determinist reductionism as its hegemonic method.¹ In Lyme disease (as in the myriad autoimmune conditions that have taken center stage in our contemporary health scene), biomedicine may have found its stumbling block from which it could learn that eliminating an infection is not only not the same as healing, but that the static self/non-self ontology undergirding immunology's approach to pathogenic micro-organisms may come to oppose or even obviate healing.

The epigraph by Virgil with which I open this piece condenses several of the most important elements of the dominant scientific ideology with which this writing takes issue. Its literal translation into English is "Fortunate who was able to know the causes of things," but often translations suppress the past tense of the verb ("potuit") and render it in the more generalizing, universalizing present tense. Dryden's well-known translation, "Happy the Man, who, studying Nature's Laws,/Thro' known Effects can trace the secret Cause," makes explicit the foundations of Science: it is "Man" who studies "Nature's Laws" (Virgil, *Works* 92). There is a unidirectional flow from a now

singular “Cause” to plural “Effects” (“things,” indeed, become “Effects”), and “Cause” is understood as secret, requiring the methodic intervention of “Man” who shall then be rewarded with happiness for tracing his way back, reversing the natural flow from cause to effects. With regard to Lyme disease and its presumed bacterial cause, I will be proposing to replace immunology’s continued hegemonic self/other ontology with an ecology of entangled coevolution, and multiple and multidirectional flows of causality,² and I will do so in reliance upon feminist science critique and ecofeminism (most explicitly Donna Haraway and Karen Barad) as one of my most prominent theoretical pillars.

2. Primary care. I found an attached tick on my arm (as numerous times before), but wasn’t particularly worried. I seemed to have caught it within less than 24 hours. There is the usual allergic reaction on the skin after a few hours. Itchy. Red. Still nothing to worry about. Then, about five days later, I develop a dull constant headache for about three days. It feels like the flu, but never quite gets there. Then I develop an itchy rash somewhere different from where the tick had attached. For two nights I am mostly sleepless, waking shortly after going to bed, all sweaty. For the first time in my life (and after many previous tick exposures), the energy-medicine practitioner (EMP) whom I consult tells me that he is reading a Lyme infection. I go to see my PCP (Primary Care Physician) during walk-in hours nine days after the tick incident, and three days into the symptoms.

The MD meets me with skepticism. Obviously I do not mention the EMP. She dismisses my insistence that the symptoms are classical acute recent Lyme infection. She says: your symptoms could be absolutely anything. I say that there is no consensus about the exact amount of time a tick needs to be attached to transmit *Borrelia burgdorferi* (Bb). She says: there is no controversy over this at all. The tick needs to be attached at least 48 hours. She says: we will test you. I counter: but tests are useless until at least 3-4 weeks after exposure. And even then, there are notoriously many false negatives. I say: please give me a script for doxycycline. Now she really begins to be irked. No, the tests are accurate. No need to wait for weeks either. How do I come up with all these ideas, she asks. Have you been diagnosed with Lyme before? I briefly explain that I have been dealing with Lyme in three of my horses for several years now. Raised eyebrows. I will write you a prescription of doxycycline for 21 days, but you will discontinue treatment if the test comes back negative. Sure! Her office notes read: “I think it is a low possibility that he could have a line [sic] infection. We discussed this at some length. He is very

concerned about Lyme disease and is very suspicious of this. We'll start empiric treatment and I will call him after we obtain the results of his labs..." (personal record).

Despite my needle phobia, and despite the general agreement among Lyme-savvy physicians and scientists that tests will not detect Bb. until at least 3 weeks after exposure, I decide to stick out being stuck in the lab because I am curious to see the result. Since I am also writing about Lyme, this has become mandatory field work. The result confirms my suspicion that I was given the two-tiers serological combination of ELISA (enzyme-linked immunosorbent assay) and Lyme IgM Western Blot tests. In other words, the negative test result is no surprise at all.

Against the PCP's recommendations, I stay on the prescribed empiric dose of 2x100mg of oral doxycycline for 21 days. At this point, my EMP does not detect Bb. in my body, and I begin to wonder whether I was infected this time at all. The biomedical tests certainly contribute nothing to the quandary. "ELISA is falsely negative nearly 50% of the time" (Global Lyme Alliance). My PCP's position, while still common among general practitioners, is clearly not supported by any of the biomedical researchers specializing in the field of Lyme disease. The more current position in those contexts is explained by Dr. Nevena Zubcevik, Harvard Medical School, who insists on educating medical students on the "gravity of this epidemic" (Stringfellow).

Zubcevik explains the dazzling array of symptoms from fever, fatigue, and joint disease to severe schizophrenia and dementia. She also acknowledges the unreliability of all existing testing for diagnostic purposes, arguing that Bb. have mutated into at least 10 major new strands that are undetectable by current tests. She equally dismisses almost every single one of my PCP's notions of diagnosis, transmission, and treatment by debunking, for example, the still-established notion that ticks have to be attached for at least 48 hours to transmit the bacteria to their new host (Stringfellow). However seriously and proactively she takes the epidemic (instantiated, for instance, in her call for long and intense antibiotic therapy in all patients suspected of having been exposed to Bb.), Zubcevik does not depart from received notions of what constitutes an infection; of the concept that successful treatment consists primarily in eliminating the "intruding" organism through aggressive and extended intravenous antibiotic therapy; or that treatment for Lyme disease is prolonged warfare against an extremely agile, "athletic," "amazing organism." While I see Zubcevik's position as an important antidote to the denial and patient-blaming of physicians like my PCP, in this article I ultimately call for a more radical reconceptualization.³

3. Testing. The point of this essay is in part to explore to what extent human medicine might learn from veterinary medicine. Before going into the more conceptual and technical aspects of this exploration, consider the following practical and political implications: as I have experienced first-hand, many mainstream MDs continue to prescribe the “two-tiers” testing system of ELISA and Western Blot, even though mainstream biomedical researchers with varying and opposing positions (see Auwaerter; Stricker; Stringfellow) agree that it misses up to, or more than, half of all Lyme infections. This has to do with the timing of testing, with the lack of sensitivity in the first tier, and with the fact that it tests for human antibodies in the blood, even though Bb. is known to be an immunosuppressant pathogen. With most other bacterial infections a culture test is the gold standard (i.e. a test that measures the presence of bacteria rather than antibodies), yet the Food and Drug Administration has not approved such testing for human Lyme.⁴ This has consequences on what insurance will cover. When my copy of the invoice for the combined ELISA and Western Blot tests arrived in the mail (a bill the average patient ignores, since the lab bills directly to the insurance, which covers these approved tests), the figure billed was \$824. For a test that has a proven 50% failure rate, this is a steep charge, and completely artificially inflated. In comparison, the more sophisticated and useful Cornell Multiplex Lyme test for horses costs \$100. Since equine health insurance is still unusual, the typical horse owner pays this out of pocket. If my PCP, who prescribed the ELISA and Western Blot to me, had to look me in the eye and say: I’m going to have you take a test that has a 50% failure rate, and it will cost you \$800+, she might have done her research before prescribing it. And perhaps a universal and affordable health care system for humans would not be as impossible as it appears to be in the USA in 2018.

Lyme disease is a complicated matter. The ubiquity of the illness continues to be dismissed among sectors of the medical community. Others blame all and every ill on Lyme, which directly fuels the dismissive attitude of the former. Both attribution and denial operate with the same monocausal model of illness based on pathogenicity rather than bacterial cohabitation. Since no reliable and approved test exists, no one can refer to the ultimate “objective” arbiter to calm agitated minds. Myalgic Encephalomyelitis, fibromyalgia, Multiple Chemical Sensitivity, PTSD, and many autoimmune conditions and other “evolving diseases” all bleed into each other.⁵ What do we mean by “Lyme disease”? The debate about whether to speak of Chronic Lyme Disease or to call it a post-infection syndrome is indicative of a conceptual clash.⁶ Is Lyme a discrete and distinct thing? What are the lived realities of cross-species entanglements in these phenomena? I am proposing that borreliosis demands a serious

rethinking of what conventionally constitutes diagnosis, etiology, treatment, and cure of an infection.

4. Toward multispecies entanglements. One of the central theoretical questions of this project concerns the category of “species” itself. Biology continues to use it taxonomically to delineate supposedly discrete entities. Inspired by Haraway’s notion of “companion species,” I will suggest instead that species are “the dance linking kin and kind” (“Encounters” 100). Margulis and Sagan’s theory of *symbiogenesis* is foundational for Haraway’s writing about the mingling of companions: *cum panis*, at table together. If we pay symbiogenesis more than lip service we cannot return to the supposed stability of species as discrete and distinct ontological entities, to the metaphysics of essence and origin. From this perspective, “bacterium,” “arachnid,” “human,” or “horse” are no longer even convenient relay stations, but inadmissible reductions. Whether you personally relate to horses or not, it makes no sense to talk of humans separately from equines because they share between five and thirty thousand years of becoming together, and this process is also inadmissibly reduced when described as “domestication,” that is, a unilateral action of the human actor (“figure”) upon the non-human, so-called natural world (“ground”), whereby the horse is understood as affected by the process, but the human is not. By studying species as a process, the established figure-ground relations that characterize our current thinking come undone.

Some of the most interesting challenges to stable ontology from inside Western science come from micro-biology, specifically research on the human microbiome and the brain/gut interface. Many researchers have demonstrated that roughly 90% of the cells that inhabit the space I have come to consider “my” body actually carry a genetic code other than “mine” (Mayer 17). But what can I claim to be properly “mine” then? The notion of the “proper” itself is at issue. What biology, like psychoanalysis, discovers is that the self is thoroughly constituted through the other(s), but our grammatical logic continues to lag behind. The Symbolist French poet Arthur Rimbaud famously said: “I is an other” (not: I *am* an other, this is crucial because it breaks with the grammatical logic of subject/verb agreement). But to write non-poetically, I am obliged to function within a grammatical/logical structure that contradicts at every point what I am attempting to think: “I” am forced to say “I,” even as “I” work to undo the “I.” As gastroenterologist Emeran Mayer suggests provocatively: “Are our human bodies just a vehicle for the microbes living in it? Do the microbes manipulate our brains to make us seek out foods that are best for *them*?” (Mayer 18). And even here, what disappoints grammatically is the continued positing of an ontological opposition between “us” and

“them.” One has to be subject, the other object, one runs the show, the other obliges, even as they are fooled. The fact that Rimbaud’s agrammatical conjugation (“I is”) continues to be “wrong,” suggests that there is still no intelligible language for an ecology of multiple becomings, for the way in which we are already conjugating, or “yoking together,” in the body.⁷

What are the *naturecultures* of an entanglement between Bb, an arachnid species defined as deer tick or *Ixodes scapularis*, and a slew of warm blooded organisms, including humans, who become hosts to the Lyme bacterium through the dance and hunger of the deer tick who, during its life cycle from larva to nymph to mature arachnid, needs a red blood meal three times? How are we already conjugated/yoked together?

5. Entangled species and environment. In addition to seasonal change, another variable in this “dance linking kin and kind” is geographical space. “Lyme” is a specific geographical reference. Old Lyme is a small town in South-Eastern Connecticut near New London. It is the place where human cases of Lyme disease were first noted in the mid-1970s. Whether you subscribe to conspiracy theories or not, there is little doubt that the disease is perhaps not so much “man-made” – implying an autocratic position of control and unilateral agency akin to Haraway’s “God trick” (Haraway, “Situated”) – but has, in its epidemic dimensions, and as a Baradian *phenomenon*, resulted from *agential intra-actions* between *Homo sapiens* and many other species in a specific environment. Karen Barad’s notion of *agential realism* is central to my project. I am unable to give a full account of her materialist reworking of feminist, queer, poststructuralist notions of performativity, which serves the need to reconsider “matter” (and more generally non-human ontologies) and its contribution to historicity, agency, change. At the core of her thinking, she interrogates the notion that the “existence of relations requires relata” (Barad 130), a critique that makes it “possible to acknowledge nature, the body, and materiality in the fullness of their becoming.” In this new “performative metaphysics” beings, things, and identities do not predate or pre-exist their *intra-actions*. In fact, they constitute *phenomena* instead of being independent and pre-existing relata (existing prior to their relations, that is). For my particular purpose here, there is no “uninfected” or “pure” human or horse, but species always already form *intra-active phenomena* with bacteria. Indeed, they are constituted as phenomena in and through these *intra-actions*. This Lyme *phenomenon* has many aspects, one of which is climate change. Population density and type of land use (suburbanization) have significant consequences on the balance of established patterns of *intra-action* between species, the climate, the environment. Deer ticks have massively

populated the Northeast over the last 20 years due to a combination of complex factors: milder winters, wetter environments, altered networks of predation, and other species-based *intra-actions*.

Reduced biodiversity has been shown to have not only increased the number of species favored by deer ticks, but also those that, due to their specific biochemical make-up, offer a perfect reservoir for Bb to thrive (see LoGiudice; Ostfeld). Consider Thom van Dooren's reference to "functional extinction" which "may well be followed by an actual extinction in coming years" (van Dooren 55). Van Dooren criticizes the dominant definition of extinction as based on the death of the last individual of a species, rather than the entangled ways in which species interface with each other. This dialogue with Haraway's notion of species as a gerund rather than a noun is highly relevant here. One likely factor in the spread and epidemic dimension of Lyme disease in recent years seems to be the functional extinction of several species, a lack of biodiversity in the increasingly suburbanized landscape of the American Northeast and beyond.

The biochemical *intra-actions* between bacterial antigens and an organism's antibodies need to be reconceptualized along similar lines, interrogating the epistemological foundations of immunology in an ontology of stable relata that are presumed to pre-exist their relations. Discussing allergy and autoimmunity conceptually, Michelle Jamieson criticizes the "assumption that cause can be confidently located in a discrete entity — be it antigen (in cases of infectious disease) or organism (in cases of immunopathology). Both positions rest on the idea that organisms and antigens have fixed or given identities" (20). The vehement disagreements over the use of the term chronic Lyme disease (is the cause a microorganism? Or is it autoimmunity? Or is it "mental"?) would seem to collapse outright before the insight that Lyme disease as a *phenomenon* cannot and should not be located "in a discrete entity," but rather must be approached as an ecological crisis, as a question of finding balance in *intra-acting*. This ecology also includes the so-called "co-infections," the realization that multiple other microorganisms (such as bartonella, mycoplasma, fungi, viruses in the Herpes family, and other "stealth infection" agents, who are always present in all earthly environments) begin to *intra-act* adversely within Lyme *phenomena*, and may actually come to be the main instigators of misery for the implicated mammal. Tetracycline-type drugs and their agential talents may or may not be the best part of a strategy for addressing the ecological crisis of any given Lyme *phenomenon*, that is, the *intra-actions* between patients, multiple microbes, environment, exercise, history, etc.⁸

6. Bb. as an unusual form of intra-action. Bb. is an unusual species, or rather, form of *intra-action*. Its genetic complexity is striking. It possesses more than 1500 gene sequences, significantly more than other spirochetes, for example *Treponema palladium*, which is said to “cause” syphilis and is one of the most complex bacteria known with its 200 gene sequences. Bb. is not only multiple times more genetically adaptable to its environment than any other known bacterium, but disposes of so-called “stealth pathology” which includes immunosuppression in the “host” (see Stricker, 149-50).⁹ Due to its specific outer surface proteins (OsP’s) — and again, the possessive pronoun “its” is an inadmissible reduction, especially here because “its” outer surface is the most obvious locus of *intra-action*, the contact zone — , its outer surface “mimics” the saliva of the tick as the future “host” is pierced by the tick’s harpoon-like hypostome and can hence invade the warm-blooded “host’s” blood vessels without being detected, unless the “host” is allergic to tick saliva, which, it was discovered, significantly reduces their chance of being infected (see “*Borrelia burgdorferi*”). So an allergy, an immune pathology, is actually a good thing. I am interested in thinking through this *intra-action*, which I deal with almost daily between April and June and between October and December, as I pull ticks out of my horses’ and my own skin.

We are used to the war rhetoric in the pamphlets issued by the CDC, as well as general, popularized discussions of medical interventions. We give shots, fight the flu, wipe out or nuke cancer cells, and a healing process is a battle with an enemy that needs to be beaten and killed. In alternative medical circles, similar rhetoric prevails touting Bb.’s “tricky” nature. With its outer surface functioning metaphorically like a dress-code or performative appearance, it mimics something it is said not to be when it enters the mammalian body. The discourse — the notion of trickery, or performative deceit — clearly assumes that mammal and Bb. have distinct and stable ontologies, even and especially as those are subverted. It is this subversion that is assumed to cause illness and pathology. In more mainstream medical literature, the term “cloaking mechanisms” describes the bacterium’s ability to hide in the “host’s” body by binding to substances such as collagen and proteoglycan, thus avoiding the “natural” or “healthy” immune response (Stricker 150). Bb. is suspected of hiding inside the body by encysting and masking itself.¹⁰ The symptoms that an infected/subverted body produces equally mimic many other common illnesses such as the flu, arthritis, multiple sclerosis, Parkinson’s, lupus, myalgic encephalomyelitis, heart disease, and depression, thus subverting medicine’s diagnostic processes. Similarly in horses, the veterinarian’s diagnostic prowess is subverted when Bb.’s influence mimics other illnesses and conditions (laminitis, uveitis, osteoarthritis, neurological diseases like EPM, etc.). The

fortress of the good, self-identical self comes undone by the evil invader. The medical advocate and soldier is mocked and derided.

Therapy is equally as elusive and tricky as diagnosis, following once again the self vs. enemy logic. The tetracycline arsenal has proven somewhat effective when administered in the early stages of the illness, but Bb. often seems to dodge all therapy to some degree, and maintains its footprint on a body it has managed to turn into its habitat, even if through that ultimate subversion of self-other stability: by having turned the “host’s” immune system against itself (autoimmunity). What concerns me about this discourse is that it fully remains within immunology’s metaphysical scheme, that it fails to see the entangled agency of all organisms involved, that it misses the *intra-action* at the feasting table of Haraway’s mess-mate mingling. The predominance of the enemy and warfare paradigm stimulates a paranoid imaginary, like in so many other pandemics before. Lyme becomes the master paradigm. Everything is Lyme.

7. Caspio the Lyme horse. My account of Lyme disease involves the companionship (in its more colloquial acceptance) cultivated between several equines and their human guardian, myself. We live in New England, one of the world’s headquarters of Lyme disease. One of my equines, Caspio, is a pure-bred member of the “Pura Raza Española” (PRE) or Pure Spanish Breed, one of the oldest breeds in the world, the horse that invented Classical Dressage together with certain Renaissance Gentlemen, our discipline and art form of choice. Caspio has chronic Lyme disease. In his case, it has produced arthritis, muscular weakness, gastro-intestinal symptoms, fatigue, and difficulty breathing, all of which flare up in more or less regular intervals.

Caspio came to me in a state of starvation and utter neglect. I restored him back to health and good weight over the period of a year, except that Lyme is here to stay. Nevertheless, as a horse of great athletic quality, he has regaled me with his talent in times of healing. His abuse and neglect have much to do with the unbalancing of his immune system, since horses are generally less symptomatic to borrelia infections than dogs and humans, though certainly by no means asymptomatic like cats and opossums. Veterinarians, nevertheless, claim that a clear equine Lyme titer is virtually unheard of in New England.¹¹ The frequent disconnect between antibody titers and clinical symptoms underscore the fact that infection is not the same as illness, and that the elimination of “invading” pathogens is often out of phase with wellbeing. Within the equine species, genetics perhaps is an additional component that explains why certain horses are more symptomatic. Caspio’s line-breeding (inbreeding) coefficient is unusually high, and reflects the human desire around modern companion breeding.¹²

In the human context, most Lyme savvy health care providers agree (as does the CDC) that diagnosis should be based on symptoms, not tests. In the absence of verbal human language to communicate the experience of symptoms, this diagnostic process is even more “soft,” or based on “subjective” factors, because much of those symptoms have to be read through the perception of the human, both owner/guardian and veterinarian. Not that pain could ever be measured quantitatively in any organism, but Caspio’s joint pain, for example, particularly when not dramatic, will become legible primarily through my experience of his movement in my own body. If his sacroiliac joint moves less fluidly, it will become noticeable in my lower back when I ride him. It will also appear in the wear patterns of his hooves. These additional interpretive interfaces, which concern symptoms whose lack of specificity could point to all manner of other causes as well, makes many veterinarians more liberal in prescribing doxycycline “just in case.”¹³ Others insist on the quantitative interface of serology, at least since the advent of the Cornell Multiplex Lyme Test (CML). In 2012, Caspio took the CML, which yielded a high antibody titer (12,000) in the chronic register, and his current veterinarian prescribed a three-month course of doxycycline, during which time his symptoms, particularly hind end joint stiffness, and GI-tract dysfunction, improved noticeably. He was tested again, and his titer had come down to the equivocal range (1,100). A few months after the conclusion of antibiotic therapy, his symptoms returned more strongly than previously, but when tested, his titer was not nearly as high as previously (5,000). His veterinarian prescribed an additional 2-month course of oral doxycycline, which brought only the slightest, if any improvement.

8. The Cornell Multiplex Lyme test. Like the ELISA and Western Blot tests, the CML is also an “indirect” test: it measures equine antibodies rather than measuring the presence of Bb. antigens in body fluids, or culturing the bacteria in a body fluid sample to corroborate its presence. In this sense, the CML must be subjected to at least one of the same central criticisms leveled against the ELISA and Western blot tests, in that it is problematic to test exclusively for antibodies to an organism that is known to be immunosuppressant. Nevertheless, the CML presents a sizable advance in usefulness over the ELISA test, not only because it has proved to be more accurate and sensitive (with far fewer false negatives), but also because it measures differentially the antibodies to different Bb. antigens and outer surface proteins (OsPs), and then proceeds to quantify them. It thus allows us not only to differentiate between acute new infection (where antibodies to OsP-C’s predominate) and chronic long-term infection (where OsP-F predominate), but also to quantify the degree of infection (see

“Multiplex” 2). The very fact of this distinction between OsP-C and OsP-F levels in the CML takes a position on the chronic Lyme disease controversy in the human context.

While a widespread position in human medicine continues to insist that there is no “chronic Lyme disease” but rather only “post-treatment Lyme disease syndrome,” and that therefore long-range antibiotic therapy is not indicated (Auwaerter), Cornell’s equine veterinary perspective clearly allows for quantifiable “chronic stages of infection” (“Multiplex” 3) also, and especially, after “successful” antibiotic therapy. As seen further below, the Cornell “pony study” also proved that doxycycline therapy does not completely eliminate Bb. from the infected horse’s body (Divers 2).¹⁴ Chronic Lyme disease is therefore not a controversy in veterinary science, but rather a life-long condition to be managed through appropriate treatment and care. These are important clinical insights that point in the direction of species entanglements rather than separate ontologies, but no matter how much we rejoice in being able to put objective numbers to a titer (as the CML does), individuals deal very differently with different levels of antibodies, and the concrete meaning of an objective number is therefore quite tenuous for patients and their treating physician.

How was this test developed? The CML is probably the only formal research project on Lyme disease in horses, conducted in 2003 by the Animal Health Diagnostic Center at Cornell University’s College of Veterinary Science. “Because of the high seroprevalence in horses in the Northeastern United States and numerous phone calls asking about Lyme disease” (Divers 1), in 2003 a research team decided to conduct a formal study with the following objectives: (1) understand the infection rate of horses exposed to ticks infected with Bb.; (2) study the treatment options and outcomes; (3) study the effectiveness in protecting previously uninfected horses by administering a vaccine, based on injecting OsP-A antibodies, and currently in use and approved for dogs. For the purpose of this study, Cornell acquired 12 “pathogen-free” ponies, on 8 of whom infected deer ticks were placed for 7 days, and 4 of whom functioned as “control ponies” who were exposed to ticks that did not carry Bb. (Divers 1). All ponies’ serum levels of antibodies were studied continuously for nine months at which time they were all euthanized in order to conduct autopsies. Separate studies were conducted for vaccine development and treatment.

While the report does not give the exact number of ponies used for the vaccine and treatment part of the study, if we assume that a number equal to the one in the infection study was used, the total number of ponies used and killed would come to 36. To rehearse in all its cynicism a utilitarian position, still prevalent even in much animal

rights discourse to this day: given the amount of unwanted equines who are either euthanized annually, or sent to slaughter in Mexico and Canada, does not 36 appear to be a low price to pay for such a valuable study, which has answered pressing questions, put before the researchers by “numerous phone calls about Lyme?” After all, I myself have used the Cornell Multiplex test, developed in 2011 in direct reliance on this study, several times over the last years for Caspio (and two other horses). So is there real benefit?

In *When Species Meet*, Haraway insisted that one of her primary goals was to expose human exceptionalism and the subsequent carnophallogocentric logic that makes animals other than humans “killable” by definition, which is also why we don’t have a comparable study to the Cornell pony study on humans. In other words, legally speaking, killing a non-human animal is by definition never murder, and therefore we can kill 36 ponies after 9 months of experimentation to conduct conclusive histological studies. Carnophallogocentrism means that we cannot do the same thing with human test subjects.¹⁵ But Haraway cautions us that veganism — one of the main contemporary strategies against carnophallogocentrism — is a fantasy of escape from the heavy, even excessive, ethical weight placed on us if we stop considering other animals “killable:” “Outside Eden, eating means also killing...” (296). No human can ultimately escape completely from the logic of sacrifice. The important distinction here is between “making killable” categorically, which she rejects, and concrete and situated killings, which she defends “for reasons and in detailed material-semiotic conditions that I judge tolerable because of greater good calculations” (87). Her conclusion to the dilemma, if we can even call it a conclusion, is that, perhaps, we need to learn to kill better (better than in a human exceptionalist fashion where causing an animal death is a not a crime by definition), but also “get better at dying instead of killing” (81). The implication in “dying better” is that, on a case by case basis, certainly not every animal experiment is ethically responsible, even if the direct positive outcome of it saved a human life.

Haraway rejects the apparent clarity and abstract elegance of rational utilitarian calculations. What complicates matters further is that, in my case, the benefactors and the sacrificial animals are of the same species, except that some are somebody’s treasured and personal companions, and others are anonymous lab ponies, “used,” “infected,” “studied,” “euthanized,” “dissected” (Divers). Quoting the biologist Marc Bekoff, Haraway suggests that his “make-or-break question is, ‘Does the research benefit the animals?’” (87), further explaining that “[a] question like Bekoff’s is not a moral absolute but a needed, mortal, focusing practice in a soul-numbing, situated

history" (88). Haraway distinguishes between animals as "individuated critters" and "kinds" (she understands the latter as "mortal and fleshy knottings, not typological units of being") (88). While we can affirm that animals (horses as kind) benefitted from this research in some ways, the research report gives us no indication as to whether the research ponies as "individuated critters" have, in any manner, benefitted from this research. Have they, for example, been afforded a richer, more livable life while serving at Cornell University than before they were chosen? Given the traditional parameters of the study (where lab animals are generally reduced to being machine tools), this is doubtful. Since I cannot explore this question concerning the individuated ponies in the sort of detail that it would require, I will instead look critically at some of the limiting outcomes and implications of the Cornell study as a measure of the benefit for horses as kind in order to discuss what "killing or dying better" might, or might not, mean in this case. Based on this analysis, I will suggest that the study can, indeed, not be justified as ethical. As I have demonstrated in "Reading Blood Work Is an Art Form," there are alternative veterinary studies on metabolic conditions in horses, based on real-life "field experience," that have not only avoided producing sacrificial victims by using equine patients that are already ill, but have also proven to be more useful for the simple reason that they avoid the artificial strictures of scientific reductionism, considering cases in the fuller complexity of real life scenarios, at the peril of limiting so-called objectivity, reproducibility, double-blindness. Such extensive non-formal studies, however, do not exist for borreliosis.

Presumably the main reason for acquiring "pathogen-free" ponies specifically for the study, for infecting them artificially, and then ending their lives all at the same moment even though there are already plenty of infected individuals in the world, is the notion of controlling the variables in order to produce objective knowledge. The canonization of the double-blind study in the human context, and the "placebo effect" that haunts medical objectivity, have been studied by Ed Cohen. In veterinary contexts, interestingly, the placebo is presumed to be absent due to the alleged inability of non-human animals to comprehend the treatment protocols and therefore to "imagine" improvement or cure.¹⁶ The standardization processes of reductionism, however, are applied here in exactly the same fashion as with human clinical trials. All ponies are housed under the same conditions, and infected by the same, lab-controlled ticks, are treated in the same way and at the same time. However, given the unknowns in background and predisposition, these controlled factors seem powerless to produce objective data on the backdrop of such a low number (36) of test subjects. To begin with a central claim of the study, to have used "pathogen-free ponies." Given that a good 50-80% of all deer ticks in New England may carry Bb., it is impossible to assume that any

equine in the Northeast has not been exposed to them. Even a pony without any antibodies in its serum could have been exposed previously, and might have other responses to infection than a pony that had never been exposed to the spirochete. In a personal conversation with a veterinarian marginally involved with the “pony study,” I learned that the conditions under which the ponies lived previously was largely unknown and considered irrelevant by the researchers. So what does it really mean that they were “pathogen-free,” other than being an unverifiable foundationalism? The study also mentions that, of the 8 ponies exposed to Bb. infected ticks for 7 days, 8 showed positive titers at the various intervals where serum was tested and skin was biopsied. How many ticks were placed on each pony is another unreported detail that would seem to be highly relevant based on my own and other horse guardians’ experience. At autopsy, all of them showed various, though differing degrees of Bb. presence in various body parts. Since the study ended after 9 months with euthanasia, it is unknown whether more time might have led to a higher degree of elimination of the pathogens. The study’s limited time factor of nine months gives little useful information to the average horse owner, who will presumably not euthanize their horse nine months after exposure to Bb., and will likely never even know when first exposure occurred.

Furthermore, while the objectively measured presence of OspA, OspC, and OspF antibodies in the ponies’ blood serum is certainly useful information, we learn nothing about whether the ponies actually showed clinical symptoms, and if so what symptoms. Since this is what really matters to the horses and their guardians, the study is again of limited value. Clinical symptoms produced by infection with Lyme disease are notoriously difficult to quantify, or even to attribute to Lyme. In human medicine, such an evaluation would need to rely on qualitative research, a methodology often dismissed in science as “too soft” or insufficiently generalizable.¹⁷

With non-human animals, such an approach meets additional challenges of translation because the patients cannot articulate their symptoms in human verbal language. More creative, even “softer,” and highly labor-intensive methodologies would have to be part of the process. Often horses are diagnosed with Lyme when their owners insist that “he just doesn’t feel right” or “she has never been so crabby when asked to canter.” So since such a really useful part of the study (which symptoms occurred in each pony) would have been impossible to carry out within the parameters of a formal, quantitative scientific study, it seems as though the study avoided it by hiding behind the

reductionist mantra of histological and serological data rather than question the larger epistemological frame.

Another important part of the study with potentially useful information for antibiotic therapy for infected horses is the treatment portion of the study. Parallel to the infection study, an undisclosed number of ponies were infected and then treated with either oxytetracycline IV or doxycycline administered orally. Treatment lasted for 3 weeks, and the ponies' antibodies were tested continuously from beginning of treatment to 4 months after the conclusion of antibiotic therapy, at which point the ponies were euthanized and autopsied. The study concluded that Osp antibodies declined steadily in the ponies treated with oxytetracycline IV. Ponies treated with oral doxycycline "produced inconsistent results in serological response and culture findings" (Divers 2). The preference for IV therapy with tetracycline is based on a study that lasted all of four months. There are several serious problems with this outcome. First of all, again the clinical setting in no way reflects the reality of real life horses "in the field." Most owners do not test their horses for Lyme titers on a daily, weekly, or even yearly basis. Titers, as a general rule, will only be pulled when there are clinical symptoms, which normally implies a much longer infection period than the one of the "naive" ponies studied. Secondly, IV therapy is of considerable impracticality. Oxytetracycline is particularly problematic, as any amount injected into the tissue around the vein can lead to lesions, and therefore requires an experienced hand at venipuncture (and a highly compliant horse). Generally the most practical solution is to hospitalize the infected horse because of the exorbitant cost of barn calls and unavailability of veterinarians on a daily consistent basis, including weekends and holidays. But hospitalization is usually not only also very expensive, it is for many horses, if they are not used to frequent travel and change of environment, connected with extraordinary stress, which is likely to suppress the immune function. I have found that few Western veterinary practitioners are attuned to those psychological dynamics in horses (neither, of course, are most MDs in the human context).¹⁸ So the only really practical solution is oral doxycycline in most cases. However, anecdotally veterinarians have found that three weeks of doxycycline is insufficient to suppress the activity of Bb. in infected horses enough to make a difference. Most vets will prescribe between 4 and 10 weeks of doxycycline therapy, just like in human medicine where Lyme specialists have had to go against established protocols concerning the length of antibiotic therapy to help their patients more successfully.

So once again, the study is of seriously limited usefulness as it discontinued doxycycline after three weeks and cavalierly concluded that it "produced inconsistent

results" (Divers 2). And this critique is really only beginning to scratch the surface of a myriad of variables not taken into account in any of the three formal studies, such as exercise and fitness level, nutrition, psychological well-being, weather and climactic conditions, breeding and genetics, training background, bonded-ness to each other, living conditions before and during the study, general health status, feet shod or unshod, teeth balanced or not, biomechanically correct training/schooling, etc. I'm not "being over the top." These factors have all, "anecdotally," been of crucial importance in whether horses will even show clinical signs, and if so, how they live with them and whether they are able to live active, useful lives despite the infection. Biomedicine continues to disavow the relevance of these "anecdotally" crucial factors. In other words, is biomedical science an enormously expensive, abstract, reductionist, ethically and monetarily costly enterprise with next to no applicability to the real life individual? Years of both CML testing and doxycycline therapy had brought insignificant improvement for Caspio's quality of life, and it began to dawn on me that diagnosis and treatment are not only frustratingly out of sync with healing, but may indeed be antithetical to it.¹⁹

9. The healing of a holobiont. Haraway's most recent return to theorizing symbiogenesis clarifies some of the above quoted statements about human nature as an interspecies relationship. She proposes that we do away with older conceptual biological models such as host/symbiont, and even symbiosis itself to the extent that it implies a hierarchy between a main organism and its associates, and replace it with holobiont as a model that captures the continuous becoming with many organisms within ecological chains: "To be animal is to become with bacteria" (*Staying* 65). In order to do justice to the "sensuous, juicy, chemical, biological, material-semiotic, and science-making world," we must reject the "zero-sum game based on competing methodological individualists" (66), in other words, refuse immunology's immune self against the rest. One of the implications of this "juiciness" that I wish to press is that animals (humans and equines in this instance) have evolved to be holobionts with bacteria, are making world(s) together. To conceptualize our coexistence even with the so-called "good bacteria" (the microbiome) as symbiosis marks an inability to relinquish the fantasy of a stable, bounded self "at the helm." But the sheer idea that pathogens form part of a holobiont continues to be utterly foreign. As I suggest elsewhere in reference to the evolutionary biologist Rob Dunn's work on Crohn's Disease and intestinal parasites such as hook and pin worms (Gundermann), what would it mean to include a pathogen like the spirochete Bb. within the notion of a human or equine holobiont? Can we imagine this "becoming together" as a creative, a "juicy" kind of

world making? Is there any role for Bb. in the world of humans and equines beyond trying to eliminate it?

In the remainder of this section, I wish to discuss two “juicy” strategies for the thriving of Caspio and Bb. as holobiont, for creativity, athleticism, and quality of life in the face of chronic Lyme disease, after biomedical (antibiotic) treatment was completed with, at best, temporary and partial success. I want to take seriously what Haraway suggests when she says that “to be animal is to become with bacteria” (65) where infection is assumed to be a necessary component of critterly complexity, which would have to mean that pathogens are part of the game. How to thrive with pathogens, particularly when their elimination is increasingly not an option?

One of the strategies we have pursued is a medical modality that understands infection differently from Western biomedicine, a medical approach that explicitly seeks to “negotiate” a form of being together with the pathogen: a form of therapy that is not founded on the notion of an originally pure organism who then became infected, and for whom medicine fights to restore this putative original purity as birth right. Diplomacy rather than modern war fare. In Jamieson’s words, this is “an ongoing intimacy or conversation” (22). Health, understood in this way, is a continuing balancing act. Balance also refers to our other strategy, in a very literal sense. No less important, and practiced in conjunction with energy medicine, is an artistic, creative endeavor of bodily expression, classical dressage, which is based on ancient rules of biomechanics and equitation and whose prime esthetic goal is mental, physical, and emotional balance in movement.

10. Stomach-36/Zu-san-li. After a strongly Western-based early career, Dr. P., DVM, has, over the past years, immersed himself in Chinese medicine. Years ago, Dr. P. had treated Caspio with antibiotic therapy according to Western protocols. With conventional veterinary methods, he then attempted to diagnose Caspio’s ongoing challenges with hindlimb soundness, and there were no results. Nothing was overtly “broken,” yet Caspio was not right. He was weak, stiff, lethargic. For a number of years, I quit consulting with Dr. P. During those years (and dissatisfied with the limitations of conventional medicine for helping his patients heal), he began acupuncture training and developed experience in the field. I consulted him again about Caspio in 2016. I described to him in detail what I understood to be Caspio’s key issues. His three main areas of concern are his lungs, his GI-tract, and the large joints of his pelvis and hind legs, the “motor” of the dressage horse. I told Dr. P. that Caspio’s symptoms appear in periodic waves, in a rhythm of between every 5 days to every three weeks, depending

on various factors including season, diet, temperature, and stress level. Those rhythmic waves of symptoms pointed toward what in immunological parlance would be called an autoimmune turn after incomplete resolution of an infection. As Vicki Kirby has argued, autoimmunity points to the “foundational quandary” at the core of immunology, an ontology of fundamental hostility between self and other (48). Rather than understanding autoimmunity as immunology does as an error or exception to the function of the immune system, I suggest here to see it in line with other ecological imbalances derived from the sufferer’s disturbed companionship with other organisms. Just like, at the macro level, the prevalence of Bb. in our environment in the Northeastern U.S. is likely the result of ecological disturbances in chains of predation, the chronic infection or autoimmune turn points to such a disturbance at the micro or ontogenetic level.

While other veterinarians had told me that the weakness particularly in his stifle joints and connected muscles were due to osteoarthritis in the stifle and hock joints (something that could only be treated with steroid injections into those joints), I knew that his joints (and his ability to move and carry himself with strength) always deteriorated when he coughed a lot and concomitantly suffered from bouts of diarrhea. His lymph nodes were also typically swollen at those times. As soon as the diarrhea passed, the strength and self-carriage improved almost within hours. Those veterinarians told me that those issues were unrelated, and their seeming connection coincidental. Lyme infection was resolved through antibiotic therapy, in this view. The joint problems were mild osteoarthritis, and respiratory and intestinal symptoms were currently unexplained, but could be explored further with endoscopy, if they were serious enough to warrant invasive diagnosis. Their migrant nature seemed to counter this way of proceeding. I could not resign myself to this conclusion about a lack of connections, but conventional medicine offered no epistemological or therapeutic model to address my observations. Dr. P. listened to my detailed descriptions, pondered them, and finally said that my descriptions made perfect sense from a Chinese perspective. The lung and the colon are pair organs, husband and wife, and when the husband is weak, the wife also suffers by having to work twice as hard. Dr. P. suggested that rather than throwing more harmful doxycycline at Caspio (for his possible chronic Lyme infection), we were better off “tweaking his immune response” by other means. “Working with” or “tweaking” the immune system to counteract a possible autoimmune response differs substantially from conventional approaches to infection and autoimmune disease. With autoimmunity, conventional medicine merely

suppresses the immune system wholesale (with drugs in the steroid family such as prednisone), which will then also suppress the immune response to pathogenic activity.

Dr. P. believed that Caspio's joint issues would improve with successful treatment of his lung and colon. In our second acupuncture session, one of the acupuncture points he decided to treat was Stomach-36, or Zu-san-li (Leg-three-mile point), because we were headed to a dressage clinic, and he wanted to give him extra stamina. He said it was a point for supporting the stifle, but was also considered a general point for immune support, and was a master point on the stomach meridian, affecting the GI-tract as well. In other words, in Chinese medicine these connections between lungs, gut, and large hindlimb joints are systematically understood. The fundamental difference between Western, reductionist-materialist approaches to the body, and how traditional Chinese medicine conceptualizes it, lies in the term "xi" (energy). The connections between lung, gut, and joints are not understood as primarily biochemical or anatomical in nature, but as energetic. While traditional Chinese medicine also has a biochemical register (similar to the pharmacological western one) when it administers herbs, crushed insects, and other substances as pharmakon, acupuncture, like Western forms of energy healing such as homeopathy, intervenes within the patient by influencing what it conceptualizes as energetic fields or streams. Inserting needles in nodal points along "meridians" that are understood as rivers of energy on the body's surface, acupuncture seeks to undo blockages, stimulate deficiencies, and deflate overabundance, thus rebalancing a disturbed field of energy that is "out of kilter." In this sense, it is not so much that lungs, gut, and hind limb joint, confluencing in the acupuncture point Zu-san-li, are anatomically connected (although of course the body, the individual, and the environment, are always physically connected as well), but that the energy flow between them is understood as particularly significant.

When Dr. P. inserted the needle into the Zu-san-li point on Caspio's right hind leg (the weaker one), a drop of blood oozed out, and unlike other acupuncture needles, this one produced marked discomfort in Caspio. Dr. P. commented that the Chinese consider it highly significant when blood appears at the puncture site (acupuncture needles are, after all, very thin and barely break the skin). Dr. P. then reminded me that acupuncture can produce "healing crises," which means that the symptoms become worse before they improve. Within minutes, Caspio began to produce a bout of diarrhea, and half an hour after treatment, when walking down the hill to his pasture, he stumbled and almost fell because his stifle was extremely weak, materializing the predicted healing crisis. Again, this diarrhea and joint pain were organic manifestation of "xi." An x-ray or MRI of the stifle joint at that very moment would likely have failed to visualize any

problem, whether because our current visualization technologies are too crude, or whether “xi” is happening at a different level of reality altogether. The only answer that materialist science has for these phenomena is to attribute them to the imagination, hence the “placebo” or “nocebo” as explanatory patterns, understanding “imaginary” in opposition to “real.” Veterinary applications of energy medicine, however, trouble the “placebo” pattern, since human exceptionalism also attributes an object status to non-human animals that excludes them from the dynamics of the imagination. They are, therefore, an interesting gauge for the realness of “xi,” which, indeed, had me worried about our participation in the approaching clinic. However, two days later, in our lesson, he produced a stronger canter than I had ever felt.

Chinese acupuncture had been able to materialize a form of support that I had not found in my experience with conventional Western medical treatment for Caspio. At the same time, acupuncture is not “a cure,” but rather a sustained practice of supporting the healing processes of the body. Cohen reminds us that “[b]y end of nineteenth century, however, the *Vis Medicatrix Naturae* had fallen out of favor among Western bio-scientists” (“Healing”). The birth moment of modern biomedicine marks this shift away from supporting toward curing, from health as balancing act to offense. My argument here is that conventional medicine has not been able to fully grasp the challenge of Lyme (and other “emergent” diseases involving the immune system) at a conceptual level, due to its foundational self-definition. Supporting a patient with Lyme disease is bound to be unsuccessful, so long as we focus primarily on identifying and eliminating a pathogen, and measuring success in binary terms as infected/uninfected. All of “juicy reality” in this world is characterized by multi-species cohabitation. Titters will and should be positive, and will sometimes have little to say about how we feel. The modern mechanistic approach based in “cold-body anatomy,” which dissects organisms until the cause is found (see the epigraph by Virgil), has yielded enormous success at the level of first response. In the face of chronic ailment, older negotiating skills will prove themselves worthy of being revisited and expanded. My preference is to live and dance with a warm-body art and science.

11. Artistic dressage. Speaking of dance, then: a key component in managing Caspio’s afflictions is classical dressage schooling. Dressage as an Olympic sport already has an intimate relationship with (conventional) medicine. Biomedicine is to fix what dressage breaks. Given the catastrophic rate at which dressage horses nowadays crash, the actual success rate of this high-tech endeavor remains dubious, but even more troubling is the ethical status of a sport that does so much damage, even though it grew out of an art

form that is all about preserving the horse's soundness as a ridden athlete. Here I am proposing a different kind of combined effort between art and science, that between energy medicine and classical dressage where both disciplines enhance each other mutually, and where sport/art and the balance it seeks to produce or restore can also be understood as both anatomical/dynamic (biomechanical) and as energetic. In other words, horses do not only learn to move more beautifully due to a set of biomechanical rules (and therefore strengthen their joints, tendons, ligaments, and muscles), but also because their energy flow is enhanced and/or balanced.

In summer 2015, Caspio and I began working with a well-known classical dressage master D. D's knowledge of both equine and human rider biomechanics is profound, and has enabled her to rehabilitate horses that had been abandoned as broken and crippled, through the use of classical gymnastics alone. Horses with neurological disorders, with injuries, and other disqualifying impediments such as poor conformation learn to (re)develop balance, feel, integration, and energy. Before working with D, I had been told over and over by veterinarians and trainers that Caspio was just too broken, even though what exactly was broken could never be identified in anatomical terms. One even suggested he might be of poor conformation. D. told me that Caspio was a well-bred, exceptionally talented horse. Her knowing but demanding gaze almost instantly changed Caspio's spirit. He felt recognized. The day of our first lesson, during which he snapped as if out of a deep slumber into a brilliance I had never yet seen in the work, our exciting journey began. Every lesson has been new and revelatory. Since summer 2015, we have gone to the arena almost every day to work, and also to find in our work the key to living with chronic Lyme. I have suggested here to think infection as an energetic and ecological imbalance, rather than as the invasion by an alien agent who needs to be identified and eliminated. I have further suggested that both Chinese medicine and the art of classical equitation can be tools to reestablish or create energetic balance, and thus to critically support an organism in its ever-present ability to heal. Neither in energy medicine nor in classical training is balance ever understood as static, but both modalities provide methods for dynamically processing balance in relation to its necessary opposite, imbalance or loss of balance. Classical training conceptualizes the beauty of this instability, the delicacy of each balancing act in succession, the gaining of strength and coordination on the abyss of imbalance: the dance on the verge of disaster, as my teacher says. Furthermore, returning to Barad's propositions about *intra-actions* between phenomena that are constituted through the act of intra-acting, rather than as separate and autonomous entities, the human-horse intra-action in classical training produces such a phenomenon. There is no ontologically delineated "here" and "there," or "before" and "after," or "subject" and "object" in this

form of training, only strategic moments of *agential cutting*. The balance, movement, and beauty constituted through this phenomenon intra-acts favorably toward re-balancing the Lyme-ravaged phenomenon of biochemical, biomechanical, and energetic imbalance.

But how to write about what we do? My work and communication with horses is largely feel based, embodied, non-verbal. My dilemma in writing this section: despite new materialisms, situated knowledges, onto-epistemologies, and our recent academic emphasis on embodied practices, there is a fundamental gap between what can be said in a verbal academic text and what I study and practice. Words, while often playing some role (particularly in communication between D. and myself), barely scratch the surface of our processes. How, then, to verbalize the knowledges that we produce through feel, touch, movement, timing, affect; the forms of cognition that are so marginalized in a world that is forevermore anthropocentric?²⁰ How to mobilize Barad's theorizations to give an account of how Caspio and I constitute an intra-active phenomenon rather than a subject/object ontology whereby, in traditional Western logic, the human subject trains the non-human object? How to convey the importance of these forms of moving and learning for, on the one hand, healing from Lyme disease and other chronic conditions (whether human or otherwise), but in a much broader sense: from a global condition that is characterized by forms of communication, production, and epistemologies that are almost entirely tailored to human, rational, and modern Western scales and needs? As Rachel Carson said already two generations ago: "Mankind has gone very far into an artificial world of his own creation. He has sought to insulate himself, in his cities of steel and concrete, from the realities of earth and water and the growing seed. Intoxicated with a sense of his own power, he seems to be going farther and farther into more experiments for the destruction of himself and his world" (94). A closed circuit. A Western human ghetto of modernity where, as in the epigraph by Virgil with which I opened this piece, logocentric "Man" processes the world of effects so as to identify the hidden cause. There are so many important matters we are failing to understand due to this isolation, probably increasingly so since Carson wrote the lines above. The economy of the same, as Irigaray said with regard to sex. The erasure of difference. How to make an opening to other scales, needs, and knowledges, to ways of knowing and learning that are not logocentric, i.e. that do not have that very specific, limited form of communication, the human word, at the center, the verbal signifier whose centrality is predicated on the absence or disappearance of the body, even as the body is never really shed, and returns as haunting supplement? But can we give verbal expression to a truly embodied way of knowledge production, one in which

the body is not “the other,” the hindrance, the suppressed matter that returns as a problem, a stumbling block to true communication, the matter under mind?

A concrete example: How to describe in verbal language the meaning of a half-halt? There is a millennial equestrian literature on training that has concerned itself with such terms, but mostly from a strictly technical perspective. Less focused on the technical aspects here, yet deeply concerned with the very materiality of the intra-action, I want to translate, trans-theorize, transpose, what this half-halt may have to do with Lyme disease, global warming, human planetary dominance, lack of ecological balance. Fundamentally a half-halt is a moment of redirecting, rebalancing, a moment that opens up a blank space in the flow of physical syntax between horse and rider; a moment of possibility or potential. It is also, perhaps most fundamentally, an intervention to restore lost or compromised balance. And it is an act that horse and rider can only do together. It is in this sense that I wish to insert classical training as embodied practice of healing against the immuno-ontologies discussed earlier, both in the literal sense of fostering balanced and aligned movement to heal an immune- (and possibly neuro-) compromised individual so that neural pathways and ravished cells and tissues can regenerate themselves, but also in a more metaphorical sense where dynamic trans-individual balance, rather than defended static self, are practiced. Ultimately, all of classical training, and perhaps all biomechanics-based interactions with horses, are based in what biologists have called entrainment or murmuration, which inherently promote balance and flow in a way that undoes the individuality and boundedness of the self. There isn't one at the wheel of control, the other receiving orders, one dominating, the other obliging. In the shifting balance of a ridden horse, there is and isn't a self. In this article, I lack the space to explore the bodily details of this art form, originating fundamentally from the human and the equine spines and pelvises as they become linked; the implications of movements initiated in the sockets rather than the balls of joints for long-term health of compromised joints; and the neurological, as well as spiritual, meaning of moving with sacro-cranial alignment, positive tension, and a supple rib cage, all of which are the basis of correct classical dressage for both rider and horse, and which have far-reaching implications for healing a body ravished by Lyme and other immune-mediated illnesses.

By way of concluding, I stress that I wish to have classical training, and other embodied practices, understood as a science (based in knowledge), alongside the dominant biosciences of our time, not so much because it can be measured,²¹ but because it has real effects on soundness and health while engaging non dualistic, non-reductionist, and non-deterministic world-making experiences. To be absolutely clear, my discussion

of energy medicine and classical art form are not to be understood as a way of refuting or replacing biomedicine per se, while I do wish to chart the limiting effects of the latter's epistemological foundation. This is not an either/or game, nor is the acupuncture/classical training approach generalizable in a reductionist way. There will never be double-blind studies on what I am proposing here. Individual patients require different treatments at different times. To assume such a generalized meaning in my argument would be to miss my main point, which is a call to expand our current limited, conceptually constrained way not only of understanding Lyme disease and immune system disorders, but of approaching the meaning of health and wellbeing more generally.

Notes

1. In "The Placebo Disavowed," Ed Cohen locates the long 19th century as the historical moment when medicine "set[s] up shop in the domain of science..." (6), and further demonstrates that during the birth moment of modern medicine and immunology in the late 19th century, "[t]he axiom that only one cause is needed for an effect [...] defines determinism as the epistemological ground for biomedical truth" (9).

2. See in this context Michelle Jamieson's work on allergy in the history of immunology where, based on the early twentieth-century pioneering immunologist Clemens von Pirquet's work, she suggests to undo the self-other ontology that has come to define immunology as a discipline and replace it with the notion of an "an ecological relation that is constantly being negotiated" (21). Such an emphasis on diverse and negotiated relationality stands in stark contrast with immunology's founding episteme as Cohen summarizes it: "'natural' hostility as the essential condition of life" ("Self" 37).

3. Another important protagonist in the "Lyme wars" who proposes long-term antibiotic therapy is Richard Horowitz, MD. See his best-selling publication *Why Can't I Get Better: Solving the Mystery of Lyme and Chronic Disease*. This Hudson Valley based physician/author also offers extensive web support for patients and medical practitioners.

4. See <https://www.lymedisease.org/lyme-basics/lyme-disease/diagnosis>

5. The advocacy, education and research network lymedisease.org claims that "[p]atients with Lyme disease are frequently misdiagnosed with chronic fatigue

syndrome, fibromyalgia, multiple sclerosis, and various psychiatric illnesses” (“About Lyme Disease”).

6. Auwaerter’s rejection of the frequent use of the term “chronic Lyme disease” is representative of the dominant biomedical, i.e. determinate mono-causal reductionist approach to infection, as when he argues that in the absence of “objective symptoms of infection” (144), i.e. positive test results, “subjective symptoms” (143) or “complaints” (144) such as “fatigue, musculoskeletal aches, and neurocognitive symptoms” (143), should not be categorized as chronic Lyme disease, but rather as a post infection syndrome. This argument strikes me as curiously self-contradictory, particularly because the author himself admits that the standard Lyme IgM western blot assay is unreliable, producing frequent false positives (144). Those who insist on long-term antibiotic therapy typically employ the term chronic Lyme disease in order to justify this treatment (see Stricker; Stringfellow; Cameron; Donta; Horowitz.). Both sides operate with the same mono-causal concept of infection.

7. I am using the noun “conjugation” intentionally and in reference to Haraway’s own poetic exploration of it in the context of “conjugated estrogens” and our need to “conjugate well” (not “correctly”) in her essay “Awash in Urine” (*Staying* 111).

8. In this context, see MD Bill Rawls’s work for a (bio)diverse approach to healing Lyme, which includes elements such as exercise, antibiotics, microbiome support, meditation, nutrition, various plant-based substances, lifestyle changes, and nutraceuticals.

9. “Host” remains in quotation marks here as it also participates in the old ontology of figure/ground relations challenged by my conjugation of the Baradian/Harawayan onto-epistemology of entangled becomings. The term “host” is discussed more fully below.

10. This is a dynamic that much, but not all, of main-stream medical research denies. See for example Auwaerter: “Suggestions that *B. burgdorferi* can survive despite antibiotic therapy by adopting a cystic form has only been seen in certain in vitro conditions and is unproven in humans” (146).

11. This comment is based on informal communications with field practitioners. The Cornell U. study on “Equine Lyme Disease” quantifies equine seroprevalence at “[n]early 50%” (Divers 1).

12. An aspect to consider in the context of this exploration of companion mingling with respect to a vector-borne bacterial infection, therefore, is the component of breeding/genetics, a complex topic with connections that branch out like a spider web at a time when reproductive technologies, tried and tested on non-human species, now come home to roost. I do not have time to explore this topic in depth in the context of this article.

13. This goes with the additional caveat that, due to its anti-inflammatory properties, doxycycline will often bring improvement even in the absence of any pathogenic presence.

14. Compare this with statements such as Auwaerter's who denies the ability of Bb. to survive antibiotic therapy: "Studies designed to investigate prospectively whether *B. burgdorferi* can be recovered after antibiotic therapy have found evidence of the organism neither by skin biopsy [...] nor by culture..." (146).

15. Let me caution, however, that the idealized term "human" is not accessible evenly among people, with the dire consequence that many human medical experiments are carried out on the backs, and at the expense, of non-white, poor, and/or Third World human populations.

16. Cohen discusses the role of the imagination in human medical treatment, as well as its increasing eclipse in modern biomedicine, which resurfaces and is formalized as the haunting supplement of the "placebo effect" ("Placebo," especially 7).

17. Recall Auwaerter's characterization of "subjective" symptoms as "complaints" in counter-distinction from "objective symptoms" (144). See also Dumit for a detailed discussion of the problematic withholding of care from sufferers of illnesses that are not fully biomedicalized.

18. As just one typical example of this lack of interest in those dynamics in relation to health, healing, and immune function, consider the discussion of an equine case study in "A New Sensitive Multiplex Assay" where a hospitalized horse is subjected to the full high-tech gruesomeness of an immunological work-up including spinal taps and biopsies under general anesthesia (Wagner 72), exemplifying the mechanistic "cold-

body science" approach to medicine. The essay may well be sensitive, while the approach to the patient clearly is not.

19. In "Healing as Metaphor," Cohn historically describes the adoption of the political term "immunity" by modern medicine. "This metaphoric innovation fundamentally reconceived the prevention and amelioration of illness. Bracketing healing as an improperly fuzzy premise, scientific medicine incorporated what it now saw as more properly 'natural' function of the organism: self defense."

20. There are several other embodied art forms, specifically music and dance, where a corresponding academic/verbal field of meta-study exists. The tensions and disconnects between musicologists and musicians, for example, while different in some of their specificity, represent a dilemma in some ways similar to the one at hand. In addition to the split between embodied practice and word-based metapractice, which in itself has also led to disputes over who truly produces knowledge, in the art work with horses trans-species communication complicates matters further. In the logocentric tradition, in all matters of knowledge production, non-human persons were only ever located on the object side. In my creative work with Caspio, our dialogue produces knowledge. Both of us train each other, educate each other, reflect, "speak," and decide. In this sense, we form an intra-active phenomenon, not a logocentric subject/object ontology (where the human trains the horse).

21. The veterinarian Hillary Clayton, the Mary Anne McPhail Dressage Chair in Equine Sports Medicine at the Michigan State University College of Veterinary Medicine, conducts studies in equine biomechanics and locomotion that attempt to prove in Western scientific terms why classical dressage is beneficial for the horse. My dressage teacher and her horses are among her research subjects.

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