# Toward a Ruminant Gastronomy

## Exploring the Creaturely Pleasures of Feeding Goats Well

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*Abstract* For millennia, gastronomy has concerned itself with the deceptively simple question of how best to eat and live. This article proposes gastronomy as a fertile discourse, practice, and site of scholarly inquiry for thinking about the social and sensual pleasures of eating and living well across species difference. Based on ethnographic fieldwork with a cheesemaker in southern Australia, this article asks what it means to take seriously goats as gastronomic subjects and to consider what a ruminant gastronomy might look like within the web of creaturely relations that make cheese possible. The article highlights the cultivation of practices of attentiveness, focusing on the use of Obsalim, a system for managing ruminant health by interpreting the "language of the rumen." Thinking about and responding to the rumen's microbial communities offers productive possibilities for understanding how goats bring their evaluations to bear on the quality of their nourishment. This counternarrative to Western gastronomy's humanist orientations proposes a re-imagination of the multi-species liveliness on which the practices and politics of eating well depend.

*Keywords* multispecies studies, multi-species gastronomy, cheese, rumen, goats, rumination, microbes

### An Invitation

When I arrive at Carla Meurs and Ann-Marie Monda's farm in central Victoria, Australia, on a mild winter day, I learn something about what goats might come to expect from humans. Carla and Ann-Marie are farmers, cheesemakers, goat lovers, and life partners. I am waiting for Carla to move the goats into the milking yard from "Lounging One," a special shed with a deep bed of warm litter where the goats were sent to ruminate after lunch. This quiet time for rumination must be respected. Eating well for goats is not only a matter of what they eat. Ruminants need time to chew the cud—that is, food that resurfaces from the rumen, the largest of a goat's four stomach chambers. Inhabited by microorganisms that ferment ingested food, the rumen is an active agent in

***Environmental Humanities*** 14:2 (July 2022)
DOI 10.1215/22011919-9712368 

shaping what a goat can eat. Carla finishes moving the herd and instructs me to grab a brush from the dairy. It's time to meet the goats.

Brush in hand, I find myself standing among the herd as the goats await their milking. Warm, bristled bodies jostle and push against mine and each other. A goat with a blue mark on her back quickly nudges in. First-time mothers are marked so they can be closely observed and fed special rations to support their health. They are also milked first to build their confidence and discourage older goats from bullying them, creating a more harmonious herd. This young mother does not lack confidence. Twice she pushes other goats out of the way and repositions herself for more brushing. She presses her body against my thighs, turning her head to capture me within her field of vision. The blue mark gives her game away. I laugh at her pluckiness and move on to another waiting goat. In this convivial moment of give-and-take, the goats and I express a mutual interest in each other, even if for radically different reasons. They pursue the sensation of soft, rubbery bristles running through their coat. Under the gaze of their strange caprine eyes, I relish being enrolled in the pleasure project of these insistent, charismatic creatures.

Later I realize that the pushy goat with the blue mark was not simply asserting herself in the herd. Stepping into the dairy yard with a grooming brush in hand gives rise to an interspecies obligation. The goat issues a bodily invitation for me to learn how and where to brush her; she trusts I will respond with long, sure strokes from neck to flank as many visitors have no doubt done before me. She asks me to acknowledge and respond to her capacity for pleasure.

### Gastronomic Ruminations

Sutton Grange Organic Farm is located approximately ninety minutes north of Melbourne. Carla and Ann-Marie live on 204 acres with just under one hundred Saanen and British Alpine milking goats, along with pregnant goats and kids. Their cheese, named Holy Goat, is celebrated as farmhouse or artisan, meaning it is produced on a small scale from milk of their own herd. This category of cheesemaking engages deeply with the microbial relations of cheese but also the broader world in which it is situated.[1] Together the goats and their milk, the microbial communities of their rumen, pasture and soil, the cheesemaker and her cheese room, along with the microbial diversity of the cheese itself, weave a story of gastronomic coproduction.

For millennia, gastronomy has concerned itself with the deceptively simple question of how best to eat. In his 1825 publication *The Physiology of Taste*, nineteenth-century French gastronomer Jean-Anthelme Brillat-Savarin famously defined gastronomy as the "reasoned understanding of everything that concerns us, insofar as we sustain ourselves."[2] As a field of study, gastronomy is attuned to the sensual embodiment of nourishment but also the ethical commitments, ontological categories, and epistemological structures that seek to order the messy business of eating. I propose gastronomy as

1. West, "Thinking like a Cheese."
2. Brillat-Savarin, *Physiology of Taste*, 52.

fertile terrain from which to think about how the social and sensory pleasures of eating might cut across species difference. My interest is in shifting gastronomy beyond its humanist orientations of consumption and connoisseurship and toward more creaturely gastronomic subjectivities.

In exploring the possibility of a less anthropocentric gastronomy, my analysis considers what it means to take seriously a goat as a gastronomic subject and the modes of attentiveness involved in doing so.[3] This "multi-species gastronomy," as I describe it, proposes a multiplicity of life-forms as co-practitioners and interested agents in an expanded gastronomic community. In this article, and as part of a broader ethnographic project of food production and farming around Australia, I explore Carla and Ann-Marie's deep interest in rumination, focusing on their use of Obsalim (short for *observation des symptômes alimentaires*), a system developed by French veterinary scientist Bruno Giboudeau for managing herd health and diagnosing dietary problems.[4] The *Oxford English Dictionary* tells us that rumination deals literally and metaphorically with that which is difficult to digest. In the turning over of thoughts or obsessive revisiting of ideas, humans ruminate at their peril. However, rumination is also how many herbivores digest their food. Thinking about this ruminant practice retains gastronomy's stomach-oriented focus but opens it up to other "messmates at table"—not only the goat herself but also the microbial communities of her rumen.[5]

Bringing the fields of science and technology studies, human geography, and the environmental humanities into critical dialogue with gastronomy, I situate this article within a proliferation of scholarship that engages deeply with the multi-species natures of food and destabilizes the centrality of the human in the ecologies that make eating well possible.[6] The burgeoning field of multispecies studies and my own project to explore the conditions of possibility for a ruminant gastronomy have been shaped by a long lineage of feminist thinking and praxis and are indebted to Indigenous scholarship for which the acknowledgement of more-than-human agency and relational ontologies is, among other things, a matter of epistemic justice.[7]

3. My interest in the rumen is situated within a broader "microbial moment" reflected by a burgeoning of research about, and public interest in, the human gut microbiome as well as practices of fermentation. See Paxson and Helmreich, "Perils and Promises of Microbial Abundance," 166; Fournier, "Fermenting Feminism."

4. Ann-Marie was not available for interview. All quotes are attributable to Carla unless otherwise indicated. When discussing their background and general approach to farming I refer to Carla and Ann-Marie, as both are integral to every aspect of the business. This case study relies on interview data plus blog posts and an intern report from Sutton Grange Farm. I also draw on detailed notes while organizing and hosting an event titled "What If Cheese Microbes Were in Charge?" in collaboration with Holy Goat, the Australian Specialist Cheesemakers' Association, and the art-science collective Scale Free Network as part of the 2019 Melbourne Knowledge Week. It was this event collaboration, in which we invited participants to co-create a "portrait of the rumen," that prompted the ideas explored in this article.

5. Haraway, *When Species Meet*, 17.

6. Elton, "Posthumanism Invited to Dinner"; Fournier, "Fermenting Feminism"; Green and Ginn, "Smell of Selfless Love"; Krzywoszynska, "Caring for Soil Life"; Szymanski, "What Is the Terroir of Synthetic Yeast?"

7. TallBear, "Being in Relation"; Todd, "Indigenous Feminist's Take on the Ontological Turn"; Watts, "Indigenous Place-Thought and Agency."

In the field of food philosophy, Raymond Boisvert makes the case for a conceptualization of convivialism that rethinks the table as a "collectivity" in which the delineations between nature and culture, self and other, human and animal, and other familiar dualisms of Western metaphysics lose their grip.[8] Ecofeminist philosopher Val Plumwood and food philosopher Lisa Heldke propose relational approaches to eating that disrupt trophic categories of predator/prey and parasite/host to remind us that humans are also food for others.[9] From a more explicitly gastronomic perspective, David Szanto's research and art practice also explore eater/eaten relations. For Szanto, gastronomy is "an ecology of ecologies" from which to "imagine food-centred epistemic and ontological models, or even frameworks in which food, humans, and other things *share* agency."[10] Without claiming that agency is equally shared or denying relations of power between species, Szanto seeks to enact a gastronomy that takes seriously the "social and political needs of food itself."[11]

Turning to cheese, Heather Paxson's ethnography of post-Pasteurian cheesemakers offers valuable insights into how microbes figure as productive collaborators in practices and politics of making artisan cheese and how cheese emerges as a "micropolitical object" that demands particular modalities of care in the crafting of cheese worlds.[12] In his exploration of what it means to "think like a cheese," anthropologist Harry G. West observes how artisan cheesemakers learn to make good cheese through continual processes of gastronomic tinkering and responsiveness, such that their "thoughts 'resonate' with the weather, the grass, the milk, the curd and, finally, the cheese."[13] West draws attention to how the knowledge needed to make good cheese is coproduced through attentive engagement with the ecologies—regulatory, social, microbial, and so on—in which the cheesemaker works, thinks, and tastes. This is the "thinking-doing-feeling" nexus of food through which gastronomy is enacted according to Szanto,[14] or, put otherwise, the "call and response" between life-forms that enlivens Boisvert's metaphysics of convivialism.[15]

### Disrupting the Purity Politics of Gastronomy

Gastronomy has long functioned as a normative discourse, prescribing how one ought and ought not eat. This normative dimension of gastronomy is evident in its etymological roots. The Greek *gastro* refers to stomach and *nomos* to rules or laws. Across millennia, these rules of the stomach have set out the criteria by which food and eating might be evaluated and sorted into ontological categories, relating to ideas of goodness, edibility,

8. Boisvert, "Convivialism," 60.
9. Heldke, "It's Chomping All the Way Down"; Plumwood, "Integrating Ethical Frameworks."
10. Szanto, "Eater or Eaten," 2.
11. Szanto, "Eater or Eaten," 1.
12. Paxson, "Post-Pasteurian Cultures," 39.
13. West, "Thinking like a Cheese," 329.
14. Szanto, "Eater or Eaten," 2.
15. Boisvert, "Convivialism," 61.

virtue, and so on, which are themselves informed by diverse cultural discourses and values: health, religion, law, ethics, and others. As a cultural project and material practice, gastronomy does the work of managing, intensifying, and moderating the pleasures of eating in ways that reflect prevailing moral frameworks.[16]

Gastronomic knowledge in the West is performed privately and publicly through epistemological concepts and practices such as connoisseurship. Pierre Bourdieu's influential work on the social construction of taste comprehensively scopes out this performative territory of judgment, distinction, and cultural capital.[17] Because Western gastronomy is also concerned with "the pursuit of culinary excellence," it is commonly associated with fine dining.[18] This is where elite food narratives—particularly notions of "good taste" and aspirational consumption practices—circulate most powerfully. Elite narratives are overrepresented in gastronomic history and culture. However, the pleasures of eating well are not—nor should be—their exclusive domain.

Neither are the criteria for gastronomic goodness fixed, or even translatable, across cultures. The laws of gastronomy are as relevant to how the earth-bound should nourish ancestors and gods in the spirit realm as they are to a meal in a high-end restaurant (though these express very different relational concerns). Gastronomy is practiced in the simple conviviality of sharing food with kith and kin (and its associated epistemic and material practices) but can also attend to complex ethical questions about when, how, and even if life should be transformed into and enjoyed as food. Yet the moral framework of Western gastronomy presents certain conceptual limitations in responding to cosmopolitical questions about how to live and eat well, or at least better, among species difference. As Plumwood argues, "the western story of reason and nature" that holds human and nonhuman spheres apart has structured "practices of human virtue and identity as they have been conceived, since at least the time of the Greeks."[19] The stories of Western gastronomy remain deeply imbricated in these intellectual and moral foundations.

The aforementioned gastronomer Brillat-Savarin is best known today for his gastronomic aphorism, "Tell me what you eat: I will tell you what you are."[20] The normative thrust of "you are what you eat" enacts a gastronomic essentialism and moralizing discourse that proposes an equivalence between the materiality of food and the person who consumes it. This essentialist evaluation reflects a "substance-based ontology" that, according to Heldke, reduces food to "masses of congealed relationships," privileging the "quality or property of a substance" over the relations in which one lives, eats, or is eaten.[21] This substance ontology retains its moral grip on contemporary gastronomic culture in the presumption that, as Amy Trubek critically observes, the "individual

16. Korsmeyer, *Making Sense of Taste*, 71.
17. Bourdieu, *Distinction*.
18. Ferguson, "Cultural Field in the Making," 599.
19. Plumwood, *Feminism and the Mastery of Nature*, 6.
20. Brillat-Savarin, *Physiology of Taste*, 13.
21. Heldke, "Alternative Ontology of Food," 83–85.

pursuit of virtue through principled eating will help create not just individual but systemic change and potentially build the good life for us all."[22] Structured by the moral dualism of virtue and sin, gastronomic narratives of "nature," authenticity, and purity situate eaters of the local, slow, organic, frugal, and artisanal within the moral camp of the virtuous. By contrast, the sin of gluttony is recast in the unenlightened "industrial eater" who, in consuming mindlessly, fails to acknowledge that "eating is an agricultural act," as farmer and agrarian intellectual Wendell Berry declared over three decades ago.[23]

Melanie Dupuis rejects the "orthocratic" gastropolitics of purity that reproduce narratives of a world constructed through better choices, good behavior, and, most importantly, "ontological certainty about what is inside and outside and what to do with it."[24] She counters this "ingestive" subjectivity with a relational "digestive subjectivity" governed by a "fermentive politics" in which eating well necessitates assembling more inclusive publics designed to account for a broader range of interests.[25] Dupuis draws on the transformative power of fermentation as a metaphor for imagining how human publics might muddle through the messy epistemological contests of tackling climate change or work collaboratively to build more livable worlds. The notion of a fermentive politics is generative for asking how the rules of the stomach might attend more carefully to the forms of multi-species mixing, commensality, and transformation that digestion engenders.

Alexis Shotwell points to how purity narratives of ethically "good" and "bad" food lean on the "epistemic position of the super-knower" invoked by Brillat-Savarin's gastronomic injunction of "tell me what you eat."[26] The purity politics of substance ontologies tell fictions, she suggests, that "get us off the hook of taking responsibility for the impossible ethical task of taking in nourishment.[27] Shotwell takes care to acknowledge that the ethical simplicity of purity politics is a conceptual limitation particular to settler thinking and practice and its "heroic food individualism."[28] Acknowledging the fecundity of Indigenous thinking and practice in attending to the messy transcorporeality of eating, she also cautions settler eaters (and scholars) against mining Indigenous ways of being and knowing for their epistemic utility. Shotwell brings queer and feminist theorizations of fermentation and composting into dialogue with the anarchist tradition of mutual aid to locate a less extractive place from which "settlers can begin to respect people's lifeworlds while also building solidarity approaches" to expanding the collective that is assumed within the question of how we should eat.[29] The ethical and political task proposed by Shotwell is to resist epistemic extractivism while also

22. Trubek, "Radical Taste," 192.
23. Berry, *What Are People For?*, 153.
24. Dupuis, *Dangerous Digestion*, 6.
25. Dupuis, *Dangerous Digestion*, 151.
26. Shotwell, "Flourishing Is Mutual."
27. Shotwell, "Flourishing Is Mutual."
28. Shotwell, "Flourishing Is Mutual."
29. Shotwell, "Flourishing Is Mutual."

considering what normativities are needed to live and eat in better relations with the life-worlds that "definitely offer us more than we offer them."[30]

A standing challenge for gastronomy as a field of scholarly inquiry is to contest the purity politics of Western gastronomy and destabilize its philosophical, political, and moral underpinnings in Judeo-Christian metaphysics that police the boundaries of pleasure and dictate which gastronomies matter. In asking a different set of questions about what it means to eat well, it is possible—indeed, politically necessary—for the normative frameworks of Western gastronomy to be thought otherwise, for gastronomy as an epistemic and material practice both makes worlds and tells stories of these worlds. A starting point in taking up this challenge is to ask whose stomach, and therefore which appetites and pleasures, might matter. What practices of attentiveness and care are needed to account for a broader range of gastronomic interests and ways of knowing? What new stories—or counternarratives—of gastronomy need telling?

**Whose Stomach Might Matter?**

Responding to this question necessitates a normative framework for "goodness" that has no truck with purity. Like Dupuis and Shotwell, Lauren Fournier draws inspiration from the metaphoric potential of fermentation's processes of microbial mixing and transformation. She conceptualizes fermentation as a practice of multi-species care that invites speculation about how to leave aside "individualism, anthropocentrism, and categorical purity" while also engaging in modes of gastronomic coproduction that cultivate delicious and "ethical ways of being together" within but also far beyond microbial worlds.[31] Along these lines, Anna Tsing's "testimony of a spore" offers a surprising counternarrative to gastronomy's human exceptionalism that playfully explores the forms fungal pleasure might take. Her story's protagonist—a matsutake spore—revels in the joy of flight as they imagine their hyphae seeking out new tastes among rocks and enjoying a symbiotic meal made possible by the "fat noodles" and "sweet juice" of tree roots.[32] Tsing proposes this tale as a "thought experiment" for asking how "kinship, gender, and sexuality" might be imagined differently within anthropology's canon.[33] This tale can also be read as a story of fungal gastronomy that not only imagines a radically different commensality but also acknowledges how myriad appetites and their pleasures become entangled in multi-species practices of world-making.

Myra Hird's micro-ontology for eating well with bacteria also provides conceptual inspiration for pushing back against the purity politics of humanist gastronomy.[34] Eating well for humans depends on the microorganisms that inhabit our stomach. The

30. Shotwell, "Flourishing Is Mutual."
31. Fournier, "Fermenting Feminism," 108–9.
32. Tsing, "Strathern beyond the Human," 222.
33. Tsing, "Strathern beyond the Human," 225.
34. Hird, *Sociable Life*.

rules of the stomach are already always more than human. The gut microbiome, which is essential for digestion, communicates with the brain through its biochemical language; the animated dialogue that runs along the vagus nerve shapes mood, appetite, and, according to Carla, even gastronomic preferences.[35] So powerful is the biochemical chatter of the gut-brain axis that Carla credits *Geotrichum candidum* with her attraction to cheese and other fermented foods. Found in soil and air, on plants, and inside the digestive tract of many mammals, including humans, this yeast-like fungus is unusual for its ability to live in and feed from such different environments.[36] It gives Holy Goat and other goat's-milk cheeses their velvety, wrinkled rind and buttery aroma. In their early days of making cheese, Carla and Ann-Marie actively sought to "get to know *Geotrichum* and what it likes and doesn't like." In inviting the fungus to make itself at home in the cheese room and to nourish itself on the rinds of her cheese, Carla now experiences *Geotrichum* as a powerful force that moves on and through her body, shaping her attraction to particular foods: "It's everywhere. It's in me. . . . I'm very drawn to the *Geotrichum*. . . . I feel like my gut actually makes me obsessed with the smell and the flavor of these [fermented] things." This prompts me to consider how gastronomy might be understood as, following Stacy Alaimo, a transcorporeal practice of "constructing habitats that can support a diverse range of symbiotic relations and interwoven pleasures."[37]

Understanding gastronomy through this lens troubles purity by acknowledging how "all creatures, as embodied beings, are intermeshed with the dynamic, material world, which crosses through them, transforms them, and is transformed by them."[38] In cheesemaking, pasture passes through the rumen of goats through the metabolic action of microorganisms. Manure enriches the bacterial liveliness of the soil, which nourishes grasses. The appetites of yeast and bacteria transform milk into cheese, gather on its rind, and inhabit the bodies of cheesemakers. The stories of a humanist gastronomy emphasize the cheesemaker's craft and the gastronome's connoisseurship, but a multispecies gastronomy attends to the social and material pleasures that circulate within the creaturely worlds in which many live and eat together. This is not to say that multispecies gastronomy is devoid of hierarchy or power, particularly where agriculture is concerned.[39] Farming necessitates, at least to some extent, the coercion of life for human appetites along with processes of death, killing, or decomposition, even when these practices are threaded through with relations of care, companionship, and pleasure.[40]

### Learning the "Way of Being a Farmer"

For Carla and Ann-Marie, these pleasures began with their apprenticeship into cheesemaking in Ireland where they learned, as Carla puts it, "the way of being a farmer." A

35. Bertrand, Loughman, and Jackson, "Gut Feeling."
36. Wolfe, "*Geotrichum Candidum*."
37. Alaimo, *Exposed*, 34.
38. Alaimo, "Trans-corporeality," 435.
39. Donati, "'Herding Is His Favourite Thing.'"
40. Heldke, "It's Chomping All the Way Down"; Green and Ginn, "Smell of Selfless Love."

formative experience was time spent with Mary, an elderly woman and their mentor in cheesemaking. Mary encouraged an ethic of attentiveness that meant "allowing yourself to be unintentional in the landscape," Carla explains, so that "you'd hear the sound change or you'd notice when the air starts to be still." This less bounded form of noticing attempts to set aside human intention, instead paying attention to what others might notice and care about. Thom van Dooren, Eben Kirksey, and Ursula Münster point to how "immersive ways of knowing and being" with other creatures "involve careful attention to what matters to them—attention to how they craft shared lives and worlds."[41] "What did you see when you weren't looking?" Mary would ask. She invites the women to observe how, as Carla describes, "animals choose this spot, not that spot" or find "a very still, special spot where they want to be." Noticing what others notice creates obligations for farmers to create productive habitats that respond to diverse needs and appetites as well as social and embodied pleasures. The act of "not looking" attempts to discern the aesthetic, affective, and material qualities of living that are imperceptible to a mind sharpened by rationalist impulses or productivist imperatives.

What Carla describes is less about "not looking" and more about learning to notice "without a predetermined outcome," as she suggests: "When I'm looking at the paddock . . . I'm not thinking of it in direct relationship to the milk quality and the cheese. I'm thinking of it in direct relationship to trying to really get better and better at seeing and understanding what most enhances the soil system and the plant systems." These practices of observation entangle her in ecologies that extend far beyond the goats or her cheese room. In the process, new subjectivities present themselves in unexpected and pleasurable ways. Carla grasps for the words to capture the force of these intersubjective moments: "For me, the noticing is . . . the strangeness of how slow you are to notice, to actually see a tree. . . . For me, I think that it's maybe one or two trees a year that you'll go, 'Oh, look at *you*. . . . How amazing . . . ' Like you'd seen a friend or you'd see . . . something beautiful, where you think, 'Gee, I'd like to know you better.'" Carla's experience is evocative of the "passionate immersion" and "multi-species love" that Tsing argues also carries obligations for the well-being of a more inclusively conceived public.[42] I would add that a concern for the pleasure of the other might also spin out from the practical and loving commitments to ecological well-being that Tsing describes. Being drawn into an emergent intersubjectivity carries aesthetic but also ethical significance for how to love, live with, care for, and feed goats who find their own pleasures in the paddock and on the farm.[43]

### Attending to Caprine Pleasure

To propose a ruminant gastronomy may appear ironic given that goats have a reputation for eating—or trying to eat—almost anything. Goats are not known as fussy eaters,

41. Van Dooren, Kirksey, and Münster, "Cultivating Arts of Attentiveness," 6.
42. Tsing, "Arts of Inclusion," 19.
43. Despret, "Body We Care For."

yet the physiology of their mobile upper lip allows them to be quite selective as they forage and browse from diverse environments; that they eat such a broad range of foods is due to nutritional need, what they have learned from their mothers, and a curious disposition.[44] Researchers studying French herding practices suggest that feeding goats well is as much art as science.[45] Ruminants are highly motivated by the hedonics of their food, not only enjoying dietary variety but coming to expect it. French shepherds note how their animals feel strongly enough about what's offered to them that they can become "frustrated or bored"—in some cases sulk or "come to dislike the herder" if their diet lacks interest or diversity.[46] When presented with diverse food options, ruminants are in fact quite discerning. Other research on French shepherds frames grazing management in culinary terms: farmers are described as "chefs" who design "menus" and set the table for their animal diners.[47] While a strong anthropomorphic thrust is at work in this culinary framing, it nonetheless acknowledges that feeding ruminants well is not a simple matter of providing adequate nutrition but must attend to how food might be pleasing to goats. It imagines pasture as a gastronomic setting that is shared without being "symmetrical," coproduced through a "withness" that comes from herders learning to be affected by the animals they care for.[48] It is an anthropomorphism that addresses ruminants with more generosity, responding to them as subjects with their own capacities for and expectations of pleasure while also ensuring a diverse diet that minimizes the risk of overgrazing delicate pastoral ecosystems.[49]

Carla and Ann-Marie are not engaged in the seasonal movement of herds across highland and lowland ecosystems (as practiced in France and elsewhere). Nonetheless, they are equally concerned with pastoral ecosystems, with 30 percent of the farm locked away from the goats so native grasses, shrubs, and trees can grow and regenerate. They nonetheless attune themselves to the herd's hedonic capacities and interests. As Carla explains, "They really like bark" but also love a new paddock: "They go and eat all their favorite things first, just like you and I would. They love . . . going out in the paddock, having a look around, eating some bark, branches that have fallen off a tree. . . . They'll eat a branch in front of anything else. . . . They're real browsers." Describing how she feeds the goats at night, the pleasures slip from theirs to hers: "We cut branches for them every night and give it to them in the sheds, and they're just crazy for them. They just love them. I love it. I love it—everything about it—and it's good for them." Just as I experienced brushing goats in the dairy, some pleasures are shared across species, even if experienced in radically different ways. For Carla, it is the interspecies conviviality

44. Dwyer, "Behaviour of Sheep and Goats."
45. Meuret and Provenza, "When Art and Science Meet."
46. Meuret and Provenza, "When Art and Science Meet," 8.
47. Gregorini et al., "Grazing Management."
48. Despret, "Body We Care For," 130.
49. Clark, "Animal Interface"; Balcombe, "Animal Pleasure"; Johnston, "Beyond the Clearing."

and social pleasure of pleasing goats. For goats, these pleasures are gustative and embodied, perhaps derived from the satisfaction of chewing wood and later the slow, collective practice of rumination. Humans cannot fully grasp this pleasure, yet it is self-evident for a farmer who knows her animals well.

### The More-than-Rumen Sociality of the Farm

Carla and Ann-Marie have learned that ingestion is only part of what's needed for goats to eat well. Conventional animal husbandry tends to focus narrowly on nutrition, which attends to the substance of what is eaten. Like any substance ontology, the emphasis on nutrition overlooks relations: in this case, the processes of rumination and rumen fermentation necessary for good digestion. The health of a goat and her herd is contingent on the "superb collegial symbiotic relationship" of the rumen that makes the world more digestible for goats.[50] Many of goats' favorite foods—branches, certain grains, or even bark—are made of cellulose that is indigestible without cud chewing and the fermentative capacity of the rumen to break it down.

A healthy rumen is productive for farmers: it helps produce milk that is good for making cheese. The microbial relations of the rumen are also reproductive, taking shape through gendered practices of gestation, birth, lactation, weaning, and milking.[51] Lush, fingery papillae line a mature, healthy rumen and enable its digestive capacity and nutrient absorption. The rumen of a newborn goat, by contrast, is a tabula rasa, her papillae developing through a relational history of "intimate cross-talk between rumen microorganisms, their metabolic products, diet," and the goat herself.[52] This dialogue begins at birth when the mother's vaginal microflora help establish the gut microbiome of her progeny (usually twins and sometimes triplets). Carla and Ann-Marie leave the mother to consume the afterbirth after kidding, circulating microbial communities between her reproductive organs and her gut. Colostrum, the mother's first milk, passes antibodies to her kids but also helps inoculate the undeveloped rumen, even if its microbial composition changes significantly after weaning.

New mothers and kids are commonly separated shortly after birth in the mainstream dairy industry. Carla and Ann-Marie prefer to place mothers and kids in a special nursery to bond and suckle for three weeks, a period of intense care during which microbes continue to move between bodies. At around three weeks of age, the cheesemakers wean the kids and teach them to drink milk from a bottle. Around this time, they also begin to offer the kids topsoil from the paddock to help further inoculate the rumen-in-formation with new microbial communities. This helps prepare the kid for the transition from milk (digested in the abomasum, or fourth stomach chamber) to a plant diet, which requires a functioning rumen.[53] This period of developing microbial

50. Hird, *Sociable Life*, 138.
51. Tracy, "Missing Microbes."
52. Abecia et al., "Feeding Management in Early Life," 1453.
53. Yáñez-Ruiz, Abecia, and Newbold, "Manipulating Rumen Microbiome and Fermentation."

complexity in the rumen, further progressed by newly learned practices of foraging and grazing, helps give shape to the rumen's papillae and therefore what a rumen can do.[54] As mothers and aunts show kids how to eat in the paddock, important food memories are bedded down. How and what a herd eats in a paddock can be so distinct that some ruminant researchers conclude that individual herds have distinct food cultures, enabled by a social intelligence and transgenerational epistemology that enact nutritional wisdom.[55] The composition of the rumen is thus not a given but rather constructed as much through caprine ways of knowing how to eat and the gendered relations of the herd as it is by the substance of what is ingested.

### Learning to Read the Rumen

When Carla and Ann-Marie encountered Obsalim in 2016 it felt like a natural progression: a new way of observing, albeit one quite different from the practice of noticing learned from their mentor Mary. Little known in Australia, Obsalim emerged in France in the early 2000s and gained momentum alongside other alternative approaches to veterinary medicine that view herd health through a holistic lens. Popular with organic farmers or those converting to organic production (as Carla and Ann-Marie did in 2003), these holistic approaches challenge the traditional role of veterinarians in dairy farming by developing observational skills in farmers that reduce reliance on pharmaceutical interventions (particularly antibiotics discouraged in organic certification systems).[56] Livestock health is pursued through disease prevention rather than treatment, an approach that requires careful attention to diet and the provision of clean, comfortable housing. Farmers are encouraged to notice the "sensory dimensions" of farming, including immediate and longer-term responses of individual animals and of the herd to changes in diet and care.[57]

Through on-farm Obsalim workshops and other interactions with Bruno Giboudeau, Carla and Ann-Marie adopted new approaches to herd management that reinforced their appreciation for the knowledge that goats bring to their own nutritional well-being. Carla and Ann-Marie address potential deficiencies in the soil by offering the goats a choice of mineral rations such as copper, salt, and boron. In the early years on the farm, Carla observed the goats choosing copper sulphate: "They'd be putting their mouth right in it, taking great big mouthfuls and screwing up their faces. It's foul, and [they're] eating it." Soil tests later revealed the paddocks were low in copper. Offering goats branches that are high in tannin also helps strengthen immunity and control parasites. Carla and Ann-Marie have learned to draw on the goats' embodied knowledge of what they need for good health.

54. Membrive, "Anatomy and Physiology of the Rumen."
55. Landau and Provenza, "Of Browse, Goats, and Men," 4.
56. Hellec, Manoli, and Joybert, "Alternative Medicines on the Farm."
57. Hellec, Manoli, and Joybert, "Alternative Medicines on the Farm," 10.

Giboudeau frames Obsalim as a focused practice of observation that helps farmers interpret the "language of the rumen" so they can "listen to what the animals are saying" and hear how the herd "speaks" together—"sign by sign, word by word" even if the rumen is "only 'whispering' rather than 'shouting.'"[58] Obsalim asks farmers to pay close attention to the conditions under which a complex range of microorganisms live together in the rumen and what this means for the goat. The system uses specialized diagnosis cards and "poo cakes," as Carla describes them. Ten color-coded card sets (sixty cards in total) point to different clusters of symptoms—for example, red cards relate to hair, dark green to rumination, and orange to skin—providing a guide for reading the animal's body across horizontal and vertical axes. A dirty upper hock points to a problem with housing conditions, whereas dirty lower hocks signal an issue with diet.[59] Symptoms are evaluated across a group of goats similar in age, sex, or level of milk production; a cluster of cards is then used to detect subtle signs of rumen imbalance or health problems across several nutritional criteria pertaining to energy, protein, fiber, and rumen stability. Yellow crystals in the eyes might signal liver parasites or excess protein, while greasy skin might indicate overcrowding. Seasonal variations in pasture, the nutritional balance of the ration, the temporalities of rumination, the quality of hay in the lounging sheds, the tannins in tree branches, the age and lineage of the goats, the herd's unique food culture, variations in how humans care for goats, and many other factors must all be considered in diagnosing symptoms. The diagnostic cards themselves do not provide definitive answers; they merely act as a heuristic device for focusing attention on the relations within the worlds that goats and farmers co-create.

Manure is another critical indicator of rumen health. Hence poo cakes are prepared for discussion at Monday morning staff meetings. When combined with the diagnostic cards, poo cakes help make the rhythms of individual goats' bodies, and that of the herd, more discernible. Each week a sample of droppings is gathered from a defined area of the holding yards, rinsed in water until it runs clear, and pressed through a potato ricer to create a "cake" for discussion by farm staff. Undigested grains and short fibers signal incomplete digestion and therefore a problem in the way that the rumen is being enacted. By "enacted," I mean that the web of relations constituting a healthy rumen cannot simply be left alone. Goats that graze widely across rangelands normally manage their own rumen health. Being confined to the farm, even one where diverse pasture and browse is encouraged, constrains dietary options and necessitates greater attention to how rumen communities are constituted. A balanced rumen, coproduced through caprine and human practices, must be "done again and again and again if it is to hold," as John Law suggests.[60]

58. Sutton Grange Organic Farm, "More on Obsalim."
59. Haicaguerre, *OBSALIM Method*.
60. Law, "Material Semiotics."

The first lesson of Obsalim for Carla and Ann-Marie was: "Don't interrupt rumination—change the farm cycle to accommodate the animals, not vice versa, where possible. Respect the rumen; there's no way around it."[61] The dual processes of mastication and fermentation in the gut enable food to be more fully and satisfactorily incorporated. Here the rules of the stomach privilege rumination as a slow, restorative practice during which the herd nourishes its collective body without expending the energy that foraging demands. As the herd chews the cud, the goats relax, entering into a sleepy state. Through the commensal and affective practice of rumination, caprine conviviality and good health become entangled.

Respect for the rumen does not mean, as Frank Heuts and Annemarie Mol suggest, "leaving things and situations as they are. Instead it is a matter of calling on strengths and tinkering with weaknesses."[62] This respect is guided by gastronomic normativities that balance the goats' capacity for pleasure, and their taste for sweet grass, with the needs of the rumen. Goats should not "[make] guts [of] themselves," Carla explains.[63] "If the grass is lush and green and there's too much of it, they'll just keep eating it and make themselves sick, like you having Christmas dinner and for some reason, even though you're full, you're still eating the pavlova." Overindulging in the sweetness of grass can manifest in soft droppings, which may take days to become apparent, or in an animal licking the area near its shoulder (roughly where the rumen is located) two hours after eating. Carla likens this to a human rubbing her belly after eating too much. This is because the sugars in grass increase gut acidity.

Rumen instability, or acidosis, is no trifling matter for a goat. Enterotoxemia, known within the industry as overeating disease, results from an overgrowth of *Clostridium perfringens*, a gut bacterium normally present in small quantities. Excess sugar enables bacteria to proliferate quickly, releasing toxins into the animal's intestines with potentially fatal consequences. Vaccination is the standard approach for managing enterotoxemia, though Carla and Ann-Marie have not needed to vaccinate against the disease since using Obsalim. In this sense, Obsalim operates as a "post-Pasteurian ethos" that encourages the flourishing of some microorganisms and conversely avoids the conditions whereby a narrow range of others become dominant and potentially lethal for goats.[64]

Carla, Ann-Marie, and their staff note how Obsalim requires them to be "animal-focused, not farm/farmer-focused."[65] Organizing their workday around the rumen means "that it is harder for the humans," as "it does 'stretch the day.'"[66] As Italian veterinary intern Eva Zanettini observes during her time at Holy Goat, "We need to adapt to the goats and respect the cycle of the animals. But you are not just working with the goat, you are also working with millions of microorganism animals in the gut; it is the symbiosis of the

61. Sutton Grange Organic Farm, "More on Obsalim."
62. Heuts and Mol, "What Is a Good Tomato?," 141.
63. This expression is an Australian colloquialism for overeating or making a pig of oneself.
64. Paxson, "Post-Pasteurian Cultures," 18.
65. Sutton Grange Organic Farm, "Obsalim Training."
66. Sutton Grange Organic Farm, "Obsalim Training."

goat and the rumen flora. Obsalim gave us each a pair of glasses and helped us learn how to read the body of the goat."[67] Close observation is needed to discern and respond to the herd's collective voice. Carla and Ann-Marie adjust feed, timing of meals, or duration of rumination in response to how they interpret the language of the rumen. After adjustments, they must keep their "eyes closed" in the short term so that the rumen can adapt and speak back in the days or sometimes weeks that follow.[68] The biochemical communication between the brain and gut is inscribed on a goat's body and through her behavior. The rumen's signifiers—shoulder licking, loose droppings, runny eyes, long fibers in the poo cakes—highlight symptoms of a problem without telling the whole story. The coded cards translate the rules of the rumen, albeit imperfectly, demanding a response to what a goat might need to eat well without universal claims or certainties about how this is best achieved. As such, Obsalim provides a framework for attending to the rules of the rumen in ways that remain "ongoing, adaptive, tinkering and open-ended."[69]

## Conclusion

This very situated account of a ruminant gastronomy offers a critical intervention into imagining a gastronomic community that is more inclusive of other "terran critters" in farming and food production systems.[70] The gastronomic "good" at Holy Goat extends beyond human concerns of crafting delicious cheese and its connoisseurship. Rather, "goodness" emerges from normativities attuned to the complex ways in which trees, pasture, soils, mineral rations, gendered commensality, and the convivial digestion of rumination come together in caring about and caring for goats (which equally concerns how goats care for themselves and each other). Obsalim brings the rumen into focus in new ways, operating as a relational knowledge practice of gastronomic care that is at once "an affective state, a material, vital doing, and an ethico-political obligation" to the herd.[71] From these temporal, social, and metabolic entanglements a more-than-human gastronomic epistemology is enacted in which goats are acknowledged as knowing, discerning, and capable of their own distinct pleasures. These are pleasures that need to be taken seriously, both for how they enhance the lives of goats—and the farmers who enjoy caring for them—and for how they might compromise the health of the rumen and the well-being of the herd.

Responding to goats as gastronomic subjects produces obligations that unfold through an iterative process of observation, deliberation, action, and waiting. Taking the rumen as a text necessitates new forms of reading that acknowledge how goats might "testify" and bring their own judgment to bear on the quality of their care and nourishment.[72] This gastronomic dialogue between humans, goat, and rumen opens

67. Sutton Grange Organic Farm, "Four-Eyed Focus on Obsalim."
68. Haicaguerre, *OBSALIM Method*, 33.
69. Heuts and Mol, "What Is a Good Tomato?," 130.
70. Haraway, *When Species Meet*, 295.
71. Puig de la Bellacasa, "Matters of Care in Technoscience," 90.
72. Despret, "Sheep Do Have Opinions," 363.

the possibility for normativities that are not governed by notions of purity but rather by concerns for the quality of metabolic and social collectives coproduced through processes of living, eating, and crafting worlds together.[73] Greater attentiveness to the conditions for gastronomic coexistence offers more productive ways of responding to the myriad pleasures and troubles that circulate within the transcorporeal ecologies of eating.

Nonetheless a ruminant gastronomy—however attentive it might be to the appetites and pleasures of others—does not deny the power dynamics within goat-human relations or suggest that everyone fares equally well in agriculture. While certain worlds are being made, others are also unmade. This forever remains the devil's detail of gastronomy.[74] Nor can a multi-species gastronomy disentangle settler farmers and eaters from the dispossessive ecologies of agriculture. Disrupting the purity politics of humanist gastronomy is, however, important to redrawing the boundaries of who constitutes an evaluative gastronomic subject and therefore whose pleasures matter. From this perspective, more relational discourses and practices of gastronomy might serve to expand settler understandings of gastronomic justice in ways that are more respectful of and attentive to "Indigenous legal and political orders" that govern food and land.[75] These come with their own distinctive pleasures and normativities for co-flourishing, which are essential to creating more livable and just futures. In this context, counternarratives to humanist gastronomy could invite the formulation of new normative frameworks from which more creative and ethically nuanced practices for eating and living well together—metabolically, socially, and politically—might emerge.

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**Acknowledgments**

I am deeply indebted to my research participants for sharing their rich knowledge and insights. Quotes have been used with their informed consent. All interpretations, and any errors, are my own. I extend my sincere thanks to Christine Knight, David Southwell, and Tania Cammarano for editorial assistance. I am particularly grateful to editors and anonymous reviewers of *Environmental Humanities* for their generous reading and constructive commentary. This article was developed during a 2019–20 fellowship at the Rachel Carson Center for Environment and Society in Munich. Support from William Angliss Institute in the form of sabbatical leave during this period is gratefully acknowledged.

73. Despret and Meuret, "Cosmological Sheep."
74. Haraway, *When Species Meet*.
75. Shotwell, "Flourishing Is Mutual."

**References**

Abecia, L., E. Ramos-Morales, G. Martínez-Fernandez, A. Arco, I. Martín-García, C. B. Newbold, and D. R. Yáñez-Ruiz. "Feeding Management in Early Life Influences Microbial Colonisation and Fermentation in the Rumen of Newborn Goat Kids." *Animal Production Science* 54, no. 9 (2014): 1449–54.

Alaimo, Stacy. *Exposed: Environmental Politics and Pleasures in Posthuman Times*. Minneapolis: Minnesota University Press, 2016.

Alaimo, Stacy. "Trans-corporeality." In *Posthuman Glossary*, edited by Rosi Braidotti and Maria Hlovajova, 435–38. London: Bloomsbury, 2018.

Balcombe, Jonathan. "Animal Pleasure and Its Moral Significance." *Applied Animal Behaviour Science* 118 (2009): 208–16.

Berry, Wendell. *What Are People For?: Essays*. New York: Counterpoint, 1990.

Bertrand, Paul, Amy Loughman, and Melinda Jackson. "Gut Feeling: How Your Microbiota Affects Your Mood, Sleep, and Stress Levels." *Conversation*, October 11, 2016. https://theconversation.com/gut-feeling-how-your-microbiota-affects-your-mood-sleep-and-stress-levels-65107.

Boisvert, Raymond. "Convivialism: A Philosophical Manifesto." *Pluralist* 5, no. 2 (2010): 57–68.

Bourdieu, Pierre. *Distinction: A Social Critique of the Judgement of Taste*. Cambridge, MA: Harvard University Press, 1984.

Brillat-Savarin, Jean-Anthelme. *The Physiology of Taste*, translated by Anne Drayton. 1825; repr., London: Penguin Books, 1994.

Clark, Nigel. "Animal Interface: The Generosity of Domestication." In *Where the Wild Things Are Now: Domestication Reconsidered*, edited by Rebecca Cassidy and Molly H. Mullin, 49–7. Oxford: Berg, 2007.

Despret, Vinciane. "Sheep Do Have Opinions." In *Making Things Public: Atmospheres of Democracy*, edited by Bruno Latour and Peter Weibel, 360–70. Cambridge, MA: MIT Press, 2006.

Despret, Vinciane. "The Body We Care For: Figures of Anthropo-zoo-genesis." *Body and Society* 10, nos. 2–3 (2004): 111–34.

Despret, Vinciane, and Michel Meuret. "Cosmoecological Sheep and the Arts of Living on a Damaged Planet." *Environmental Humanities* 8, no. 1 (2016): 24–36.

Donati, Kelly. "'Herding Is His Favourite Thing in the World': Convivial World-Making on a Multispecies Farm." *Journal of Rural Studies* 66 (2019): 119–29.

Dupuis, Melanie. *Dangerous Digestion: The Politics of American Dietary Advice*. Berkeley: University of California Press, 2015.

Dwyer, Cathy. "Behaviour of Sheep and Goats." In *The Ethology of Domestic Animals: An Introductory Text*, 3rd ed., edited by Per Jensen, 199–213. Oxfordshire, UK: CABI, 2017.

Elton, Sarah. "Posthumanism Invited to Dinner: Exploring the Potential of a More-than-Human Perspective in Food Studies." *Gastronomica* 19, no. 2 (2019): 6–15.

Ferguson, Priscilla Parkhurst. "A Cultural Field in the Making: Gastronomy in Nineteenth-Century France." *American Journal of Sociology* 104, no. 3 (1998): 597–641.

Fournier, Lauren. "Fermenting Feminism as Methodology and Metaphor: Approaching Transnational Feminist Practices through Microbial Transformation." *Environmental Humanities* 12, no. 1 (2020): 88–112.

Green, Kelsey, and Franklin Ginn. "The Smell of Selfless Love: Sharing Vulnerability with Bees in Alternative Apiculture." *Environmental Humanities* 4, no. 1 (2014): 149–70.

Gregorini, Pablo, Juan J. Villalba, Pablo Chilibroste, and Frederick D. Provenza. "Grazing Management: Setting the Table, Designing the Menu, and Influencing the Diner." *Animal Production Science* 57, no. 7 (2017): 1248–68.

Haicaguerre, Maider. *What Are the Principle and the Advantages of OBSALIM Method for Holy Goat Organic Farm?: Internship Report A2*, Summer 2016.

Haraway, Donna. *When Species Meet*. Minneapolis: University of Minnesota Press, 2008.

Heldke, Lisa. "An Alternative Ontology of Food: Beyond Meataphysics." *Radical Philosophy Review* 15, no. 1 (2012): 83–85.

Heldke, Lisa. "It's Chomping All the Way Down: Toward an Ontology of the Human Individual." *Monist* 101, no. 3 (2018): 247–60.

Hellec, Florence, Claire Manoli, and Manon de Joybert. "Alternative Medicines on the Farm: A Study of Dairy Farmers' Experiences in France." *Frontiers in Veterinary Science* 8 (2021). https://doi.org/10.3389/fvets.2021.563957.

Heuts, Frank, and Annemarie Mol. "What Is a Good Tomato? A Case of Valuing in Practice. *Valuation Studies* 1, no. 2 (2013): 125–46.

Hird, Myra. *The Origins of Sociable Life: Evolution after Science Studies*. New York: Palgrave McMillan, 2009.

Johnston, Catherine. "Beyond the Clearing: Towards a Dwelt Animal Geography." *Progress in Human Geography* 32, no. 5 (2008): 633–49.

Korsmeyer, Carolyn. *Making Sense of Taste: Food and Philosophy*. Ithaca, NY: Cornell University Press, 2002.

Krzywoszynska, Anna. "Caring for Soil Life in the Anthropocene: The Role of Attentiveness in More-than-Human Ethics." *Transactions of the Institute of British Geographers* 44, no. 4 (2019): 661–75.

Landau, S. Y., and Frederick D. Provenza. "Of Browse, Goats, and Men: Contribution to the Debate on Animal Traditions and Cultures." *Applied Animal Behaviour Science* 232 (2020). https://doi.org/10.1016/j.applanim.2020.105127.

Law, John. "Material Semiotics." Heterogeneities: John Law's STS Web Page. January 19, 2019. http://heterogeneities.net/publications/Law2019MaterialSemiotics.pdf.

Membrive, Claudia Maria Bertan. "Anatomy and Physiology of the Rumen." In *Rumenology*, edited by Danilo Domingues Millen, Mario De Beni Arrigoni, and Rodrigo Dias Lauritano Pacheco, 1–38. Cham, Switzerland: Springer, 2016. https://doi.org/10.1007/978-3-319-30533-2_1.

Meuret, Michel, and Frederick D. Provenza. "When Art and Science Meet: Integrating Knowledge of French Herders with Science of Foraging Behavior." *Rangeland Ecology and Management* 68, no. 1 (2015): 1–17.

Paxson, Heather. "Post-Pasteurian Cultures: The Microbiopolitics of Raw-Milk Cheese in the United States." *Cultural Anthropology* 23, no. 1 (2008): 15–47.

Paxson, Heather, and Stefan Helmreich. "The Perils and Promises of Microbial Abundance: Novel Natures and Model Ecosystems, from Artisanal Cheese to Alien Seas." *Social Studies of Science* 44, no. 2 (2014): 165–93.

Plumwood, Val. *Feminism and the Mastery of Nature*. New York: Routledge, 2003.

Plumwood, Val. "Integrating Ethical Frameworks for Animals, Humans, and Nature: A Critical Feminist Eco-socialist Analysis." *Ethics and the Environment* 5, no. 2 (2000): 285–322.

Puig de la Bellacasa, Maria. "Matters of Care in Technoscience: Assembling Neglected Things." *Social Studies of Science* 41, no. 1 (2011): 85–106.

Shotwell, Alexis. "Flourishing Is Mutual: Relational Ontologies, Mutual Aid, and Eating." *Feminist Philosophy Quarterly* 7, no. 3 (2021). https://ojs.lib.uwo.ca/index.php/fpq/article/view/10850.

Sutton Grange Organic Farm. "A Four-Eyed Focus on Obsalim." Blog, October 27, 2016. https://www.holygoatcheese.com.au/a-four-eyed-focus-on-obsalim/.

Sutton Grange Organic Farm. "More on Obsalim—Learning the Language of the Rumen." Blog, n.d. https://www.holygoatcheese.com.au/animal-health/more-on-obsalim-learning-the-language-of-the-ruminant/.

Sutton Grange Organic Farm. "Obsalim Training: Motivated Farmers + Small On-Farm Changes = Big Returns." Blog, November 6, 2017. https://www.holygoatcheese.com.au/obsalim-training-motivated-farmers-small-on-farm-change-big-returns/.

Szanto, David. "Eater or Eaten: What Revolves around Who?" Dublin Gastronomy Symposium: Food and Revolution, May 31, 2016. https://arrow.tudublin.ie/dgs/2016/May31/3/.

Szymanski, Erika. "What Is the Terroir of Synthetic Yeast?" *Environmental Humanities* 10, no. 1 (2018): 40–62.

TallBear, Kim. "Being in Relation." In *Messy Eating: Conversations on Animals as Food*, edited by Samantha King, R. Scott Carey, Isabel Macquarrie, Victoria N. Millious, and Elaine M. Power, 55–67. New York: Fordham University Press, 2019.

Todd, Zoe. "An Indigenous Feminist's Take on the Ontological Turn: 'Ontology' is Just Another Word for Colonialism." *Journal of Historical Sociology* 29, no. 1 (2016): 4–22.

Tracy, Megan. "Missing Microbes and Other Gendered Microbiopolitics in Bovine Fermentation." *Current Anthropology* 62, no. S24 (2021): S276–86.

Trubek, Amy. "Radical Taste: What Is Our Future?" *Radical History Review* 110 (2011): 192–96.

Tsing, Anna. "Arts of Inclusion; or, How to Love a Mushroom." *Australian Humanities Review*, no. 50 (2011): 5–22.

Tsing, Anna. "Strathern beyond the Human: Testimony of a Spore." *Theory, Culture & Society* 31, nos. 2–3 (2014): 221–41.

van Dooren, Thom, Eben Kirksey, and Ursula Münster. "Multispecies Studies: Cultivating Arts of Attentiveness." *Environmental Humanities* 8, no. 1 (2016): 1–23.

Watts, Vanessa. "Indigenous Place-Thought and Agency amongst Humans and Non-humans (First Woman and Sky Woman Go on a European World Tour!)." *Decolonization: Indigeneity, Education & Society* 2, no. 1 (2013): 20–34.

West, Harry G. "Thinking like a Cheese: Towards an Ecological Understanding of the Reproduction of Knowledge in Contemporary Artisan Cheesemaking." In *Understanding Cultural Transmission in Anthropology: A Critical Synthesis*, edited by Roy Ellen, Stephen J. Lycett, and Sarah E. Johns, 320–45. Oxford: Berghahn Books, 2013.

Wolfe, Benjamin. "*Geotrichum candidum*: A Yeast Holding on to Its Moldy Past." *MicrobialFoods.org* (blog), December 23, 2015. https://microbialfoods.org/geotrichum-candidum-mold-transition/.

Yáñez-Ruiz, David R., Leticia Abecia, and Charles J. Newbold. "Manipulating Rumen Microbiome and Fermentation through Interventions during Early Life: A Review." *Frontiers in Microbiology* 6 (2015): 1133. https://doi.org/10.3389/fmicb.2015.01133.