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Introduction to the special issue on the post-human turn in agri-food studies: Thinking about things from the office to the page

The familiar and distinctive ring of Skype echoes through our offices on a regular basis. Whether interrupting our paper grading, or writing projects, or calling us away from making coffee down the hall, the noise elicits an immediate thought (is it 2:30 already?) and a response (putting down the pen, or darting across the hallway and back to our computers). The coordination of this special issue unfolded through a series of Skype calls, where the click of a button would generate a noise a thousand kilometres away, and signal the temporary opening of a communication path. That path would allow for the quick exchange of ideas and a plan of action to be established. Matt (at Massey) would email the journal editor, Katharine (at Otago) would find out where the papers would be submitted online and email back a link. Sometimes the movement of a truck outside the offices at Otago would temporarily interrupt our conversation, or distant jackhammering at Massey would provide a low hum of distraction. Our campuses have been under construction, so that we find ourselves globally networked across a seemingly immaterial cyberspace while our landscapes are transformed, pulling us into a surge of sensory experience, enveloping us in our realities of constant reconstruction.

The experiences of our evolving campuses do not discretely interrupt our communications over Skype, but rather all of our material engagements continually shape our academic work. How many manuscripts have been typed on the plane, where our private, worldly entanglements, are suspended and unavailable to us? How have our campus offices, with their bookshelves full of reassuring references, ergonomic chairs, and singular windows, influenced our work and how we think of our work? The construction on campus serves as a reminder of the broader institutions in which we work, and the physical changes those institutions undergo in an effort to build particular intellectual and educational outcomes. In an effort to produce this text, we have enrolled our computer programs, our scraps of papers, our door locks, our colleagues, and our stacks of texts. We have organized our non-human worlds so that we may talk about other non-human worlds. Writ small these anecdotes encapsulate the essence of this special issue: that the social, political, economic and environmental worlds that we inhabit, and which we aim to understand and improve, are fashioned in respect to those intricate and intimate relationships that we have with the materials that surround us.

It was our developing realization of the need to understand material relationships, their devices, modes of understanding, and practices of enactment that increasingly came to structure the work of the Biological Economies project, with which both of this special issue's editors were involved. The project began with an engagement with New Zealand's booming milk economy during 2008 and 2009, and which saw milk being referred to as 'white gold'. This developing milk economy was in the process of profoundly disrupting understandings about New Zealand's primary sector and its ability to generate economic value from biophysical assemblages of animals, plants, soil and water. Those involved in the Biological Economies project were reflecting on the implications of the boom, and in particular the forms of economic value that could be generated in places where dairying was not an immediate option and where other traditional forms of pastoral farming were seen as providing limited prosperity. A realization that started to develop out of these discussions was that understanding the production of economic value, and of how that value was made to stick in place, required new thinking about the materialities of things such as milk, meat, honey, and tourism, and the ways in which these materialities were being transformed into economic objects, and could be transformed in different ways in the future. This pulled our attention to the novel agentic relationships created by evolving technobiological, economic assemblages.

Increasingly then these questions about materialities, and non-human agency became the 'matters of concern,' to quote Latour (2004), about which the Biological Economics project revolved. In this context the editors of this special issue recognized that there was an opportunity to broaden the discussion of the post-human turn that had been shaping the work of the Biological Economies project, and we organized a session at the annual Agrifood Research Network meeting being held in Sydney. We were deliberately agnostic in our call for papers, asking only for an engagement with the ideas circulating about the agency of non-human things. Much to our surprise we were able to fill three sessions with engaged, stimulating discussion that ranged from water and mice to snails and climate change. The papers in this special issue all had their genesis in these 2015 Agrifood special sessions. Yet, as we elaborate, the special issue and the post-human in agrifood more broadly has a trail that spans much farther back than the Biological Economies project or Agrifood Research Network, and draws on both science and technology studies and political economy. In elaborating on these foundations, we hope to also clarify that we are not suggesting that we eclipse attention to social processes with material determinism. Instead we are proposing that sociality and materiality are intertwined, and that paying attention to material process in the social world can be analytically useful.

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1. STS and agri-food studies

There is a strong tradition of commodities research within agri-food studies. Authors within this tradition often elaborate extensively on the actual material contours of their objects of study. Bill Friedland pioneered commodity systems analysis in the sociology of agriculture, which paved the way for a fine-tuned focus on specific agricultural commodities and the development of industries around them (see Friedland, 1984). In this work, and in his later reprise to the original (2001), he stresses that the materiality of the good and the technologies that are introduced for commodity production all play an important role in the types of relational networks that develop. In his emphasis on the systemic aspects of the approach, he notes the ways that different parts of the network all play a role in generating the commodity, and that they all become constitutive and inter-dependent elements of production. Adopting this kind of material-attentive approach, Sidney Mintz (1985) published the classic *Sweetness and Power*, where he considered the material features of sugar and its impact on our tastebuds and energy production as foundational to the global economy that developed around it. This was followed by Miriam Wells' (1996) work on strawberries in California, Friedberg's *French Beans and Food Scares* (2004), and Soluri's *Banana Cultures*, (2005), to name a few. The materiality of these products, whether it is the thick skin of the banana, the perishability of French beans, or the mobility and calorie content of sugar is socially, economically and politically meaningful. In many ways, the more-than-human approach resonates with this commodity chain history, but has simply drawn our focus more intently to the specific character of non-humans and the shape of their agentic qualities within our agri-food worlds.

Framed by this tradition, the vibrancy of the sessions at Agrifood in Sydney compelled us to continue our conversation about the focus of things (and thingness) in our intellectual work. Why post-human? Why now? What does the post-human offer to agri-food studies? By focusing on the forcefulness of non-humans in our work, we bring science and technology studies and what it tells us about the economics of objects and formation of commodities, to the critiques typical to agri-food studies. We consider post-humanism, new materialism, and metrologies to be part of a broader project of forming a post-structural political economy that sees the relationship between non-humans and social, economic, and political life as non-linear, entangled and mediated. That is, there is no direct causation between the characteristics of an apple or the standard measurements used by a butcher and the industries that emerge from them. We suggest that the tools of science and technology studies aid in our efforts to temper the determinism that can be associated with a more materialist foundation. Actor-Network Theory is useful in helping us consider how materials *become* vibrant or lively through their relationships with other materials, both human and non-human. Perhaps Michel Callon's (1984) initial foray into Actor-Networks with his rich depiction of the scallops of Bruic Bay best illustrates this relatedness. The behavior of the scallops is determined by the network of other things in which the scallops are situated, so that the act of defining scallop behavior generally becomes an act of assembling a defined environment. That environment is then folded into the definition of the scallop and forgotten.

For food commodities, the Actor-Network analysis pulls our gaze to the physical and conceptual architecture of the world that produces apples, or rice, or water, as commodities. Recent edited collections further draw our attention to the role that this approach can play in economic and political analysis. *Living in A Material World* (Pinch and Swedberg, 2008) focuses on the nexus between STS and (largely institutionalist) economic sociology, *Political Matter* (Braun et al., 2010) engages with the politics emerging from material substance, while *Biological Economies* (Le Heron et al., 2016) brings this very close to home by shedding new light on the non-humans among us. Building on these works and sharing the excitement of their contributors, we narrow our focus to agri-food studies, and look at the disease, machinery, standards and rules that produce the realities of food production, trade, and consumption as we know it.

An important methodological, and conceptual, way-point for the Biological Economies group, and our interlocutors, has been the developing attention to assemblage, or the more enactive assembling. Drawing on special issues of both *Area* (2011) and *Dialogues in Human Geography* (2012) devoted to working with ideas of assemblage, the Biological Economies published a special issue of the *New Zealand Geographer* (2013) in which assemblage theory was used to interrogate elements of New Zealand's agribusiness economy and landscapes in different ways. Introducing the *New Zealand Geographer* special issue, the editors Rosin and Lewis (2013) argued part of the attractiveness of using assemblage was its provocation to openness that encourages relational thinking without necessarily prioritizing specific actors, agencies, or geographies, or withdrawing anything from the analysis (Latour, 2010). The advantage of this approach is that it enables us to both grasp the ways in which the food that we see and consume is generated through a complex network of mechanisms, and also to identify those mechanisms that operate largely unseen while also rendering parts of the world invisible—the operation of grading standards in produce that erases visual outliers from the supermarket aisle, for example. We wish to reengage with those mechanisms so that we may understand what has been made invisible, foreclosing alternative imaginings of the possible. The implications are an expansive world of possibility and a pragmatic approach to alternative food systems, enabled through the explication of specific arrangements, and a critique of the social dynamics and the power structures they uphold.

2. More than human political economies

Assemblage and network approaches are often challenged for their absence of a coherent critique of power. These critiques are necessary for our discipline, driven by a concern many Agrifood scholars have about our current industrial agri-food system. In employing actor-network and assemblage theories in the agri-food context, we are not forgetting about the broader political economies that have been so well described in work around food regimes (Friedmann and McMichael, 1989; see also McMichael, 2009) and commodity chain analyses (Friedland, 1984; Wells, 1996; Friedberg, 2004). Rather, we are looking at practices of power in new places, and how these alternative power sources may contribute to our understanding of contemporary food politics and their alternatives. While assemblage and post-human networks have been described as an analytic power-void, by placing them in time and space, narrating their historical emergence, and tracing them to the reaches of their often unintended influence, we develop a discussion around these networks as power laden. From this approach, things can hold a type of congealed power, socialized in the networks that compel their enactment, while the authors of the arrangement may disappear.

The post-human in agri-food has generated another critique: what is new about this? What differs from the commodity analyses of Mintz, who discussed the role of the properties of sugar and sugar technologies without discussing them as an actor-network or assemblage? What differs from Marx, the original materialist? We have a number of responses to this question. The first and perhaps most well-known is that the post-human is an idea with