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Risk, Trust and ‘The Beyond’ of the Environment: A Brief Look at the Recent Case of Mad Cow Disease in the United States

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ABSTRACT

The epistemologically distant nature of many of today’s environmental risks greatly problematises conventional risk analyses that emphasise objectivity, materiality, factual specificity and certainty. Such analyses fail to problematise issues of ontology and epistemology, assuming a reality that is readily ‘readable’ and a corresponding knowledge of that reality that is asocial, objective and certain. Under the weight of modern, invisible, manufactured environmental risks, however, these assumptions begin to crack, revealing their tenuous nature. As this paper argues, statements of risk are ultimately social products that come to us by way of *translation*. They are statements not of what *is* (ontology) but of knowledge (epistemology) expressed in probabilistic terms, and are thus thoroughly social in nature, for it is we – through our actions and social networks – that imbue them with meaning. One way we do this is through our social relations of trust. And it is this relationship – between trust and risk – that this paper seeks to detail both conceptually and empirically (while remaining grounded in a realist philosophy of science). While one could look toward any number of case studies to develop the conceptual details of this project, this paper focuses on the relatively recent (and first) case of mad cow disease to have been reported within the United States. Here, we have an epistemologically distant, and thus hotly contested, ‘object’ (or is it?), which has been the source of much risk debate; a debate that is also, in part, the effect of a deeper erosion of trust, particularly toward those managing our meat supply.

KEY WORDS

Risk, Trust, Translation, Complexity, Epistemology, BSE

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INTRODUCTION

Throughout human history, we have relied upon our senses to establish danger and assess uncertainty. Sight: e.g., to appraise the cleanliness of a stream or the health of a freshly caught fish. Hearing: e.g., to give caution of nearby predators or an approaching avalanche. Taste: e.g., to establish the freshness and eatablility of potential foodstuff. Touch: e.g., to warn the body of the extreme temperatures of an object soon to be within one's grasp. Smell: e.g., to forewarn of a raging, yet unseen, forest fire. Even today, we rely upon our sight, hearing, taste, touch and smell to alert us to potentially harmful phenomena that may be near. But while our senses remain the same today as they did centuries ago, the risky objects that confront us do not (although centuries ago our ancestors where less likely to speak of 'risk' but rather of 'danger' or 'fate').[1] The tide of modernity has brought with it a new species of risk, not readily perceptible to our senses alone (Erikson 1994).

Pesticide residue, antibiotic resistance, fecal contamination. BSE, GMOs, rBST. Radon, dioxin, radiation. PCBs, DDT, VOCs. Smog, global warming, hazardous waste. The talk of risk is in the air, leading some theorists to conclude that we have entered into an 'age of risk' (Rosa 2000) or that ours (read 'the West') is a 'risk society' (Beck 1992, 1995, 1999). Yet while this world may indeed be one marked by risk, many of these risky objects are epistemologically distant to us (Carolan 2004, 2006a, 2006b). We cannot see, taste, hear, feel, or smell dioxin, radon, radiation, VOCs and the like. So we must rely increasingly upon machines and statistical models to do our seeing, tasting, hearing, feeling and smelling for us.

This distant epistemological nature of many of today's environmental risks greatly problematises conventional analyses of risk, which emphasise objectivity, materiality, and factual specificity and certainty (Adam 1998). Conventional risk analysis fails to problematise ontology and epistemology by assuming a reality that is readily 'readable'. Under the weight of epistemologically distant modern environmental risks, however, such assumptions begin to crack, revealing their socially-mediated underbelly (Irwin 1997). We see this manifest in risk discourse and debates that are far from clear cut. The increasingly invisible, inaudible, scentless and intangible character of modern ('manufactured' [e.g., Beck 1995, 1999]) risks has lead to much confusion and conflict among the various actors involved. Global warming: fact or fiction? – we can't seem to decide. Genetically modifying food: Frankenfood or a second Green Revolution? – the jury is still out on this too. Disposing nuclear waste through entombment: a prudent course of action or the passing off of our problems to future generations? – depends on who you talk to. And with each debate there are 'experts' from both sides presenting their own 'scientific' evidence to bolster their position while refuting that of their antagonist.

To make sense of such debates, it is important that we first realise that statements of risk are *not* statements of ontology. That is, they are not statements about what *is*. Rather, they are statements of what we *think* is (framed in probabilistic, statistical terms). As I argue, too often ontology is confused with epistemology when speaking of risk – as in the problematic distinction between 'actual' (or 'objective) and 'perceived' (or 'virtual') risks – leading many risk scholars to commit what Roy Bhaskar (1997 [1975]) has termed an 'epistemic fallacy'.[2] This is not to suggest that risks have no attachment to materiality. At high enough levels, radiation really does alter genetic encoding. Bhopal really did kill thousands of people.[3] And ultraviolet radiation from the sun really can cause skin cancer. Yet, in granting the (critical) realist assertion that risks (can) correspond (however in/accurately) to a material reality 'out there', we must not lose sight of the fact that said correspondence is mediated through social processes, what sociologists of knowledge refer to as *translation* (Callon 1986; Latour 1987, 1988, 1999; Mol 2002), lest we succumb to an 'epistemic fallacy' of our own.

Which brings us to trust. While risky objects really do exist, thus granting their independent material existence, they have no meaning to us until they are embedded within social networks. Once embedded, they then become imbued with symbolic significance and are made part of the social landscape. Granted, beginning arguably with the writings of Mary Douglas and Aaron Wildavsky, scholars have given significant attention to how statements of risk tell us as much about the culture and social relationships out of which they emerge as they do about potentially harmful objects 'out there' (Douglas 1992; Douglas and Wildavsky 1982; Cohen 1999; Wildavsky 1988; Wynne 1980, 1989). Nor is this the first time the relationship between risk and trust has been examined (see, e.g., Covello and Peters 1996; Freudenburg 1996, 2000; Leiss 1995; Rayer and Cantor 1987; Szerszynski 1999; Wynne 1992, 1996). The contribution this paper seeks to make is by way of problematising our knowledge of, and thus by extension our knowledge of risks as they relate to, environmental objects – or 'hybrids' (Latour 2004) – that exist beyond direct perception. How, then, do we work, literally (for it is a performative act), to bring those epistemologically distant hybrids into focus, into our realm of social understanding, and thus give meaning to statements of risk that are associated with them? This paper seeks to explore and answer this question.

The relationship between trust and risk becomes salient once we give conceptual space to the socially mediated character of risk and the 'facts' upon which statements of risk are made. Trust relations give meaning to our knowledge of risk and shape how we deal with that knowledge when it comes our way. For instance, someone can tell you that eating a hamburger in the United States represents a significant health risk, now that the first case of 'mad cow' has been documented within its borders. Yet if you do not trust that person's knowledge on this subject to be true – or perhaps you trust the beef industry and its representatives more (who daily reassure the public as to the safety of the meat supply) – then you will likely not perceive beef within the United States as representing any particular risk to your health. And so it goes for the multiple and conflicting risk statements that we find ourselves inundated with on a daily basis.

Toward this argumentative end, this paper progresses as follows. I begin by elaborating on the concept of translation, particularly as it pertains to our knowledge of risk, and how, through translation, risks are brought into our social fields and imbued with meaning. Discussion then turns toward the aforementioned interrelationship between trust and risk to give further explanatory and descriptive expression to this process of translation. From here, attention is directed toward an empirical case study in order to further develop and elucidate risk's relationship to trust. Specifically, this section examines the contestation of risk as it relates to the recent case of mad cow disease within the United States. The site of empirical investigation for this case study: 'ground zero' of the incident itself – central Washington State. To conclude, I reflect upon what the interrelationship between trust and risk means for risk analysis in particular and environmental disputes more generally.

LOST IN TRANSLATION

Life for humans is risky; it has always been. By focusing on modern risks I do not mean to suggest that life is any more perilous today than it was for generations passed. For centuries, diabetes was a death sentence, diarrhoea was a killer, as were infections and the common cold, and food was hardly plentiful. In other words, life for many of our ancestors was brutal and short-lived.[4]

Nor do I mean to imply that the invisibility of risky objects is strictly a modern phenomenon. The world which we inhabit has always had within it potentially harmful phenomena that we could not readily perceive, such as the defensive chemical toxins that plants and fungi possess to protect them from predation.[5] But these objects differ from their modern counterparts in significant ways. For instance, while we cannot see many of the evolutionary-based environmental poisons themselves, we can see and differentiate between those plants and fungi that contain such toxins and those that do not. Moreover, while we cannot *see* these invisible risky objects, we still can detect most of them – such as through taste (most are bitter to us), which is the product of millions of generations of primate coevolution (Ehrlich 2000). Finally, and perhaps most significant to the discussion here, these 'natural' toxicological defence mechanisms typically stay *within* the plants and fungi themselves – until, that is, they are consumed by another organism. Consequently, they do not have the ability to colonise the environment in the same way that many of the manufactured risky objects that we face today can – such as radiation, radon, dioxin, PCBs and the like.

This brings us to *the beyond* of the environment: the realm of being that exists just beyond our direct perception, but within which many of today's risky objects reside.[6] Given the inaccessibility of this realm to direct human perception, we must rely increasingly upon machines, computer models and printouts to do our perceiving – our seeing, tasting, touching, hearing and smelling – for us, and through this bring this realm of 'the beyond' into the social. Yet in doing this, something occurs that is of significant epistemological, and thus political, consequence. What I am speaking of is *translation*.

Philosophers of language, from Wittgenstein to Foucault, have argued that words do not convey a one-to-one representation of the reality they are said to describe. Yet the same argument can be applied to the 'output' from these aforementioned machines, computer models and tests. For example, a 'positive' reading from a dioxin plume test is not 'dioxin', at least not initially. The same can be said for, say, the digital display on a radon detector or a rising global mean atmospheric temperature; the former *is* not radon just as the latter *is* not global warming. Only through translation do our direct experiences of these tests, digital displays and measurements become that which they are said to represent. We translate those figures from a positive dioxin plume test into that which *is* dioxin. We translate the readings from a radon detector into that which *is* radon. And we translate a rising global mean atmospheric temperature into that which *is* global warming.

The process of translation is far from unproblematic, however. As when translating from one language to another, inconsistencies arise. Translation never results in a perfect one-to-one representation; something is always lost, gained, or ever-so-slightly altered (Kuhn 1970). Such is the conflictual nature of modern, epistemologically distant, environmental problems (Carolan 2004). All of which brings us to environmental hybrids and the risks some are said to constitute.

Modern environmental hybrids are a particularly complex bunch, which involve, for instance, ecosystems, hydrological systems, atmospheric systems and biological systems. Weinberg (1972) speaks to this complexity as representing 'trans-science'. For instance, risk scientists can ask questions in clear scientific terms: 'What will be the long-term consequences of a five percent increase in methane emissions over the next thirty years?' Yet there is no way to answer this question except in the laboratory of the real world; there are simply too many variables and complex interactions for us to construct a neatly packaged 'closed' causal model (although we sometimes attempt to do so nonetheless). Wynne (1992) highlights the difficulty that accompanies answering these trans-scientific questions – in a 'normal' Kuhnian way – by suggesting that we speak not of 'uncertainty', for such a term implies that what is needed is simply more (and/or better) science. Instead, Wynne (1992) argues we need to speak of 'indeterminacy' to make clear that some of these questions are beyond 'normal-'

(Kuhn 1962) or 'research-' science (Weinberg 1972). And as such they may never be adequately answered by way of a strict science (of fact) alone.

Take, for example, the questions that must go into establishing a statement of risk for a waste-burning power plant suspected of emitting dioxin. First, where do you test for dioxin? The combustion chamber? The stack? Say you decide to utilise a plume test. But even plume tests, which are designed to test for dioxin in the plant's emissions, require that you once again answer the question of 'where' – namely, where in the stack do you test?

Now say dioxin is ultimately found. Can a statement of risk be made just on the basis of this discovery? – not quite yet. Questions involving toxicity, for instance, must now be addressed: for example, at what level is dioxin considered dangerous for the human body? Yet even this question begs others – like *which* human body are we referring to? Since people are different, in that we all come in different shapes and sizes and thus have different susceptibilities to environmental pollutants, *who* should our representational 'body' be – an infant, a pregnant women, a middle-aged man, or perhaps a ninety pound elderly women? And *who* makes these difficult decisions – scientists, residents of the potentially affected community, or politicians who live and work hundreds of miles away? Such questions are far from clear-cut, and reveal the moral, social and political underbelly of risk analysis, which is nevertheless frequently packaged as 'scientific' and 'objective'.

Nor are all of us engineers, physicists and epidemiologists. Thus, for argument's sake, even if (and this, as we have seen, can be a big *if*) the above questions were answered to some degree of satisfaction, most of us would not even know it, for such questions are simply beyond our areas of knowledge and expertise. So we must look beyond science to give these scientific questions meaning as we seek to establish the truthworthiness of the various responses to them.

Since environmental risk statements are frequently in reference to phenomena we cannot see (except perhaps in their effects), how then do we, experts and non-experts alike (for no one is an expert on everything, particularly of something as complex as the environment) assess the truthfulness of such statements? To answer this question, let us examine the interrelationship between risk and trust.

KNOWLEDGE, RISK AND TRUST

Risks are not, in-and-of-themselves, material things. Rather, they are statements of probability relating to future possible events; 'the product of future-oriented human calculations – assessments made by people in the face of an uncertain world and the possibilities that it holds for them' (Garland 2003: 52). This is why the distinction between 'objective' (also referred to as 'actual') and 'subjective' risk is problematic, for the latter suggests an unmediated statement of what *is*. Yet risks are *not* ontological statements. Instead, statements of risks are epistemological – they express *estimates* of future *possible* events.

This position is guided by the philosophical postulates of critical realism (e.g., Archer et al. 1998; Bhaskar 1997 [1975], 1998 [1979]; Carolan 2005a, 2005b). According to Roy Bhaskar (arguably the leading proponent of this philosophical position), knowledge is, and will always be, socially mediated, to various degrees. Yet, in making this declaration, he is *not* reducing all of reality to a mere social construction. There is, for Bhaskar, an independent material reality – what he refers to as the 'intransitive dimension' – in which exist deep structures and causal tendencies. Bhaskar arrives at this position by way of transcendental deductive reasoning – by, if you will, standing Kant (and his transcendental idealism) on his head. The details of this argument need not concern us here (see, e.g., Collier [1994] for a concise and accessible review of Bhaskarian critical realism). The importance of this position for the argument at hand is that it provides a philosophical foundation upon which to speak of the mediatedness of knowledge, while still grounding the argument in a realist philosophy of science. When set against this framework, relief is provided that allows us to make claims as to the socially mediated quality of risk without denying the potential links such statements have to a material world 'out there' (the lacking of a realist ontology is a criticism frequently level at, for instance, cultural and social constructionist perspectives of risk [see, e.g., Rosa 1998]). So how are risks socially mediated?

As philosophers of science have argued – be they Kuhn, Feyerabend, Latour, or Bhaskar – knowledge always needs to be placed within an interpretative context (e.g., Kuhn 1962; Latour 1987; Polanyi 1962). Knowledge, in other words, is an amalgamation of social networks, which shape interpretative structures that allow us to distinguish facts from falsities, truths from untruths, and science from science fiction. For example, when a 'fact' is brought to our attention we immediately seek to link it to a particular social network. 'Who told you that?' or 'Where did you hear that from?' are some of the questions we ask in order to make this determination. When we encounter knowledge we thus seek to know not just what and which knowledge it is but *whose knowledge* it is so we can determine how it fits with our personal sense of trustworthiness, and through this begin to assess the knowledge claim's *truth*worthiness (Bell 2004; Carolan and Bell 2003, 2004). From this we can begin to see how knowledge and trust connect. Yet how does this link up with risk – and in particular modern environmental risk?

As earlier described, many modern environmental risks point to a realm that is beyond direct perception. The question of risk, then, while indeed scientific, is also thoroughly social, for reasons given previously. So we must likewise look beyond science to give these 'scientific' statements of risk meaning. In short, we must look toward those we trust. And through this, we can begin to assess whether we trust the social origins of these risk claims as speaking the truth and to what degree.

Let us now turn attention to a case study to give further conceptual depth to the analysis at hand. The recent (and first) case of mad cow disease within the United States is an issue that brings with it much risk contestation and debate. Generally, this debate involves a myriad of players – from (agricultural) producers, to consumers, to government actors, to scientists and so forth. For purposes at hand, however, this case study focuses specifically on agricultural producers. The goal of this paper is not to provide an ethnographic or contextual analysis of the entire debate surrounding this case of mad cow disease. Rather, interest resides in unmasking the interrelationship between trust and risk as it pertains to this case study. And by focusing in on one key group – agricultural producers – this can be accomplished without introducing too much analytic complexity into the analysis.

WHOSE TRUTH DO YOU TRUST REGARDING STATEMENTS OF RISK?

Date: mid-December, 2003. Event: the first reported case of mad cow disease within the United States. Location: central Washington State. Suspect in question: one Holstein, who had arrived – with 80 other herdmates – from a farm in Alberta Canada in 2001.[7]

Mad cow disease, known also as bovine spongiform encephalopathy (BSE), is a slowly progressive, degenerative fatal disease affecting the central nervous system of adult cattle. It first made its way onto public radar screens in Britain in 1986, prompting the eventual slaughter of thousands of cattle and the decimation of the European beef industry (as well as public perception of beef throughout Europe). The exact origins of BSE remain uncertain, but it is thought that cattle initially may have become infected by a type of protein called ‘prions’ when fed feed contaminated with scrapie-infected sheep meat-and-bone meal. In cattle with BSE, these abnormal prions initially occur in the small intestines and tonsils, later spreading to the central nervous tissues, such as the brain and spinal cord. Yet it is BSE’s transference across species that has most people concerned – namely, from non-human mammals to humans. The human form of the disease, known as variant Creutzfeldt-Jacob Disease (vCJD), has so far taken the lives of approximately 150 people in Britain (although specific figures vary widely). In the United States, (as of December 2005) there has been only one known case of variant CJD – a Florida woman who died in June of 2004 after eating contaminated beef more than a decade earlier in England.

It is important to note, however, that while doctors are legally obligated in most European countries and Canada to report all cases of CJD, only twenty-five states in the U.S have a notification policy, which greatly problematises their mortality figures for vCJD. Moreover, only about 60 percent of all CJD cases in the U.S are being reported to the National Prion Disease Pathology Surveillance Center (located at Case Western Reserve University in Cleveland, Ohio) (Coghlan 2004). Thus, the number of people to have died in the United States from vCJD may be higher than the single case. (For clarification: sporadic CJD, or simply CJD, is the most common form and effects largely the elderly from chance mutations; vCJD, on the other hand, is the human form of BSE.)

The United States has claimed to be proactive in its policies so as to prevent what happened in Britain from happening within its borders.[8] Safeguards were first put into place in 1990 to monitor for the disease. This included randomly testing the highest risk cattle going to slaughter. Since 1990, 10,000 to 20,000 animals per year have been tested for BSE as a result of these methods. As of 1992, the FDA (Food and Drug Administration) has advised dietary supplement manufacturers and distributors to take steps in order to ensure that no dietary supplement ingredients come from cattle that were born, raised or slaughtered in any country known to have BSE, or that has ‘inadequate’ methods to detect and control it. And by 1997, the FDA prohibited the use of most mammalian protein (most importantly cattle and sheep) in the manufacture of cattle feed.

In light of the recent discovery of mad cow disease within its borders, the U.S Department of Agriculture (USDA) now plans to expand its testing for the disease to include more than 200,000 to 300,000 ‘high risk’ animals a year, over 10 times the number tested in previous years. Additionally, testing will randomly be conducted on about 20,000 older animals sent to slaughter, even if they appear healthy. These tests are aimed to sample cattle old enough to have eaten feed produced before 1997, the year the FDA banned the use of mammalian protein in cattle feed. Such tests, the USDA claims, will be enough to detect an incident of BSE as low as 1 in 10 million (for comparison, France had a detection rate of 2 in 10 millions in 2003) (MacKenzie 2004).

Doubt remains, however, as to the adequacy of these measures. To obtain this large sample of ‘high risk’ cattle every year, the USDA is asking cattle producers to volunteer their ‘downers’ (cattle that can no longer walk) for testing. Yet if a cow were to test positive for BSE, the entire herd must then be destroyed. Is it therefore a realistic assumption to believe that cattle producers would volunteer suspect cattle for testing, particularly in light of what a ‘positive’ test would cost them? Rather then risk losing one’s entire herd, producers may opt instead for the old ‘shoot, shovel and shut up’ method to deal with suspicious acting cattle, which places into question the adequacy of the USDA's safety measures (MacKenzie 2004).

Nevertheless, pointing to all of the safeguards in place before December 2003, and to all of those soon to be implemented, the government has been clear and steadfast in its message regarding the safety of the beef supply within the United States. Case in point: Ann Veneman, the Secretary for the Department of Agriculture at the time of the ‘incident’, at a news conference shortly after the positive mad cow test was announced by the media, stated, ‘We see no reason for people to alter their eating habits’, adding, ‘I plan to serve beef for my Christmas dinner.’[9] Let us now turn to the specifics of the case study.

THE CASE STUDY

The research site for this paper is central Washington State, involving both grain and beef producers. Between the months of January and April of 2004, twenty-eight individuals were interviewed using a semi-structured interviewing technique. Eight interviews were conducted face-to-face, while the remaining twenty were conducted over the phone. All interviews were tape-recorded and transcribed. Each interview lasted between one and two hours. A list of prospective informants was obtained by way of a snow-ball sampling technique. I began by ‘cold calling’ agricultural producers near the site of mad cow ‘incident’, asking for both their participation in this research as well as for the names of additional agricultural producers who might be interested (and willing) to be interviewed for this study.

All of those interviewed were acutely aware of the case in question; a few even knew individuals who either worked ‘on site’ where the diseased cow came from or at the facility where the cow was slaughtered. Yet, while all were involved in production agriculture, and all were located in relative proximity to each other, their perceptions of risk as it related to mad cow disease were tellingly divergent. As Wynne (1992, 1996) has documented, while people often posses a public form of trust in institutions, such public trust may rest upon a deeper private *mis*trust. This appeared to be the case among those interviewed, but in the context of risk perception. While all participants were quick to say they believed the meat supply within the United States to be safe for human consumption, further questioning revealed positions of risk which seemed, in some cases, to contradict these initial risk-free declarations.

Currently, tests for BSE can only detect the disease after the cow dies, by searching for the infectious prion proteins in brain and spinal cord tissue, which leads to the slaughtering of entire herds if a single cow is suspected of being a carrier. Critics therefore charge that the standard immunoassay tests are inadequate for large-scale screening of cattle (Andrew 2003). Additional concerns reside in the fact that such tests can produce false positives (a point of economic significance when a ‘positive’ test may mean the slaughtering of thousands of animals) and can take up to a week to yield results (USDA 2005).

> ‘We can only test for BSE in animals that are already down [visually sick]. But by then it could be too late. The news people make you think that you can see when an animal’s infected. When they talk about the disease they’ll show a cow that’s wobbling all over the place. Well, that’s not mad cow disease, not always at least. And it’s those outwardly healthy looking cows that concern me the most.’

The individual above makes explicit reference to a salient epistemological quality of BSE: that it is not directly visible to the human senses alone. Sure, we can see its outward effects by way of a loss of muscular and neural control – it is, after all, a neurodegenerative disease. But this, as the respondent made so perfectly clear, is 'not mad cow disease'. What then *is* BSE? Is it the presence of the prion protein? Perhaps, but then why do we not just call it 'prions' – why bother calling it BSE at all? Maybe, then, BSE is a particular pattern of neurodegeneration? Yes, but any good scientist will tell you that such degeneration is merely the effect of something 'deeper', something further 'down' the causal chain. So is BSE an object, an effect, or both? Answer: Yes. Or perhaps more accurately: it depends upon the situation in question.

When the cow is dead, and its brain and spinal cord are laid open for examination, BSE *is* prions (in addition to perhaps the visual presence of brain deterioration). Yet when the cow is alive, shaking and struggling for each and every step, BSE *is* prions, brain deterioration and the uncontrollability of its limbs. And what of the outwardly healthy cow that inwardly harbors those nasty prion proteins – what is BSE then? In such a cow, BSE *does not exist*. Prions – yes, of course they exist in this case. BSE, however, does not exist – not until, that is, the cow either begins to show (outward) signs of a loss of neuromuscular control and/or until the cow is opened to reveal the (inward) prions and brain deterioration.

What, then, of the new testing methods being developed – such as the conformation-dependent immunoassay (CDI) – that promise to detect the prion proteins in muscle tissue and perhaps even blood while the animal is still alive (American Chemical Society 2003)? Such tests make the following ontological reduction: BSE = prions. But others point to how prions can remain dormant (and have done so) in their host's body for years, maybe even the lifetime of the host, without negative consequences and manifest effects (Pennington 2003). Such cases problematise the aforementioned ontological conflation of prions to BSE and *vice versa*. For such cases ultimately beg the question: why effect X (neurodegeneration) in case A, while effect Y (no such degeneration) in case B, even though prions were present in both instances? If the presence of prions really *is* BSE – and BSE really *is* the presence of prions – such cases could simply not exist. Given that such cases do exist, however, we must once again go back to the question: what *is* BSE? And, once again, we find ourselves back where we began, responding in a way abhorrent to our modern sensibilities: 'It depends upon the situation in question'.

This invisibility, this ontological uncertainty, of BSE is what worried a number of respondents, for it problematised testing methods. In the words of one individual, inquiring toward this end: 'How do we know our testing methods are effective? How do we know some cases are not getting by undetected?' BSE, in other words, represents a highly mediated, thoroughly translated, object. Its existence can be located, to evoke terminology from a recent piece by Carolan

(2004), at a 'third order of ontology'. Not only can we not 'see' it directly through our senses, we cannot indirectly 'see' it either. Rather, we can only indirectly 'see' it indirectly. That is, although we can indirectly 'see' prions through the employment of various instruments, as we established this is *not* (ontologically speaking) BSE, another step of translation is required.

As an epistemologically distant, complex phenomenon, the politics of BSE is contentious and dynamic. BSE represents a thoroughly socially mediated 'object', in terms of both its *being* and *becoming*. In other words, it is a 'matter of concern' as much as it is a 'matter of fact' (Latour 2004: 24). Statements of risk in relation to BSE, therefore, which all too often proclaim objectivity and certainty, are problematised as the certitude of modernity begins to erode under the weight of complexity and epistemological distance.

Again, risks are epistemological statements expressed in terms of probabilities. Our inability to take a 'God's eye' position, to see and comprehend all variables and interactions, leads both 'experts' and 'non-experts' alike (to various degrees) to fall back upon their social relations to help make sense of, and therefore evaluate, statements of risks (particularly those risks directed toward objects, or hybrids, that are beyond direct perception). The evaluative tool of which I speak resides in our networks of trust – that is, we tend to find greater truth in statements of risk when they come from sources we trust.

To be sure, social relations of trust are not the only evaluative tools we use to give meaning to statements of risk, particularly among 'experts' – there are also norms (Merton 1973), 'epistemic cultures' (Knoor Centia 1999) and the like. Yet, even among experts, trust relations are relied upon more often than we think. Remember, expertise is bounded. No one is an expert in everything (Beck et al. 1994). Potentially harmful hybrids, on the other hand, know no bounds. They can involve variables and complex interactions irrespective of disciplinary boundaries.

> 'Our meat supply is safe. Like they say, you have a better chance of getting struck by lightening than you do eating contaminated [BSE] meat.', remarked one individual.
> 'Who's this 'they' you are referring to?', I asked.
> 'Well, you know, the government, the people on TV.'
> 'Do you trust the government to effectively and honestly handle the disease?', I inquired.
> 'Yeah, sure, why wouldn't I? What do they have to gain by lying to us? But I recognise that I'm not any expert or scientist on the matter. Who am I to say what's the truth and what's a bunch of lies? So yeah, I'd say I trust the government to be truthful on the subject of mad cow disease. I almost have to.'

Here, the individual is making explicit reference to the role of trust in assessing levels of risk. Indeed, by saying, 'I almost have to [trust the government]', the respondent is referring to the ontological and existential security that comes from trusting the government, the lack of which could lead to dread. In short, were this individual not to trust the government on the issue of BSE, what would he do? Were this individual to lose trust in the government on this issue, he would concomitantly experience a breakdown of truth (on this issue). This would lead him to the undesirable position of being unable to differentiate between 'what's the truth and what's a bunch of lies', which could lead to insecurity, uncertainty and ultimately a degree of anxiety. Building upon this, the above quote also highlights a point earlier made by Wynne and colleagues: namely, that sometimes trust is more a condition for satisfactory existence than it is something authentically felt by its conveyors (Wynne et al. 1993). This is in recognition of the fact that sometimes people have no choice but to trust (recall the words of the respondent: 'I almost have to [trust]'). And as Giddens (1990) notes, there is a degree of ontological security in such unexamined, unreflexive commitment.[10]

Others individuals, however, possessed alternative positions of risk when it came to the issue of mad cow disease, from their drawing upon divergent networks of trust. In the words of one respondent:

> 'I have no reason to trust anything the government says on the issue. If you're looking for the truth, you have to look long and hard to find it coming from anyone employed by government. Unfortunately, it's all about power, money, and politics – not the truth.'
> 'So who do you trust to tell you the truth on this issue?, I asked.
> 'Let's just say I'm a very discerning reader. I research issues that are important to me very carefully, largely over the internet – although you have to be careful here too – but also by talking to friends who are themselves very discerning.'

For this individual, truth on the issue of mad cow disease comes not from the government – there, 'it's all about power, money, and politics'. Rather, it comes from other sources whom he trusts – like friends (whom one must infer he trusts, otherwise they would not likely be his friends). Of course, he also looks toward the internet for his information, 'although you have to be careful here too'. With this, this individual is saying that the internet is not to be entirely trusted to be reporting the truth, which is why he sees it so important that he and his friends be 'discerning' readers.

The above respondent likewise saw risks associated with mad cow disease. This stemmed, at least in part, from his belief that the government is untrustworthy in regard to the issue at hand. As he remarked later in the interview, 'The true risks are being glossed over; they're greater than the government and officials like Secretary [of Agriculture] Veneman are leading onto.'

In short, this individual does not trust the government and its officials (like the Secretary of Agriculture) to be truthful in their statements of risk when it comes to mad cow disease. Thus, while the state is steadfast in its message that risks are minimal – recall when the Secretary of Agriculture said 'I plan to serve beef for my Christmas dinner' shortly after the media broke the story in December of 2003 – not all individuals found its message resonated equally with their senses of truthworthiness. Again, it depends on whom one trusts as telling the truth about the risks associated with BSE. For some, who 'actively trust' (in the Giddensian sense) such institutions as the USDA, the risks perceived are minimal. While for others, who actively *mis*trust such institutions, the risks perceived are far more significant.

CONCLUSION: NURTURING TRUST

As observed by Jungermann (1997), the nature and meaning of risk cannot be properly comprehended using scientific and technical tools alone. Rather, the meaning of risk emerges and mutates over the course of social and political debate. The analysis presented here fine tunes this observation. As I have argued, questions of risk go beyond science. Indeed, it is only after they are placed within an interpretative context that such statements have any meaning to us (Wales and Mythen 2002). What constitutes a 'safe' level of exposure, at what duration, and who (what body) is being referred to in the making of these risk statements (e.g., a twenty-something male, a pregnant female, or an infant)? These are questions that science alone cannot (and should not) answer, yet they are part and parcel of any risk analysis.

Yet beyond this, the interpretative context of risk also involves trust (and here is where this paper gives further specificity to those earlier insights by Jungermann [1997]). Risk contestation is therefore not simply the result of 'bad' science – although this can (and does) contribute to conflict in some cases – that can be overcome if only we employ 'more' and/or 'better' science. Moreover, as noted by Wynne (1996, 2000), lay opposition to risk statements need not be the result of sheer ignorance, irrationality or emotions. As detailed in the analysis above, social relations of trust play a significant role in shaping the interpretative framework through which we give risk statements meaning. And it is trust, then, that must be nurtured and sustained if we are to begin working through the many risk-based conflicts that fill our newspapers daily. As Mary Douglas and her colleagues have shown, the risks we identify 'out there' reveal as much about ourselves and our relationship to others – such as who we trust – as they do about material hazards that confront us on a daily basis (Douglas 1992; Douglas and Wildavsky 1982; Thompson, Ellis and Wildavsky 1990).

Building this trust, however, will take more than kind words and the proverbial 'open' democratic table at which everyone, theoretically, has a seat. It is equally important that we keep in mind the role of (unequal) power relations when speaking of risk. That is, who is creating, in the words of Ulrich Beck (1995), these 'manufactured' risks, and who are most sceptical (most untrusting) of them? Chances are these are not the same individuals and/or groups.

Scholars have noted that those in positions of power typically have resources at their disposal to minimise the effects that environmental risks pose to them (e.g., Boyce 1994; Freudenburg 2000). Such inequality is what Freudenburg (2000: 113) was describing when he stated that environmental risks often also imply 'environmental privileges'.

Ultimately, money and power can play a significant role in shifting and framing risk debates, particularly when they are (grossly) inequitably distributed. As noted by Steve Rayner and Robin Cantor (1987), the question driving debates surrounding what is an 'acceptable' risk should not be 'How safe is safe enough?' but 'How fair is safe enough?' In asking the latter question, a normative dimension is explicitly introduced into the debate (granted, the former question is normative and political too, but is often masked under the guise of being 'scientific'). And in doing this, the debate itself becomes reframed and opened to the 'democratising of expertise' (Commission of the European Communities 2001).

In short, the nurturing of trust will likewise require a reduction of inequalities and the redistributing of such 'environmental privileges'. This conclusion also fits with the literature on trust, for ultimately we tend to trust those most like us (Coleman 1990; Hardin 2002; Luhmann 1979, 1994; Misztal 1996; Sztompka 1999; Uslaner 2002). And when there are tremendous disparities between individuals and groups in terms of access to resources and decision-making structures (which reflect distances in social positioning), distrust will remain and heated, non-communicative conflicts over risk will continue.

By highlighting the relationship between trust and risk I am not, however, suggesting that we place all risk statements on equal epistemological footing. Nor am I positing that all knowledge claims are equally privileged social constructs. Statements of risk can be more or less valid, all of which depends upon the methods used and how the parameters are predefined (Rosa 1998).

Nevertheless, we must not forget that 'risk' is a type of language game, to evoke Wittgenstein, which we moderns employ to comprehend the un-comprehensible (or what Jasanoff [2003: 238] refers to as a 'technology of hubris'). For, ultimately, if we could assume a 'God's eye' position, we would not need statements of risk. Instead, we would *know* if and how object X (or action Y) would harm us. In such a reality, there would be no need to express the future in probabilistic terms, for the future would no longer be made up of statistical probabilities, only matters of fact. We are not, however, all knowing, omnipresent beings. Consequently, we need to speak in terms of 'risk' to give the future meaning, as well as a certain level of (perceived) predictability. And in doing this, we place a degree of moral responsibility on our actions, for such a move allows us to then speak (and think) in terms of 'the risks' associated with those actions (Ericson and Doyle 2003).

To speak of risks is to speak of an epistemic void – for, again, if we knew the consequences of object X or action Y it would not be a statement of risk but a statement of factual certainty. So we must look toward our social relations of trust to give these risk statements meaning and fill this epistemic void. Such trust provides us with a needed compass by allowing us to navigate through the numerous risk statements that flood our lifeworlds daily. It allows us to separate 'truths' from 'untruths', and in doing so provides us with a means through which to make sense of the complex, epistemologically distant, world around us.

NOTES

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[1] The word 'risk' comes from the French 'risqué', itself derived from the Italian 'rischio' from the sixteenth century (perhaps in connection with the rise of commercial navigation [Hacking 2003] and a 'freeing' of the individual from the fate-orientated worldview associated with traditionalism and religious dogma [Giddens 1990, 2000]).

[2] Specifically, Bhaskar (1997 [1975]) speaks of this in the context of conflating epistemology with ontology.

[3] Delhi Science Forum (1984) places a 'conservative' figure at 5,000. Others, like Kurzman (1987), put the figure closer to 8,000. As for those injured, the standard figure reported is 200,000, but some sources, like Kurzman (1987), put the figure closer to 300,000.

[4] This is not to say that such does not still resemble life for many in the world today.

[5] In the case of such defensive toxins, however, there has been at least millions of generations of primate evolution during which resistance to these toxins could evolve (Ehrlich 2000).

[6] The epistemologically distant modern environmental risks of which I am speaking of have affinities with what Rosa (1998) calls 'post-normal risks'.

[7] And of those 80 animals, 52 are listed as 'missing' according to the federal government after officially ending its investigation into the case on February 10, 2004.

[8] I qualify this 'proactivity' because the actions of the U.S government do not always line up with its rhetoric. In both 2001 and 2002, for instance, legislation was passed in the U.S. House and Senate to prohibit the slaughter of 'downer' cattle for human consumption. Yet in both years committee leaders made sure that these 'downer provisions' were not in the bill when it came out of conference committee. Then again in 2003, the Senate favored a rider on the agriculture appropriations bill that would have prevented the slaughter of these cows. Yet in July of that year the prohibition was rejected by the House by a vote of 202 to 199 (Wald 2003). I thank an anonymous reviewer for bringing this information to my attention.

[9] 23 December 2003.

[10] There may also be a degree of 'performative trust' (Szerszynski 1999) occurring as well in this example, but space constraints do not allow me to explore such potential here.

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