
discussion article

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Fluid consistencies. Material relationality in human engagements with water *Veronica Strang**

Abstract

Material things are not just passive recipients of human categories, meanings and values, nor mere subjects of human agency. Their particular characteristics and behaviours are formative of human–non-human relations. The common material properties of things, and the shared cognitive and phenomenological processes through which people interact with them, generate recurrent ideas and patterns of engagement in diverse cultural and historical contexts. Despite growing instrumentalism in human ‘management’ of the material world, and the emergence of new relational forms, these patterns persist.

Keywords

Human–environmental relations; materiality; agency; bioethics

Water provides a useful focus for thinking about relationships between things and persons and between material properties and meanings. It is also useful for ‘thinking with’: it permeates all organic things and kinds, including humankind, flowing through and connecting the various micro and macro scales at which they interact. Drawing on ethnographic research in an Australian river catchment, this paper follows this flow to consider how material and social processes combine to provide both fluidity and consistency at every level of human–non-human engagement.

Fluid relations

Anthropology and archaeology have developed a variety of theoretical approaches to understanding how humans, other species and things interact over time. This paper suggests that ‘immersing’ these discussions in the materials themselves, and thinking about how their properties and behaviours enable human–non-human relations, allow us to see putatively incompatible theories in more complementary terms. Flowing between and connecting the human and non-human on multiple systemic scales, water is particularly

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Figure 1 Water feature on the Brisbane River. (Colour online)

‘good to think’, offering new local and global perspectives on material relations. The first part of this paper therefore attempts to bring different theoretical approaches together in an attempt to dissolve their boundaries, and the second provides a case study intended to demonstrate the potential analytic gains of ‘thinking with water’.

We are all familiar with water’s material properties: its fluidity, its transformative capacities, its conductivity and its connectivity. Its molecular structure is such that these properties pertain at every level: thus its ‘behaviour’ in becoming ice, liquid or steam in a domestic kitchen is echoed in its freezing and thawing at the edge of a polar ice cap, or in its evaporation from oceans and forests. Its capacity to hydrate casts water as an essential ‘matter of substance’ for even the smallest microbial organisms. It is vital in human, animal and plant bodies, irrigating cells, enabling the circulation of nutrients, and carrying away waste. It is similarly essential to all ecosystemic processes, whether local, regional, continental or planetary in scale. Water materially connects the tiniest microbe with human bodies, with ecosystems and with world hydrological systems, composing the relationships between them (Helmreich 2009; Vernadsky 1986). This connection is both spatial and temporal: water’s fluid movements may be as fleeting as the tiny capillary shifts through which water crosses a plant membrane, or as glacial as the accumulation of meltwater in underground aquifers. Water is therefore an ideal medium for considering material and ideational flows between scales and for revealing how the properties of things are omnipresent in and active upon engagements between things and persons.

We think with water both literally, as it enables the neurons via which thought is carried, and metaphorically, by employing its properties to conceptualize notions of flow (Edgeworth 2011; Féaux de la Croix 2011; Shields 1997). As a material that regularly shifts between liquid and solid states, water highlights the conceptual opposition between movement and stasis. In the process of being ingested, water is incorporated, becoming (at 67 per cent) a major part of the body and thus demonstrating both the contingent stability of the body and the permeability of the person as an ‘assemblage’ of both internal and external matter. This helps to underline a reality that matter is neither ontologically nor literally distinct: all things – and living kinds – are dynamically composed of flows of condensed matter. In this sense one can ‘think with’ the properties of any material and these contribute to the meanings attached to them. Thus Boivin notes,

Meanings emerge from the characteristics of the material mineral world and the properties that are imminent [*sic*] in embodied human engagement with that world . . . The recognition of the non-arbitrariness of material symbols has emerged gradually over the last decade . . . and is closely linked to an increased interest in the substantive, physical properties of minerals and other substances (Boivin 2004, 16–17; see also DeMarrais, Renfrew and Gosden 2004).

The anthropological and archaeological literature on minerals and other materials (such as clay) highlights the ‘substantial’ conceptual and material relations between bodies and environments (Boivin 2004, 7; Taçon 1991; 2004). One might have parallel discussions about the movements and meanings of other materials, or even air. However, water’s ubiquitous capacity to flow between articulates most clearly that persons are bio-cultural beings, and that human–environmental relationships are composed of interactions between material and social processes. Knappett (2007, 22) reminds us that these interrelationships are spatially and temporally processual and that ‘categories of persons are distributed across biographical time and space’ (Knappett and Malafouris 2008, p. xi). Strathern (1996) describes ‘hybrid’ networks of relations, and Bird-David (1999, 77; see also Bird-David 1990) promotes epistemically relational visions of human–environmental engagement, suggesting that we replace Cartesian dualism with ‘I relate therefore I am’.

This latter point coheres with a theoretical shift to less anthropocentric visions of human–environmental interactions. Seeking a more egalitarian bioethic of relationality, efforts have been made to recognize more distributed forms of agency: the agential power of non-human species and the dynamism of human interaction with what Bennett (2010) calls ‘vital materiality’. Describing Latour’s (2005) ‘assemblages’ of things and persons and Deleuze and Guattari’s (1987) representations of life as a pulse or movement in which all entities constantly differentiate or transform, Harvey highlights the utility of actor-network theory (ANT) in expressing the fluidity of relationships between humankind and non-human species and things (Harvey 2012; see also Harvey and Knox 2010). Ingold (2007a) takes a more ecological view to argue that, rather than separating things and people, or earth and sky, we

need to pay attention to the fluxes of wind and weather and to the ‘ecology of materials . . . in form-making processes’ (Ingold 2012, 427). This echoes Edgeworth’s (2011) nice description of water as the ‘dark matter’ of landscape archaeology, in which rivers shape and are shaped by human activities.

Social theory has therefore generated increasingly fluid and permeable visions of inter-human and human–non-human relations. Things and people mix in complex and constantly shifting relationships. ‘Previously taken-for-granted notions of “persons”, “things” and “relations” are now thoroughly destabilized’ (Busse and Strang 2010, p. xv). Notions of personhood are highly contingent (Verdey and Humphrey 2004). Identities flow across boundaries; things and places are incorporated into social life (Henare, Holbraad and Wastell 2007); and, as Knappett and Malafouris (2008, p. xiv) put it,

The only available starting point and obligatory point of passage for studying the emergence and germination of agency is that of material engagement. As with many other extensions of the human mind, agency and intentionality should be understood as distributed, emergent and interactive phenomena rather than as subjective experiences.

As this implies, notions of mind and cognition have become similarly ‘extended’ (Clark 2010), further acknowledging the co-constitution of things and persons. Current writing on relational materiality also highlights the ontological fluidity in which experiences, practices, technologies and representations undergo continual renegotiation, and multiple ontologies exist in tension, competing, dominating, subverting and altering (Law 2002; Mol 2002).

Affective relations

Phenomenological perspectives on relationality have also been fruitful. For Ingold (2000; 2007a; 2011a; 2011b) the environment is a ‘generative field’ in which people engage, simultaneously experiencing, dwelling in, assessing and utilizing its various elements. Analyses of sensory experience have similarly underlined both the processual nature and the intimacy of human interactions with the material world (Csordas 1994; Damasio 1999; Howes 2005). Water is central to this engagement, permeating multiple everyday experiences with the dampness of rain, the relieving rehydration of a cold drink, the taste of spring water, the weightlessness of immersion. Human senses are entranced by the mesmerizing shimmer of water surfaces, the excitement of waterfalls, the calming rhythm of waves, the movements of water through the material world, and the vagaries of the weather. In every cultural and historical context, weather is integral to people’s experiences of landscape and their cosmological understandings of it over time (Pillatt 2012, 33). The temporal depth of experiential engagement with water is highlighted, for example, by Harmansah (2007), who notes how key water places, such as the source of the Tigris, enabled the construction of mytho-poetic landscapes in ancient Assyria. Edgeworth (2011) similarly describes long-term archaeological traces of material relations between rivers and people.

The more immediate notion of embodiment expresses the simultaneously affective, cognitive and material nature of these interactions and the

incorporation of their emotional, imaginative and physiological effects into long-term relations with place. Such engagement is not static: it entails constant flows between the subjective phenomenological experience of things and the objective perusal, classification, evaluation and representation of them. Hegel (1979) described this as a dialectical process and, following Merleau-Ponty's (2003) seminal work in this area, Tilley (2004, 1) observes that 'knowledge of a thing is grounded in our bodily experience of it'. Schlanger (2009) reminds us of Mauss's point: that the body is the first tool, and the 'technology of the body' includes the cognitive schemes through which things are described and categorized.

Categories, and the meanings and values attached to them, are foundational to relationships. But such categories are not arbitrary: to compose and represent them, people draw directly on the material and behavioural properties of things (Tilley 2007, 17). In this sense, if we accept Deleuze and Guattari's vision of mutually constitutive being – which builds on Spinoza's (2001) critique of Cartesian dualism – engagements with the world are not dialectical so much as emergent, dynamically integrating material and human processes of 'becoming' (Deleuze and Guattari 1987; see also Bennett 2009; 2010; Coole and Frost 2010).

In anthropological and archaeological debates, material-culture analyses have often been placed oppositionally to more phenomenological approaches (see Johnson 2012). However, their immersion in water reveals more complementarity than has been acknowledged. Analyses of material culture have also encompassed sensory engagement, articulating relationships between things and persons. They have shown how meanings are encoded in objects and communicated intergenerationally, evoking affective responses, transmitting ideas and practices and inspiring religious fervour (see Boivin 2008; Edwards 2012; Gell 1992; 1998; Hodder 2012; Morphy 1994b; Pinney and Thomas 2001). Such approaches are as readily applied to 'natural resources' as to human-made artefacts, and I have drawn on both these and more ecologically oriented theories in considering recurrent patterns in people's relationships with water (Strang 2004; 2005a; see also Edgeworth 2011).

Informants describe aesthetic, emotional and spiritual responses to water that highlight, in particular, its capacities to 'revive' or 're-create' the self. As well as focusing recreational activities around water, they engage with it through painting, poetry and music. They sprinkle it in important rituals, especially those signifying social inclusion. They also use water for a vast range of practical purposes. In every instance, it is encoded with powerful meanings that draw imaginatively on its particular properties. Material flows of water are employed conceptually and linguistically in metaphors for time (Lakoff and Johnson 1980; Strang 2004; Tilley 2004). The literal vitality of water to human life and the recognition that this is equally essential to all organic beings – its 'upwelling' and down-pouring, and its dynamic movements through the material environment – lead consistently to its categorization as the primary life-generating substance. There are obvious comparisons that could be drawn with the studies noted earlier, focusing on the generative capacities of minerals and in particular oil, which, like water, 'wells up' dynamically to enable 'energy production'.



Figure 2 Re-creating water on the South Bank of the Brisbane River. (Colour online)

Keane (2005, 186) observes that meanings are not merely communicated through language and semiotic signs, noting that materiality itself ‘gives rise to and transforms modalities of action and subjectivity regardless of whether they are interpreted’. Co-substantiality between persons and things, and the flow of water between bodies and environments, also lead to deeply relational ideas about common substance and connection: for example in imagining the co-identification of people and places (Strang 2002; Strang and Garner 2006). Thus water is useful in dissolving theoretical divides between ‘textual’ analyses of material culture and more abstract processual views of how ‘human beings and other organisms are bound in webs of life’ (Ingold 2012, 428).

Water and agency

Implicit in discussions about affect is some acknowledgement of the agency of things in forming human–non-human relations. This issue has been much debated: as Knappett and Malafouris observe, many anthropologists remain committed to the notion that agency can only be constituted by human consciousness and intentionality, and that ‘the only true agents in history are human individuals’ (Knappett and Malafouris 2008, p. x). But Tilley argues (2007, 19) that agency is inherent in ideas about affordances (see also Gibson 1979; Gibson and Ingold 1994): things and landscapes ‘influence forms of perception and activity, but they do not determine thought and action, and not anything can be made of them. They offer a series of affordances for

living and acting in the world, and a series of constraints' (Tilley 2010, 29). Extending Appadurai (1986), Tilley (2006, 10, original emphasis) adds that 'if things have their own biographies, it is but a short step to consider these things as having their own agency and actively having *effects* in relation to persons'.

This suggests that the perceived qualities of things are actively promoted by their particular properties. In the constantly negotiated and transforming relational materiality of things and persons, agency may therefore be said to be distributed between human actors and non-human 'actants' that 'variously enable and support, or resist and disrupt, human intention' (Harvey 2012, 117). And in less anthropocentric bioethical models, the agency of things – or, as Coole and Frost (2010, 9) put it, their 'agentic capacities' – are not confined to their interactions with humankind, but are equally concerned with their abilities to co-constitute their relations with other things/species (see Chen, Macleod and Neimanis 2013). Ingold (2007b, 9, 10) accepts that things are 'active constituents of a world-in-formation', but rejects the idea of locating agency in them, maintaining that, in a 'lifeworld',

Things are active not because they are imbued with agency but because of the ways in which they are caught up in these currents of the lifeworld . . . bringing things to life . . . is not a matter of adding to them a sprinkling of agency but of restoring them to the generative fluxes of the world of materials (ibid., 1).

As Pels (1998) says, it is important not to assume some form of intentionality or sentience or to 'fetishize' material objects. Anthropologists have provided many ethnographic accounts of the animist beliefs of particular cultural groups, for example ideas about sentient landscapes (Bradley 2000), the spiritually generative power of stones and minerals (Bender 1998; Boivin 2004; Taçon 2004), or the notions of 'living water' that recur with stubborn consistency in a wide range of religious and purportedly secular cosmologies (Krause and Strang 2013). However, while intellectual engagement with these modes of thought has clearly contributed imaginatively to debates, this does not imply the incorporation of animism into anthropological theories, nor does it obviate the potential for acknowledging the dynamic co-constitution of things and persons. Tsing's (2004) writing on 'friction' is useful in this regard, describing a generative sea in which people, processes and things collide, abrade and affect each other, shaping and being shaped in the process.

Notions of generative seas or 'flux' are appealing, resonating with Latour's (2005) view that agency emerges neither from people nor from things but from their combination. However, I would argue that, while these ideas provide invaluable metaphors for describing dynamic and complex processes, such wholly distributive approaches do not give sufficient weight to the specific materiality of things and the formative capacities of their particular properties. 'Collisions and abrasions' do not take place by chance, and the properties of things and persons are not random. They reflect long-term evolutionary adaptations and co-development, and consistent patterns of engagement over time.

In this sense a focus on the materiality of things offers some counterbalance to rather absolute postmodern notions of fluidity. If things (and persons) have abiding properties, processes and behaviours, which are formative of their relationships, it is reasonable to consider the characteristics of objects (and, for that matter, human and other living kinds) relative – though by no means fixed – constants in an evolving ‘flux’ of emergent relations. That is not to say that things, even water, are homogeneous: all have their own specific material variations and micro-historical trajectories (Gell 1998; see also Appadurai 1986). But there is room for both continuity and change. The perceived qualities of things and their meanings and uses may change radically according to temporal and cultural context, and new relational forms will emerge, but their material properties provide consistent cognitive stimuli and phenomenological experiences and encourage recurrent ideas, values and practices (Strang 2005a; 2010).

In anthropology a disciplinary commitment to cultural relativity, and a concern to stress the particularity of each ethnographic context, have tended to discourage comparative analyses of how material things contribute ontologically to human–non-human relations. Archaeology, meanwhile, has been more open to this notion: for example, Richards (1996) notes that, in its disciplinary representations, elements retain ontological status. As Andrew Barry has commented (pers. comm., 2013), both materials and cultures are specific, but both need to be located within broader processes of imagining relations between things and persons. I have argued previously (Strang 2005a) that cultural specificity and cross-cultural commonality in meanings are not mutually exclusive (see also Morphy 1994a). Anthropological theory fundamentally relies upon spatial and temporal comparison (Gingrich 2012). In fact, a repudiation of human-centred views, and an acknowledgement that material things have a role in forming human–non-human relationships and engendering meanings, offer a compelling logic that their capacities to do so must necessarily cross cultural boundaries and persist over time.

There is ample ethnographic evidence to this effect. For example, as Rival, Bloch and others have shown (in Rival 1998), recurrent ways of thinking about and engaging with trees in diverse cultural and geographic contexts suggest that these relationships are formed in part by the particular physical properties and behavioural characteristics of trees themselves. As noted above, work on minerals suggests similar material agency. Research on the meanings of water (Strang 2004) also offers some rapprochement between cross-cultural themes and cultural specificities. While highlighting the diversity of human–water relations, it provides abundant ethnographic and historical evidence demonstrating major spatio-temporal continuities in societies’ engagements with water, and in the metaphors associated with it. Water’s core meanings as a life-generating, life-connecting source; as the basis of wealth, health and power; as a transformative medium; and as a metaphorical base for concepts of movement and flow, recur so reliably in different cultural and historical contexts that there is little choice but to conclude that its material properties are relationally formative.

Materializing justice

Like any other form of agency, material agency represents a potentially shifting balance of power. The agency of ‘the other’, and the extent to which non-human interests are upheld, are important themes in debates about ecological justice, which highlight the reality that material relations are also social and political relations between human societies and other species and things (Descola and Palsson 1996; Ingold and Palsson 2013; Strang 2009; 2013).

In a context dominated by neo-liberal values, primacy is generally given to an intensely human-directed, instrumentalist view of the world, in which the role of the non-human is, apparently, to provide ‘ecosystem services’ to serve human interests. But non-human animals have their own forms of sentience and intentionality, and diverse abilities to mould humans to their needs (Haraway 2008; Serpel 1996). Plants have complex symbiotic relationships with humans and non-humans (Castree and Head 2008; Head and Atchison 2009). As we have seen, even objects such as minerals, generally described as ‘inanimate’, have material properties that respond to events, offer potentials for (or challenges to) the creation of artefacts, provide food for thought and thus co-constitute relations. Boivin (2004, 20) observes that ‘it is just as important to consider what minerals do as what they mean’. Thus Harman’s (2009) account of a process of building a tunnel describes how engineers had to consider the particular character of the rock, and how it might ‘behave’. Every human interaction with material things necessarily entails similar considerations of its agentic capacities: what is this material/object? What are its properties? How does it act? What can/will it do?

So what does water ‘do’? Water has a multiplicity of effects upon people and environments, ranging from immediate molecular interactions in organisms; to carving out watercourses, depositing silt etc. in river valleys; to making vast hydrological movements and transformations at an atmospheric level. It similarly carves out a central space in the human imagination, which is predisposed to formulate concepts epigenetically. Thus the trans-scalar persistence of water’s properties enables ‘scheme transfers’ (Bourdieu 1977) in which ideas about the circulatory movement of water through the body are readily transposed to imagine flows of water through the ‘veins’ of local, regional and planetary ‘ecosystems’. Recent writers have coined the term ‘environmental pattern imitation’ to describe the way that people employ material things and processes to compose mental schema (Clark 2008; see also Smith 2014). Such imaginative relationships are also manifested in practice, for example in the use of ‘biomimicry’ in design (Benyus 1997). These processes are founded in phenomenological experience: thus engagements with water shift readily from internal thirst and dehydration, to wider experiences of drought – the sensations of dry air, the feel of dust, an awareness of withering plants and shrinking waterways – to yet more abstract consciousness of wider global events, such as rising temperatures or extreme weather.

Similar fluidity in scale is provided by theories about cultural landscapes. Traditionally these have provided close-grained accounts of engagements with the dynamic properties of immediate material environments, and the

inscription of particular beliefs, values and practices in these, but they can also articulate vast cosmic visions of generative seas and spiritual creativity (see Bender 1993; Hirsch and O'Hanlon 1995; Strang 1997; Tilley and Bennett 2004). Ideas about cultural landscapes are also helpful in considering how things become 'resources', with all the values and assumptions about their utility – and the primacy of human agency – that this term implies. Linking with notions of 'affordances', I would suggest that the properties of material things and their agentive effects constitute a form of potentiality, and it is the 'harnessing' of this potentiality to serve human interests that re-forms them as 'resources'.

Resourcing water

Water is categorized as a resource at various stages in its movements through persons and landscapes. This is critical because it demonstrates very clearly multiple impositions of human agency and control. As notions of 'resources' have become increasingly reductive, reframing things as purely economic 'assets' or 'services', contests for the ownership and control of water have increased in number and intensity. Water is quintessential in its 'resourcefulness' – this is, after all, a term which quite literally suggests a constant wellspring of generative power. It has the fluid potential to effect transformations in every sphere of human endeavour, and in this sense constitutes '*über*-potential' in material form. It readily illuminates the relationship between political ecology and materiality (see Bakker and Bridge 2006; Coole and Frost 2010; Braidotti 2010). Thus Hudson observes that, while Marx conceptualized economy as containing processes of value creation and transformation, there is also 'a need to understand production as ... a material transformation process' (Hudson 2012, 2).

As I have noted elsewhere (Strang 2005b), it may be helpful to frame this process as a shifting continuum of agency. At each stage, things retain their material properties and their agentive capacities, but their re-formation as 'resources' is enabled by the application of more and more human (and specifically cultural) agency, materially enacted through technology, the 'prosthetic' extension of human physical capacities (Gell 1998). The phrase 'raw materials' is telling, implying that to be 'cultural' things have to be physically and/or imaginatively transformed or 'cooked' into a different state. At various stages they may also be categorized as 'waste' or 'dead matter', with the implication that all potential (or life) has been extracted; this can be regarded as the polar opposite of 'resource' – unless other 'potentials' can be accessed via reclamation, reconstitution and recycling. As Hawkins (2006, 2–3) observes, 'it is in the dynamics of these relations that it is possible to see the mutual constitution of human subjects and inanimate wasted objects'.

As materials flow through spatio-temporal and bio-cultural processes, what is considered to be potentially valuable or 'waste' is mediated by cultural ideas and values, but *how* things move is also a fundamentally material business, dependent upon the physical characteristics of the resource in question and on technologies of transport. Ephemeral resources – intellectual property, ideas etc. – require living people and communicative media. Physically substantial materials such as stone and timber require stalwart oxen, large trucks or hefty

ships. Cotton requires space. Crops generally require storage that prevents or at least delays decomposition. Water, other liquids and gases can only be moved in large quantities through channels and pipes, and require effective containment if they are not to escape or evaporate.

Each material 'resource' thus shapes the technology of its transport. Also materially relevant is the topography and climate of its location. Just as they produce particular resources, particular locations may also impede or assist infrastructural developments such as the roads, pipelines, airstrips and canals necessary for their movement. Carrying capacity affects population levels and thus the workforce available to grow, harvest and dispatch crops; to extract minerals and load them into trucks; to dig irrigation channels or lay pipelines. In a global economy physical distances to markets are important, constraining the possible technologies of transport, the energy required to move objects, and thus the practical and economic feasibility of doing so. In moving through processes of production, exchange and consumption, the material characteristics of 'resources', the materiality of their original locations and destinations, and the material bodies of human beings therefore participate in dynamic and mutually constitutive relationships.

Flowing through Queensland

A useful way to articulate material relationality is to follow a water stream as it flows through a specific social and material context. In Queensland, the Brisbane River begins as run-off from inland ranges that, 200 years ago, with the river and wetlands emerging from them, supported a self-sufficient Aboriginal economy. Archaeological traces of this low-key engagement with the local environment remain in stone tools, shell middens, domiculture and so forth. Today the Jimna Ranges primarily support cattle grazing and forestry. Gathering at the base of the hills, small streams merge and form the larger river. Over millennia, the river has cut a wide valley eastwards to the coast, from time to time flooding the flat plains it has created. Its movements have both provided fertile farmland for colonial settlers and, with the clearance of land for this purpose, increased the risk of inundation of the expanding urban areas near the estuary.

The impoundment of water is the most basic application of human agency. For 60,000 years hunter-gatherers in Australia cleared and protected springs and dug wells, and since the first city pipeline was built by colonial settlers in 1893, the purpose of the dams and weirs in the Brisbane River Valley has been fundamentally the same: to ensure a reliable supply of potable water for the local population. The increasing scale and instrumentality of human activities in the region are readily evident. Determined that topography should not be destiny, successive Queensland governments have built larger and larger dams to assure supplies of drinking water, to irrigate crops and to provide flood mitigation. The fluid nature of the balance of human-water agency is clear in that water regularly subverts this control, disappearing in lengthy droughts, or arriving in unmanageable quantities, as it did in the floods that subsumed much of Brisbane in 2011. The subversive agency of water is combated with deeper bores and desalination plants, flood prevention



Figure 3 Moogerah Dam in the Brisbane River Valley. (Colour online)

infrastructure, pipelines for recycling, and more sophisticated forms of water treatment.

Through these extensions of human agency, water is drawn into socio-technical systems that transform it into ‘drinking water’. It is dammed and filtered, microbial organic presences are killed off with chlorine, fluoride is added. It becomes ‘drinking water’ or H_2O , the product of science and engineering (Illich 1986; Linton 2010). As ‘water supplies’, it is piped into the city, underlining Miller’s (2005; 2007) point that even the most basic things that people engage with are rarely ‘raw’ or ‘virgin’ materials, but complex artefacts incorporating sophisticated levels of acculturation.

Transformed and distributed through a network of supply pipes, the ‘drinking-water supply’ gathered from the Jimna Ranges flows down to the household tap, through which it enables the various functions of a domestic context: food preparation, hygiene and sanitation. Here, on an even more immediate scale, water also loops through an interface with bodies, engaging not only with individual human bodies and their cells, but also, as Neimanis (2013, 217–18) points out, with the ‘gut sociality’ of their microbial inhabitants. Its interaction with the human body entails an internal cycle of cellular hydration and waste removal. Infused with waste and with the nomadic microbes of the intestines, water carries these ‘outwards’ to be diffused/defused (via sweat, breath, urination and excretion). The larger domestic body of the house expels it into sewage pipes and treatment plants. It is then returned to the river for rehabilitation through the agency of the environment, nicely expressed in the idea of the ‘magic mile’: a distance in

which the river below sewage treatment plants is expected to dilute, absorb or at least ‘take away’ the flow of waste.

Demonstrating water’s capacities to enable scheme transfers across scales, there is ready coherence between ideas about the ‘right’ balance of water flowing through the body and in a wider material environment. Houses, cities, rural and urban landscapes all depend upon an orderly flow of water. Running eastwards through the Brisbane River Valley, this flow is regulated with various forms of impoundment. One of the most important is Lake Wivenhoe, the vast ‘reservoir’, created in 1983. Irrigators describe such reservoirs as ‘liquid gold’, highlighting a view that this is an economic reserve in which water and its potentiality are captured and held. Lake Wivenhoe’s water is diverted into farm dams, sprayed onto crops, and so transformed, ‘becoming’ the products that express the agency and identity of the region’s ‘primary producers’ (Strang 2006b; 2009). Thus its culturally and historically ubiquitous generative potential is realized in the ‘fruitbowl of Australia’.

Until recently, many local products were transported down the river to Brisbane. Today these flows happen primarily by road, but the river still enables the movement of goods outwards via the large port constructed in its estuary. The port – one could say portal – is indeed the *raison d’être* of the city, linking Brisbane umbilically to larger social and economic bodies. Thus the water that began in the Jimna Ranges is exported from the state into global circulations of trade.

Throughout all of these transformations, water retains its material properties and capacities to compose relationships. Shared drinking water links bodies and places, and water’s incorporation into human bodies co-substantiates extended networks of ‘blood relations’ in the river valley. Water is used in local churches to baptize newcomers into congregations. The river connects farms and settlements, providing a sense of community and shared productivity; the networks of water pipes linking domestic households compose particular social and material connections. The river’s winding course through Brisbane forms the city’s distinctive identity. Thus multiple social relations are enlivened by water’s material properties and by its capacity to carry core meanings as the substance of social and spiritual being.

However, although water connects, it is also implicit in regimes of inclusion and exclusion. Locally, these are defined by who has piped supplies, independent boreholes or riparian land; who has licences to abstract, to impound or to harvest water; who has access to use it recreationally. Cities consume water that would otherwise feed the ecosystems from which it is abstracted. Larger regional, national and international networks are focused on long-running contests about who owns and controls the flow of potentiality – and who is therefore advantaged or disadvantaged. Water, like other ‘reserves’, is physically located, but the transformations that realize its potential convert it not just into other material things but also into virtual resources.

Transpiration

Like the water that flows up through trees, transpires from their leaves, and evaporates upwards and outwards, the water diverted into production

in south-east Queensland flows outwards into larger relational scales. Queensland's exports – pineapples, mangoes, fruit juice, wine and also water-thirsty but highly profitable crops such as rice and cotton – are composed of vast amounts of 'virtual water' (Allan 2011). There are beef and dairy products from cattle watered from the Great Artesian Basin or local aquifers and fed on irrigated pastures. There is timber grown most effectively along waterways, gravel formed by the river's 'work', and manufactured objects made in water-dependent production processes. All are influenced not only by the properties of water, but also by the material characteristics of the local environment: the river that allowed settlers, 200 years ago, to dispossess the indigenous inhabitants and clear land for farming; the local and imported flora and fauna; the climate and rainfall; and the topography permitting flows of goods downriver. Via the combination of material processes and the human agency enacted upon these, the water that flows through Queensland is thus appropriated to serve human interests and transformed into the products that generate the wealth and well-being of the state.

The export of material goods from Queensland entails a further transformation of water. Initially, with a prerequisite that they would produce things, landowners were given licences to abstract water in unlimited quantities and then, as farming intensified, in limited volumetric amounts. In the last decade another transformation has occurred: the federal government introduced a system of water trading that converted licences for water allocations into private assets tradable on a virtual 'water market'. Thus water was allocated to particular people via a system of rights, then quantified, then reconstituted as their private assets. Held initially by farmers and local industries, these privatized allocations are now being bought up by giant irrigation companies (see Strang 2013). In this way fresh water has been commoditized and enclosed and, in Polanyi's (1957) terms, 'disembedded' from its locality.

Rising to a global scale, this 'dematerialized' water gets caught in the jet stream and captured by the jet set to be dispersed into the streams of wealth circulating the globe and connecting local, national and international economies. Reconstituted as cash flow, some of it might rain back down into the local economy; some might enable the extraction of resources elsewhere in the state – for example through investment in mining ventures. But most will flow in virtual form into the fluid financial resources of transnational corporations. Where it pools and whom it benefits depend on an increasingly volatile balance of international relations in which non-human agency has little impact.

Dehydration

What transpires when water 'resources' flow out of social and ecological systems into levels of consumption that these cannot sustain? Like other material resources, water is diverted into production processes that, for the most part, externalize their costs, creating increasingly unequal bioethical relations. Australia, the world's most arid continent, has become a massive net exporter of water to wetter and more densely populated countries. In the process, 'water footprints' of various kinds are left: the 'freshwater footprint'

of the water abstracted from local ecosystems, and the 'greywater footprint' of the polluted waste water of production (Meissner 2012). Most of the social and ecological costs of such footprints are treated as external to productive processes, to be borne by less powerful human groups and the non-human inhabitants of the material environments from which these 'resources and services' are (over)drawn.

Queensland's rapid agricultural intensification and dependence on irrigation has led to chronic overuse of water, with multiple effects. For example, rivers' seasonal flows synchronize with the reproductive cycles of aquatic species: when flows are altered, this orderly pattern of symbiotic agency is disrupted. Where forests and wetlands previously absorbed run-off and maintained hydrological stability, the radical clearance and drainage of these has removed key non-human habitats as well as causing soil erosion and pollution, and leaving areas highly vulnerable to flooding, often followed (because of lost storage capacity) by water shortages. Falling water levels in the Great Artesian Basin are causing springs to disappear, requiring ever deeper boreholes and producing water infused with arsenic and fluoride. Crop irrigation has salinated vast land areas, rendering them incapable of supporting even native flora and fauna.

Rapid urban expansions have increased demands for water supplies and waste management, placing ever higher levels of stress on ecosystems and their dependent species. Low flows, quarrying and dredging compromise water quality, as do the chemicals used in farming and industrial production. The waste products of all of these activities flow into coastal areas, with concomitant impacts on marine species. As well as massively transforming water in the immediate material environment, Queensland's enlarging human population is also burning fuel, consuming other resources, and in this way contributing to the production of CO₂ and so to climate change. Thus the impacts of human production and consumption, like the water of the Brisbane River itself, are carried outwards into larger-scale human-environmental interactions.

As well as affecting local and planetary ecosystems, water-use practices in Queensland have immediate social, economic and political effects. The drinking water in Aboriginal communities located on the edge of the Artesian Basin contains rising levels of harmful chemicals. Upstream water impoundment and redirection has deprived many downstream farmers of their livelihoods and impinged upon the activities of recreational water users. Primary producers are locked into a mercilessly competitive water market: many small farmers can no longer afford to buy water allocations, and have traded the water away from their land and retired. Farmers must also contend with rising competition for water from urban populations, and with the decisions of politicians dependent on urban votes. They are also subject to the wider pressures of global economic markets, which make it impossible for them to remain economically 'viable' without intensifying and irrigating at materially unsustainable levels.

Not everyone agrees that these are reasonable costs: groups concerned about social and ecological justice are campaigning against the activities of commercial water users and a state government doggedly committed

to continued growth and development. As in other countries where water privatization has occurred, many people resent the enclosure of previously collective resources (Albro 2005; Strang 2004; 2013). This is not merely a matter of distribution of material wealth. Given the links between water and power, the privatization of water has direct impacts upon democracy, contributing to the disenfranchisement of all but a powerful international elite of water owners and political decision-makers. What transpires, then, is that the redirected flow of Queensland's water is benefiting smaller and smaller percentages of the human population, and the overriding of alternative forms of agency is impacting negatively on many human groups and non-human species in Queensland and elsewhere.

International relations

The patterns of water use evident in Queensland, and their social and material consequences, are being repeated all over the world. Widespread drainage of water from wetland areas to extend agricultural activities has destroyed the habitats vital for a range of species, contributing to vastly accelerated rates of extinction (Strang, in press). Over-abstraction has reduced many rivers to poisonous trickles (Reisner 2001). Too much water is being poured onto farmland to irrigate shallow-rooted crops, drawing salts to the surface and degrading delicate soil systems. Increasing demand for urban and industrial water has not only caused humans to compete for water with other species, but also produced complex forms of waste, further compromising the health and sustainability of aquatic ecosystems. Though these impacts are far from evenly distributed, there is no place, no society, in which people, non-human species and material environments are not experiencing the effects of the overuse of water and other 'resources'. Even social elites are being confronted with the extreme negative potentials of irreversible environmental change, wilder variations in rainfall and weather, and political unrest. As Hansen (2009) says, there are storms on the horizon.

More sustainable human–environmental engagements cannot be achieved if societies continue to expand their populations and remain wedded to growth-dependent economic systems. Recent economic crises have resuscitated both a robust critique of these and the promotion of ideas about 'degrowth economics' (Georgescu-Roegen 1971; Meadows *et al.* 1972; Schumacher 1973). While some analysts (e.g. Latouche 2004) seem to elide the political implications of a shift in this direction, others (e.g. Daly 1996; Harvey 2010) have been more open about its potential to spark radical social and political change. Thus Harvey (2010) suggests a need for a 'co-revolutionary movement' brought about through a coalescence of countermovements critical of the status quo.

Intrinsic to such a groundswell is the flow of information between groups, which, like water, circulates between the grass roots and global media. But seeing and comprehending the complex material connections between local, regional and global events is challenging. It may be useful, therefore, to focus on the exemplar of flows between scales that water provides. By thinking with water, it is possible to see sustainability not just as an abstract measure of resource use and its ecological and social costs, but as a matter of material

flows – or indeed as a flow of material matter. Sustainability relies on the orderly movements of things, i.e. at a rate which permits the material renewal not just of resources themselves, but also of the other elements of the social and ecological systems upon which their production and use depend. As well as being an ‘orderly system’ in Douglas’s (1975) terms, the flow of material things is also a system with its own agentive order, a set of adaptive reciprocal relations that has evolved over evolutionary time. This temporal stability is now being anthropogenically disrupted, with emergent effects on all scales. Following the flow of water from local into larger resource movements is useful in rematerializing these relationships and serves to connect individual and local actions with larger flows of events.

Conclusion

Ingold (2000) has argued that cultural groups inhabit the world with different positioning vis-à-vis their environments, existing intimately ‘within the sphere’ or casting a more detached Western gaze at a distanced ‘globe’. Different societies or groups may indeed emphasize particular foci in this regard, and so develop commensurately diverse environmental values (Strang 1997), but, as noted at the outset, all human engagement with the material world involves shifting cognitive positions ranging from unreflexive subjectivity to reflexive objectivity. I would suggest that it is precisely this imaginative capacity for varying degrees of distance and reflexivity that enables people to shift conceptual scales, and thus to connect immediate human–environmental interactions with wider, global flows.

Such connection may be assisted by conceptual models that emphasize the material relations between people, other species and things. In this respect, flowing between them, water is particularly ‘good to think’ (Lévi-Strauss 1966). A major connective abstraction, which has been recycled recently to articulate a more relational ethic in human–environmental relations, is provided by Vernadsky’s (1986) early twentieth-century vision of the biosphere. Founded on a principle of symbiogenesis, this observes that all organic biota on land are extensions of former seaborne creatures and, being connected by water, therefore compose a land-based ‘hypersea’ (Margulis and McMenamin 1992; McMenamin and McMenamin 1994; see also Chen, Macleod and Neimanis 2013). On a related tack, Helmreich draws anthropologically on the work of microbiologist Ed DeLong to consider the role of marine biota not only as the ‘ancient ones’ (*archaea*) providing the origins of life on Earth, but also as links between human beings and all organic life. Thus, he says, ‘Seawater, likened to blood, a powerful symbol of relatedness, becomes a substance securing human kinship to aqueous Earth’ (Helmreich 2009, 10). Such ideas sit comfortably with broader debates about bioethics and ‘new materialism’ (Coole and Frost 2010).

These less anthropocentric modes also highlight the practical need to engage more reciprocally with non-human agency and its orderly purposes. Anthropological work on ‘resilience’ (Hastrup 2011; Humphrey and Sneath 1999) stresses the need for more flexibility in human–environmental engagements, but in essence this is also an acknowledgement of shared human

and non-human agency, and of the reality that this takes material form in accord with the physical and behavioural properties of things.

What I hope this paper has shown is that a focus on the materiality of water and its particular properties enables us to bring human and non-human systems on various scales together coherently, recognizing an interconnected flow of events in which persons, ideas and things work upon and compose each other in ways that are both fluid and consistent.

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Does water have agency? Does it need to?

Vernon L. Scarborough*

Michael Pollan recently published an essay in the *New Yorker* (December 2013) introducing the notion of 'plant intelligence' and how plants have evolved by virtue of their lack of mobility to cultivate and attract the resources they require. Although not using the humanistic language identified with 'agency', a widely used term most frequently associated with human motivation, action and accomplishment, Pollan lends his implicit support for the communicative 'behaviours' of plants and their own brand of agency in effecting change in the world. Veronica Strang champions this view for the role of the non-human organic world, but moves a step or two further in suggesting that the inorganic has its own sense of agency. And though she and those phenomenologists whom she cites attribute agency to all things, it is difficult for some of us to entirely accept such a premise.

Strang is an influential scholar who has published widely on the role of water as a principal resource, perhaps the fundamental resource for all life on Earth (air and light are right up there too). Granting water agency rather on its own terms seems to be the thrust of her present piece – logic felt necessary to accent its physical properties in the context of its present overexploitation by humanity, principally following our recent neo-liberal and Western world view. Although I am fully appreciative of much of what the author articulates,

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I am not sure ‘agency’ is productively attributable to non-human life forms or the inorganic.

By way of definition, the term ‘agency’ is used so often and widely that its meaning can be confusing for many of us. Of course context is everything, but my use of the word suggests a human thought process – ‘water is good to think’, Strang’s own adaptation from Lévi-Strauss. Although plants and animals can be identified with behaviours and patterns of activities, humans interpret those behaviours and patterns and discern their meanings. We work and play in their world, with all the interdependencies implied by our evolutionary and developmental pasts. Together with the inorganic elements – water, fire, air and earth – societies are constrained and find opportunities to approach degrees of well-being in the only material world we know. It is the human mind that deciphers the codes posed by their ‘natural’ patterning.

I understand the argument that domestication was a set of variable pathways, with plants, animals and perhaps even the inorganic elements adapting to facilitate their own ‘lifeways’ in allowing human society to flourish or at least develop as the most influential force for radical and sustained change on the planet over the last 10,000 years. Recent discussions concerning how far back in time this ‘Anthropocene’ extends are debated. Regardless, the unfortunate truth of humanity’s seven billion consumers today is that our most pressing influence is by way of changing the global climate. This powerful human hand has forced itself into and through the relatively slow-moving, accretional developments in the biophysical landscape of the Earth, and it is this principal development that now argues against an agency attributable to the non-human. Because of the concentration and speed of our minds – inclusive of the conscious, the less conscious, and the attendant ‘unintentional consequences’ of often rash decisions and actions – we can and do interrupt the checks and balances set in place by Lovelock’s notion of Gaia. Our societal separation from the non-human world is our ability to plan, project and implement a future; and through our conscious recognition of the interdependencies we have cultivated with the non-human world, we have driven and will drive many plants and animals to extinction. Without developed sentience – agency – they have limited options but to follow our path.

Our earthly mismanagement will be of consequence to our present definition of humanity, forcing millions of us toward catastrophic ends. And though the organic and inorganic worlds will likely redefine themselves – as palaeontology has vividly shown – our overexploitation will drag many of today’s plants and animals down with us as both global sea levels and temperature rise. Although humans are highly resilient, measured in part by our technologies that buffer and distance us from the fluctuations and extremes of the environment, we will be but a subset of ourselves if our collective human minds do not attribute a different and deeper value to life on this planet.

I, too, think of myself as a water scholar, and try to be inclusive of the all-encompassing influence it has on this planet (Scarborough 2003; in press). As a field archaeologist having worked in several regions of the world, my interests are in how ecologies have been altered by societies and, in turn, how engineered landscapes modify the course of culture (human niche construction). Although archaeologists frequently apply the term ‘agency’ to

the material record – the shreds and patches of the preserved past – my bias rests in an assessment of the environment as it acts upon the social collective, societies' reaction to the ecological settings they produce and consume, and, in turn, how these groups socially structure themselves. Although our excavations do allow a sometimes tentative view of the individual, our lens can generally only magnify at the family level of abstraction at best – the house or shelter – and then permit meaningful assessments about the course or coarseness of life at the community level. Notions of agency are different for the ethnographer, or the 'instrument' assigned to the interviewee by a sociologist; historians, too, can locate that occasional literate individual commenting on his person – perhaps most apparent with kingship and nobility as society develops into more complex appearances.

The archaeological record can show how societies have deliberately modified their surroundings, perhaps most significantly by way of altering the movement and containment of water. I do not see water as having a mind of its own or any sentience to deliberately work for or against human interests. Water simply *is* and humans have directed its course with all the unintended consequences of their efforts. The volume of water on the planet is fixed, and it will continue with its cycle of vapor to liquid to ice with or without the human mind. However, our escalating dependence on technology initiated with those first stone tools, but accelerating with growing social complexity, has disrupted the flow of water in a dramatic manner. What archaeology can offer is the myriad of low-tech solutions to move and collect water at the level of the community – techniques and associated methods that were frequently a glove fit with societal structures of shared social identity and common pool resources.

Linton (2010, cited by Strang), in his most compelling book, makes it clear that we are not outside the hydrological cycle but are part of, and heavily influence, its rhythms and circulations. The idea of water is big and understanding its sacred place rather than its mundane and predictable availability is an important lesson yet to be accepted or acculturated by the dominant drivers of a Western world and our all-pervasive, fast-paced, materialistic consumerism.

Of special merit is the notion provided by Aaron Wolf (2000; 2007) that historically water conflicts seldom result in major warfare. The first recorded treaty has been attributed to a water deal between Lagash and Umma along the Euphrates drainage (2nd millennium B.C.), and since then humans have been negotiating water allocation, access and rights in collaborative and lasting agreements. What is it about this medium that unites many times more often than it divides, even in the most drought-prone zones? Perhaps it is the immediacy of its effect on a neighbour when it is made unavailable for a day, a week. So it is the humanity in humanity that unites us and water; if it were to have agency, then it would know this.

Is the requirement to grant 'agency' to things the need to have things then push back on the detrimental ways in which societies are disrupting the balance between the non-human and the human? If this is the endgame for this definition of agency, then there may be at least as convincing other ways to engage change and a mindful understanding of the earthy processes

of which societies are but a component (though a highly influential and integrated component). It is true that non-Western societies have given ideological agency to both non-human life and the inorganic world that has surrounded them, but to do so sacrifices notions of evolutionary theory and frequently conflates historical time depth. The Water People or the Bird People of indigenous groups are highly significant metaphors and concepts that have unified and worshipfully affected the fundamental fabric of many societies. However, they need separation from our science and aspects of our scholarship. We need both, but like church–state separations they require some distance from one another if we are to most effectively address our societal human futures and project a world where myths and metaphors of non-Western ways can be thoughtfully contextualized.

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Don't water down your theory. Why we should all embrace materiality but not material determinism *Matthew I.J. Davies**

As an archaeologist who ‘works’ with water, my experience has largely focused on the historical ecology of water management within agricultural landscapes (particularly in Eastern Africa) and I have only just begun to think about the broader materiality of water itself, but in this context I find Strang’s essay thought-provoking and extremely useful with a great deal to commend. If I read it correctly, Strang’s key premise is that water is ‘good to think with’ since it permeates all aspects of human and biophysical processes – thinking through water thus allows us to think across scales, from the molecular to the global, and to explore recursive relations at each level. At the same time, as an element integral to the physical/biological sustenance of all life, and also a core symbolic or cognitive referent, tracing relationalities of water within and between communities therefore also forces us to bridge common disciplinary boundaries and theoretical approaches. Thus at the same time as using water to ‘think through’ human–material relations, Strang also uses water to think through and reconcile different approaches within social theory. Finally, Strang’s focus on materiality argues that water’s immutable physical properties determine certain ‘universal’ and ‘non-arbitrary’ approaches to water – both physically in the sense of its management (capture, storage, irrigation, drainage) and symbolically and cognitively in terms of water’s various positions in ideological regimes and its consequent uses in ceremonial and ritual life. Overall, Strang argues that the immutable physical properties of water induce physical and cognitive responses such that we should think of water as possessing a certain material agency.

To my mind Strang’s concept of ‘relationality’ requires further elaboration, but it is the question of the material agency of water itself which will continue

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to polarize audiences and which unfortunately is not satisfactorily theorized. Repeated statements point to the inherent properties of water (fluidity/flow, dampness, weightlessness, taste, conductivity), but the essay lacks a concise examination of what forms material agency takes, how it coincides with or differs from human agency, and exactly what common and ‘non-arbitrary’ approaches it induces. This is unfortunate, because I think there is much to be gained by focusing very clearly on the material properties of water and the commonalities of response that these properties specify (whether or not these are defined as ‘agency’) – while at the same time making it more precisely clear what a strictly ‘materialist’ approach does not explain and thus differentiating between theories of materiality and more historical and contextual analyses (see below).

Strang’s choice of ‘water’ as an analytical tool is nevertheless very well made, not only because water allows us to explore human life across scales but also because, as a substance which bridges scales, process and cognition, it also acts a vehicle for thinking about scalar and analytical approaches within archaeology itself. However, while thinking through water thus allows us to explore material and cognitive relationality across biophysical scales and methodological approaches, Strang’s essay to my mind confusingly bounces between the search for generalizing universals and commonalities and deeper degrees of particularistic historical and contextual analyses, as well as between the methodological scientific analyses of material properties or biophysical process and humanistic understandings of cognitive–symbolic systems. These boundaries naturally need to be dissolved and the search for both universals and the particular are to my mind mutually compatible and indeed mutually desirable. But at the same time I think it is often confusing when the recursive interrelations between the universal and the particular (however fuzzy in practice) are not made analytically explicit, and to this extent Strang’s essay fails to take full advantage of the methodological impact it might otherwise make.

As Strang suggests, the primary utility of theories of materiality (and especially the materiality of water) is their ability to bridge deeply entrenched theoretical and methodological divides, both in archaeology and in cognate disciplines. However, to fully understand this issue I think we need to more deeply historicize the emergence of theories of materiality within archaeology (at least in the UK) as this helps us to explain what materiality rallies against, its context of application, and what it does and does not help us to understand. First we must think about the way in which archaeology has tended to polarize scale in its approaches – in particular between, on the one hand, analyses of broad-scale human–environment–ecology-type relations, often via discussion of ‘landscapes’, and, on the other, studies of the small-scale, most notably material objects, but also things like human bodies. This polarization of scale is doubly interesting in that there is also a polarization of analytical response evoked at each scale. Although naturally a gross oversimplification, analysis of the former has often tended towards generalization from universal biophysical processes to generalized understandings of ecology, while the latter has tended towards understandings of human cognitive and symbolic systems and the particularities of certain

historical and cultural contexts. The more generalizing approach to human–environment relations has been increasingly challenged in recent decades by humanistic, phenomenological and practice-based understandings of landscape which tend towards the particular and contextual (interestingly they often do so by focusing on the ‘built’ landscape, the nature of monuments and other physical ‘material’ transformations). Similarly, historical ecology attempts to bridge the generalizing versus particular and the scientific versus humanistic by analysing the specific historical context of human–environment conditions and emphasizing the anthropogenic nature of the world from soils and vegetation to more obviously built features of the landscapes (field boundaries, terracing, architecture). In various formats, landscape–environment studies are therefore gradually shifting from the general to the contextual and from the universal to the particular.

At one end, theories of materiality intersect with the landscape-scale focus on ‘monuments’, but at the other they have become popular within much smaller-scale and higher-resolution analyses of material objects. Interestingly, to some extent, the analytical trend here is quite the opposite to that found in landscape–environment studies – a focus on the raw physical properties of the materials utilized in the construction of artefacts aims to explore the more universal and generalizing aspects of material–culture production and the consequent ‘non-arbitrariness’ of seemingly relativistic human material–symbolic systems. Materiality thus rallies against an absolute focus on human worlds as purely human-constructed symbolic–cognitive systems and instead argues for the non-human agency of things and animals (or actants). There is a contrasting move here from the contextual and particular to the universal.

It remains, therefore, to be seen whether we are in the process of witnessing a convergence of approaches and scale or whether landscape–environment analyses and ‘material’ analyses will bypass each other analytically. However, Strang’s focus on water is seminal because it emphasizes these interconnections of scale from object to landscape and argues for analytic approaches which bridge material and biophysical science and the symbolic–cognitive. What I find particularly important to emphasize is that archaeological scientists and others who might be wary of ‘highbrow’ theory and who might all too easily dismiss theories of materiality as yet another indulgent theoretical fad might do well to look again. The reason for this is that theories of materiality refocus emphasis on the physical, material properties of the world, whether these be understood through the scientific analysis of material objects or through wider ecological processes. To an extent, then, theories of materiality potentially represent a new convergence of theory and scientific method and practice which should be welcomed. But my worry here is that this convergence may in itself encourage an uncritical retreat away from the historically contextual and particular, and a loss of focus on the intersection between material agency and its recursive interactions with human agency (choice, intentionality, improvisation, innovation) which undeniably sits within and remains shaped by symbolic–cognitive understandings (cosmology, belief, language, semiotics) which themselves are only partially based on universal material properties.

There is, of course, generally a non-arbitrariness of technique and task (e.g. in technologies of water management) and experience (as in phenomenology) and symbolic selection (forms of communication) in human–material engagements. But as Moore (1996, 126–27) informed us some time ago, while symbols (e.g. ash) and referents (e.g. female fertility) are often non-arbitrary, unambiguous and highly durable, it is the historically and situationally contextual interpretation of the symbol–referent relationship which gives rise to secondary meanings or significations and frames the practical deployment of actual behaviour (ash as pollution versus substance of resistance). As such, I worry that a refocus on universals and non-arbitrary understandings could all too easily lead to a form of material determinism which neglects human agency and contextual historical analysis (see Moore 2011, 178–87, for discussion). To state this in a more practical form: stone is hard and it endures, hence it is used to construct durable things and becomes a symbolic referent for the quality of durability, but *how* this hardness is employed to construct enduring things of certain forms and in what ways the qualities of ‘durability’ and ‘permanence’ are understood and deployed are multiple, historical and contextual. Similarly, water flows, hence its fluidity determines certain responses in its harnessing and capture and makes water the symbol for fluidity and movement par excellence, yet the physical ways in which water is harnessed and used and the various powers and uses of ideas about water are historical and contextual, with their own unique trajectories. Take, for example, the difference between beer and tea as means of purifying drinking water (both specified by the universal propensity of water to carry bacteria) and the consequent historical and cultural trajectories that have followed.

Moreover, I wonder if the emphasis on the universal properties of materials requires greater theorizing – water in particular needs to be understood as a rather unique material form which differs in most respects from more solid materials – water moves, flows, changes; it is, in this regard, an atypical material form, worthy of atypical discussion. As Strang alludes, water uniquely takes on multiple material forms of its own (steam, ice, drizzle, fog etc.), each of which is often used, understood and experienced in rather different ways, and not always ‘as water’. Water is also a vehicle for other things both visible and invisible (any East African irrigation-using farmer will tell you that irrigation water not only ‘waters’ but also carries rich sediments and chemical nutrients: see e.g. Stump 2006; Davies, Kiprutto and Moore, in press) – but as a carrier, water both ‘brings’ and ‘carries away’. However, while these variations in form and property are most dramatically evident in the case of water, we may also need to think harder about the inherent material properties of other substances: how they take different forms; not only how they feel, but also how they move, their temperature, taste, and their ability to carry or catalyse other things or substances. While focusing on the universal and immutable properties of materials, we must realize that Western conceptions do not represent a universal and comprehensive understanding of what a material ‘property’ is and what range of properties are experienced and should be studied.

To my mind, Strang’s emphasis on relational materiality is therefore highly important but any suggestion that it is, or should be, an all-encompassing

theoretical turn overemphasizes its primacy. At the same time, I believe that studies of materiality still require considerably greater theorizing if they are to reach their full potential, but in that context Strang's paper is a very welcome addition. Theories of materiality and indeed the materiality of certain substances such as water are clearly very useful tools to think through and they are ones which help bridge scales and analytical approaches, but materiality must be seen as a springboard or jumping-off point for other analyses at different resolutions and different scales of space and time. Interestingly, Strang's case study is to my mind less explicit on the 'material properties' of water in Brisbane and actually provides more of a historical and contextual analysis of water management. To this extent it therefore makes a strong case for the utility of 'thinking through water' but a less clear case for understanding the universal agentive actions of water cross-culturally.

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On the agency of rivers *Matt Edgeworth**

Veronica Strang has written an excellent account of the fluid relationships between humans and the non-human materiality of water. The very idea of anthropology of water challenges our commonly held assumptions about water being just a material or economic resource (or, conversely, about anthropology being just the study of people). It holds that water is socially, politically and ritually constituted, while acknowledging at the same time that water also has an existence outside the human domain. There is much to agree with and to be inspired by in the paper, which is especially strong on 'fluidity and consistency at every level of human–non-human engagement' (p. 133). By virtue of the emphasis on that specific aspect, however, there are some aspects which are underemphasized, and it is these which I focus on in my comments.

I refer mainly to rivers, as this has been the focus of my archaeological research. Rivers are interesting because they not only comprise materials, in the form of water or mud or biological inhabitants of riverine environments. They also are characterized by an energy that is derived partly from the sun and partly the gravitational pull of the Earth, which together power the hydrological cycle (with tidal stretches of rivers also subject to the influence of lunar gravitation). Put your hand into a river, or immerse any part of your body, and you can feel these cosmic and planetary forces at work in the form of the flow or current of water. Put a dam or other artificial structure across the river or modify the channel in some way and you actively interpose human projects and designs onto the supposedly natural cycle. Put a waterwheel or turbine or other kind of energy-utilizing device in and you can turn the

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flowing energy towards some particular task or end. It is more than merely the materiality of the water itself that we are dealing with here. It is more than human agency, too, or the relationships between human and material, however fluid these may be. It is also the flow or energy of the river itself.

For this reason I find the discussion on the agency of water, while useful in many ways, somewhat constrained in others. Established arguments about the material agency of things are applied as though water is little different from other, more solid, kinds of material. Yet water in general, and rivers as flowing energies in particular, have so much more to offer to a theory of material agency. The agency of a river is quite different from that of objects that reside in a museum cabinet, though I do not deny that these can have power of a kind too. To experience the difference at first hand, just push a boat out into a river until it gets caught by the current. The river itself moves the boat in a particular direction, sometimes (unless the eddy force is actively countered) spinning it around. The agency it exerts or force it applies is palpable – something that has to be responded to in order for the person in the boat to regain partial control of the situation. Anyone engaging with rivers, on whatever scale, finds themselves caught up in this physical interaction with river forces. And for all the fluidity of the interactive situation, there is actually something dialectical about it – a sort of ‘push and pull’, or ‘action and counteraction’ – which unfolds through time (Edgeworth 2011).

In looking at the archaeological evidence of human–river interactions in the past, a typical scenario is as follows. People make some material intervention in rivers, but this leads to an unexpected river response, which in turn requires some human reaction, which results in further unexpected river responses, and so on. Both human and non-human participants get drawn into a dynamic entanglement or enmeshment with each other – almost a kind of wrestle.

A recent historical and contemporary example is the ongoing struggle between the US Army Corps of Engineers and the Mississippi River to stop it flowing into the Atchafalaya River, thus preventing a change of course and the consequent shifting of the delta, with all the economic and political shifts such a scenario would entail. The engagement perhaps began in earnest with the hand-digging of a small channel in 1831 to provide a short cut for steamboats, and the use of explosives to break a logjam on the Atchafalaya River in 1839. But the unanticipated side effect was that it presented the Mississippi with a shorter and steeper route to the sea, pulling more and more of its waters out of the established channel. Each river-control structure built to prevent the change of course brings about further river responses, requiring further or strengthened river-control structures to counter them. The unfolding human–river interaction is well documented by McPhee (1989).

A more archaeological example is provided by the discovery of the material remains of (a sequence of) three medieval bridges next to the River Trent at Hemington in Leicestershire. Bridges present both openings and obstacles to river flow, sometimes creating vortices which scour out holes beneath bridge piers, undermining them. Stratigraphic evidence indicated that such scour holes had led to weakening of parts of the structures, contributing to their eventual destruction during episodes of flooding. Each successive bridge used different construction techniques in an attempt to respond and adapt to river

conditions, but the river was changing too, partly in adaptation to the bridge structures themselves. Attempts to counteract the force of water, sometimes by presenting material resistance to it and sometimes by the alternative strategy of presenting as little resistance as possible, are evident in the design of bridges. The whole sequence of three bridges and related evidence is a material testament to the dynamic and temporally unfolding character of human–river interaction (Ripper and Cooper 2009).

I do not mean to suggest that all human–river interactions should be configured as a battle between oppositional forces. That would be a caricature, for people work with flow as well as against it. But something important needs to be added to the analysis of relationships between the human and the non-human. Partly it is the temporal dimension – and this is where archaeological and historical approaches to river flow can augment the anthropological one – but it is not just that. It is also the sheer power of water, which goes far beyond just material resistance to human agency. This is a power that, at its most destructive and dangerous, can ravage, inundate, overcome and submerge cultural forms. The torrential flooding of the River Arno that swept through Florence in 1966 is the other aspect of ‘the mesmerizing shimmer of water surfaces, the excitement of waterfalls’ (p. 136) just as the tsunami that hit the east coast of Japan in 2011 is the darker side of ‘the calming rhythm of waves’ (p. 136). Even when not in such destructive mode, flowing water still actively and physically challenges human projects and intentions. Friction and turbulence, as well as fluidity and consistency, can result. Rivers represent a force to be reckoned with.

Another way of putting it is that, for all that rivers are partly shaped by humans, they retain something wild and non-human about them. The dangerous, unpredictable aspect of river water is still there when using it as a metaphor or model for reconceptualizing human–non-human relationships. Strang rightly points out that ‘thinking with water’ can help reconnect otherwise polarized positions and perspectives, especially with regard to closing the gap between concepts of culture and nature, human and non-human. Following from the discussion above, and looking at the author’s own power to challenge viewpoints through her writing, it is worth adding that thinking with water also has the capacity to subvert established categories, to undermine long-held assumptions, to flow around and over static structures of classification and analysis, to break out of old and established channels – and thus to carve new paths of flow, new ways of thinking.

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How does water mean? *Ben Alberti**

The St Anthony’s Day procession was caught in a bitter, driving rainstorm, accompanied by thunder and lightning. We elected to carry on to the church,

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despite the weather and the sense of threat. By the time we reached our destination we were soaked through. Locals were happy for the rain and all it implied, students and faculty to have shared the powerful experience which appeared to close an affective gap with our hosts.

Veronica Strang has written a compelling statement about the importance of taking water's materiality seriously. By bringing the material properties of water to bear on the form and content of an argument about water as a material and social thing she shows how water is good to think with. The language we commonly use to describe the qualities of water is shown to be up to the task of also describing relations (human and non-human) established through water. Terms such as flow are not simple metaphors but refer quite specifically to what water can do.

Strang points us towards a range of theorists who are telling us the same thing – materials matter, are agentic, and have a say in their meanings. While drawing on theorists who stress the agentic or affective capacities of materials, Strang is critical of a tendency to take 'flow' or 'flux' as an overgeneralized model for materiality. She certainly has a point. Replacing a general model of stasis with one of movement does not let us off the hook in terms of explaining and demonstrating the specific types of movement involved. The point is illustrated by a narrative of the expanding relations water engenders through its properties in the Brisbane River Valley and beyond. Strang argues that just as humans are able to shift conceptual scales through reflexivity, water has the ability, because of its specific physical properties, to maintain relations between it and humans at all scales. Water is good to think because it can thus bring human conceptual life along with it from local to global concerns. As such, water's properties – and she has a list – help build conceptual bridges that enable us to better understand sustainable resource use as the 'orderly movement of things' at a rate that all involved can keep up with. Water clearly works well in the way described here and has great potential to rearticulate debate. This is a clever use of the recent trend in non-anthropocentric theory which stresses non-human agency. Putting non-human agency at the fore is thus seen to be an ethical imperative, one that can be used to challenge forms of resource exploitation.

There is also an odd tension in the paper, which results from a long-standing conundrum, that of the relationship between matter and meaning. To my mind, the central theoretical challenge to the paper, and one of the thorniest questions for archaeology in general, is how to reconcile materials and meaning without introducing a representationalist logic where meaning is applied to matter by a thinking subject. The difficulty is to show their co-existence without resorting to determinism. It's one of those issues where even when one claims, with confidence, to have avoided it, someone will point out that in fact one has not. In Strang's case, I don't think she is making any claims to have resolved the issue. The paper is in fact much more about relationality than about meaning. The way in which the case study develops the language of water and mimics its structure does much that a cultural-construction argument could not; that is, I think Strang is on firmer ground when she writes of relations rather than meanings.

But the question of meaning remains. How are we to think about non-arbitrary categories, meanings and values without recourse to universal properties? I think all archaeologists struggle with this question, and I am thankful that Strang has presented us with one unapologetic response. The tension is produced by the language of ‘cultural construction’ that creeps into the paper. Materials that guide their own meanings through their properties are set alongside concessions to culturally inscribed values and ideas. Once the debate has been couched in those terms, the only choice really is to side with a quasi-universal experience of properties and hence commonalities of meanings across time and culture. Properties of things and people are not fixed, Strang argues, but offer some ‘relative ... constants’ in a ‘flux’ (p. 140) of emergent relations in relation to universal human experiences of particular properties.

But this somewhat dodges the question of how different meanings can adhere to the same substances. What interests me is whether we can hold on to the insight that materials lend themselves to conceptual innovation and analysis because of their properties while simultaneously admitting that properties do in fact differ. Can we provincialize Strang’s ideas without juxtaposing properties to meanings or arguing that meanings are the direct correlates of properties?

A concern with water is never far from the surface in northern New Mexico, usually due to its scarcity. Storms during religious processions are affectively powerful experiences in many ways. In our fieldwork,¹ field crews from relatively wet, urban settings must be schooled daily in water conservation. Locally, the *acequia* system of water-sharing and control has existed for several hundred years in the area (Rodríguez 2007). The antiquity of the canal systems has archaeologists, Pueblos and Hispanic communities at loggerheads. A more knowledgeable person than I could write a narrative of flow similar to Strang’s Brisbane example (see Arellano 2014; Rodríguez 2007), though the differences might be telling – instead of consistency, inconsistent flows and the effects of inundation must be managed. The labour required to maintain the systems is becoming scarce, not because water is being willed away by a more agentive segment of the population, but due to the attraction of other kinds of work elsewhere. The power of the *mayordomos*, *acequia* managers, is weakened as control is given over to municipalities.

Is this water the same? Can we think of the stoppages, flows and power relationships established with hands, minds, vision, rock, histories, politics and so on as formative of its material properties? Or, at least, can we think of the entire phenomenon as one in which properties become determinate? I suggest we read Boivin’s (2004, 16–17) point that ‘properties ... are imminent [*sic*] in embodied human engagement with that world’ in such a light. The body may be the first tool, but it does not work on a closed field of set properties. Feminist physicist Karen Barad (2007) states the case more strongly, writing that there is no such thing as a property that belongs to an independent object. The proper referent for a property is instead a relation (or phenomenon, in her terminology). Properties, potential or otherwise, cannot be listed, as they only exist as such in relation. ‘Flow’, then, can be read

as a property of water-in-relation (to a stream bed, for example). I suspect archaeologists will benefit from looking for ways in which not-quite-the-same properties are in evidence in other contexts. If water is always in relation, we can expect new properties from new relations, even given the undeniable set of affective responses noted by Strang.

The site of Kissing Fish is deep in a gully on the west rim of the Rio Grande Gorge in northern New Mexico. A magnet for rock art, the north wall of the gully reveals many years and layers of this practice. Pecking the basalt rock surface is a relatively new practice, however – the action of water on stone provoked by powerful, intermittent run-off has sculpted the basalt into smoothed, curved shapes. As Edgeworth (2011) has noted, there has been a long-term relationship between special meanings and waters, especially sources, confluences and so on. Here we see such places repeatedly marked by rock art. But the rock art seems to respond to processes, not properties, mimicking movement rather than things. How can water continue to be good to think with in this context, but in a way that pushes us to think beyond what we perceive as the qualities that express its timeless properties? Can we think of the experience of water here as inseparable from that of rock? Rather than archaic foragers grappling with the question of the agentive capacities or properties of the rock or water, I suggest we think in terms of the properties of the phenomenon ‘rock/water’ as engendered by specific, embodied practices in this place.

There are good reasons for taking the properties of a substance as generative of potential meanings common to all people. In the case of water, it enables the types of scheme transfer envisaged by Strang and put to good effect by her. Water as agent presents us, as she shows, with an ethical dimension to the substance itself that is belied by talk of it as a ‘resource’. But I argue that we need also to keep pushing beyond universal notions of properties, experience and scheme transfer, however well these respond to pressing contemporary concerns. There are many waters, not only many meanings of water.

Note

- ¹ The Gorge Archaeological Project, directed by Severin Fowles (Columbia University).

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Holy water. The universal and the particular *Terje Oestigaard**

Veronica Strang’s ‘Fluid consistences. Material relationality in human engagements with water’ is a highly welcome theoretical discussion regarding the role of water in society and social theories. As a discussion article, Strang’s piece opens up a number of fields of enquiry where water empirically and theoretically challenges current theories, but given the limitations of an article

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there are still other spheres where water may contest dominant theories, and I will briefly address some of these aspects with an emphasis on holy water.

Strang's point of departure is current social theories challenging Cartesian dualisms, the apparent polarization between material-culture analyses and more phenomenological approaches, and the question of agency: whether things (in this case water) may have an agency on their own or whether agency is resulting from a combination of people and things. One problem with the above-mentioned theories and theorists is that they all in varying degrees work within the sociological tradition of Emile Durkheim (1858–1917), who stated that in the social and human sciences social facts can only be explained by other social variables (Durkheim 1966). C.P. Snow (1966) described this scientific divide as 'two cultures' – a universe of humanities as opposed to the natural sciences. Although material-culture studies and, for instance, actor-network theories include materiality and the role of nature (preferably in a modified form),

The name of the game is not to extend subjectivity to things, to treat humans like objects, to take machines for social actors, but *to avoid using* the subject–object distinction *at all* in order to talk about the folding of humans and nonhumans ... Science and technology are what *socialize* nonhumans to bear upon human relations (Latour 1999, 193–94, original emphasis).

Water, on the other hand, may enable an approach where 'it is possible to reconstruct, describe, delineate and understand its movement and role in nature and in society and at the same time evade the problems created both by natural or biological determinism and social constructionism' (Tvedt 2010, 146). The fluidity of water, always being universal and particular, may open up further entrances for understanding human engagement with the cultural and natural worlds, since water is always culture (including religion) and nature at the same time (Tvedt and Oestigaard 2010). In order to understand the religious role of water, one may distinguish between 'holy' and 'sacred'. In general, 'holy' and 'sacred' are often seen as identical and are used interchangeably, but the terms imply different relationships with the divine. Most people say 'holy water', but not 'sacred water', and this difference is important. Theoretically, 'holiness' refers to the Divinity and what is derived from the Divinity as attributes, whereas 'sacredness' points to consecrated items, 'respected or venerated objects but not the divine itself and not to persons as individuals'. Moreover, it is 'the holy Bible' but the 'sacred books of the East' (Oxtoby 1987, 434).

Although a small fraction of all people on Earth do not believe in any religion, and many believe in science, including those who develop social theories excluding the agency of holy water, the majority of the world's population believe in holy water in its various forms, whether they are Hindus, Christians or Muslims or belong to any other denomination. Among the Hindus, the most sacred festival is the Kumbh Mela, which is held every twelve years in Allahabad, on the confluence of the Ganges, the Yamuna and the mythical, subterranean Saraswati River. It is a 42-day pilgrim festival. In 2001 it was estimated that between 50 and 70 million people came to this sacred confluence, in 2013 more than 100 million. They shared one

aim: to erase their sins by bathing in holy water. On a smaller scale within Christianity, the holy waters of Lourdes in France are annually visited by some 5 million pilgrims. As nature, holy water is the same water in the hydrological cycle as any other water, but its significance is fundamentally different: it works because it is holy. Being culture, religion and nature at the same time, it has agency.

Understanding the nature and character of holy water is essential not only for challenging dichotomies like culture and nature and the Cartesian concept of body and mind, but also for understanding specific practices in, for instance, Hinduism or Christianity. The caste system is built upon notions that water transmits purity and impurity; one single drop of water may challenge high-caste status if the giver is impure (low-caste). Sin may therefore be seen as a bio-moral phenomenon and fluid (Parry 1994, 127), and impure water may threaten both the body and the soul's purity. The purity of body and mind is the same, and affected by the status of the giver.

However, the relation between ritual purity and ritual impurity, on the one hand, and physical purity and physical impurity, on the other hand, is not straightforward. Holy rivers in Nepal and India are often notoriously polluted despite being the most holy and ritually pure. Cleaning of physically polluted rivers has often been challenged because of the intimate relation between nature (physicality) and religion (purity). The logic is simple, but also challenges Western dichotomies: if the water is holy and has the capacity to transfer and transform human impurity (sin) into purity, it has also the capacity to transform physical impurity into purity (i.e. a clean river). If the rivers do not have the capacity to transform physical impurity into purity, they may not have the religious capacity to do so spiritually either. In a similar vein, if engineers clean a river mechanically and chemically, it might be physical pure but not spiritually, since this was due to human, and not divine, interventions (Oestigaard 2005). Holy water has agency, particularly since it is holy, otherwise it would only have been neutral water, but even 'secular' water from a religious point of view embodies other qualities and capacities, as Strang points out.

Such notions of holy water are not restricted to Hinduism, but are also found in Christianity. Not only is baptismal water seen as holy among Catholics, offering protection against the Devil as well as enabling divine interactions, but also holy water has throughout the ages been used for a wide range of apotropaic and other purposes (Oestigaard 2013). Concepts of holy water also challenge Cartesian dualisms which originated in Christian contexts. With regard to the most holy River Jordan, despite being highly polluted, the Latin patriarch vicar general of Jordan explained in 2013,

There is a distinction between the physical state of water and the sacred realm. From a religious perspective it does not matter whether the water is dense or light, clear or cloudy, polluted or not polluted. This does not touch upon the aspect of faith . . . Pollution is a Western concern, it is Cartesian. Descartes's influence stopped on the northern shores of the Mediterranean (Châtel 2014, 225).

Water transcends Western concepts.

Thus, although just a few brief examples, these point to the fact that water can be seen as both universal and particular, always in flux and always culture (or religion) and nature at the same time, but in different forms and shapes at various points in history and specific contexts. It is fundamental not only for understanding society but also for challenging common theories. The ‘water’ blindness of many of these theories is obvious, but what is perhaps more striking is that they do not hold water, so to speak, when empirically scrutinized. This is also one of the great strengths of Veronica Strang’s article: she uses a Western context and empirical material to challenge theories which to a large extent are based on Western premises and horizons of understanding. As Strang has shown, ‘secular’ water in Australia is intimately interwoven in numerous spheres transcending existing theories and conceptions; by including ‘profane’ or holy water, even in Christianity, this picture is further challenged. Thus, in all cultural and historical contexts, since water is always culture and nature and in flux, and every human at every point in time in history has depended upon water, water studies may enable new understandings of what has mattered the most to all people throughout history.

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Contributaries. From confusion to confluence in the matter of water and agency *Veronica Strang*

I am happy to see that my essay has generated a lively discussion, and am most grateful to the respondents for their insightful contributions. Their comments express varying levels of agreement regarding the agency of things. Vernon Scarborough revisits anxieties about whether agency implies intentionality. Using the term ‘agency’ is indeed problematic if we assume that it entails sentience or intentionality (and I do not), but if we define it more precisely as a capacity to act (upon), it is possible to excise intentionality from the equation. This simultaneously allows us to acknowledge the agentive capacities of things without proposing or implying a form of *faux* animism. Anthropology has indeed drawn imaginatively on specifically cultural beliefs and knowledges, for example in composing more relational visions of human–other interactions than Western science tends to allow (see Strang 2006a), but this is not tantamount to assuming that things contain spiritual presence, or have ‘their own *sense* of agency’.

Matt Edgeworth observes, however, that things do have ‘power’ to act upon each other and upon us. For him, material agency is a product of energies and forces, and his nice description of the ‘wrestle’ of human–non-human engagement highlights the reality that it is the material properties of things that define what they bring to the match. Water does indeed illustrate the materiality of power (or the power of materiality) particularly well, but I would suggest that even more static things, such as ‘museum cabinet’

objects, may have considerable material say in their making and in their possible uses. A woven basket, for example, will have emerged in part from the relative pliability of cane, reed or grass, and its strength and lightness will determine what can be carried in it. A hardwood mask might have put up considerable resistance to the carver, and its weight and rigidity will influence how it is worn or used. All things will present specific constraints and opportunities through their properties of flexibility, fragility, resilience, density, durability (and of course fluidity) etc., thus bringing material agency to the design of the technologies and practices through which human agency is exerted upon them. These technologies and practices, in turn, reflect human choices about the extent to which they work *with* these material properties or try to override their agentive capacities (the difference, perhaps, between a waterwheel and a dam). Material agency – as Edgeworth presents it – is a matter of physics, and whether human groups succeed in taming a river or not, it remains ‘a force to be reckoned with’. In considering the capacity of water to carve the river bank, and the ability of rock to resist, we might therefore conclude that the intrinsic agency of material things is located in their particular physical properties, and that these and their agentive capacities exist independently of human interpretation of them. However, we might *also* say that these properties make things ‘good to think’.

Both Matthew Davies and Ben Alberti stress the relationality of material agency, with Alberti noting Karen Barad’s (2007) contention that ‘there is no such thing as a property that belongs to an independent object’ (p. 161). While allowing for some degree of Heisenbergian uncertainty, I would beg to differ, suggesting that the physical properties, energies, forces and so on of things pertain, whether we name, measure and interpret them or not. Were humankind to vanish from the face of the Earth, water, rock, organic life and so on would continue to act upon each other in accord with their particular patterns of ‘behaviour’ (though perhaps with rather less impediment). So it may be useful to distinguish between, on the one hand, the intrinsic properties of things and their capacities to exert material agency, and, on the other, the ways in which these affect mutually constituted – though, as Scarborough notes, highly unequal – relationships with persons.

Matthew Davies suggests a need to define ‘non-material agency’, and I suppose one could suggest ‘anything that doesn’t involve physics’. But tangible and intangible agencies are greatly entangled: things present potential symbolic imagery (such as visions of flow) as well as expressing energetic physical forces. Human affective and imaginative responses to the materiality of things are both ideational and physical, being located in neurological and physiological processes, and ‘materialized’ through physical action. The capacity of things to ‘induce physical and cognitive responses’ (as Davies puts it, p. 153) arises from the meeting of their intrinsic material properties and what they present intangibly to the human imagination, with the specifically contextual cultural beliefs, knowledges, values and practices that mediate human engagement with them. So it is a little difficult to parse agency into material and non-material forms. As for how the agency of things differs from our own: one might say (or at least hope) that the latter is distinguished

by consciousness and intentionality. But even this is not cut and dried if we include in our discussion the agency of non-human living kinds, in which case we might want to consider a continuum of possible degrees of intentionality and indeed consciousness.

Acknowledging that material relations are dialectically composed in the engagement between human and non-human agencies allows us to address what Alberti describes as a ‘tension’ – a ‘long-standing conundrum’ (p. 160) in the relationship between matter and meaning. His concern is that, in acknowledging the capacity of things to evoke meanings, we risk arguing that meanings are the direct correlates of properties. This recalls a much longer-running argument about environmental determinism, in which the deepest roots of contemporary debates about agency lie. There are two responses: one theoretical and the other evidential. First, it seems to me that this is not an ‘either–or’ issue. Acknowledging the agentive capacities of things – and, yes, permitting them some part in ‘determining’ events – does not obviate the (generally much more powerful) agency of humankind in manipulating and managing the material world. The properties of water intersect actively with the human particularities of each cultural context, and it is this dynamic and recursive relationship that provides the bridge between matter and meaning.

Alberti is right, though, to be wary of ‘simple correlates’: things have multiple properties and produce multiple stimuli, engaging not only with a complex array of cognitive and sensory processes, but also with all the specificities of particular cultural and historical contexts. But still, when we step back to consider the larger comparative picture and its patterns, strong and consistent relationships between properties and meanings are discernible. Those of us who pool comparative historical and ethnographic evidence on human relationships with water are so regularly confronted with recurrent themes of meaning that it becomes impossible to deny water’s capacity to evoke spatio-temporally consistent meanings, for example as the substance of life, and as a metaphor for time and flow. Terje Oestigaard’s helpful interjection about the multiple historical and cultural contexts in which water is considered to be holy provides just such an example, and is surely – as Alberti hopes – quite readily ‘provincialized’. One might assume similar theoretical nudges to the contributors to Boivin and Owoc’s collection on minerals (2004) or Rival’s edited volume on *The social life of trees* (1998). And the latter allows me to employ an obvious analogy to make the point that this is partly an issue of scale: that the patterns visible in the bark of a particular tree may be more specific and intricate than those discernible at the larger scale of the forest, but they are ineluctably connected.

Davies helpfully highlights the importance of scale, noting the difficulty of reconciling immediate cultural and historical specificities and larger-scale spatio-temporal continuities. He finds ‘bouncing’ between these ‘confusing’ (p. 154). But perhaps confusion is precisely the right word. People’s engagements with the material world are quite literally a ‘con-fusion’ of responses to the consistent material properties of things, which evoke recurrent meanings, *and* the particular meanings and practices pertaining in the specific cultural and historical context that they inhabit. As I have argued

previously (2005a), these things are not mutually exclusive: acknowledging the consistent agency of things over time and space does not require, as Davies suggests (p. 155), ‘a retreat away from the historically contextual’ or, for that matter, the ethnographically specific.

Nor do I think that acknowledging this agency drops us into material determinism, though Davies is right to note a potential trap. While there may be a sound bioethical rationale for thinking in more egalitarian terms about non-human agency, the relocation of humankind in a bigger, more-than-human, picture does risk obscuring our collective responsibility for massive anthropogenic impacts on other living kinds and the material environment. We should indeed be careful not to lose sight of the inequities in human–non-human relations. But I would argue that this imbalance is compounded by a vision in which the non-human is seen as a passive subject to the human will. A clearer vision of the agency of ‘the other’ permits its repositioning as co-constituent of events, and so encourages a more reciprocal vision of relationality.

This is somewhat implied in Oestigaard’s useful argument that agency combines nature and culture and ‘water is always culture . . . and nature at the same time’ (p. 163). This suggests that the capacity for things to have agentive effects is in itself a challenge to nature–culture dualism and to the alienation of humankind from ‘the other’. In this sense, acknowledging the agency of water requires us to recognize – maybe even celebrate – the ‘confusion’ of human and other forms of agency. Should we do so, a confluence between ‘historical and contextual analyses’ and ‘scientific analyses of material properties/biophysical process and humanistic understandings of cognitive–symbolic systems’ (p. 155) becomes not a ‘highbrow’ or ‘indulgent’ aberration, but a theoretical imperative. I’d say dive in: the water is fine.

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