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# The Anthropology of Water

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## Abstract

The anthropology of water is a self-declared relational field that attempts to transcend nature/culture distinctions by attending to the fact that the social and ecological aspects of water are separated only by convention. Despite its recent coming of age, the anthropology of water is incredibly expansive. It attends to molecular, embodied, ecosystemic, and planetary issues. I provide an overview of that breadth in four thematic clusters: (in)sufficiency, bodies and beings, knowledge, and ownership. These clusters highlight issues of materiality, ontological politics, and political economy. They are the grounds on which questions of water justice are elucidated. Furthermore, I show how water is always more than itself; its force and material presence constantly frame people's efforts to address the fundamental question of what it means to live life collectively in a world that is always more than human. I close with two directions for research: the denaturalization of water's materiality and the diversification of the moral undertones of our analytic vocabularies.

## INTRODUCTION

It would be a truism, but also accurate, to start a review of the anthropology of water by noting its multiplicity—the endless variation of water's semiotic, historic, political, and material forms. In the twenty-first century, anthropological thinking about water will take the concept of multiplicity as an analytic starting point rather than as a revelation. As researchers encounter worlds that unfold amid diverse waters, the critical project of the discipline will have to entertain new directions that will be profoundly shaped by changing climatic conditions and their ontological and political implications.

The anthropology of water is a self-declared relational field (Strang 2005) that attempts to transcend nature/culture distinctions (Hastrup & Hastrup 2015a) by reminding us that the social and ecological aspects of water are separated only by semantic convention (Wagner 2013, p. 2). In the form of a molecular compound, toxicity vessel, infrastructural matter, or environmental figure, water has been an efficient theory machine (Helmreich 2011). Its properties, particularly those that have been scientifically determined, have inspired stories of circulation, fluidity, and movement that include nonhuman life forms and socialities. Today, however, the assumption that water is a site of holistic interconnectivity (Schmidt 2017) can no longer be taken for granted. Furthermore, the very substance of water is being reexamined. Scholars have shown how the materiality of water goes well beyond pipes and water bodies and is shaped by everyday future-making practices taking place in computer screens, labs, government institutions, financial spreadsheets, and congressional bodies (Ballesterio 2019a, Helmreich 2016).

Despite having come of age only recently, the anthropology of water is expansive (Johnston & Fiske 2014, Orlove & Caton 2010, Whiteford & Padros 2011). It is also in deep conversation with scholars from geography and science and technology studies (Bakker 2012, Gandy 2008, Linton 2012, Page 2005, Spackman & Burlingame 2018, Swyngedouw 2009). To highlight that breadth, I have organized this review around four thematic clusters: (a) (in)sufficiency, (b) bodies and beings, (c) knowledge, and (d) ownership. The first cluster brings together works concerned with regimes of scarcity, excess, and even infinity—asking how these come into being and to what effect. The second cluster traces the role of water in shaping bodies and beings, reshuffling the politics of personhood and theorizing watery life-worlds as liquid media. The third cluster charts water knowledges by articulating their intersections, disencounters, and power to regiment ancestral and everyday worlds. Finally, the fourth cluster brings together scholars thinking about ownership and commodification and their social lives at the community, corporate, state, and transnational levels.

Together, these clusters highlight issues of materiality, ontological politics, and political economy that have preoccupied anthropologists of water. They also make explicit how water participates in the definition and destabilization of the boundaries between materiality and abstraction. Furthermore, the clusters show how water is always more than itself; it is a political field where people elucidate what it means to live life collectively in a world that is always more than human, and even inhuman (Clark 2011).

In the conclusion, I return to the concept of multiplicity and argue that anthropological meditations should avoid taking for granted what water is in the first place. One way to accomplish this aim is by going beyond its liquid form(s). Another possibility is to carefully interrogate the presumption that water has a positive ethical valence. Many of the concepts commonly used in the study of water—such as circulation, connection, fluidity—carry a positive moral charge and are of clear liquid inspiration; the challenge is to be cautious of ontologizing water in this way.

## (IN)SUFFICIENCY

Fully embraced in the nineteenth century, the concept of a hydrological cycle describes water as moving through a never-ending circuit, something of a homeostatic machine constantly churning and renewing. This hydrological cycle reflects dreams of endless reproduction and makes water a renewable resource. Today, the notion of continuous cycling—rain into rivers, into aquifers, into oceans, into clouds, back again into rain—is a remnant of the failed promises of modernity. Inspired by political ecology and by the impulse to reject Cartesian dualisms, anthropologists embraced the alternate notion of a hydrosocial cycle, a process that constitutes humans and water alike, rather than taking them as preexisting entities affecting from the outside the sociomaterial life of the other (Budds et al. 2014). Using it as shorthand for rejecting separations between nature and culture, anthropologists have resorted to the idea of a hydrosocial cycle to analyze how people live with water in the everyday and encounter extreme weather events.

Droughts in California (2011–2016) in the United States, in the West Cape region of South Africa (2016–2018), and in the Northeast (2014–2018) and São Paulo regions (2014–2017) of Brazil have traveled globally via apocalyptic images of scarcity. Episodes of dramatic water excess such as the 2017 floods in Houston in the United States and in the state of Benue in Nigeria, in addition to hurricanes in Puerto Rico and the Virgin Islands and monsoonal rains in Bangladesh, Nepal, and India, have all provided evidence of how water excess transforms geography and displaces large numbers of people. These events are evidence of hydrosocial cycles that are no longer predictable or manageable, as they were for a limited number of people in the world. If at some point there was a global condition organized around cold war geopolitics (Masco 2015), today we live in a planetary hydrosphere marked by permanent drought and flooding. Acknowledging this condition, and acting on anthropology's commitment to the specificity of place and time, researchers have examined what I conceptualize as a question of (in)sufficiency: a research program organized around how human and nonhuman life reckons with water scarcity, excess, and even infinity.

To determine scarcity, modelers and engineers perform all sorts of boundings (Muehlmann 2012). These actions include bracketing river tributaries, springs, and seeps and discounting the flow of materials across vast territories so that water can be represented in figures such as average flow or liters per second. Combining historical experiences and statistical projections, these quantifications regulate agricultural activities, habits such as taking a shower, and political negotiations over the glory and prestige of solving water problems (Ballesterio 2012, Nelson & Finan 2009). The numeric figures those accountings yield replicate one/many and part/whole logics, according to the scientific or economic rationales that inspire them (Verran 2010). More fundamentally, these forms of accounting make countable what for many communities is uncountable (Muehlmann 2012) and can flip abundance into scarcity as a geopolitical tactic to rally nationalist and neocolonialist energies (Alatout 2008).

With the emergence of climate science, technical approaches to measuring scarcity have gone from domestic to planetary. Take the case of Egyptian scientists who see themselves as simultaneous nation-builders and international scientific players (Barnes 2016). At the national level, these scientists are careful about incorporating uncertainty into their decisions to avoid derailing national priorities and agricultural production objectives. In their international role, they find themselves negotiating their scientific prestige on the basis of their infrastructural capacity to run intensive computer models. As a result, the definition of water scarcity in the Nile represents more than water volumes. It includes transnational scientific hierarchies, computing infrastructures, and domestic nation-building responsibilities.

Accounts of water scarcity are also cast as matters of biopolitical security. Whether measured at the level of the household (Wutich et al. 2014) or the city (Whittington 2016), the move toward the securitization of water destabilizes modernist imaginaries of control that calculated sufficiency on the basis of a few variables. Today, those doing the counting face “pluripotential climate futures” (Whittington 2016), conditions that require radical and nonlinear understandings of the hydrosphere that can no longer be based on the select variables with which technical responses of the twentieth century worked.

To the extent that there has been a dominant approach in the anthropological study of water (in)sufficiency, it has been through a focus on infrastructure. Large- and small-scale infrastructures promise to stabilize water flows, a precondition for achieving dreams of urban cosmopolitanism, such as Mumbai’s aspiration of becoming a “world class” business center (Björkman 2015). This dream depends not only on Internet access and shiny business parks, but also on the sociopolitical networks and brokerage relations that domesticate unruly water flows. Schwenkel (2015) examines the thickness of these kinds of relations among urban dwellers in Vietnam. Residents of decaying state-constructed apartment buildings refuse to repair decrepit water pipes and tanks because doing so relieves the government of its fundamental obligation to provide basic services. This refusal is not harmless, however. It augments the domestic labor that women and children perform, entrenching inequalities at the household level (Shepler 2010). A similar relational density envelops wastewater treatment in neighborhoods where poor sewage infrastructures cannot keep waste in circulation (Farmer 2014). Wastewater excess creates a scarcity of drinking water, as people limit the amount of water they use inside the household to avoid stressing the sewage system outside in the streets. Scarcity and excess are thus not geographically dispersed by necessity; they often coexist and intimately shape each other in a single location.

Besides its everyday, infrastructural occurrence, water excess can also take dramatic forms. As Cons (2017, p. 52) argues, recurring large-scale flooding makes dampness a new generalized condition full of “swampy spaces where distinctions between land and water break down.” Here, benevolent metaphors of water fluidity need to be rethought, as muddiness and stickiness make life difficult. Take the devastation produced in Indonesia, Sri Lanka, and Japan by two tsunamis in 2004 and 2011. Each of those events recharted the interstices of land and water through an expansive wave of liquid mud that unleashed humanitarian crises. In Sri Lanka, reconstruction became an opportunity to manage population and territory on the basis of nationalist imaginations and even vigorous military campaigns (Choi 2015, p. 287). In Japan, the excess and inseparability of land and water intensified people’s sense of precarity, solidifying a feeling that life “stayed sodden in mud” (Allison 2013, p. 183).

Similarly traumatic has been the water excess produced by hurricanes and typhoons. After the devastation inflicted by Hurricanes María and Irma in Puerto Rico, the US federal government strategically deployed austerity measures and cemented neocolonial logics into the relation between Puerto Rico and the United States (Ficek 2018, Lloréns 2018, Soto 2017). Here, water excess created new playgrounds for private investment, for reformist aspirations of energy transitions to renewable sources, and for public performances of right-wing populism by the president of the United States. At the same time, the destruction left behind by water excess revealed a hidden geography of community organizations with long-standing relations to springs and creeks as their source of water (Arce-Nazario 2018). In these kinds of extreme weather events, water excess becomes a disastrous backdrop, a kind of atmospherics that dissolves into traumatic context. In these circumstances, we can see most clearly how water refuses to become an object and instead is an all-encompassing force that dampens everything and troubles intimate, neocolonial, and planetary relations.

In places where recurrent water excess is a new phenomenon, retreat becomes a guiding motive to reorganize urban dwelling. Scholars tracking people's strategies in these conditions are showing how land-based aesthetics dwindle as people reckon with and embrace the cyclical emergence of aqueous topographies (Joseph 2013). In some cases, this highlights the precarious conditions of life in intertidal conditions of submergence (Zeiderman 2016). In others, people enroll organisms, such as oysters, to perform the infrastructural work previously assigned to levies and walls (Wakefield & Braun 2019). In yet others, people replace narratives of mastery and control with a sense of capitulation in the face of climate change (Koslov 2016). One important point this scholarship raises is how although climate deniers in places such as the United States reject weather patterns and predictive models, they readily accept the power of droughts (scarcity) and floods (excess) to upend their worlds. But excess is not limited to massive water volumes. People also turn to excess in consumption, for instance, as a way to reject capitulation and assert class aspirations even under severe scarcity. In India, as the country becomes more invested in expanding its middle class, conspicuous display of substantive water use not only performs class mobility but also helps people access more water (O'Leary 2019). Thus, once again, we see conditions of excess within scarcity, troubling any analytic that diagnoses one as the opposite of the other.

Scarcity and excess do not exhaust people's quantitative reckonings with water (in)sufficiency, however. In a counterintuitive turn, amid what has been diagnosed a global water crisis (Shiva 2008, UNESCO & World Water Assess. Progr. 2006), the possibility of infinity has emerged in different forms. By accounting for "virtual water," a concept that captures the volume of water used in any productive process (e.g., agricultural, industrial, artisanal), we see water flowing toward affluent consumers, erasing from the record all other water uses and functions in the environment (Barnes 2014). The unsurprising consequence is the exacerbation of inequalities along ethnic and class lines (Zolniski 2011), as the illusion of infinity is available only to those who master the ambiguities of hydrologic and economic languages (Harvey 2015) and to those who participate in global commodity markets. Similar to how virtual water turns everyday objects—jeans, oranges, bread—into never-ending sources of water, desalination techniques promise to turn seawater into an infinite supply of freshwater. Permeated by the widespread myth of infinite oil in the Arabian peninsula, the relatively simple, but energy-intensive process of desalination is an alchemical trick that upends water accounting practices by making infinity thinkable (Günel 2016).

Scholars examining the question of (in)sufficiency show how fluctuations in water quantities are a matter not only of volume, but also of the historical and contemporary relations that make water stagnate, flow, flood, or undergo chemical transformations. Water (in)sufficiency manifests in pipes, rivers, and commodities, as much as it is evident in the flooding of coastlines and river margins, in intense precipitation from the sky, and in its tendency to saturate all dimensions of life.

## **BODIES AND BEINGS**

The works that attend to water (in)sufficiency reveal how quantitative questions are always matters of quality. With a similar sensibility, but a different conceptual repertoire, a second cluster of the literature examines the lively, multidimensional qualities through which water makes bodies and persons and how water itself is a medium for multiple forms of life (Bakker 2012, Camargo & Camacho 2019).

As body-shaping fluid, polluted and potable water turns a person's organs into sites where bodily metabolics and societal forms of care align, or not. As a vessel of toxicity, water carries pollutants and chemicals across cellular and bodily boundaries, confounding assumptions behind juridical allocations of responsibility over the intoxication of people's bodies (Hamdy 2008). The difficulty of allocating juridical responsibility has made the nexus between water, food, and health suspicious,

redefining in the process people's visual and embodied relations to territory and agricultural production (Hoover 2017, Montoya 2017, Wolfe 2017).

The body-shaping powers of water also include deep histories of healing (Walsh 2018). Through practices of soaking, rubbing, and ingesting water, people develop physical and symbolic relations with minerals, viruses, bacteria, animals, and plants. Analyses of both medicinal and toxic water circulation use notions of continuity and connection to account for the physical movement of water in and out of bodies. Roberts (2017), however, argues for an approach that recovers the importance of separations, against implicit assumptions of entanglement and continuity. She notes how in Mexico City, a toxic water reservoir functions as a porous barrier that, while creating sick bodies, keeps neighborhoods out of reach from repressive police subjugation associated with the war on drugs. What is at stake in water's body-shaping force is more than water *qua* water. It is also the question of who can legitimately interpret water-related embodied experiences (Islam 2014).

An earlier generation of anthropological work on water and persons, inspired by the work of Wittfogel (1957), examined the question of legitimacy using the sociomaterial organization of water as an index of political authority. Recent work replaces diagnostic orientations with processual concerns that ask how people use water to negotiate their political standing. Von Schnitzler (2014), for example, shows how those negotiations take legal forms as people use water to claim their right to "dignity," expressed in the fundamental right to access water for daily needs. Struggles over political standing also happen in the administrative realm where legal categories, authorized forms of evidence, and lived histories seldom align. This lack of alignment is particularly salient for indigenous peoples whom the state requires to collectively identify with administratively determined types of indigeneity (Muehlmann 2013). This requirement not only infringes on self-determination but also effects exclusions from water access that have even more dramatic consequences under conditions of scarcity (Carrasco 2016, Radonic 2015).

If water helps determine who counts as a subject, it also places expectations on the governance structures that grant that standing (Pia 2017). When people understand themselves as water- (Paerregaard et al. 2016) or hydraulic-citizens (Anand 2017), they turn their attention to the state and assess its responsibility to provide basic services (Bulled 2015). In this process, citizenship consists of the "iterative, discreet and incremental ways" (Anand 2017, p. 6) of monitoring, interrupting, and redirecting the flows of money and knowledge that make water move. Conversely, when people find themselves in deeply antagonistic relations with that state, they craft nonnormative subject positions such as that of a water defender or water protector in indigenous worlds. While seemingly new, these positions are continuations of historical struggles that make evident the violent means by which repressive settler colonial forces regiment water, land, and personhood (Estes 2019).

Those struggles have resulted in important redefinitions of, for example, who counts as a person in the first place. Writing from a North American indigenous perspective, Yazzie & Baldy (2018, p. 3) note that "water is a relative with whom we engage in social (and political) relations premised on interdependency and respect." Analogous understandings have been mobilized by Maori communities who demand that Western legal systems recognize ancestral forms of commingling (Salmond 2017). *Ko au te aaa, ko te aaa ko au* is a condition that can be loosely translated as "I am the river and the river is me." This commingling presupposes that at a particular moment a river may stand as an ancestor, and at another moment it can speak as a hydrologist, historian, or trained lawyer (Salmond 2017).

If water seeps into bodies and is a legal person, it is also a medium for other beings to thrive and whither. In a growing field of aquatic and maritime anthropology, water's materiality becomes substrate for forms of floating, flowing, and immersing (Amimoto Ingersoll 2016, Helmreich 2007). Water as a medium draws on the immense analytic power of context, shifting land-based

metaphors with new figurations. Thinking with salmon, for example, Swanson (2017) describes how fish migrate, taking temporary residence for spawning, continuing their routes, and finally dissolving into water streams after their death. Here fish make “aquatic environments” (Swanson 2017, p. 90), and the anthropologist follows their lead in her investigations of their world-making. The same is true for studies of “invasive species” such as the lion fish taking over the Bahamas maritime environment, a site where conservationists determine they do not belong (Moore 2012). To control this species, international conservation programs emplace the ocean as an ecosystem of international interest. This process privileges managerial and biodiversity knowledges that reorganize people’s relation to their watery worlds as preexisting knowledge and practices become supplemental to international objectives.

In addition to being an ecosystem and “natural” medium, water is also a human-made context. Fearnley (2015) demonstrates how scientists and health authorities turn a lake into an experimental laboratory to study the dissemination of influenza. They find the lake generative because it makes visible the interpenetrating categories of wild and domestic, a dyad that in conventional laboratories remains stabilized and dislodged from real-world conditions. Something similar occurs in the case of the BP oil spill in the Gulf Coast. There, the ocean becomes a laboratory for corporations and environmental agencies to technically establish an idea of nature predicated on the relation between hydrocarbon and water (Bond 2013), a notion that also happens to yield credibility and certainty to their actions despite the volatility and lack of knowledge of the spill as chemical, physical, and biological phenomena.

Natural or human-made, water as a medium is “an active site of engagement” (Todd 2014, p. 217) where humans and nonhumans encounter “multiple ways of knowing and defining” what the world is and how one inhabits it (p. 217). To grasp these engagements, Helmreich (2009, 2016) invites us to adjust our instruments and sensors and immerse ourselves in transductive knowledge production forms. Gaynor (2012, pp. 818–19) suggests following observational practices “in the offing,” that is by attending to things that are about to happen but are perceivable only by looking offshore while remaining cognizant of inshore hazards (pp. 818–19).

Taking water as a body itself (Neimanis 2017), anthropologists and other scholars have paid considerable attention to rivers and watersheds. The watershed is a geographic category that parts waters and territories into units for conservation, management, and extraction. As Carse (2012) explains, in the watershed, topography and hydrology become a relatively closed system where people’s everyday practices can be emplaced and ecological processes can be turned into infrastructure. Despite its apparent naturalization through modernist planning efforts, the watershed is a political and ideological construct (Molle 2009) that escapes the boundaries of administrative jurisdictions, which is most evident when watershed thinking and planning confronts and disturbs administrative jurisdictions—municipal, city, or national (Trombley 2018). Watersheds are at once enactments of modernist scalar visions and transgressions of legal jurisdictions.

Thinking with rivers, rather than watersheds, has yielded a different approach. As Raffles (2002) shows, distinctly human concerns with honor, family, and profit have historically shaped the routes of the creeks that feed the Amazon. They have done so to such an extent that this large-scale river cannot be seen as a pristine natural entity in any way. Khan (2016) attends to these mutual determinations by conceptualizing a river as an “eternal object” whose processual existence is tied to religious renderings of personal tragedy in addition to its physical permutations. In this sense, a river is a “palimpsest of prior forms of life” (Khan 2016, p. 181) that makes as much of an indention in people’s symbolic order as it does on its bed. Focusing on remembering, Lyons (2018) suggests that an alternative to narratives of flooding is to recognize that a river has a memory, that is, the capacity to recall “the courses of its currents, expanse and heights of its beds, and the areas that it seasonally occupies” (p. 6). Also thinking about memory but with a future orientation,

Hayman et al. (2018) examine rivers in practices of prospective memory-making. In collaboration with Tlingit and Tagish First Nation elders of the Circumpolar North, Hayman and colleagues note how in their nine-thousand-year view of history, glaciers are “future rivers of the Anthropocene” (Hayman et al. 2018, p. 77). Shifting the temporality of memory-making dramatically, their work emphasizes the mutability of form, particularly at times of significant biophysical change. That mutability, if studied with a serious commitment to naturecultures, should challenge our conceptual repertoires and yield new vocabularies beyond the linearity of loss and redemption.

Water bodies such as rivers, lakes, and oceans have a robust presence in the anthropology of water. More recently, other water forms are beginning to draw anthropological attention. One of those is the amphibious environment, a denomination that includes marshes, swamps, and wetlands. These amphibious environments cannot be understood by simply rejecting territorial metaphors (Richardson 2018). Rather, amphibious environments highlight the dynamic distributions and redistributions of sediment and water and make clear how these movements challenge infrastructural attempts to fixate hydraulic dynamics (Kane 2012, Morita & Jensen 2017). Krause (2018) argues that understanding these landscapes necessitates multiscale methods that trace flows of water, sediment, animals, and people to capture the processes of hydrosocial change inherent to them. As Scaramelli (2018) describes them, these inherent changes include the cyclical movements of waterlines, the syncopated windows of opportunity for newcomer inhabitation, and the interruption of permanency as an assumed condition of life.

In part, the emergence of marshes, deltas, and estuaries as objects of anthropological investigation is tied to their role in buffering against sea-level rise. That role is made official by, for example, transforming a delta or a mangrove into an internationally protected wetland. This process depends on the articulation of “good management” practices, biodiversity counts, and engineering plans that change the national and international significance of local livelihoods (Vaughn 2017). Local fishing communities in Turkey, for example, become “vessels of tradition,” subjects that embody the ideological center of the nation while becoming marginal political and economic entities (Scaramelli 2018).

Against this amphibious character, visions of dryness justify large-scale technical interventions to, on the one hand, drain water and interrupt ecological processes and, on the other hand, restore and control hydrological patterns. The Florida Everglades in the United States is a powerful example of this dual approach. As Ogden (2011, p. 126) shows, draining the everglades depended, in part, on the criminalization of local practices, such as alligator hunting, which were transformed into evidence of the inability of local residents to sustainably manage swamps. While this process made some groups visible targets, it also aspired to make others invisible. Cattelino (2015) explains how attempts to restore the Everglades’ hydraulic dynamics, fueled by negotiations among farmers, conservationists, and state actors, tried to erase indigenous histories by dissolving Seminole pasts and futures into settler colonial views of nature.

In addition to amphibious environments, the aquifer is another water body that is starting to garner more anthropological attention. Commonly imagined as an underground water tank, an aquifer is a hydrolithic architecture in constant movement (Ballesterio 2018). In Costa Rica, I have learned from hydrogeologists and water activists to think of aquifers as spongy formations where water constantly transgresses any sense of fixed borders or subterranean stratigraphies. Instead of being objects, aquifers are hydrolithic choreographies (Ballesterio 2019b). In California, Brooks (2017) shows how stories of watery relations between geologic strata, time, and water extraction are combined into numeric models that people use to narrate a form of balance between nature and culture that maintains life as is, requiring only minor variations to endure. An area where the prominence of underground water has been ever present is in studies of hydraulic fracturing (Willow & Wylie 2014). De Rijke et al. (2016), for example, show how the pursuit of



unconventional gas has reorganized the semiotic geopolitics of mining. While less intrusive, if compared with open pit mines, unconventional gas extraction operations have polluted aquifers and set off tectonic movements. For people living in areas of intense fracking, this practice has radically redefined how they relate to subterranean water worlds.

## KNOWLEDGE

As an extension of the fundamental observation that water has a multiplicity of meanings (Strang 2011), a significant part of the literature has tracked how different knowledge regimes embed water in particular histories, politics, and values. As anthropologists examine these regimes, they organize them laterally, putting knowledge forms side by side and revealing their blind spots, ontological assumptions, and political potential. Even if brought together by conflicts or “disencounters” (Stensrud 2019), these lateral arrangements create shared planes of epistemic struggle, many of which are organized around notions such as restoration (Rademacher 2011), resilience (Crate 2013, Tucker & Nelson 2017), and sustainability (Orlove & Caton 2010). In Alaska, for instance, ideas of sustainability go beyond ecological and public health issues to focus on economic viability (Eichelberger 2014). In response to cost–benefit analyses that deem unviable a project to build water infrastructures, village leaders produce narratives of technology, tradition, and suffering that affirm Iñupiat struggles for visibility. Here we see incommensurable knowledges intersecting, revealing a geometry of crossing points, rather than producing a mosaic of knowledges that coexist, forming a whole. These crossing points create what Vaughn (2017) describes as a form of “inverse performativity,” whereby instead of knowledges creating worlds in their image, unruly worlds create new knowledge landscapes. In Vaughn’s example, this process happens as one expert group (civil engineers) in Guyana requires the support of another group (climate modelers), and through their intersection they enact a new epistemic ecology with its own institutional, scalar, and postcolonial politics.

Another form of knowledge articulation that has captured anthropological attention is proleptic in nature. Rainfall prediction rituals, for example, have the capacity to organize knowledge hierarchies, water rights, and things as diverse as control over the commons, fertility, and sex (Krautwurst 1998, Sikkink 1997). More recently, these predictive rituals have taken the form of climate-forecasting programs that promise more precise information for decision making (Roncoli et al. 2016). If anthropologists have shown how water prophets and diviners used a bird’s call, a flash of lightning, or the position of a stick to diagnose water futures, today they also track how forecasters work with statistical modeling, scenario planning, and risk calculations. Participants and observers of these forecasting rituals find themselves ignoring some types of prediction or combining many, adjusting in the process their points of reference for things such as evidence and accuracy (Pennesi 2013). And yet, even in the cases where people privilege scientific predictions, science is not fully taken for granted. Haines (2019) shows how experts are deeply aware of the uncertainty intrinsic in their knowing and of the distrust this uncertainty inspires in their publics. In response, experts come to see themselves as expectation managers who need to skillfully anticipate water futures as they struggle to maintain their own prestige, the trust of users of forecasts, and the very meaning of usefulness. In this epistemic hydrogeopolitics, uncertainty ceases to be an epistemological wrinkle. Instead, it is “a condition for action or of not knowing how to act” that creates a “predicament of disenfranchisement” for modern knowledge in the anthropogenic era (Whittington 2018, p. 6).

The multiplication of dominant knowledge regimes not only troubles claims to certainty but also attempts to structure water governance. Take the example of proliferating hydrographic maps in a single region in Peru. Their multiplicity makes graphic the presence and effects of different

knowledges that are never synthesized into a cohesive whole (Andersen 2016). A map produced by an agency that monitors swollen rivers differs radically from a map of water scarcity produced by a drinking water utility; each representation enacts a distinct network of physical relations, knowledge traditions, and ways of accounting for water (Andersen 2016, p. 170). Their copresence tangles people and power relations as they navigate competing epistemic regimes and the different geographic scales, legal definitions, and policies those regimes help crystalize.

## OWNERSHIP

The stakes of water's epistemic multiplicity are dramatically embodied in its emergence as "an ideological and ontological piece" of resistance for indigenous and nonindigenous communities challenging extractivist forms of water use and distribution (Li 2016; Yazzie & Baldy 2018, p. 8). The schemes these communities oppose are extensions of well-established forms of control. For instance, when water is taken as part of Western nature, governance projects can use universalized discourses of stewardship and ecological restoration to impose brutal forms of militarized social control (Bhan & Trisal 2017). When water is an infrastructural good, it is often mobilized as a state-making resource, as the material form of the nation in its trajectory toward modernist macroprogress (Mosse 2003). When it is a transnational environmental asset, water reboots national biographies away from, for example, ideas of postcolonial struggle and into neoliberal marketized ideas of economic success (Kaplan 2016). When it is dammed and a "raw material" for large energy operations, water transports waste (Willow & Wylie 2014) and is redirected into reservoirs and to engines and generators, radically changing its flow and submerging people's everyday lives (Lord 2016). Despite the historical continuity of these motifs, examinations of water sovereignty bring attention to how entrenched liberal-capitalist notions of ownership and property coexist with new ways of figuring water as a commodity.

Anthropologists have paid considerable attention to water ownership, particularly in relation to distinctions between community, private, and public forms of possession and to the particular rights and forms of legitimacy associated with each. Works that document community-based practices of water sociality have used the notion of moral economies to show how principles of proportionality and material symmetry between community members are mobilized in search of equitable forms of water distribution and use (Rodríguez 2006, Trawick 2001). But equity is a slippery goal. And when those same practices are examined at the household level, for example, what seemed equitable replicates deep gender inequalities (Wutich 2011). Also, when these experiments are scaled up to connect urban and rural areas, anthropologists have documented the difficulties of interrupting multiscale commodity chains and dealing with unexpected environmental disruptions caused by climate change (Fabricant & Hicks 2013).

Studies of how water ownership operates at the corporate level consider the financialization of water, a process that is structured by accounting technologies that adopt predetermined profit levels across both public and private utilities (Ballesterio 2015, Bresnihan 2016). Detailed analyses of the technicalities of exchange and commodification show how these processes, while reproducing central capitalist principles, also engender new experiments. Muehlebach (2017), for instance, shows how in Naples, Italy, after dramatic price increases, residents took it upon themselves to recalculate how much they paid for water services. Their purpose was not to abscond payment, but to produce a just price that prevented "thievery" on the part of the utility.

An important segment of the work on commodification has examined the relation between cultural meaning and marketing, particularly in relation to the branding of bottled water, the "pure" commodity (Wilk 2006). Predicated as the embodiment of ancient springs, pure forests, or melted glaciers, water bottles are multisited composite structures undergirded by a cultural

politics that combines the desires of consumers with the bottom-line calculations of corporations. Branding draws on context in different ways. In some locations, corporate success depends on severing ties to local struggles over history and land, as Kaplan (2012) shows in the case of Fiji. In instances of government-sponsored exports, as Hoag (2019) documents in Lesotho, engineers and policy makers need to thoroughly emplace and contextualize water before they can make it an exportable asset. The relation between water and context becomes even more slippery when what is commodified is not water as a liquid substance. These cases include the exchange of water pollution credits (O'Connell et al. 2017), climate finance models that turn water infrastructure plans into a green bond economy (Tripathy 2017), and humanitarian resolutions that compress water access into an "affordable" human right equivalent to its price in a water bill (Ballesterio 2019a).

The anthropology of water of the twenty-first century will continue attending to this variability and will surely diversify its accounts of how water commodification happens. A portion of this project will have to revisit the assumption of possessive ownership, Lockean in foundation, that has guided a significant part of this scholarship. Decolonial approaches are powerful means to accomplish that objective. Through a rich linguistic analysis, for instance, Muru-Lanning (2009) shows how in Maori worlds ownership is more than a situation where a person commands her objects. Instead, ownership emerges out of prestige, authority, and status, yielding the kind of rights that "a chief who is empowered to speak on behalf" of others holds (Muru-Lanning 2009). This form of ownership troubles the assumption that property is a bundle of rights and that the fundamental right in that bundle is the possibility of alienation, the capacity to separate an object from its material, human, and political settings. In a very different context, I have attempted to elucidate the supposed clarity of ownership when water is treated as a commodity versus when it is assumed to be a human right, a distinction that is far from clear and hinges on a dense network of epistemic, political, and material bifurcations that are never finished (Ballesterio 2019a). In this sense, the fiction of possessive ownership, despite its sometimes brutal consequences, is constantly undone as people go about their everyday world-making. Thus, the critical anthropological project is to query the ideological presuppositions of the economic and legal systems in which we work and live, rather than taking them for granted, even if we do so to critique them. Here, the rich history of feminist and queer thought on economic questions is another inescapable inspiration for enriching our property and commodity imaginaries (Bear 2015, Gibson-Graham 2006, Weston 2013).

## CONCLUSION

Anthropologists generally see water as multiple, never singular. Entangled, never isolated. Material, only artificially abstracted. Without a doubt, water has been a generous theory machine (Helmreich 2011, p. 132) that has helped us think about liquidity, circulation, seepage, and leakage. As a machine, perhaps up to now it has been something of a nineteenth-century industrial one: producing multiple outputs, but generally leaving in place assumptions that implicitly separate matter and meaning. It seems that we are at a point of inflection where water is becoming more like a learning machine: undoing its own assumptions, yet doing so in always culturally and materially determined ways. This shift is most visible in two transversal concerns that anthropologists will grapple with.

The first concern is destabilizing our ideas of what water is, or at least of what counts as water in the first place. In response to the materialist and ontological discussions of the last few years, anthropologists can go further and transcend the Eurocentric and science-privileging limitations of some of that literature. Anthropologists of water can very powerfully denaturalize what counts as materiality by showing how water itself is always a historically and culturally specific matter.

This denaturalization move can entail turning to nonconventional forms—clouds, aquifers, vapor, tears—to diversify our commitments to liquid forms of presence. If so far anthropologists have studied water by locating themselves in its midst, those nonnormative forms of water will require new methodological experiments. For instance, they will require ethnographic approaches that thrive from afar, in distant locations from where water sits, putting the ethnographer in proximity to what we might imagine as water's distributed form. Tracing the politics of water as a distributed phenomenon that cannot be circumscribed to the physical location of liquid water will result in more investigations of feral and trouble-making waters.

The second concern puts pressure on the ethical and moral undertones of our vocabularies. While sacred and a source of life, water is also unremarkable, a nuisance, and a source of consumerist pleasure. As Weston (2017) notes, what is missing from many of our accounts are the joy and pleasures that coexist with the damaging practices we document. Something else that is missing are the unremarkable and boring affects that undergird so much of the work necessary to live in and with water. Attending to a more varied ethical and affective repertoire entails decoupling concepts such as relationality, fluidity, and continuity from implicit positive moral undertones. It entails paying more attention to how the conflicting ethical meanings of water need not be alternatives, but can be evaluations and orientations that coexist within people's practices.

In closing, I note that the anthropology of water has had a decidedly historical orientation by focusing on ongoing and past events. And yet, as people confront the joy and horrors of life and death in the hydrosphere, they turn to speculative forms of future world-making. They grasp futures that seem certain, futures that could be, and those that will never be. As our interlocutors' everyday lives take this orientation, we will certainly follow. This transition will entail caring for the ordinary and the embodied, but also for the exceptional and for the abstractions necessary for diverse forms of life to flourish.

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