Article

(Un)Earthing Civilization: Holocene Climate Crisis, City-State Origins and the Birth of Writing

Nigel Clark

Lancaster Environment Centre, Lancaster University, Lancaster LA1 4YQ, UK; n.clark2@lancaster.ac.uk

check for updates

Abstract: Today, concern about population displacement triggered by climate change is prompting some sovereign states to tighten security measures, as well as inciting ethically and politically motivated calls to relax border controls. This paper explores resonances between the current climate predicament and events in the mid-Holocene. Paleoclimatic and archaeological evidence is reviewed, suggesting that an abrupt turn to cooler, drier weather in the 4th millennium BCE triggered high volume migration to fertile river valleys—most fully documented in Mesopotamia but also visible in other regions around the world. This unprecedented agglomeration of bodies has been linked to the emergence of intensive irrigated agriculture and the rise of city-states. In conversation with the ancient Sumerian *Gilgamesh* epic, this paper draws upon archaeological research to conceptualize urban wall building and emergent practices of graphical notation as different forms of mediation. Both city walls and early writing, it is argued, deal with the interplay of mobilism and sedentarism, and both 'media' entail tactile, plastic use of local materials—namely riverbank clay. This paper addresses the paradox that the underpinning of 'civilization' by these once experimental media may now be fundamentally restricting socio-political, cultural, cognitive and embodied capacities to engage effectively with climate-driven upheaval. All authors have read and agreed to the published version of the manuscript.

Keywords: climate change; climate migration; city-states; nomadism; Mesopotamia; sedentarism; literacy; numeracy; fortification; Holocene

1. Introduction: Archaeologies of the Anthropocene

In the 2015 speech in which he announced his run for the US presidency, Donald Trump memorably declared: "I will build a great wall, and nobody builds walls better than me, believe me, and I'll build them very inexpensively. I will build a great, great wall on our southern border" (Time Staff 2015, p. 22). The logic of building walls to keep out undesirable elements, it hardly needs to be said, is an ancient one (Brown 2010). As the *Epic of Gilgamesh* speaks of Uruk, one of the first Mesopotamian fortified urban centres: "Its towering walls protected it from all sorts of evil, from the armies of enemy kings, from floods, from wild beasts too, and unfriendly gods" (Bryson 1967, p. 1).

The Gilgamesh poems, often referred to as the world's oldest known work of epic literature, have been pieced together from cuneiform tablets dating back to the 3rd millennium BCE (Johns-Putra 2006, pp. 13–14). Their protagonist is widely accepted to be a historical king of the Sumerian city-state of Uruk who ruled around 2750 BCE (Ziolkowski 2012, p. 6). Inscriptions have been found that credit the 'actual' Gilgamesh with the construction of the 10-km wall that surrounded Uruk—fortifications of a scale that awed ancient observers (Ziolkowski 2012, p. 6; Mark 2018). But even in its heyday, it appears, the logic of hard-edged defensive engineering was a contested one. What sets the plot of Gilgamesh in motion is an appeal to the gods by Uruk's disgruntled citizenry. As representatives of the town make the case against their otherwise beloved king: "He continues to build the city walls higher

and ever higher, yet who has need of such high walls? It has become a heavy burden . . . We want to rest!" (Bryson 1967, p. 1).

Walls, of course, face inward as well as outward. "We ourselves rather like the high walls," reply the gods to the petitioning elders of Uruk. "We often come and crouch here at night and watch the goings-on of mortals" (Bryson 1967, p. 2). Likewise, overseeing workaday life behind the hardening US border looks to be as important to the Trump presidency as protection from encroaching trouble. The wall may be the final flourish, but with its emphasis on rebooting local industry, rebalancing unfavourable trade relations, and taxing US companies who outsource production, the focus of Trump's speech is securing the wealth and value that he imagines to be streaming out of the country.

Like securing city or state perimeters, improving the conditions of life of a population is a burdensome, resource-intensive task, which means that a major priority of regulating flows is about maintaining a viable tax base. "Physical mobility and dispersal are the bane of the taxman", as anthropologist James Scott deftly puts it (Scott 2017, p. 146). While he may be gesturing toward contemporary issues, that is not Scott's explicit concern. The tax collectors he refers to belong to the world of Gilgamesh; the mobilism in question pertaining to the Near Eastern Fertile Crescent of the 3rd–4th millennia BCE (see also Graeber 2012, p. 65). Alongside the regulation of what comes and goes through the city walls, graphical recordkeeping is widely recognized as the key to ancient fiscal policy. Rather than simply conceiving of nascent or proto-states as inventing systems of notation, it could equally be said—as Scott expresses it—that 'writing makes states' (Scott 2017, p. 139). In this light, that we have a hardcopy of the Gilgamesh tale is but a fortuitous offshoot of the means by which the world's first bureaucracies sought to render legible people, produce, debts, and revenue.

Today, climate change is increasingly featuring in discourse around migration. Despite the fact that establishment of direct causal relationships between changing climate and increased human mobility is proving elusive, imaginaries of present and future climate-driven displacement are becoming more prominent in debates around spatial governance. In the words of Brigadier General Stephen Cheney addressing a 2015 conference on national security and climate change in Washington DC: "No surprise to anyone here: extreme weather presents a direct threat to U.S. homeland security" (cited in Miller 2017). Conversely, for many critical thinkers, the emerging global climate crisis—with its monstrous imbalance between those most responsible but least vulnerable and those least responsible but most exposed—offers compelling reasons to work towards a world of open borders (see Ehrenreich 2019).

It is also unsurprising that debates about tightening or relaxing trans-border traffic in the era of accelerating climate change quickly return us to issues of state revenue. Questions soon arise as to the demands migrants might place on social services, their potential contribution to service provision, and their impact on economic productivity. As with the broader challenges arising from climate displacement, it would appear that there is no obvious way to redress these issues within prevailing global sociopolitical frameworks and imaginaries. As geopolitics scholar Simon Dalby sums up: "Migration is a necessity for survival for some people, but sovereignty in terms of territorial fixity does not imply an obligation to receive those who have to move. There is as yet no clear path forward in resolving these tensions" (Dalby 2017, p. 50).

Taxing times indeed. As climate migration enters mainstream policy arenas, one option being considered by policymakers and political commentators is the reframing of the problem in terms of 'opportunities' to selectively absorb the most resilient and enterprising migrants from climate-impacted regions into global labour markets (Bettini 2014; Clark and Bettini 2017). Or as New York Times columnist Thomas Friedman recently put it, fully acknowledging that "countries to our south . . . are being destabilized by poverty and extreme weather", what his nation needs is "a *high wall with a big gate—but a smart gate*" that admits a "steady flow of legal, high-energy and high-I.Q. immigrants" (Friedman 2019, p. 2, author's italics). The use of digital surveillance, biometric screening and a host of other data capture and processing techniques are indicative that border control in the more privileged

zones is indeed getting 'smarter'. But how far have we really come from the logics of gatekeeping and recordkeeping that were so central to the earliest city-states?

It is important to keep in mind that it is not only those wishing to commute climate-displaced people straight into revenue streams who seem to be hewing to the five thousand year-old script of Sumerian tax collection. The whole endeavor of tracking greenhouse gas emissions and imposing taxes on major carbon emitters, it should be added, cleaves to principles of legibility and accountability whose roots go back to the settlements of the Tigris-Euphrates alluvium. And it is not only nationalist or populist zealots foretelling migrant 'floods' who inherit Gilgamesh's bent for fortification. When Earth systems thinkers identify threats to the Earth system functioning and call for 'planetary boundaries' to be erected around looming danger zones (Steffen et al. 2015), they too make recourse to logics that resonate with the strong-holding of Uruk against rampaging floods, beasts and gods.

What happened five millennia ago that was so momentous that it still leaves its signature in the way we respond to climate crisis today, I want to ask, and what might we learn from these events? The social transformations that took place in the midst of the 11,700-year-old interglacial epoch that geoscientists refer to as the Holocene appear even more significant when we consider that this was another period of climatic upheaval. A few centuries before the reign of the historical Gilgamesh, paleoclimatic and archaeological data suggest, came a climatic transition severe enough to undermine patterns of agricultural subsistence at multiple sites across the globe. Evidence points to large numbers of displaced people seeking refuge in fertile river valleys and deltas—an agglomerating of population that has been implicated in the coupled emergence of intensive irrigated cereal farming and the earliest city-states, including the city referred to in the *Epic of Gilgamesh* as 'Uruk-of-the-Walls'. Closely associated with these developments are the innovations referred to above: new means of recording the movement of people and things, new ways of marking out and securing the spaces of the city. And so it could be said that social and cultural reorganization in the face of climatic disruption and displacement is as old as civilization. Or, perhaps, that it *is* civilization.

In this paper, I make a case for drawing creatively on paleoclimatic and archaeological research to probe the origins of the inscriptive or ordering devices through which so many of us seek to make sense of the current planetary predicament. I am not claiming that 'we have never been modern' (cf. Latour 1993) or that our modernity is mere footnotes to Mesopotamia. What I am proposing is that archeologists, anthropologists, geologists and other researchers who focus on ancient worlds have a great deal to offer those of us grappling with contemporary Earth system change, and by the same token, that social and cultural changes associated with major climatic transitions in the mid-Holocene take on new meanings when viewed from today's climate crisis.

In a more general sense, I am seeking to show that there are provocations arising from climate change and the Anthropocene hypothesis that go well beyond prevailing efforts in the humanities to 'socialize' Earth science narratives: a strategy that too often assumes that existing disciplinary categories and conceptual frameworks suffice to make sense of the current planetary conjuncture (Clark and Gunaratnam 2017). Not least, unfolding climate trajectories and the arrival of the Anthropocene risk lapsing into orphan events if they are not firmly contextualized within the longer *durée* of geo-climatic and socio-material transformation.

Archaeologist Matt Edgeworth and his interdisciplinary co-authors have argued that the big picture of globally synchronous change that dominates Anthropocene geoscience is missing the more localized and incremental, but nonetheless crucial, imprint of agricultural societies that emerged deep in the Holocene epoch. 'Earth-oriented investigators', according to Edgeworth et al. (2019, pp. 337–38), bring into relief the traces in the Earth's geological strata—the 'artificial ground' or 'earthworks' generated by ancient social formations. Just as importantly, I would add, these modes of inquiry offer rich resources for exploring the originary connections between climate-induced migration and the devices and practices through which social life is mediated. In excavating the reworked material ground of the ancient world, that is, Earth-oriented investigators also bring to light something of the 'grounds' of cultural and cognitive processes that we still use to make sense of a shifting world.

Specializing in 'thick description' based upon meticulous analysis of material evidence, archaeological research also offers more speculative probing of the meaning of traces that will always be incomplete, decontextualized and distant. Archaeologists bring a special attunement to the uneven durability of materials in the face of eventful geo-histories, to the differentiated investment of mobile and sedentary populations in such materials, and to the long-standing bias in the modern western thought toward durable remains over more fleeting traces (see Porter 2012, pp. 129, 249; Barber 1994, pp. 745–47). Alongside concerns with the grander scale of environmental change, some researchers have also delved into the more fine-grained textures of human engagement with the stuff of the physical world—which includes intriguing inquiries into the elemental properties of the earliest known media of numeracy and literacy.

Taking cues from what Scott describes in relation to his own engagement with research on the first city-states as 'trespasser's reconnaissance' (Scott 2017, p. ix), I venture into the speculative-evidential reconstruction of the earliest 'civilizations'. After an overview of mid-Holocene climate change and its impacts, I turn in more detail to two momentous forms of ancient mediation: the construction of city walls and the coupled technics of numeracy and literacy. Climate-induced clustering of population in fertile refugia, I suggest, is implicated in the rise of wall-building and graphical notation, and both 'media' can be viewed as creative engagements with the plasticity of matter—in this case, locally available riverbank clay. This brings us back to the relevance of archaeological and other 'Earth-oriented' inquiry into the events of the mid-Holocene for the contemporary quandary of climate change and the displacement of people it is triggering. What does it mean, I ask, that we engage with today's climate challenges using cultural and cognitive capacities that emerged in the context of climate crisis over five thousand years ago? And how might a fuller understanding of that earlier moment of material-semiotic transformation help us to fashion new imaginaries fit for another world of climatic upheaval?

2. Mid-Holocene Climate Crisis and City-State Origins

"The cuneiform script, created in Mesopotamia, present-day Iraq, ca. 3200 BC, was first," concludes archaeologist-historian Denise Schmandt-Besserat after surveying the independent invention of writing at several different sites (Schmandt-Besserat 2014, p. 1). "The region around Uruk-Warka played host to a sudden tenfold increase in settlement density at about 3200 BC," notes archaeologist Robert Matthews, likewise speaking of Mesopotamia (Matthews 2003, p. 110). "The apparent episode of rapid climate change around 5200 BP (3200 BCE) coincided with a number of cultural transitions," observes climatologist Brooks (2012, p. 98). Or in the more exuberant formulation of communication theorist David Porush: "suddenly around 3200 BC, BANG! Something leaps across the chaotic bifurcation into a new order of frantic self-organization" (Porush 1998, pp. 61–62).

Such co-incidences, especially when environmental forces are in the mix, used to make critical social and cultural thinkers decidedly nervous. But as the potentially catastrophic impacts of climate change ascend the political agenda, the idea that significant episodes of geophysical change might be bound up with socio-cultural transformation is shedding its stigma. In particular, growing awareness of the potential for abrupt reorganization in physical systems—tipping points or threshold transitions—is encouraging reassessment of the influence of climatic instability on human history (see Davis 2001, p. 279; Clark and Gunaratnam 2017). As the thriving field of paleoclimatology provides increasingly fine-grained and globally triangulated reconstructions of the Earth's climatic past, opportunities open up for archaeologists and anthropologists to situate their disciplinary matters of concern within detailed geo-climatic contexts. In the process, the Holocene interglacial epoch is beginning to look a lot more climatically eventful than was once supposed. There is still a pronounced sense that in comparison to the glacial cycles of the previous two and a half million-year-long Pleistocene epoch, the Holocene enjoyed exceptionally stable climate. "Civilization' arose during a remarkably long summer" reflects archaeologist Fagan (2004, p. 25). But as Fagan and others explain, even the congenial climate of the Holocene contained enough variability to impact significantly on where and how people lived.

It is important to recall that post-glacial sea level rise resulting in extensive submergence of coastal land did not finally settle down until around 6000 years ago (Hole 1994). This meant that fertile freshwater and estuarine environments—key attractors for early Holocene 'Neolithic' sedentary life—were themselves constantly on the move.

When the immortal Uta-napishti tells the story of surviving a great deluge in the Gilgamesh epic, it is notable that he speaks first of enjoying "rare fish and shy wild-fowl, a rich harvest-tide" (Sandars 1960, p. 106). As the Gilgamesh flood tale and its Old Testament Noachian heir demonstrate, inundation left indelible marks in storytelling. Or as philosopher Peter Sloterdijk asserts, the tale of catastrophic flooding "probably constitutes the most important shared memory trace in world cultures" (Sloterdijk 2014, p. 238).

Around the time that sea levels were finally settling, global climate was again shifting, a transition attributed in part to a decline in solar radiation resulting from long term changes in the Earth's axial precession—the gravity-induced cyclical change in our planet's axis of rotation (Brooks 2012). These more gradual cyclical processes alone do not explain observed transitions, however. Researchers have superimposed on the precessional cycle two shorter, more episodic influences on global climate that impacted during the 4th millennium: declining solar output resulting from cycles in sunspot and solar flare activity (known as the Hallstatt cycle) and the erratic impact of large volcanic eruptions (Brooke 2014, pp. 175–82). The result of this convergence of forcings was that between 6400 and 5000 years BP the warmer, more humid conditions known as the Holocene climatic optimum gave way to generally cooler temperatures that were manifest as increased aridity in the tropical latitudes. While there are varying accounts and chronologies of what is referred to as the mid-Holocene climatic (or environmental) transition, there is some consensus that at a certain point incremental or stepwise shifts gave way to a rapid surge of change. That threshold is most often dated at 5200 BP: its signature showing up in environmental records spread across the Middle East, China, Africa, South America and Europe (Hole 1994; Brooks 2012; Brooke 2014, pp. 182–86).

Though crude environmental determinism may be long discredited, there is growing willingness at the intersection of climatological and anthropological research to view events of the magnitude of the mid-Holocene climatic transition as involving the crossing of a limit such that it demanded a major response from impacted human populations (Brooke 2014, p. 317; Brooks 2012, p. 40; Hole 1994, p. 123). Unrelieved aridification in many afflicted regions around the 5200 BP juncture meant that certain patterns of agriculture ceased to be viable, and there are signs at multiple sites in early agrarian societies of villages being abandoned and whole areas depopulating. Caution is necessary when making generalizations, however, as this is a case when some impacts and responses leave far clearer material traces than others. As archaeologist Frank Hole notes in an early intervention on the mid-Holocene transition, while Southern Mesopotamia saw a shift towards city-centred administration, there is evidence in other regions of a turn to more mobile and extensive pastoralism (Hole 1994, p. 140; see also Brooks 2012). But this does not necessarily contradict evidence of another response that shows up even more clearly in the archaeological record: the unprecedented aggregation of population in fertile river valleys and deltas.

Under conditions of enhanced aridity, it has been suggested, riverine floodplains functioned as environmental refugia for humans and their companion species (Scott 2017, p. 60), just as zones of microclimatic benignity or exceptional fertility have sustained biota during bouts of climate stress for hundreds of millions of years (Bennett and Provan 2008). The key to supporting rapidly growing human populations was intensive irrigated agriculture, which was in turn bound up with a raft of developments in the centralized administration of land, labour and produce: what anthropologist Childe (1950) designated 'the urban revolution' and later researchers refer to as the first state societies (Scott 2017).

Most accounts of the late 4th millennium transition speak of a shift from small, relatively egalitarian villages based on subsistence agriculture to large grain-fed urban centres—changes most fully documented in Southern Mesopotamia. Archaeologist Anne Porter's approach to this region,

however, encourages us to be attuned to the continuing and perhaps enhanced importance of the interrelationship between sedentarism and pastoral mobilism. Prompting us to look beyond urban centres to "the interstices between cities where so much critical activity happens", she directs our attention to the close and constantly evolving entanglement between economies revolving around lowland cereal cropping and those involving more extensive animal husbandry (Porter 2012, p. 249). So while the encounter between urban-based Gilgamesh and 'wild man' Enkidu is most often read as a mythopoeic account of tensions between grain-based sedentarism and nomadic pastoralism or foraging life-ways, Porter reads the Babylonian cycle as "the iteration of the essential and necessary unity of the steppe and city" (Porter 2012, p. 263).

The events in question, along with tales of the transacting between arable farmers and pastoralists, stretch far beyond Mesopotamia (Tudge 1998, pp. 7–10). Just as the signature of the mid-Holocene climatic transition shows up at multiple global locations, so too have similar social and spatial patterns been discerned at other sites where populations converged upon fertile riverine environments. The recurrent model of the alluvial-based state includes monumental architecture and fortification, pronounced social hierarchy and division of labour, a king-centred polity and centralized administration. Though the neatness of fit around 5200 BP mark may not be as pronounced as in Southern Mesopotamia, variations on the basic city-state diagram are manifest in the Nile Valley, central Sahara, north-central China, the Indus region in South Asia, and coastal Peru (Brooks 2012; Kennett and Kennett 2006).

The narrative, of course, does not end with establishment of grain-nourished city-states. Holocene climate continues to waver, and with later climatic shifts the high-density intensive cereal regime reveals its own vulnerability to environmental stress. "Having arisen as a successful defense against small catastrophes", intones Fagan, "the city found itself increasingly vulnerable to larger ones" (Fagan 2004, p. 7). While accounts of the historical Gilgamesh locate his reign some four to five centuries after the irruption of population in the Uruk-Warka region to which Matthews referred earlier in this section, the end of the epic informs us with no great fanfare that "Uruk and its walls slowly crumbled and melted into the earth" (Bryson 1967, p. 29).

What interests me about the link between climatic change and the advent of the city-states is less the idea of strict linear causality and more the general sense that climate-driven dislocation is a recurring and constitutive aspect of human life. Archaeological evidence, in this way, seems to support what literary theorist Claire Colebrook describes "a history of the world that has always been one of climate change, migration and refuge" (Colebrook 2017, p. 118; see also Clark 2017a). But some periods or episodes stand out amidst the ceaseless pulsing of global climate. What seems to show up in the mid-Holocene archaeological record is a radical reorganization of socio-material life under conditions of instability and recurrent crisis involving a renegotiation of the relationship between sedentarism and mobilism. As Hole argues, this is not simply a matter of 'the state' emerging to take control of conditions of environmental stress and crisis. Rather, as he puts it, "the presence of refugees and other misfortunates, as well as an organized tradition that emphasized communal work . . . created opportunities for leaders to become managers" (Hole 1994, p. 138).

Neither should we see nascent states as resolutions to the predicament of enhanced mobility and population agglomeration. Far from a simple ascendance of centralized urban-based states over more dispersed and nomadic peoples, state sovereignty in the ancient world might best be viewed as more aspirational or 'presumptive' than accomplished, historian Richardson (2012) contends, involving a constant struggle for the allegiance of mobile, non-aligned peoples. As Porter observes more generally of this complex and ongoing negotiation: "some of the key attributes of this period—the development of urbanism, the nature of political organization and structure, the origins of writing—arise from the tensions implicit in societies that have significant mobile components" (Porter 2012, p. 2). To gain further understanding of the material-semiotic dimensions of the state experiment, we turn now to what is ostensibly one of the ancient world's starkest statements of durability and immobilism: the construction of monumental urban perimeters.

3. Shifting Grounds of Fortification

Gilgamesh's wall may glow with grandeur in the dim light reflected by contemporary concrete barriers and razor-wired fencing, but as the denouement of the epic poem, the return to Uruk's defensive brickwork feels like a bit of a comedown. Demigod Gilgamesh, having spurned the sexual advances of a goddess, slain demons and mythic beasts, and had the secrets of immortality within reach, winds up his adventures with a rumination upon his earlier-career civil engineering achievements. Upon abandoning the quest for eternal life, literary theorist Theodore Ziolkowski muses, the mighty hero resorts to "the consolation of simple human achievement—the building of the great walls of Uruk" (Ziolkowski 2012, pp. 166–67).

The rationale for wall construction in the ancient world is by no means obvious. Earlier assumptions by historians that the requirements of defense against hostile forces told the full story have given way to more nuanced approaches hinging on the idea that "fortifications . . . deserve proper multi-perspective interpretations in order to evaluate sufficiently their particular role in historical-political, local-regional, physical-topographical, economic and practical contexts" (Frederiksen et al. 2016, p. 1). But even the equation between wall and fortification is under review. While there is considerable evidence in the Mesopotamian context that by the 3rd millennium BCE escalating conflict between kingdoms was manifest in an arms race between siege-craft and urban defenses, this is not incompatible with the idea that the scale and splendor of city walls may originally have exceeded military requirements (Sloterdijk 2014, pp. 254–67; Butterlin and Rey 2016). The townsfolk of Uruk, we recall from the Gilgamesh tale, seemed to say as much.

In the tradition of Childe (1950), who linked ancient monumental architecture to the rise of god-kings presiding over an agricultural surplus, subsequent accounts have frequently read early ramparts as symbolic expressions of royal power and status (see Butterlin and Rey 2016). Sloterdijk takes the symbolism of sheer verticality in a related but distinct direction—proposing that forbidding walls and towers are themselves embodiments of divinity: "God has become wall . . . Anyone living in such a city inhabits a hypothesis of eternity" (Sloterdijk 2014, p. 258). Above all, what this gargantuan gesture of longevity—this "pure stationary Now"—is raging against, he argues, is the inconstancy of the natural world (Sloterdijk 2014, p. 258). Although he neither refers explicitly to climate change nor to the juxtaposition of the flood story and wall building in the Gilgamesh epic, Sloterdijk tethers monumental wall construction to the myth of the deluge. In the wake of the world-effacing catastrophe of the flood, he proposes, the verticality of the city is a flaunting of obduracy and permanence. Framed by its fortifications, the city, for Sloterdijk, is effectively an ark that has become earthbound: in defiance of the potentially annihilating forces of first nature, it inaugurates a second nature composed of that which humans construct for themselves (Sloterdijk 2014, pp. 240–61).

If we take our cues from Sloterdijk, then the contemporary counterpart of the ancient city wall may be as much the large-scale dam as the barrier constructed to hold migrants at bay. For as anthropologist Anna Lowenhaupt Tsing reminds us, in the latter 20th century big dams came to function as preeminent "symbols of human mastery over nature"—in this way establishing themselves as standard-bearers of nation-state sovereignty, especially in the context of international development (Tsing 2005, p. 223). But dams or levees too are credited with being a Mesopotamian innovation, and the connection with urban fortifications may be as literal as it is figurative.

Sifting the evidence of one of the earliest known urban perimeter walls in the Near East, the biblically renowned walls of Jericho, archaeologist Bar-Yosef (1986) suggests that the original impulse behind their construction was not defense against human invaders but against encroaching water. "(T)he Neolithic walls of Jericho", he proposes, " . . . were built in stages as a defense system against floods and mudflows" (Bar-Yosef 1986, p. 161). Building close to watercourses and taking advantage of the soil fertility of alluvial fans and terraces, Bar-Yosef argues (Bar-Yosef 1986, p. 160), left settlements perennially vulnerable to the very hydrological processes they were dependent upon—as is suggested by the inclusion of floods as one of the key threats from which Gilgamesh's wall protected the people of Uruk.

The inherent risk of inhabiting floodplains, geologist David Montgomery adds, provides an additional, more mundane, explanation for local deluge myths: "The story of a great flood that submerged the world would have been perfectly plausible to those living in Mesopotamia's flood-prone estuary, where everyone was no more than a few generations removed from a locally disastrous flood" (Montgomery 2013). Moreover, such hydro-meteorological hazards would have likely been exacerbated by up-river deforestation resulting from urban demand for fuel-wood (Scott 2017, p. 196). Once more, with its ominous but rather ambiguous episode of clear felling the sacred groves of Cedar Mountain, the Gilgamesh epic is our trailblazer.

It is notable, however, that as early as the 1980s, Bar-Yosef is also taking into consideration the impact of climate change on the functionality of urban walls. With the passing of the early Holocene climatic optimum, he speculates, severe livelihood and demographic pressures associated with climate stresses were implicated in the advent of larger, more aggressive social formations—conditions that were conducive to the repurposing of walls as fortifications (Bar-Yosef 1986, pp. 161–62). Pointing to the climatic transition we addressed in the last section, Scott likewise links the near ubiquitous presence of perimeter walls around ancient cities to rising populations in the alluvial refuges and growing reliance on high intensity water-fed arable farming. The grain surplus was so vital to the very existence and continuity of the city-state, he insists, that every means had to be taken to secure it (Scott 2017, pp. 137–39).

But Scott brings a twist to the story. So crucial was the labour that produced the grain surplus that it too had to be secured. No-one with any cultural memory of a more mobile and egalitarian existence, Scott argues, would have willing submitted to the drudgery of intensive cereal production and processing, meaning that most of the labour-power upon which 'grain states' depended was bonded, enslaved or otherwise coerced (Scott 2017, pp. 152–53). Warfare in alluvial Mesopotamia and its environs, he argues, was more a matter of assembling and sustaining a viable population of labourers than it was about attaining territory. Consequently, the guarded perimeter walls of the city were as much about keeping a largely unfree workforce within as they were about keeping aggressors out (Scott 2017, pp. 138–39, 154–55). Scott's twist resonates with Hole's much earlier assertion that, although urban social reorganization under mid-Holocene conditions should be seen an opportunistic response to rapid influxes of dislocated people, the intense demands of developing and maintaining the infrastructure of irrigated agriculture under conditions of ongoing environmental instability put a premium on procuring adequate labour-power (Hole 1994, pp. 136–38). Likewise, Richardson speaks of ancient Babylonia's 'surfeit of land and dearth of labour'—and the resultant desire to 'recruit' people into the fold of the state (Richardson 2012, pp. 8, 30). To which he adds that these same populations were quite likely to scatter when states fell short on their promises to support, protect and provide (Richardson 2012, p. 31).

Ancient urban walls, we can conclude, were at once a medium and an artifact of nascent statecraft, their meanings and functions varying over time and in different contexts. But whether it is by physically or symbolically holding floodwater at bay, by helping secure the labour-force necessary for intensive irrigated cereal farming, or by protecting people and produce during times of environmental stress-exacerbated aggression, recent opinion increasingly implicates solid fortifications with climatic and other environmental volatility—and with the human mobilization this can precipitate. If climate change is an impetus to urbanization, and if, as Scott contends, 'walls make states' (Scott 2017, pp. 121, 137), then it is no great leap to conceive of the walled city-state as a materialization of social relations with climatic variability. To put it another way, statecraft, from the outset, is in part climate-craft: a set of experiments and improvisations in reorganizing socio-material existence in the context of climate stress. With this in mind, we turn to another vital medium and artifact of the ancient alluvial grain-fed state: the complex notational systems through which people, produce and value could be made legible.

4. Elemental Origins of Numeracy and Literacy

We have already met with the claim that writing emerged in tandem with city-states nourished by Mesopotamian alluvium. At one time more coarsely construed as the signal discriminator between 'savagery' and 'civilization', literacy has come to be viewed as playing a specific role in agrarian city-state governance—linked closely to administration of grain surpluses (see Childe 1950, p. 14; Porter 2012, p. 240). Recent research has been teasing out interconnections between writing, numeracy and measurement, and more generalized shifts in human reckoning with time and space (Renfrew and Morley 2010).

Schmandt-Besserat (2010, 2014) traces a gradual process of complexification running from the use of simple tokens in the Fertile Crescent around the 8th millennium BCE through to systems of two-dimensional pictographic marks used for accounting, and finally onto phonetic signs that enabled writing to emulate spoken language—and in this way to express the full range of human experience. It is the third of these developments, as I touched upon earlier, that maps closely onto mid-Holocene climate change and the advent of the city-state. A formative step in the shift from three-dimensional to two-dimensional representation, Schmandt-Besserat explains, was the storage of counters representing debt inside clay envelopes onto whose exterior the counters themselves had first been pressed: "About 3200 BC, once the system of impressed signs was understood, clay tablets—solid cushion-shaped clay artifacts bearing the impressions of tokens—replaced the envelopes filled with tokens" (Schmandt-Besserat 2014, p. 4).

Shortly afterwards came pictographic signs inscribed with a stylus, which enabled counting and writing to abstract itself from the one-to-one correspondence of the impressed token. It was the morphing of this system a step further into phonetic signs, most visible in the Sumerian context, that enabled writing to finally break away from accounting and attain the expressive and narrative qualities of spoken language (Schmandt-Besserat 2014, pp. 6–9)—of which the Gilgamesh epic is an early flowering.

As Schmandt-Besserat insists, "the origin of writing can be viewed as a by-product of the abstraction of numbers" (Schmandt-Besserat 2010, p. 31). The process of abstracting information from its immediate context is in turn closely tethered to the demands of tracking the movement of material goods through the burgeoning ancient Near Eastern economies and to the requirements of taxation systems (Schmandt-Besserat 2010, pp. 31–33). Along similar lines, Scott proposes that the imperative of the archaic state was as much to render visible and keep tabs on workforces as it was to regulate the products of their labour: "thousands of cultivators, artisans, traders, and laborers were being, as it were, repurposed as subjects and, to this end, counted, taxed, conscripted, put to work, and subordinated to a new form of control" (Scott 2017, p. 140). That this 'subjectification' was partial, provisional and frequently reversible arguably made the task of visualization and monitoring more rather than less important.

Reviewing the role of written inventories in both 4th–3rd millennia BCE Mesopotamian city-states and in 2nd–1st millennia Chinese dynasties, Scott is astounded by the sheer volume and scope of official documentation that is in evidence. But he is just as taken up with the enthrallment of the centralized state with standardization: the application of units of quality and quantity that extended its remit not only over produce but over labourers and slaves, the land they worked, the quality of its soil, and expected crop yields (Scott 2017, pp. 142–47). "In embryonic form", concludes Scott, "the vital statistics of an appropriating state aiming to extract as much value as possible from its land and people is already in evidence" (Scott 2017, p. 144).

The train of thought I have been laying out thus far points towards the significance of climatic shocks behind the exploding populations of the riverine refugia, the pressure to organize these bodies into a viable productive system, and the haunting of past natural catastrophes. In this context, alongside its more practical notational functions, writing can also be seen as a means of 'putting the world in order' in times of crisis or rapid change (Porter 2012, p. 149); just as fortifications served at once as physical sorting devices and symbolic statements. As Porter puts it: "while writing is certainly one

means of stretching time and space, it may also operate as a strategy to counter the effects of change, for it has the potential to reify knowledge, culture, and identity" (Porter 2012, p. 152). Such possibilities open up complex, vexing questions about whether an extraordinary moment of innovation might also be implicated, in pervasive and enduring ways, with a certain channeling or restriction of potentiality.

One way to begin to address these questions is to further probe the connection between the evolving practices of counting-measuring-writing and the mutable materialities of the archaic alluvial world. While the exceptional human capacity for dealing with numbers has long been appreciated (Malafouris 2010), researchers have recently been exploring in more depth how and why a leap occurred in the ancient Near East in regard to abstract numerical cognition—which formed the foundation of writing. Such concerns have been drawing inquiry beyond the issue of the immediate recordkeeping requirements of economically intensifying social formations and into consideration of connections between material artifacts, embodied practices and shifts in cognitive processes.

Schmandt-Besserat suggests that the characteristics of the early Mesopotamian system of clay tokens—the fact that they were 3-D, graspable, easy to manually move and remove—played a crucial role. "The tokens made it possible to visualize and manipulate numerosity", she surmises (Schmandt-Besserat 2010, p. 33). In effect, by virtue of being thoroughly tactile and somatic, tokens paved the way for numbers and later words to become *extra-somatic* (Schmandt-Besserat 2010, p. 33). This pivotal significance of the haptic dimension of numeracy was anticipated by pioneering media theorist Marshall McLuhan who made the point, unequivocally, that "number is an extension and separation of our most intimate and interrelating activity, our sense of touch" (McLuhan [1964] 2013, p. 186).

In conversation with the work of Schmandt-Besserat and recalling McLuhan, material culture theorist Lambros Malafouris proposes that in order to explain the radical jump into the abstract concept of number we need to look to processes '*where brain, body and culture conflate*' (Malafouris 2010, p. 38 authors italics). The clay token-envelope system, he suggests, is pivotal. For Malafouris, the visualization and literal grasping involved in manipulating the token-envelope assemblage is the vital bridge between everyday material culture and a deep-seated rewiring of mental processes: it serves as "the missing link between neural and cultural plasticity" (Malafouris 2010, p. 41). Chiming with Schmandt-Besserat, Malafouris concludes that "the emergence of true numerocity (is) grounded upon a clay foundation" (Malafouris 2010, p. 40).

But the idea that, through its implication with abstract numeracy manipulating riverbank clay paves the way to literacy opens up a whole range of possible connections with the material and somatic environment of the ancient alluvial world cultures. Derrida—and he is hardly the first—reminds us of how writing's linear and inscriptive structure recapitulates the furrowing of the soil by the ploughman (Derrida 1976, p. 287). Analogously, Porush notes the shared rectilinear logic of ancient irrigation systems and urban layout, linking this in turn to the cognitive restructuring involved in training scribes to get their hands and hands around pictographic writing: "Hundreds of boys . . . sit for hours hunched over clay tablets, learning to scrawl in regular lines" he observes. Before adding "if we superimpose the scratching of these lines they look like the lines of irrigation written on the face of the earth itself, as seen from an orbiting satellite" (Porush 1998, p. 62). Anticipating key points made by Malafouris, Porush argues that there is a direct link between transformation at the cognitive level and the material culture of the Mesopotamian world: a 'canalizing' of minds resonating with a literal 'canalization' of the landscape.

Likewise, the idea that literacy and numeracy has 'a clay foundation' casts the architectonic achievement of the urban wall in a new light. For monumental wall construction provides another case of what Malafouris refers to in the context of writing and numeracy as "spatiovisual problems . . . directly manipulated and manually resolved in real time and space" (Malafouris 2010, p. 40): an example that requires not only an imposing set of calculations and a grappling with formidable materials but also a vast coordination of bodies. Malafouris's reference to the informed manipulation of the medium of clay in the '*building* of neural connections', in short, may be even more literal that

he supposes (Malafouris 2010, p. 41 my italics). In this light, when Gilgamesh makes in his climactic homecoming towards the end of the epic, we can observe the narrative weaving seamlessly between a carefully enumerated spatio-temporal configuration of the world and an affirmation of what Malafouris refers to as 'intelligent use of clay' (Malafouris 2010, p. 40).

> After twenty leagues they broke their fast, after thirty leagues they stopped for the night; in three days they had walked as much as a journey of a month and fifteen days. When the journey was accomplished they arrived at Uruk, the strong-walled city. Gilgamesh spoke to him, to Urshanabi the ferryman, 'Urshanabi, climb up on to the wall of Uruk, inspect its foundation terrace, and examine well the brickwork; see if it is not of burnt bricks; and did not the seven wise men lay these foundations'? One third of the whole is city, one third is garden, and one third is field, with the precinct of the goddess Ishtar. These parts and the precinct are all Uruk. This too was the work of Gilgamesh, the king. (Sandars 1960, p. 114)

While it is Enkidu rather than Gilgamesh whose physical form is modeled from 'a huge lump of clay' scooped from the Earth (Bryson 1967, p. 2), the denouement of the epic takes us to a point where it seems as though fired-brickwork has made Gilgamesh who he is as the much as great king has made the city what it is. As we know from deciphered clay tablets, the Gilgamesh story was first inscribed on city walls—a shuttling between inscriptive media suggestive of complicity between wall-building and notational systems in the Mesopotamian city-states of the 4th–3rd millennia. If monumental urban perimeters help Gilgamesh and his contemporaries deal with issues of existential vulnerability—variously corporeal, spiritual, martial, and climatic—so too might we argue that early notational systems, with their 'often geometric forms' (Schmandt-Besserat 2014, p. 11), played an important role in countering the chaos and disorder of an upheaving world.

However critical we might be of the routine brutality, oppressive working conditions, and deeply-incised inequalities that characterized ancient city-states, it is important to acknowledge how—with remarkably short turnaround—Neolithic peoples improvised their way to a new socio-material order capable of supporting unprecedented numbers of people under unfamiliar climatic conditions. As with innovations in the urban built environment, writing emerges from this acutely uncertain context. While climate change looks to have been a trigger for the transformations in question, the 'media archaeologies' I have been considering point to a more subtle and nuanced set of engagements with earthy materials that underpins the emergence of novel notational systems. In this way, the intense demands of organizing people, produce and land are manifest at the level of cognitive reorganization: a simultaneous reconfiguration of '*brain, body and culture*' with pervasive and lasting consequences. This raises questions not only about how we understand a crucial transition in paleoclimatic and human history, but about how deeply inscribed patterns of culture and cognition inherited from the origins of state-centric society might be conditioning our responses to current climate change.

5. Holocene Legacies, Planetary Futures

With their flair for fortification, their philandering ways, and their flouting of laws and mores, contemporary demagogues do much to recall ancient despots, even as they fall well short of the soul-searching spirit of their mythopoeic predecessors. Once more, walls are being tasked with filtering out the ill-disciplined, indolent and irreverent, while keeping in the deserving, the dutiful, the industrious. In today's intensifying digital surveillance and screening of mobile populations, I have been suggesting, we might well hear the echo of Sumerian or Qin Dynasty recordkeeping. So too in the current policy move toward converting climate migrants into disciplined and grateful workers might we see resonances of the tradeoff proffered by ancient alluvial city-states to the drought-stricken pastoralists who arrived at their gates.

There is something deeply troubling about the way the script deployed by governing bodies to deal with mobile or displaced populations resounds so loudly over a five thousand-year interval.

At the same time, however, simply drawing parallels between the tactics of today's administrative and defensive powers and their archaic antecedents seems a little too convenient. While it may be consoling for critical thinkers to characterize their political opponents as monumentally regressive and to smear every securitization strategy as a kind of paleopolitical atavism, this alone does not help us to see why certain storylines are so stubbornly iterative or prompt us to imagine alternative pathways that learn from the *longue durée*. Neither does it encourage us to reflect upon how even the most 'critical' or 'progressive' engagements with the current quandary of global climate displacement also make recourse to the socio-political and cultural resources of the ancient world. When any of us back up our political arguments with figures and models generated by climatologists, whenever we attempt to craft convincing and empowering narratives about climate change, we too are reliant upon achievements of numeracy and literacy that crystallized in the alluvial refugia of the mid-Holocene. And if we seek to radically rewrite existing global relations of debt—as in proposals that early industrializing nations should pay their dues to climate vulnerable regions—we are still working within the notational logic of the first bureaucratic states.

That the sorting-tracking mechanism of walls and gates, words and numbers might be hardwired into 'civilized' life, I have been suggesting, may have much to do with the fact that their origins lie in crises of subsistence, in upheavals of earthly conditions severe enough to have been literally unworlding. This confronts us with an irony of rather massive proportions: a situation in which the political and cultural configurations we are currently failing to reinvent for an era of climatic upheaval may be so intractable in part because they were forged in response to climate catastrophe. With an eye to this paradox, there are three points I want to draw out of the preceding account of the transformations of the mid-Holocene that may be broadly salient to the current deadlock between territorial state imperatives and escalating climate-induced displacement.

The first point is about the originary and unresolved interplay between the strategy of mobilism and the institution of the state—in the context of a planet that is itself inherently 'mobile'. As well as acknowledging that the "utter hegemony of the state form" is a recent achievement (Scott 2017, p. 13), we must take stock of how the state itself was engendered by entanglements of mobile and sedentary peoples—and has been tussling with this condition throughout its rambling five millennial trajectory. As Scott would have it, what this deep history reveals is the extent to which states have been provisional, precarious, liable to disaggregation into smaller, suppler political units (Scott 2017, pp. 209–10). Or in the words of Richardson, "the full control of early states over their own rural zones and border marches remained an unfinished project more than a millennium after they first appeared" (Richardson 2012). Rather than behaving as binary opposites, state-centred and nomadic or non-state formations, as Porter (2012) insists, have frequently enjoyed relations of mutual influence and exchange—one of the morals of Gilgamesh and Enkidu mythical liaison. But if we fully factor in climate change, or the broader instability of the Earth system, then it becomes difficult to imagine that there will ever be an endpoint to "the millennia of flux and movement back and forth between sedentary and non-sedentary modes of subsistence" (Scott 2017, p. 231). If spatial territorialization is itself in part an ancient mode of imposing order on climate-induced upheaval and mobilization, then it becomes increasingly apparent that the state form itself remains a wavering, incompletable project—as obliged to seek compromise with mobile or non-sedentary peoples in the present as it was at the outset. And in this way, the idea that the inscriptive device of the urban or state perimeter is always already a medium for modulating *terra mobilis* raises questions that go beyond debates about whether or not to open political borders—and push on into issues of how to best to govern transitions between states of the Earth system (Clark 2017b).

My second point concerns how ancient responses to climatic crisis that most likely began as probing and experimental became deeply entrained or path dependent and what this might mean for our current predicament. It is worth recalling that the term 'levy' referring to the imposition of a tax or other charge, and the 'levee' holding back a river both come from the Latin 'levare'—to raise or lift up, which in turn derives from the Proto-Indo-European 'legwh-' meaning not heavy or weighing little.

Yet, the process of inscription tends to take on weight and heft, as it settles into pathways, and in the process comes to preclude other potentials. Wall building, cried the citizens of Uruk has 'become a heavy burden'. This is a logic we have encountered in the context of the canalization of waterways, the sorting of bodies by way of urban architecture, the regulating of fiscal flows through alphanumeric recordkeeping. As media theorists have often observed, new communicative mediums at once extend and delimit the human sensorium (Peters 2015, p. 25). But so too do the media through which the flows of the Earth system are channeled both expand and restrict human responsive capacities; the point Fagan was making when he noted that the ancient city's successful adaptation to one round of catastrophes rendered it ever more vulnerable to later ones. In this regard, today's struggle with fossil hydrocarbon dependency and all its repercussions follows doggedly in the footsteps of ancient soil exhaustion, watercourse siltation and the resultant exacerbation of vulnerability to climatic stress. More than simply a matter of certain groups accruing and holding onto political power, the relatively recent 'hegemony of the state form' might also be viewed as a channeling of mediating devices and regulatory apparatuses down dangerously restrictive pathways. We should keep in mind, however, that human mobilism—with its predilection for slipping out of grooves, staying lithe and travelling light—can serve as a counterpoint to ordering-sorting repertoires that have grown rigid and heavy. Following the prompt of some of the more searching media archaeologies of the mid-Holocene, we might also consider whether such path-breaking applies as much to the level of cognition as it does to the realms of socio-spatial organization.

This brings me to my third point. In a general sense, boundary markers delimit whatever it is we are trying to conceptualize and define. As such, in the words of political theorists Mezzadra and Neilson (2013, p. 16), borders "structure the movement of thought". Likewise, I have been suggesting, the construction of urban perimeters and the development of pictographic media—in the course of regulating flows of bodies, objects and values—may have helped constitute the very cognitive processes of early urban, state-governed peoples. Inextricably bound to the logistical demands of the embryonic state, early notational systems were probably as precarious as the city-states they help script into existence. Yet, despite this turbulence—perhaps because of it—the basic organizational principles of numeracy–literacy and the territorialization of space endured. In this regard, we should recall Schmandt-Besserat and Malafouris's elegant paradox that neural plasticity associated with the manipulable medium of clay paved the way to the abstraction of number and text. We cannot know whether such innovation sprang from mobile or more settled peoples, though if jewelry is an art of the nomad (Deleuze and Guattari 1987, p. 401) and brickwork a craft of the sedentary, it is feasible that the embedding of portable tokens in hand-sized clay objects combined elements of both worlds. We should also take seriously claims that that subsequent 'canalization' of cultural–material and cognitive processes was linked to the entrainment of mental and manual labour to the needs of burgeoning agrarian state societies. This connection between abstraction and path dependency is cause for concern when we consider the extent to which recent developments in numeracy and literacy cleave every more intently to disembodied, dematerialized pathways. For as anthropologist Tim Ingold reminds us: "It is precisely where the reach of the imagination meets the friction of materials, or where the forces of ambition rub up against the rough edges of the world, that human life is lived" (Ingold 2013, pp. 72–73). So while 'rough edges' may be multiplying in the world of accelerating climate change, experiences of a grainy, recalcitrant materiality are increasingly rare in social lives mediated by digital architectures. Without insinuating that we return to the 'soft and malleable' material native to riverine agro-ecosystems, there is much to be learned from the brain-body-culture conflation associated with 'intelligent use of clay' as we confront a contemporary crisis in the physical conditions of social existence. To extrapolate on Porter's concern with 'aspects of materiality' related to pastoralism (Porter 2012, p. 8), there are questions to be asked about the specificity of engagements with matter by mobile or nomadic peoples—and lessons to be learned from the very lightness of the traces their material practices tend to leave in the archaeological record.

It may turn out that the most important consequence of the clamour around the Anthropocene idea for humanities scholars is the discovery of the Holocene—or at least the fuller appreciation of the work of our colleagues who specialize in the *longue durée* of social-material life. Research into the mid-Holocene, I have been proposing, offers windows into the originary complication of climate displacement, numeracy and literacy, and the territorial inscription of space. What I glean from my disciplinary interloping into studies of the ancient world is the value of combining deep histories of the sedentarism-mobilism interplay with archaeologies of media. Thinking through the tangle of sedentary and mobile life, as signposted by 'Earth-oriented investigators', offers valuable insights into the triggers and incitements for developing new ways of mediating social and physical life. Such connections do more than remind us that geoclimatic upheavals can alter the trajectories taken by human collectivities. They also help us to envision how engaging with the stuff of the world at the most intimate level can have momentous social, cultural and psychic consequences. In short, we see how the negotiation between moving and staying, and what people take with them they make these transitions, is inseparable from the practices and structures that we devise to make sense of a shifting earthly existence.

While media theorists have long insisted that the materiality of any medium makes a difference to the meanings it conveys, evidence from the improvisational spree of the mid-Holocene adds new layers to our understanding of how the grit, heft and texture of communicative materials shapes our life worlds. At the contemporary climatic–historical juncture, accounts of the mid-Holocene crisis might be read as reassurance that socio-material lives can be thoroughly reconfigured at short notice. But we must also bear in mind just how *sedimented*, *engrained* and *canalized* so much of our civilizational inheritance has become.

What material practices should we let go, and what kind of matter or elements might we yet join forces with in order to open up truly novel pathways? Alongside making decisions about how to tax carbon emissions or whether to redistribute income to the most climatically vulnerable, we need to find ways of stretching our hands and minds around the stupendous spatio-visual challenges of climate change. As well as deciding if we should reinforce, dismantle or wise-up our walls, we need to work out how to bring '*brain, body and culture*' together in response to the momentous cognitive, embodied and cultural demands of global climate-induced mobility. If we are serious about mediating climate change, a useful first step might be to ask 'what are the 21st century equivalents of riverbank clay, and what would count as their 'intelligent use"?

References

Barber, Elizabeth. 1994. *Women's Work: The First 2000 Years*. New York: W. W. Norton.

Bar-Yosef, Ofer. 1986. The Walls of Jericho: An Alternative Interpretation. *Current Anthropology* 27: 157–62. [CrossRef]

Bennett, Keith, and Jim Provan. 2008. What Do We Mean by 'Refugia'? *Quaternary Science Reviews* 27: 2449–55. [CrossRef]

Bettini, Giovanni. 2014. Climate Migration as an Adaption Strategy: Desecuritizing Climate-Induced Migration or Making the Unruly Governable? *Critical Studies on Security* 2: 180–95. [CrossRef]

Brooke, John. 2014. *Climate Change and the Course of Global History: A Rough Journey*. New York: Cambridge University Press.

Brooks, Nick. 2012. Beyond Collapse: Climate Change and Causality During the Middle Holocene Climatic Transition, 6400–5000 Years Before Present. *Geografisk Tidsskrift-Danish Journal of Geography* 112: 93–104. [CrossRef]

Brown, Wendy. 2010. *Walled States, Waning Sovereignty*. New York: Zone Books.

Bryson, Bernarda. 1967. Gilgamesh: Man's First Story. Available online: http://www.atlantis-webportfolios.com/world/blog/epic.html (accessed on 10 August 2019).

Butterlin, Pascal, and Sébastien Rey. 2016. Mari and the Development of Complex Defensive Systems in Mesopotamia at the Dawn of History. In *Focus on Fortifications: New Research on Fortifications in the Ancient Mediterranean and the Near East*. Edited by Rune Frederiksen, Silke Müth, Peter Schneider and Mike Schnelle. Oxford and Philadelphia: Oxbow Books.

Childe, Gordon. 1950. The Urban Revolution. *The Town Planning Review* 21: 3–17. [CrossRef]

Clark, Nigel. 2017a. Strangers on a Strange Planet: On Hospitality and Holocene Climate Change. In *Life Adrift: Climate Change, Migration, Critique*. Edited by Andrew Baldwin and Giovanni Bettini. London: Roman and Littlefield.

Clark, Nigel. 2017b. Politics of Strata'. *Theory Culture & Society* 34: 211–31.

Clark, Nigel, and Giovanni Bettini. 2017. 'Floods' of Migrants, Flows of Care: Between Climate Displacement and Global Care Chains. *Sociological Review Monographs* 65: 36–54. [CrossRef]

Clark, Nigel, and Yasmin Gunaratnam. 2017. Earthing the *Anthropos*? From 'Socializing the Anthropocene' to Geologizing the Social. *European Journal of Social Theory* 20: 146–63. [CrossRef]

Colebrook, Claire. 2017. Transcendental Migration: Taking Refuge from Climate Change. In *Life Adrift: Climate Change, Migration, Critique*. Edited by Andrew Baldwin and Giovanni Bettini. London: Roman and Littlefield.

Dalby, Simon. 2017. On 'Not Being Persecuted': Territory, Security, Climate. In *Life Adrift: Climate Change, Migration, Critique*. Edited by Andrew Baldwin and Giovanni Bettini. London: Roman and Littlefield.

Davis, Mike. 2001. *Late Victorian Holocausts: El Nino Famines and the Making of the Third World*. London: Verso.

Deleuze, Gilles, and Felix Guattari. 1987. *A Thousand Plateaus: Capitalism and Schizophrenia*. Minneapolis: University of Minnesota Press.

Derrida, Jacques. 1976. *Of Grammatology*. Baltimore and London: The John Hopkins University Press.

Edgeworth, Matt, Erle Ellis, Philip Gibbard, Cath Neal, and Michael Ellis. 2019. The Chronostratigraphic Method is Unsuitable for Determining the Start of the Anthropocene. *Progress in Physical Geography* 43: 334–44. [CrossRef]

Ehrenreich, Ben. 2019. Open Borders Must Be Part of Any Response to the Climate Crisis. *The Nation*, June 6. Available online: https://www.thenation.com/article/climate-change-refugees-open-borders/ (accessed on 1 August 2019).

Fagan, Brian. 2004. *The Long Summer: How Climate Changed Civilization*. London: Granta.

Frederiksen, Rune, Silke Müth, Peter Schneider, and Mike Schnelle. 2016. Introduction. In *Focus on Fortifications: New Research on Fortifications in the Ancient Mediterranean and the Near East*. Edited by Rune Frederiksen, Silke Müth, Peter Schneider and Mike Schnelle. Oxford and Philadelphia: Oxbow Books.

Friedman, Thomas. 2019. Trump is Wasting Our Immigration Crisis. *New York Times*. April 23. Available online: https://www.nytimes.com/2019/04/23/opinion/trump-immigration-border-wall.html (accessed on 24 October 2019).

Graeber, David. 2012. *Debt: The First 5000 Years*. New York: Melville House.

Hole, Frank. 1994. Environmental Instabilities and Urban Origins. In *Chiefdoms and Early States in the Near East: The Organizational Dynamics of Complexity*. Edited by Gil Stein and Mitchell Rothman. Madison: Prehistory Press.

Ingold, Tim. 2013. *Making: Anthroplogy, Archaeology, Art and Architecture*. Abingdon: Routledge.

Johns-Putra, Adeline. 2006. *The History of the Epic*. Houndmills: Palgrave Macmillan.

Kennett, Douglas, and James Kennett. 2006. Early State Formation in Southern Mesopotamia: Sea Levels, Shorelines, and Climate Change. *The Journal of Island and Coastal Archaeology* 1: 67–99. [CrossRef]

Latour, Bruno. 1993. *We Have Never Been Modern*. Cambridge: Harvard University Press.

Malafouris, Lambros. 2010. Grasping the Concept of Number: How did the Sapient Mind Move Beyond Approximation? In *The Archaeology of Measurement Comprehending Heaven, Earth and Time in Ancient Societies*. Edited by Iain Morley and Colin Renfrew. Cambridge: Cambridge University Press.

Mark, Joshua. 2018. Gilgamesh, Ancient History Encyclopedia. Available online: https://www.ancient.eu/gilgamesh/ (accessed on 19 August 2019).

Matthews, Roger. 2003. *The Archaeology of Mesopotamia: Theories and Approaches*. London: Routledge.

McLuhan, Marshall. 2013. *Understanding Media: The Extensions of Man (e-version)*. Berkeley: Gingko Press. First published 1964.

Mezzadra, Sandro, and Brett Neilson. 2013. *Border as Method: Or, the Multiplication of Labor*. Durham and London: Duke University Press.

Miller, Todd. 2017. *Storming the Wall: Climate Change, Migration, and Homeland Security (e-version)*. San Francisco: City Light Books.

Montgomery, David. 2013. *The Rocks Don't Lie: A Geologist Investigates Noah's Flood*. New York and London: W.W Norton.

Peters, John Durham. 2015. *The Marvelous Clouds: Toward a Philosophy of Elemental Media*. Chicago and London: University of Chicago Press.

Porter, Anne. 2012. *Mobile Pastoralism and the Formation of Near Eastern Civilizations: Weaving Together Society*. Cambridge: Cambridge University Press.

Porush, David. 1998. Telepathy Alphabetic Consciousness and the Age of Cyborg Illiteracy. In *Virtual Futures: Cybernetics, Technology and Post-Human Pragmatism*. Edited by Joan Broadhurst Dixon and Eric Cassidy. London and New York: Routledge.

Renfrew, Colin, and Iain Morley. 2010. Measure: Towards the Construction of Our World. In *The Archaeology of Measurement Comprehending Heaven, Earth and Time in Ancient Societies*. Edited by Iain Morley and Colin Renfrew. Cambridge: Cambridge University Press.

Richardson, Seth. 2012. Early Mesopotamia: The Presumptive State. *Past and Present* 215: 3–49. [CrossRef]

Sandars, Nancy. 1960. *The Epic of Gilgamesh*. Harmondsworth: Penguin.

Schmandt-Besserat, Denise. 2010. The Token System of the Ancient Near East: Its Role in Counting, Writing, the Economy and Cognition. In *The Archaeology of Measurement Comprehending Heaven, Earth and Time in Ancient Societies*. Edited by Iain Morley and Colin Renfrew. Cambridge: Cambridge University Press.

Schmandt-Besserat, Denise. 2014. The Evolution of Writing. Available online: https://sites.utexas.edu/dsb/tokens/the-evolution-of-writing/ (accessed on 8 August 2019).

Scott, James. 2017. *Against the Grain: A Deep History of the Earliest States*. New Haven and London: Yale University Press.

Sloterdijk, Peter. 2014. *Spheres 2: Globes—Macrospherology*. South Pasadena: Semiotext(e).

Steffen, Will, Katherine Richardson, Johan Rockström, Sarah Cornell, Ingo Fetzer, Elena Bennett, Reinette Biggs, Stephen Carpenter, Wim de Vries, Cynthia de Wit, and et al. 2015. Planetary Boundaries: Guiding Human Development on a Changing Planet. *Science* 347: 6223. [CrossRef] [PubMed]

Time Staff. 2015. Donald Trump's Presidential Announcement Speech. *Time*, June 16. Available online: https://time.com/3923128/donald-trump-announcement-speech/ (accessed on 19 August 2019).

Tsing, Anna Lowenhaupt. 2005. *Friction: An Ethnography of Global Connection*. Princeton and Oxford: Princeton University Press.

Tudge, Colin. 1998. *Neanderthals, Bandit and Farmers: How Agriculture Really Began*. London: Weidenfeld & Nicolson.

Ziolkowski, Theodore. 2012. *Gilgamesh among Us: Modern Encounters with the Ancient Epic*. Ithaca and London: Cornell University Press.