EDITORIAL

The Time of Materials

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Materials are not in time; they are the stuff of time itself.
Tim Ingold (2012)

The papers in this issue investigate the interactions between time and materials. They explore the ways in which materials are *in* time, in the sense that they are caught up in the superficial extensive nature of chronological time that gives them identities and fixes them in certain ways; and the ways in which materials become, as Tim Ingold argues, "the stuff of time" by realizing distinct temporal ontologies. While the idea that materials are in and of time may seem a banal observation for archaeologists, Ingold's orientation is more philosophical and more concerned with exactly *how* material and temporal processes interact and influence each other. In his argument, materials are not simply inscribed with time but become it in their ongoing flux and unfolding. This recognition of the liveliness of materials and of matter as movement opens up new perspectives on time. It challenges many archaeological, geological and anthropological accounts of the relationship between time and materials in which the artefactual realm of objects and fragments exists as an inert repository for human speculations about times past and, increasingly, times to come. It also challenges the tendency for abstract and immaterial accounts of materiality that have proliferated in recent debates, by foregrounding the contingency of material properties and the ways in which they are enacted in time and also produce time.

Using a variety of different disciplinary approaches and methods these papers explore how the temporalities of diverse nonhuman materials emerge and become potent through recursive interactions with formative and formidable processes. In **Josh Reno**'s paper the practices of amateur astronomers are revealed as utterly dependent on the shifting and layered temporalities of extra-terrestrial phenomena. Avocational astronomy is not simply attuned to but fundamentally shaped by the radical space-times inhering in objects, both distant and intimate. The growing problem of orbital space debris which threatens to interfere with extra-terrestrial human ambitions shows that, even here, efforts to mediate and mitigate debris depend on emergent, inhuman rhythms. **Cristián Simonetti and Tim Ingold** explore competing accounts of the temporalities of environ-

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mental change in science and engineering and in anthropology. Using the examples of ice and concrete – two materials characterized by their capacity for solid fluidity – they show that these processes are not opposed or mutually incompatible. They are not punctuated contrasts that reveal the distinction between time as measurable succession and temporality as flow and continuity; rather, solid fluidity must be understood as generating an ontology of constant variation and becoming in which rhythm enables open and ongoing exchanges with environments. **Juan Salazar** is also interested in ice. He explores how glaciologists use ice-sheet modelling to trace the flows of ice and the movement of glaciers in their attempts to understand glacial cycles and evolution and also predict future ice-stream dynamics. Ice cores have become central to climate modelling and the dynamics of ice now inform contested projections of future geophysical conditions on Earth. These practices show how Antarctic ice – the oldest on the planet – also anticipates the temporality and natures of the future.

While the time of the Anthropocene implicitly shadows all papers, some wrestle with its material complexities directly. **Ben Dibley**'s analysis of the technofossil explores how it has been framed as a "golden spike" in geological time scales. For geologists advocating the notion of the Anthropocene, the deposits of human technology buried in the Earth's crust are not only that species' geological legacy, but the mineral markers of its emergence as a major geo-force. However, while the technofossil has been important for geologists making the case for the Anthropocene's formalization as a geological interval, its pathos is of equal import in building a public for it. In the hands of the Anthropocene's stratigraphers the prospective mineralization of human activity is also the species' anticipated memorialization. The strata of the Anthropocene will be a memorial to human existence – to the era of its doing and undoing. Dibley shows how the technofossil is as much a *memento mori* as it is a heuristic for imagining a world after the human – a "world without us". **Denis Byrne** looks to the sandstone seawalls around Sydney Harbour to reflect on how the steady erosion of this material and the rising lapping of the sea reveal anthropogenic climate change in action. Erosion shows how the time of sandstone and the time of human forgetfulness and denial ("*it's not happening, it will never happen*") interact. Meanwhile, underneath our feet, the *terra firma* of the land reclaimed in order to build seawalls and expand foreshore property steadily washes away. **Astrida Neimanis** gets to the time of the Anthropocene through discarded Second World War chemical weapons in the Gotland Deep. The chemical latency of these materials generates an uncanny temporal lag in which effects from the past can become reactivated at any time. But this threat is not the only temporality in play. These chemicals are also the time of militarization, of slow violence and of anthropogenic changes in the waters that are prompting anoxic suffocation. The issue is not to document these different times and temporal scales but to investigate their interactions, how they make each other and make queer times.

Fire is **Tim Neale**'s focus. Australia, along with California and Spain, is experiencing more frequent and intense bushfires as a result of the higher temperatures and drier fuels generated by climate change. He explores how scientific knowledge of fire behaviour – and, thereby, the future of fire – is reliant on a specific set of materials and temporalizing practices. These include, for example, reading geological charcoal deposits as signs

of the presence (or absence) of precolonial Aboriginal fire regimes, or using algorithms based upon small-scale experimental fires in the 1960s and 1970s to predict the fire intensity in anticipated landscape-scale disasters. Attending to such diverse materials and practices reveals the extent to which human entanglements with fire and its futures are conditioned by a politics of anticipatory control.

Finally, **Gay Hawkins** and **Elana Resnick** respectively tackle the mundane materials of plastic and glass. In trying to understand how a material as tough and durable as plastic became classified as transient and disposable Hawkins explores analyses of presentism, a temporality that is seriously neglected in current debates. She explores the processes whereby the actual material qualities of plastic's endurance and synthetic immortality were obliterated by the economic and cultural practices of single use and rapid turnover. Disposable plastic things generate a distinct temporal ontology marked by being immediately present, transient and ephemeral. These things seem to be most definitely in the flow of time: barely there before they are gone, but what does this presentism affirm? And what role does plastic's plasticity play in the material realizing the present as direct, without history or origin, and endlessly replaceable? Resnick, meanwhile, examines the nested temporalities of glass in a changing eastern Europe, foregrounding the ways in which the materiality of glass connects various periods of political-economic change and scales of time. Glass in this context provokes a complex network of temporal relationships between the biological life of food extended by jarring, the accumulation of glass recyclables in industrial warehouses awaiting the right market price, and the continuities and disjuncture between state socialism and the neoliberal project of Europeanization, in which single-use consumption is celebrated as evidence of capitalism arriving at last.

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References

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