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Heritage assemblages, maintenance and futures: Stories of entanglement on Hampstead Heath, London

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ABSTRACT

This paper investigates a heritage assemblage in which the most prominent elements are an old brick arch and a massive beech tree, entwined together on Hampstead Heath. In drawing upon the figure of the assemblage, I explore how the practices of maintenance and management must take account of numerous human and nonhuman agencies that shape the ongoing emergence of the arch-tree assemblage. These multiple interactions continue to emerge and vanish according to divergent temporalities. I argue that in resisting reified, reductive accounts, more complex, layered narratives about heritage objects might be compiled to detail their historical entanglements with multiple forces and agencies. An awareness of these complexities also informs contemporary maintenance practices and provoke diverse conjectures about their futures.

This paper investigates a heritage assemblage in which the most prominent elements are an old brick arch and a massive beech tree, entwined together on Hampstead Heath. In drawing upon the figure of the assemblage, I explore how practices of maintenance and management must take account of numerous human and non-human agencies that continue to shape the emergence of the arch-tree assemblage. These multiple interactions continue to emerge and vanish according to divergent temporalities. I argue that in resisting reified, reductive accounts, more complex, layered narratives about heritage objects might be compiled to detail their historical entanglements with multiple forces and agencies. An awareness of these complexities also informs contemporary maintenance practices and provokes diverse conjectures about their futures.

A remarkable sight greets walkers in a quiet glade of Sandy Heath, an area of London's Hampstead Heath. An archaic brick and stone edifice with a central round arch surmounted by a stone lined pediment is conjoined by two lower flanking walls to comprise a 6-m-long, 4-m-high structure. This is Pitt's Arch. Enmeshed with the old arch and looming over it, is a venerable beech tree, colossal in height and width, its huge bole dividing into four mighty subsidiary trunks that each support hefty branches. The tree has wholly enveloped parts of the arch's flank wall; the remainder of this flank leans towards the ground supported by a sturdy buttress fashioned from timber and steel poles to prevent collapse. These entangled things constitute an arch-tree assemblage (see Fig. 1).

If you linger, subsumed by colour, light, temperature, sounds, textures and smells, a circulating array of more-than-human energies become apparent. They inhere in gravity, growth and decay, the breeze, birdsong, the impress of the past and the inexorable flow of time. Such vital forces, Vannini and Vannini contend, 'demand that 'we turn our attention to stories awaiting to be heard'.[1] These stories tell of the entangled histories of both humans and non-humans and of their ongoing role in co-creating place, of change, impermanence and emergence.[2]

In this paper, I seek to tell some of these stories in contributing to an expanded approach to heritage interpretation. First, I explore the assemblage as a potent theoretical figure through which to investigate the ongoing entwining of the arch and the tree with each other and with innumerable situated human and non-human forces. After outlining a brief history of the site, I investigate how heritage management practices have responded to these non-

[1] P. Vannini and A. Vannini, Attuning to wild atmospheres: Reflections on wildness as feeling, *Emotion, Space and Society* 36 (2020) 1–8, 6.

[2] A. Tsing *The Mushroom at the End of the World: On the Possibility of Life in Capitalist Ruins*, Princeton, 2015.

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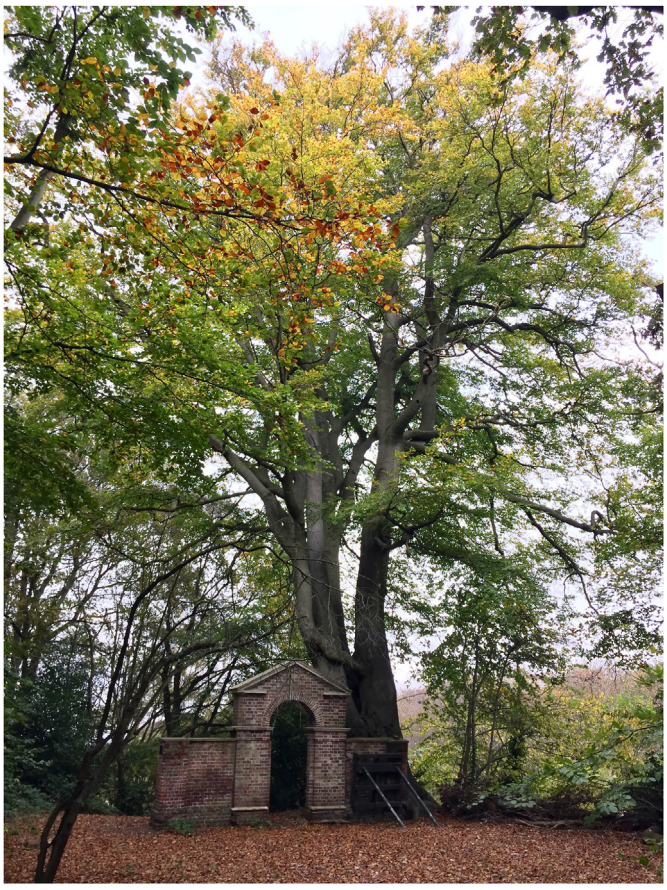

Fig. 1. Pitt's Arch and Beech Tree, Hampstead Heath, author's photograph.

human agencies and subsequently shaped the shifting forms of arch and tree, looking at how changing aesthetic appraisals, technical understandings and heritage values have informed these interventions. I then discuss how the ensemble of human and non-human forces that act upon the two things produce deep, complex multi-temporalities. While a thick sense of the past inheres in each form, I also consider how heritage management and maintenance practices envisage different futures and impact upon the destinies of the assemblage.

Entanglement and assemblage

The figure of the assemblage, originating in Deleuze and Guattari's notion of *agencement*, has been variously interpreted, most influentially by Manuel De Landa.[3] However, I largely follow accounts from critical heritage studies and archaeology that adopt the concept. As Jane Bennett claims, 'there never was a time when human agency was anything other than an interfolding network of humanity and non-humanity'.[4] Consequently, she insists, 'an assemblage owes its agentic capacity to the vitality of the materialities that constitute it'.[5] In foregrounding the emergent qualities of these heterogeneous elements that collectively constitute an assemblage, making it cohere for a while or subsequently unravel, we can become alert to the different, shifting agencies they exert. This is particularly salient in considering how heritage interpretation and practice might understand and manage a dynamic, entangled assemblage such as that of the arch-tree in the present and into the future. This provides a more substantive picture of its emergence over time and underpins how this ongoing material transformation lures humans into practices of maintenance and repair.[6]

In developing a critical heritage approach, Rodney Harrison forcefully advocates a key tenet of assemblage thinking in refusing to distinguish between those things formerly organised into the separate domains of culture and nature.[7] Instead, these elements are thoroughly entangled, as amply evidenced by the complex assemblage that includes the arch and tree. This interpenetration means that taking account of the multiple material relationships in which we are entangled can contribute to a more balanced perspective from which to explore heritage from an 'anthroposcenic' perspective.[8] Moreover, it allows us to grasp that the arch-tree assemblage has emerged from a complex mix of human and non-human actions and processes.[9]

In focusing on their emergent qualities, archaeologist Yannis Hamilakis contends that 'assemblages are contingent and temporary, and have the endless generative potential to lead to new configurations, new assemblages', and this ongoing transformation enables new material, social and political possibilities to emerge.[10] This ongoing material transfiguration over time, Hamilakis argues, also reveals that an assemblage constitutes 'a multiplicity of times, of various pasts and various presents, but also a multiplicity of temporal modalities: geological times, archaeological/historical times, human experiential times, non-human animal experiential times'.[11] Archaeological and heritage assemblages are thus typified by 'dynamic folding, intersections, and entanglements of time'.[12] Consequently, they may be encountered at particular times when certain temporal effects have become prominent – older elements rise to the surface or conversely, swiftly erode, or new growth rapidly emerges. In interpreting an emergent heritage assemblage, geographer Nadia Bartolini' draws on the metaphor of *brecciation* to identifies how things of different vintage accumulate and mingle in an ongoing flux, transcending the temporally linear, layered figure of the palimpsest.[13] In insisting that an assemblage often extends below ground, Bartolini offers a critical insight for exploring the arch-tree assemblage, for it includes foundations and roots amongst many other agencies within its jumbled, transitional underground.

In taking account of the multiple temporalities of the assemblage, anthropological archaeologist Matthew Reilly also points to the 'pluralities of envisaged futures', with evidence of engagements in the past that have the future in mind, an imagined future that may not have eventuated and interventions that have become obsolete,

[3] G. Deleuze and F. Guattari (1987) *A Thousand Plateaus: Capitalism and Schizophrenia*, Minneapolis, 1987; M. DeLanda, *A New Philosophy of Society: Assemblage Theory and Social Complexity,* London, 2006.

[4] J. Bennett, *Vibrant Matter: A Political Ecology of Things*, Durham, NC, 2010, 34.

[5] Bennett, *Vibrant Matter*, 31.

[6] R. Harrison, On heritage ontologies: rethinking the material worlds of heritage. *Anthropological Quarterly,* 91 (2018) 1365-1383.

[7] R. Harrison, Beyond 'natural' and 'cultural' heritage: toward an ontological politics of heritage in the age of Anthropocene, *Heritage and Society*, 8 (2015) 24-42.

[8] D. Matless, The anthroposcenic. *Transactions of the Institute of British Geographers*, 42 (2017) 363–376.

[9] T. Edensor, Entangled agencies, material networks and repair in a building assemblage: The mutable stone of St Ann's Church, Manchester, *Transactions of the Institute of British Geographers*, 36 (2011) 238-252.

[10] Y. Hamilakis, Sensorial assemblages: affect, memory and temporality in assemblage thinking. *Cambridge Archaeological Journal*, 27 (2017) 169–182, 175.

[11] Hamilakis, Sensorial assemblages, 173.

[12] M. Reilly, Futurity, time, and archaeology. *Journal of Contemporary Archaeology*, 6 (2019) 1–15, 2.

[13] N. Bartolini, Rome's pasts and the creation of new urban spaces: brecciation, matter, and the play of surfaces and depths. *Environment and Planning D: Society and Space*, 31 (2013) 1041–1061.

even counterproductive to their intentions.[14] Through these processes, certain assemblages endure for longer than others, especially those that are valued and subject to human interventions to maintain, conserve and restore them. In this context, Rodney Harrison considers heritage as an active assemblage itself, as approaches shift to form new heritage ontologies that foreground particular pasts, practices, technologies and approaches to conservation.[15]

For heritage ceaselessly assembles diverse technologies, people, institutions and procedures. National listing practices, declarations, institutional modes of narrating, classifying and curating objects co-exist with local practices, reports and inspections, displaying an ontological plurality rather than a monolithic ideology or systematic approach. This plurality, according to Harrison, 'provides us with multiple templates with which to imagine alternative futures *for* heritage, and future alternatives *to* heritage'.[16] He contends that visions and strategies may emerge 'in dialogue among individuals, communities, practices, places, and things'.[17] Exemplifying this process, I discuss below how a gathering of diverse professionals, managers, enthusiasts and experts collaborate to plan the future of the arch-tree assemblage.

Dominant notions that heritage assets are irreplaceable and constitute non-renewable resources has underpinned a 'commitment to protect heritage from damage, decay and destruction'.[18] Yet with the acceptance that climate and environmental change will inevitably lead to widespread loss, new heritage values, attachments and narrative potentials are emerging. Notable are ideas about relinquishment and Caitlin DeSilvey's notion of curated decay, approaches that diverge from idealistic and unrealistic goals to preserve heritage objects for future generations and acknowledge that ceaseless repair and maintenance may be unsustainable.[19] This is the case with the arch-tree assemblage; the beech has a finite life and cannot be preserved forever.

Despite an awareness that it cannot last forever, there has been an ongoing consensus to conserve the arch-tree assemblage for as long as possible, and this has involved the critical application of maintenance and repair. Maintenance and repair are vigilant human practices that seek to counter entropic tendencies and secure the immediate future of valued things; indeed, 'enormous effort is put into making objects achieve independency and anteriority', not least, in heritage conservation work.[20] Without this, non-human agents would reduce built environments to rubble; the tree would already have obliterated the arch.

However, although seeking to secure material continuity, maintenance can produce unpredictable consequences that unfold over time, with harmful and obsolescent techniques resulting in damaging outcomes. Accordingly, as Denis and Pontille suggest, maintenance and repair should be understood as an inevitable part of living with uncertainty, vitality and change, and with the dynamism of the assemblages with which we live.[21] Favoured approaches, technologies and techniques are superseded as new knowledge develops and divergent aesthetics emerge. In this sense, maintenance and management may successively enrol forms of matter, labour and expertise but also entangle new people and institutions into caring for things as part of emergent heritage assemblages.[22]

Finally, my discussion of the unfolding arch-tree assemblage notes Hamilakis's important insistence that an assemblage can also be construed as a conglomeration of affects in which elements diminish or enable the ability of each other to act.[23] Moreover, this vital materiality can also generate an affective force that impacts upon the sensory experience of those who come across assemblages, soliciting desires to gaze, touch and move. With heritage assemblages, these affects can evoke time, as 'certain planes of the past, or temporal occasions embedded in matter, voluntarily or involuntarily, acquire *sensorial intensity and affective weight*'.[24] As I will discuss, such affective and sensory intensities can emerge with an encounter with the arch-tree assemblage.

Origins and setting

Sandy Heath is part of the massive Bagshot Sands that were deposited by a giant river system in the semi-tropical conditions of the Eocene era 40–50 million years ago. The sand has been excavated since medieval times for making bricks and laying railways, and in the mid-nineteenth century, was extensively exploited by Sir Thomas Maryon Wilson, Lord of the Manor of Hampstead, who granted leases to numerous mining operators. Ignoring the rights of copyholders, tenants who customarily possessed a right to land, graze animals, take fuel and materials for building, and were usually obliged to undertake work or pay rent, Wilson exploited the land for profit and sought to deliberately despoil its aesthetic and recreational potential. Yet by the 18th century, the Heath had become especially esteemed for its mineral waters and became a highly popular recreational space for Londoners.[25]

Consequently, Wilson's mining operations were fiercely opposed by campaigners from the Open Spaces Society, and following Wilson's death, Sandy Heath became the first part of Hampstead Heath to become public land, acquired in 1871 by the Metropolitan Board of Works. The success of this landmark battle to preserve common land spurred subsequent acquisitions that extended the Heath to its current dimensions of 790 acres. Much of Sandy Heath's landscape remains pockmarked by the ponds and hillocks created by sand excavation, though it is now primarily covered with trees and shrubs. Like most of the Heath, it was once rough heathland, covered with gorse and heather and sustained by grazing and scrub-clearance to prevent woodland encroachment; indeed, sheep continued to graze on Sandy Heath until the 1950s. Over the past hundred years, however, grassy fields and extensive woodland have replaced the heathland, a more arboreal landscape that rapidly became favoured by many Londoners. These changing land uses and habitats signify how often contesting English landscape aesthetics, including notions of the picturesque, the wild, the pastoral and the arboreal have shaped the management of the Heath, an object of intensified concern as a cherished green space within an expanding city. Some campaigners continue to call for the re-establishment of heathland and the reintroduction of livestock, although the dominant preference is for the retention of woodland. Currently, Sandy Heath is densely wooded, the arboreal setting of Pitt's Arch.

[14] M. Reilly, Futurity, time, and archaeology, 2.
[15] Harrison, Beyond 'natural' and 'cultural heritage'.
[16] Harrison, On heritage ontologies, 1378.
[17] Harrison, Beyond 'natural' and 'cultural' heritage, 35.
[18] C. DeSilvey and R. Harrison, R., Anticipating loss: rethinking endangerment in heritage futures, *International Journal of Heritage Studies*, 26 (2020) 1–7, 2.
[19] C. DeSilvey, *Curated Decay: Heritage Beyond Saving*. Minneapolis, 2017.
[20] I. Farias, Introduction: Decentring the object of urban studies, In: I. Farias and T. Bender (Eds), *Urban Assemblages: How Actor-Network Theory Changes Urban Studies*, London, 2010, 1–24, 13.
[21] J. Denis and D. Pontille, The multiple walls of graffiti removal: Maintenance and urban assemblage in Paris, In: A. Brighenti and M. Kärrolm (Eds), *Urban Walls: Political and Cultural Meanings of Vertical Structures and Surfaces*, New York, 2018, 215–235.
[22] Harrison, Beyond 'natural' and 'cultural' heritage.
[23] Hamilakis, Sensorial assemblages.
[24] Hamilakis, Sensorial assemblages, 174 (emphasis in original)
[25] Historical details derived from A. Farmer, *Hampstead Heath*. London: Historical Publications Ltd., 1996; J. Lee, Of Field and Forest: Aesthetics and the Nonhuman on Hampstead Heath, PhD dissertation, York University, Toronto, 2016.

The land that Pitts Arch stands on was untouched by industrial activities; in the later 18th century it was part of the family estate of Charles Dingley, a wealthy merchant and sawmill owner. The landholding was located south of the village of North End, a 17th century semi-rural retreat for wealthy Londoners. Dingley extended the family estate by two and a half acres between 1742 and 1769 and when completed, it accommodated a coach house, stables, garden, grotto, wilderness, and four other houses. In seeking to acquire political influence, he invited British prime minister (from 1756 to 1761, and 1766–1768), William Pitt the Elder, to his house on several occasions, most importantly when Pitt suffered prolonged periods of debilitating depression in 1766 and 1767. At this time, Dingley made improvements to the garden to gain the prime minister's favour, including what became renowned as Pitt's Arch.

The redesigned garden was a contemporary example of the picturesque style, epitomised at the much larger estate of Kenwood House less than a mile to the east. Such designed landscapes, with their faux ruins and follies, demonstrated a stylized informality that excluded any disruptive evidence of labour or industry. While they emphasised the visual, these landscapes were to be beheld from various prospects while walking. Pitt's Arch, with its round-arch, moulded stone impost bands, open pediment and stone coped flanking walls was influenced by the fashionable structures created by landscape architect William Kent (see Fig. 2). His designs are most exuberant at Stowe, Buckinghamshire, a confection of classically derived temples, grottoes, winding paths, lawns, bridges, monuments, water features and woodland. Though more modest, Pitt's Arch was similarly designed to solicit a striking architectural and visual experience during a walk around Dingley's estate.

Though we cannot ascertain whether he participated in the arch's design, especially given the state of melancholia into which he had sunk during his retreat, Michael Symes contends that Pitt was a garden design enthusiast, a central figure 'in spreading a taste for the pictorial and varied type of garden scene', and an advisor to many friends and acquaintances.[26] Symes suggests that Pitt's 'was an all-round approach which balanced plantings, "incidents" and the shaping of paths and water'.[27] The arch seems to constitute such an 'incident', and if not designed by Pitt, was likely influenced by his tastes. Unfortunately, while Pitt and Dingley are prominent in narratives about the arch, like other heritage accounts, those who laboured to extract and shape the stone, manufacture the bricks, transport the materials to the site and skilfully assemble the structure are ignored. This resonates with Raymond Williams' critique of histories that typically efface the role of labour and ignore the social relations necessary to produce landscapes and buildings.[28]

The arch is constructed out of bricks and mortar and embellished with Portland Stone. Following its extensive use in the late 17th century construction of St Paul's Cathedral, imports of this tough, white-grey limestone, quarried at the Isle of Portland, Dorset, accelerated to the extent that it became known as London's 'local stone'. An oolitic limestone from the Jurassic period, 150–200 million years ago, it was forged from millions of small marine fossils, revealing how as Lesley Instone exemplifies, the 'geo merges and mingles with the bio'.[29] The arch's handmade stock bricks were probably manufactured at one of the several local brickworks and

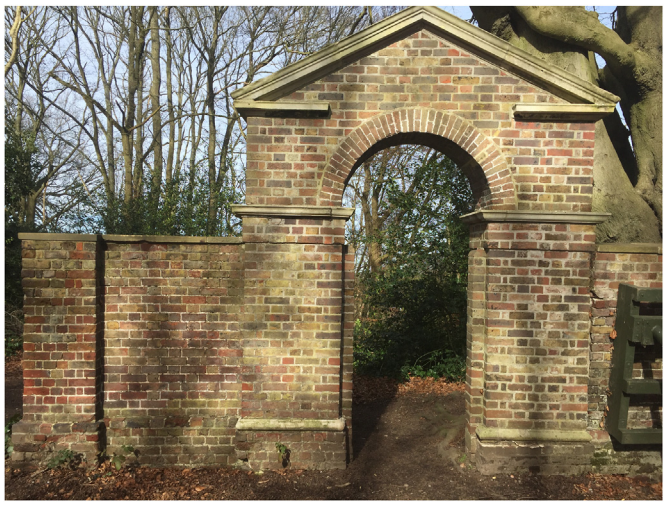

Fig. 2. The Kentian architecture of Pitts Arch, author's photograph.

derived from one of the 18th century clay pits that were worked on the Heath, foretelling of the expanded 19th century brick production that exploited the abundance of the material found in the silty, sandy Claygate beds. The arch thus provides a snapshot of the historical supply network at the time it was built. The spatial connections through which an assemblage is constituted may be differently scaled, far flung or very near at hand.[30] Before the 18th century, the stone and brick used for the material infrastructure of most places was overwhelmingly local, yet the sourcing of the Portland Stone used to construct Pitt's Arch prefigures the present-day extended global supply of urban construction materials.

Beech trees (*fagus sylvatica*) are native to south-east England and mark the border between the European deciduous forest zone and the northern pine forest zone. Like other old beech trees, the large specimen next to Pitt's Arch provides a habitat for hole-nesting birds, wood-boring insects, fungi, mosses and lichens. Beech trees carpet the woodland floor with leaves and mast, rendering it inhospitable for only but a few specialist native orchids and box plants, yet beech mast provides food for badgers, rodents and wood pigeons. As with other large trees, this beech relies on an underground network of mycorrhizal fungi to which it passes sugars in exchange for minerals.

This tree has inserted itself into the environment, occupying space, transforming the nature of the soil, limiting the growth of other organisms and hosting others. Its growth has been accompanied by a multitude of non-human participants - soil nutrients, rain and sunlight, and innumerable animals, insects, birds, invertebrates, microorganisms and fungi that have lived off it, provided nourishment, broken down the soil, and produced the ecosystemic processes that have enabled it to prosper. This reveals how inapposite are conceptions of 'nature' as 'passive, static and mute'; the tree's growth to a point where it threatens the structural integrity of the arch shows that like other non-humans, as Dyke et al. contend, it 'resists and unsettles human schemes'.[31] Nonetheless, humans continue to play an important role in its life and destiny.

The origins of the beech are obscure. City of London Corporation tree management officer David Humphries conjectures that it is

[26] M Symes, William Pitt the Elder: The gran mago of landscape gardening *Garden History* 24 (1996) 126–136, 126.

[27] Symes, William Pitt the Elder, 135.

[28] R. Williams, *The Country and the City*, Oxford, 1973.

[29] L. Instone, Making the geologic with urban naturecultures: Life and nonlife on the Victorian Volcanic Plains grasslands of Melbourne, Victoria, Australia, *Geoforum* 106 (2019), 363–369, 367.

[30] T. Edensor, *Stone: Stories of Urban Materiality*, London, 2020.

[31] A. Dyke, H. Geoghegan and A. de Bruin, Towards a more than human approach to tree health, In: J. Urquhart, M. Marzano and C. Potter (Eds) *The Human Dimensions of Forest and Tree Health: Global Perspectives*, London, 2018, 445–470, 451.

possibly 'the remnant of a linear hedge that's been left and it's just been allowed to grow … you just wouldn't plant a tree so close to a structure'.[32] The ways in which the beech has adapted to changing conditions in seeking maximum opportunities for growth reveal it to be a 'fluid shape-shifter'.[33] Its multi-stemmed form has contributed to its longevity and size, and strikingly, the process of inosculation, whereby branches have come into contact with a neighbouring branch and grafted together to create a strengthening buttress, has extended the tree's stability and magnitude (see Fig. 3).

Humphries surmises that at 'one point, it would have been a very cylindrical tube of wood like a normal tree trunk but then you start seeing these buttresses developing and that's an adaptation to load and decay'. A photograph from 1954 shows the tree set amidst pasture with little surrounding tree growth (see Fig. 4). This indicates that the beech's growth may also have been facilitated by the restriction of competing plant species by sheep grazing.

Fig. 3. Inosculation, author's photograph.

Conservation and heritage: managing the beech tree, maintaining the arch

Since the early years of the twentieth century, the care of heritage spaces and objects has become increasingly undertaken under the custodianship of national institutions that mobilise an organised regime of systematic evaluation, explanation and protection. While this has generated what Laurajane Smith refers to as the authorised heritage discourse, in recent years, the number of special interest heritage groups has multiplied and diverse alternative perspectives have somewhat decentred the prescriptions of the rather monolithic national heritage authorities.[34] In considering the conservation and maintenance of heritage assemblages, landowners, local government departments, heritage and conservation bodies, environmental managers and voluntary organisations variously influence decisions about which elements of place and landscape should endure. Decisions about the maintenance of the arch-tree assemblage are formed through the interventions of local groups and nationally constituted organisations. For both arch and tree, as I now discuss, ongoing maintenance and care are complex.

Managing the beech tree

Historically, broadly speaking, trees have been primarily valued for their economic and practical utility, while also having religious, mythical and political associations.[35] Yet contemporary evaluations increasingly regard them as intimate, cherished elements of place and landscape, important for the mental and physical health of urban inhabitants and indicators of quality of life,[36] estimations that draw on the sensory and affective charge of trees as much as their symbolic meanings. Often valued for their picturesque and mythical qualities, deciduous trees in particular are markers of time, of seasonal change. Contemporaneously, they are also emotionally freighted symbols of environmental anxiety as well as significant local fixtures, spurring campaigns to preserve them. In this context, the beech tree, like many of the other ancient and veteran individual trees on Hampstead Heath, has become the focus of an accentuated desire to conserve and manage it.

As DeSilvey and Harrison detail, assessments about 'natural' heritage focus on the 'ecological, genetic, social, economic, scientific, educational, cultural, recreational and aesthetic values of biological diversity'.[37] In the specific case of the tree explored, the beech is cared for by the City of London Council whose tree management department is responsible for the trees on Hampstead Heath. Local decisions about specific trees are typically made in consultation with the Ancient Tree Forum, who identify and champion ancient and veteran trees they regard as worthy of protection and offer guidance for their maintenance.[38]

Not old enough to be assigned status as an ancient tree (for beech trees these are usually over 350 years old), the beech is classified as a veteran tree, valuable biologically, culturally or aesthetically because of its age, size or condition, and especially because of its remarkable inosculated branches. It is also categorised as a heritage tree because of its huge size and position in the landscape. Indeed, for Hampstead Heath's Open Spaces Department, 'the tree has as much heritage as the arch'.[39] It is also included in the Ancient Tree Forum's *Hampstead Heath Veteran Tree Trail*.[40]

Over the past 250 years, the tree has prospered without any major interference. David Humphries surmises that older management practices may have sought to aestheticize woodland areas of the Heath, intervening in the growth of the beech. For the dearth of low, drooping branches that might be expected in a tree of this age and size suggests that it may have been crown raised, whereby the crown is retained but the lower branches are removed, in this case possibly to create extensive views across the Heath unobstructed by foliage. If crown raising was undertaken, this has not

[32] Interview with David Humphries, 3 March 2021.

[33] Dyke et al, Towards a more than human approach.

[34] L. Smith, *The Uses of Heritage*, London, 2006.

[35] S. Daniels, The Political iconography of woodland in later Georgian England, In S. Daniels and D. Cosgrove (Eds) *The Iconography of Landscape*, Cambridge, 1988, 60–75; C. Watkins, *Trees, Woods and Forests: A Social and Cultural History*. Reaktion Books, 2014.

[36] C. Phillips and J. Atchison, Seeing the trees for the (urban) forest: more-than-human geographies and urban greening, *Australian Geographer* 51 (2020) 155–168; R. Jones, Grace in the street: arboreal atmospheres and the co-mediation of care, *Australian Geographer*, 52 (2021) 93-109.

[37] DeSilvey and Harrison, Anticipating loss, 2.

[38] https://www.ancienttreeforum.org.uk/.

[39] C. Locher, Hampstead Heath, *Forestry Journal*, https://www.yumpu.com/en/document/read/41634685/hampstead-heath-forestry-journal, last accessed 10 March 2021.

[40] Ancient Tree Forum *Hampstead Heath Veteran Tree Trail*, https://www.arcgis.com/apps/MapJournal/index.html?appid=90cf2175c2a84407beb8c1a0910f6caf, last accessed 18 February 2021.

Fig. 4. Pitt's Arch in 1954, courtesy of Baxter and Associates.

impacted upon the tree's long-term health. One evident visible intervention is a single pruning wound caused by an earlier saw cut to stop the tree from hitting the top of the arch.

More recently however, following inspections by tree officer and colleagues for the City of London Corporation, a range of interventions have been organised to retain the beech's health into the near future. Firstly, although the process of inosculation has ensured that it retains strength and structural stability, this has been reinforced by the sturdy tethering together of large branches to minimise the possibility of their breaking off (see Fig. 5).

Secondly, to ensure that an adequate supply of light is garnered by the tree for photosynthesis, halo pruning - cutting of branches belonging to the canopies of neighbouring trees - has been undertaken. This process also facilitates greater epicormic growth – thin branches that sprout from the lower part of the beech – to further increase the amount of light absorbed. Looking forward, David Humphries explains that 'eventually the tops will die and snap away and then you'll have this lower growth', which will become especially useful in retaining light-acquiring leaves unthreatened by wind load if higher branches are lost through storm damage.[41] He also emphasises that there must be a measured approach to halo pruning; if too much surrounding foliage is removed, excessive exposure to sunlight could scorch the beech's thin bark.

A third concern relates to the tree's relationship with fungi. Contemporary advances in knowledge about the role of fungi in ecosystems has transformed tree management. Most important is a growing awareness of how mycorrhizal fungi vastly extend the network that connects to the tree's root system, providing a symbiotic relationship that expands nutrition and improves soil quality, besides distributing nutrients to a wider community of plants. Trees of over 250 years such as the beech are susceptible to colonisation by the large polypore *Meripilus giganteus* which can cause root decay leading to a top-heaviness that increases the danger of toppling over during fierce winds. As Matthew Gandy notes, mature trees such as this 'pass through a series of stages of increasing spatio-temporal complexity within which the saproxylic dimension to their fauna steadily increases before a final reabsorption into the web of life'.[42]

This beech, however, has been colonised by *Perenniporia fraxinea*, a tough, woody, creamy-white fungus visible near the base of the trunk that lives on the rotting heartwood of the tree, but leaves the bark, cambium and sapwood intact, safeguarding the flow of

[41] Humphries, interview, 3 March 2021.

[42] M. Gandy, The fly that tried to save the world: Saproxylic geographies and other-than-human ecologies, *Transactions of the Institute of British Geographers*, 44 (2019) 392–406, 398.

Fig. 5. View upwards from base of beech tree, branches tethered together, author's photograph.

nutrients and water (see Fig. 6). The tree's interior condition was assessed by a sonic tomograph to confirm that more harmful fungi that attack the vascular tissue were not present. Two sets of 20 equidistant sensors were placed on nails driven into the trunk and attached to a hammer that sent a sonic wave through the tree to assess the density of the wood, revealing that the outer layers of wood remain strong despite the decaying heartwood.

Critically, besides an assessment of the health of the tree, an appraisal of its ecological value as a host for species of fungi, lichens, insects and bacteria takes place. A plethora of fungal forms thrive in different conditions, rely on different trees and exploit diverse parts of the tree, stages of tree growth and decay. For instance, the process of abscission, where during spells of drought the tree sheds smaller branches inessential to its sustenance provide a particular ground habitat for fungal micro species, while rotten pieces of timber that fall to the woodland floor attract different saproxylic organisms. Indeed, Britain's woodlands host nearly 2000 insects and over 3000 fungi that live on dead and decaying wood. A 2010 survey by Dan Hackett indicated that Hampstead Heath has a high Saproxylic Quality Index (SQI); it is a fungi-rich environment that accommodates several rare species amongst its decaying trees and piles of rotting wood.[43]

Whereas former management approaches may have assessed the tree as a separate organism, present practice consider it to be entangled with myriad other living and non-living elements. In this light, David Humphries underscores the necessity of considering the relationship between trees and fungi:

> That's one of the biggest lessons I've learned in my years. We used to clear everything up; we had a kind of Victorian value of making everything nice and tidy – gardening almost. But about 15 years ago we suddenly understood the value of maintaining dead wood in the environment - not getting rid of it, chipping it, burning it - because of everything it supports. The microcosms that live on dead wood feed the birds. It's a huge cycle.[44]

This chimes with a wider awareness wherein 'the conservation value of saproxylic habitats is now recognised internationally as one of the most distinctive features of woodland ecology'.[45] Contemporary heritage and aesthetic estimations in woodland management now celebrate as biodiverse and beautiful that which was once conceived as threatening and disorderly.

Fig. 6. *Perenniporia fraxinea* fungus extruding from the Beech Tree, author's photograph.

A fourth threat to the future of the beech tree lies in the popularity of the heath amongst Londoners, for in many areas, large numbers walk across its terrain, eroding soil and producing heavily compacted ground. In the last ten years, annual visitor numbers have increased from 7 million to 10 million, and during the recent pandemic lockdown, these numbers swelled further as people sought spaces in which to escape from their homebound sequestration. Soil compaction affects the capacity of tree roots to access water and nutrients and impacts upon the gaseous exchanges in the soil. Beech trees are notably affected by this compaction since most of the nutrients are derived from the top layers of soil. David Humphries recognises that the effects of compaction on levels of nitrogen, the health of the mycorrhizal fungi and the presence of nematodes in the soil is little understood but contends that more advanced knowledge needs to be developed through extensive soil sampling. Soil compaction, in combination with periods of drought, weakens roots and renders the tree vulnerable to strong winds. This concerns Humphries who states, 'after every strong wind I wonder about a number of big trees and I think, "How have they fared?"'

The ground around the beech is bereft of vegetation because its canopy blocks out light and its thick mast and leaf carpet inhibits

[43] D. Humphries, Standing dead trees in the urban forest, http://www.ancient treeforum.co.uk/wp-content/uploads/2016/12/David-Humphries-on-standing-dead-trees-Autumn-2014.pdf, last accessed 29 March 2021.

[44] Humphries, interview, 3 March 2021.

[45] Gandy, The fly that tried to save the world, 394.

the growth of other species. However, the pathway towards and through the arch is characterised by compacted earth caused by footfall. To divert pedestrians along particular routes and obviate further soil compaction, the arisings trimmed from surrounding trees during halo pruning have been gathered to form a dead hedge to limit access to one side of the tree. As with many other veteran trees on the Heath that have been fenced off to minimise the effects of soil compaction, the beech is partially protected from walkers. Yet as David Humphries acknowledges, 'we have to manage the increase in the number of people. It's a difficult thing to do, to get that balance right – the tree health – tree root ecology and increased people'.[46] This consideration of competing interests highlights how woodland management is an entangled, situated practice that requires immersion in place over time. In the case of the beech, certainly considered as an integral element of the Heath's heritage by the Ancient Tree Forum and the local tree manager, this is further complicated by its entanglement with the arch, a heritage object managed from a different institutional perspective.

Maintenance of the arch

As DeSilvey and Harrison disclose, the governmental statutory body, Historic England 'identifies values related to cultural heritage' as 'evidential', 'historical', 'aesthetic' and 'communal'.[47] Typically, as with Pitt's Arch, the organisation imparts its opinions about maintenance, restoration and management to the local authorities responsible for the care of heritage sites under their administration.

In 1980, Pitts Arch was listed as a Graded II building on the Statutory List of Buildings of Special Architectural or Historic Interest, a status upheld and overseen by Camden Council whose conservation officers recommend any repairs and may seek advice from Historic England.[48] In accordance with the values of English Heritage, the arch is specifically valued for its historical association with Pitt and as the only prominent vestige of Dingley's former estate, with its original design a 'key part of its significance' as a 'Kentian pedimented arch'.[49] It also possesses aesthetic significance 'as a surviving "folly" or "eyecatcher" feature'.

As discussed above, the beech tree is entangled with innumerable agencies that impact on its capacity to prosper, and this is also the case with the arch. For like all matter, brick and stone does not possess 'a fixed essence; rather matter is a substance in its intra-active becoming - not a thing but a doing; a congealing of agency'.[50] Stone and brick are typically more durable than many other elements in the built environment, possessing properties of density, longevity, manipulability and colour stability. Consequently, Pitt's Arch has remained in situ for 250 years. Yet lithic materiality is far from inert, and stone and brick change their composition at different rates according to their specific properties and the agencies that assail the assemblages in which they are entangled; plants, animals, water, air, chemicals and humans secure or threaten their stability.

The climate of southern Britain is not subject to the extreme cold and heat that cause stone to deteriorate but it is persistently damp. Consequently, the arch's yellow and red hand-made stock bricks have suffered cracking, and many are pockmarked. While the capacity to release and re-absorb moisture is one of the crucial capacities of brick, as with all porous building materials it is vulnerable to the weathering effects of rain and polluted air. However, the arch is quite sheltered by its position and the surrounding air is less toxic than in other parts of the city, and so while significant signs of age are obvious, it presently constitutes a compact assemblage. Fortunately, the arch stands on well-drained soil; the absence of any deposits of sodium chloride below the surface means that the brickwork remains free of salt-induced decay.

As with most building assemblages, the arch is a *habitat* for myriad non-humans for whom it affords nourishment and accommodation and they exploit its succouring qualities of chemistry, temperature, humidity and light, often within specific micro-habitats. This colonisation underscores Hinchcliffe and Whatmore's assertion that we should acknowledge the production of the material fabric of the world by non-humans as part of a 'recombinant ecology', an argument that resonates with the aforementioned insistence that heritage assemblages must be conceived as thoroughly entangling the human and non-human.[51] The arch's brickwork is subject to the agencies of biofilms, micro-organisms that adhere to each other and to lithic surfaces. These environmentally specific, complex communities of algae, bacteria, fungi, lichens, protozoa and mosses emerge according to the properties and capacities of the lithic qualities they colonise and to wider environmental conditions. Though not extensive, if left untreated for many years, subsequent biofilm growth might act as a gateway to larger, woodier, more harmful plants, the roots of which may penetrate the arch's brick and mortar. In addition, the cracks and crevices of the arch are home to insects and hundreds of spiders' webs. Where these colonising species offer no threat, contemporary conservation practices regard the patterns and colours they create as adding to patina and testifying to material age. By contrast, former aesthetic conventions directed maintenance workers to thoroughly cleanse surfaces, often causing harm to materials; however, no such stringent measures are apparent at the arch. These entanglements are deemed acceptable.

As Denis et al. emphasise, 'repair is at the heart of a continuous process that includes patching up, reconfiguring, interpolating, and reassembling settings from previous forms of existence'.[52] This foregrounds how maintenance timetables and inspection schedules widely vary in their frequency. At Pitt's Arch, such interventions have been sporadic. Repointing of brickwork was undertaken made in the 1960s or 70s and the arch was subject to emergency repairs in 1982 when the beech tree was threatening its integrity. Some matching replacement bricks were inserted but it was largely rebuilt using existing bricks, following the advice meted out by the Society of the Protection of Ancient Buildings (SPAB) to 'keep any remedial work to a minimum' to restrict 'the loss of the historic fabric' and 'retain the authenticity of the building'. Repair also followed SPAB's advice that original bricks 'can be carefully removed and then reversed to hide the decay'.[53] (see Fig. 7).

Photographs from the 1950s show that some of the Portland stone on the trimmings had disappeared, presumably through

[46] Humphries, interview, 3 March 2021.

[47] DeSilvey and Harrison, Anticipating loss, 2.

[48] British Listed Buildings https://britishlistedbuildings.co.uk/101113181-archway-to-former-pitt-house-garden-in-woodland-approximately-5-metres-east-of-road-hampstead-town-ward#.YC-J_S-l3jA, last accessed 10 February 2021.

[49] Alan Baxter and Associates *Pitt Arch, Hampstead Heath Structural Engineering and Conservation Study Draft,* prepared for City of London, London, 2009, 11.

[50] K. Barad, Posthumanist performativity: toward an understanding of how matter comes to matter, *Signs: Journal of Women in Culture and Society* 28(3) 2003, 801–831, 828.

[51] S. Hinchcliffe and S. Whatmore, Living cities: towards a politics of conviviality, *Science as Culture* 15 (2006) 555-570.

[52] J. Denis, A. Mongile and D. Pontille, 'Maintenance and repair in science and technology studies, *TECNOSCIENZA: Italian Journal of Science and Technology Studies* 6 (2015) 5–16, 9.

[53] Society for the Protection of Ancient Buildings (SPAB), A guide to the repair of old brick walls, https://www.spab.org.uk/advice/guide-repair-old-brick-walls, last accessed 9 April 2021.

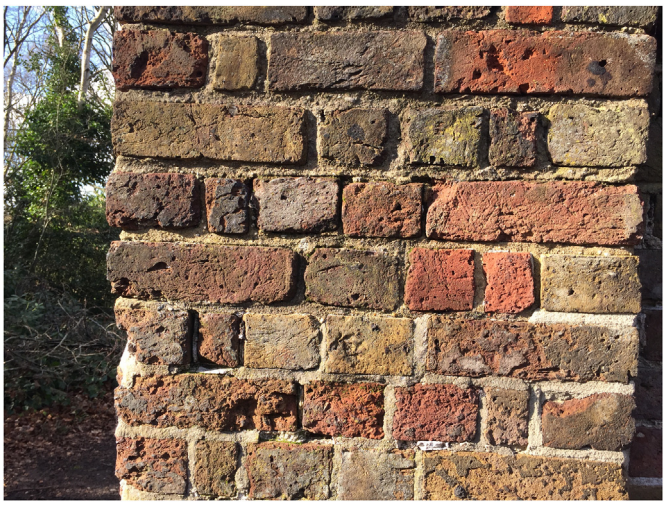

Fig. 7. Old brickwork on Pitt's Arch, author's photograph.

human appropriation, and this was replaced. More problematically, the 1982 repointing deployed impervious cementitious mortar which being more waterproof than the bricks, may ultimately lead to saturation and consequent spalling from frozen trapped water during icy weather. Finally, a decision was made to make a cut between the flank wall and the central arch to protect the latter.

In 2009, Camden Council, English Heritage and concerned members of the Hampstead and Heath Society considered that the arch required substantive intervention to secure it as an enduring feature in the landscape. Subsequently, Alan Baxter and Associates, a multidisciplinary design consultancy, were contracted to write a structural engineering and conservation report to advise on how this objective might be met. As their report acknowledges, the greatest threat to the arch remains the tree, for the 'fundamental problem is that both the brickwork and the tree are trying to occupy the same space'.[54] I now discuss the five options that they suggested.

Option 1 mooted the prospect of neglecting to undertake any renovation of the arch, aligning with a policy of what Bartolini and DeSilvey describe as allowing 'the landscape to change without intervening'.[55] As the tree grows, it will inevitably press against the arch. At first, the flank wall will crumble and later the rest of the structure will collapse, although it is difficult to estimate when this might occur. This course of action would be prompted by an acceptance that the arch will eventually dissolve into indistinction. Its time as a fixture in the landscape will have come to an end. Rather than preserving the arch and tree in an illusory perpetuity, such a choice would dispense with the current aversion to loss and accept what DeSilvey describes as acknowledging decay and erasure as part of dynamic change.[56] Option 2, which proved to be the successful solution, I return to shortly.

Option 3 proposed that the effects of the tree on the central arched section should be continuously monitored but the immediate threat of the tree's growth on the adjoining flank wall should be circumvented by its removal. This would have reshaped the arch, truncating its form so that a full appreciation of its proportions and dimensions would be curtailed. However, the report advises that a longer-term strategy could involve this removed part of the arch being 'carefully stored for when the opportunity came to rebuild this section, for example if the tree died'.[57] The future of the arch could thus be safeguarded by its rebuilding in years to come. This proposal offers an intriguing perspective that recognises the ongoing emergence of the site and the potential that future conditions will offer. While human intervention could be suspended for a time, it could be reintroduced by a restorative action when conditions allow.

In Option 4, it is asserted that the exact location of the arch is not particularly significant; accordingly, it could be relocated to a nearby site to avoid the depredations wrought by the tree. It would thus 'be carefully recorded, dismantled and rebuilt to the same design'. However, it is also acknowledged that 'the existing brickwork that is currently embedded in the tree would need to be left there to avoid the risk of damaging the tree'— so not all of the original parts of the arch that remain could be transported to the new site.[58] However, the site on which the arch stands was originally chosen to best bring out its relationship with the landscape and this singular vision would be lost, as would a sense of the tree's power and the extraordinary juxtaposition that the scene offers.

Option 5 considers that one solution would be to remove the tree. However, the prospect of losing a charismatic veteran tree such as this was, the report admitted, unlikely to be acceptable. The Ancient Tree Forum would likely protest, along with many other users of the Heath. In the past, when trees were valued according to different criteria, this solution may have been considered more practical but would be unacceptable in contemporary times.

In line with Baxter and Associates' strong recommendation, Option 2 was chosen, and repair and maintenance works were subsequently carried out, though the report advised that future monitoring may call for a 'more significant intervention as described in Options 3 or 4'.[59] The key intervention involved the creation of a robust buttress placed on a concrete plinth that would support the flank wall affected by the tree, while allowing it to slowly collapse by gradually inclining towards the ground (see Fig. 8). Critically, the buttress was sited after paying attention to its potential impact upon the roots of the tree, with trial pits dug to ascertain where this would be less harmful. This collaborative operation between tree specialists, architects and engineers deployed an air spade to carefully clear away the soil to show where root growth should be avoided by the installation (see Fig. 9).

In the intensified setting of Hampstead Heath, which has long been an epicentre of diverse ideas about heritage and landscape aesthetics, both arch and tree are currently recognised as possessing heritage value. Indeed, both have been subject to practices of maintenance and management over decades, but the operations carried out to sustain their presence have changed. This elucidates how maintenance is ongoing and incremental, characterised by impasses, unanticipated processes and agencies, sudden breakthroughs, new technical solutions, superseded aesthetics and values, and modes of making do. The humans involved have become part of a vital assemblage in which numerous constituents solicit contingent responses to their unpredictable, emergent effects. In dealing with the increasingly entangled tree and arch through the application of new technologies and materials, they have 'put forward competing claims from different occupational stances'.[60] And while debates have occurred over the choice of materials, techniques and aesthetics, the different institutional and

[54] Baxter and Associates, Pitt Arch, 12.
[55] N. Bartolini and C. DeSilvey, Landscape futures: decision-making in uncertain times, a literature review, *Landscape Research* 46 (2021) 8–24, 16.
[56] C. DeSilvey, *Curated Decay*.
[57] Baxter and Associates, Pitt Arch, 13.
[58] Baxter and Associates, Pitt Arch, 13.
[59] Baxter and Associates, Pitt Arch, 14.
[60] D. Lyon The labour of refurbishment: The building and the body in space and time, IN S. Pink, D. Tutt and A. Dainty (Eds) *Ethnographic Research in the Construction Industry*, London, 2012, 41–57, 57.

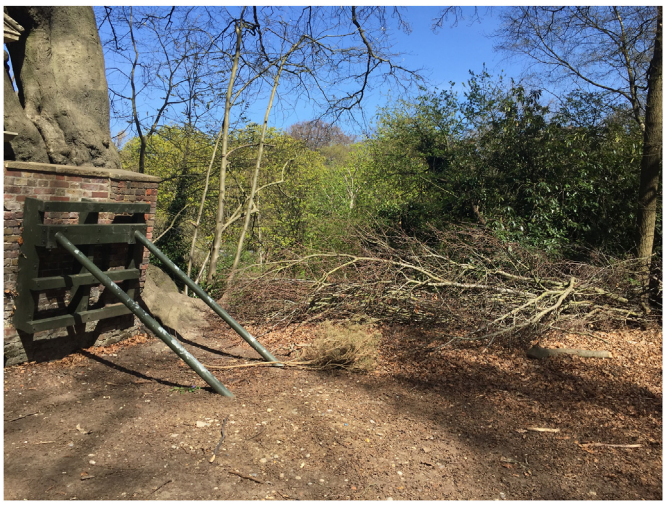

Fig. 8. The buttress and the dead hedge, author's photograph.

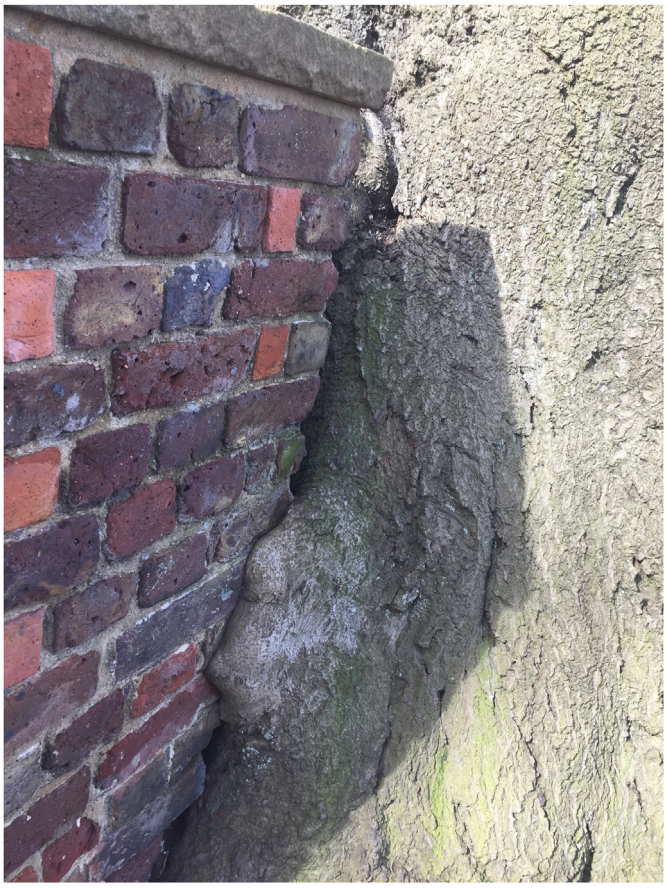

Fig. 9. Beech tree engulfing part of Pitt's Arch, author's photograph.

professional perspectives mobilised have arrived at a holistic settlement that allows both arch and tree to continue to subsist within a heritage assemblage, albeit provisionally.

The multiple temporalities of arch and tree

Maintenance endeavours have had to take account of the dynamic, ongoing changes wrought by the multiple entangled agencies that sustain and imperil the arch-tree assemblage. Heritage management, itself an assemblage, seeks to slow the flow of time in response to these vital effects, to temporarily arrest processes of decay, fragmentation, colonisation and material instability. These practices direct care towards certain elements of place and landscape, reaffirming their cultural value. As such, maintenance can produce recognisable durabilities in landscapes, acting to sustain the presence of cherished, familiar fixtures even as they continuously and irrevocably transform, visibly and invisibly.

Dallying in sites of vitality and profusion such as that on Sandy Heath can 'alert our senses, animate attachments and orientate us to certain ways of living with the world', attuning the visitor to texture and form.[61] Such feelings are surely also solicited through maintenance, and though it may seem to be based on detached judgements, equally, decisions are based on intimate, embodied experiences.[62] Accordingly, those involved in the heritage management of the arch-tree assemblage must become aware of how multiple intersecting temporalities inhere in the signs of change wrought on their material constituency and form. They exemplify Doreen Massey's contention that place is a setting for situated engagements between a host of human and non-human agents that 'form configurations, conjunctures of trajectories which have their own temporalities … where the successions of meetings, the accumulations of weaving and encounters build up a history'.[63] All too often, heritage interpretation reifies valued objects, ignoring these temporal multiplicities and entangled becomings, shaping narratives according to the role of prominent humans, architectural styles and discrete episodes from human history. At present, websites provide potted narratives of the arch's historical creation and scanty particularities about the tree's significance, while a small metal plate affixed to the arch provides brief details of its origins. There is little else that details the profusion of agencies, happenings, processes and interventions. Paying attention to the multiplicity of divergent temporalities at the arch-tree assemblage can expand the notion of the past and of heritage, and thereby inform the telling of more multi-faceted, complex accounts, as I now demonstrate.

In some ways, the past remains in place. When visiting, I am enticed to walk through the arch, lured by its form, texture and function, and I am drawn to caress the tree, run my hands over its bumps and scars, bathe in its shade and look upwards to its mighty branches and leafy canopy. In this way, I am connected to the people who moved through this place before me, apprehending sensations that belong to an 'ever-present'.[64] The tree still casts its shade and looms as it has for decades, and the arch still provides a textured portal that leads to the slope beyond.

Yet though these temporal consistencies persist, other aspects of the landscape have irrevocably transformed. The estate roamed by Pitt has dissolved, the pasture has disappeared, and the sounds of nearby sand extraction can no longer be heard. The tree has grown enormous, the arch has partially collapsed, and a host of other trees and shrubs have become recent neighbours. Newer bricks and stones have been inserted, stolen and replaced, mortar has been replenished, the flank wall has been cut adrift. Surrounding trees have been halo-pruned, branches tethered together, buttresses and dead hedges have been constructed and trunk health assessed. Biofilms, insects and fungus have penetrated, inosculation has

[61] K. Stewart, Atmospheric attunements, *Environment and Planning D: Society and Space* 29 (2011) 445–453.

[62] P. Gruppuso, Nature as a constellation of activities: movement, rhythm and perception in an Italian national park. *Social Anthropology*, 28(3) 2020, 629–645.

[63] D. Massey, *For Space*, London, 2005, 139.

[64] L. Olivier, The past of the present: archaeological memory and time, *Archaeological Dialogues* 10 (2004) 204–213.

taken place and the soil has transformed. Accordingly, the elements from different temporalities are jumbled together, exemplifying Bartoloni's notion of brecciation discussed above.[65] Where the tree has become entangled with the arch, some bricks have become buried, some absorbed in woody matter and others brought to the surface, melding divergent temporalities in a material assortment both underground and visible on the surface.

The beech tree grows, prospers and decays, displaying how like all trees, it is 'capable of exploiting a wide and contingent variety of circumstances', in this case, over several hundred years.[66] Under the unique conditions of this site, the beech has grown in specifically idiosyncratic ways; no other tree has quite the same configuration of branches or shapely trunk. In its present form, the tree embodies the entire history of its development from the moment it first took root, a history that includes the unfolding of its relations with manifold non-humans and humans. In this sense, like the trees studied by Cloke and Jones, the beech is 'is a marker of time, of circumstance, of ongoing embedded interconnections of things and people'.[67] It occupies vertical and horizontal space, and during its life it has dynamically transformed the space around it chemically, physically and culturally. Over time, it has also been exploited by diverse organisms during different phases of its life; it presently hosts fungi, insects and birds, while producing a thick mulch that restricts the growth of other organisms. It has conditioned how we move through space, and how we experience light, colour, wind and birdsong. It currently affords a distinctive kind of shelter in the rain, contributes to the textures underfoot, invites people to climb its lower branches, carve names into its bark, and offers a range of leafy and fungal aromas. When it decays and dies, all these things will change.

These sensory experiences underpin how humans are thoroughly imbricated in the historical, continuous emergence of arch and tree. These human entanglements began with the construction of the arch in the late 18th century, as garden designers and architects enrolled it into the production of a particular landscape aesthetic. Since then, a shifting array of tourists, enthusiasts, engineers, historians and tree managers have arrived to interpret, move across and amend the scene. The immediate environs and Sandy Heath as a whole has been 'both a highly produced landscape, and one that constantly escapes its "created" definition, growing and changing in its own way'.[68] Intermittent maintenance follows on from the numerous human engagements undertaken in the past and continues to take place against a shifting cultural and social terrain in which trends in landscapes aesthetics, understandings of nature and land ownership emerge, reign and disappear. The original picturesque, orderly aesthetics envisaged by the 18th century designers of this garden would be violated by the proximity of the tree to the arch. These tastes have been superseded by a dominant preference for rural wildness initiated by the campaigners to preserve the Heath for Londoners, as depicted by Jessica Lee.[69] Further, the decision to cease sheep farming and the more recent appreciation of trees as signifiers of locality, place and environmental wealth resonates with a broader context of planetary conservation. The arch and the land on which it is built are no longer the property of private individuals who may exploit and enjoy them as they wish but belong to an urban landscape of public recreation. Different human modes of encounter, appreciation and activity have thus circulated around the arch-tree assemblage. Yet though many may have evaporated, traces and memories of these older meanings, agents and practices haunt the site.

A consideration of a longer time scale dizzily reveals how the sandy ridge, the clay and the stone belong to a geological time in which 'minerals shift, churn, dissolve, and re-create themselves on and near Earth's surface'.[70] Gary Brierley writes that all landscapes manifest a geologic memory that remembers the inhuman tectonic, volcanic, depositional and erosive forces that have continuously forged topography.[71] The lithic materials in the arch and the substrata on which tree and arch stand conjure up the giant rivers and shallow tropical seas in which they formed, recording the ancient upheavals and formations aeons before human life. And as I have emphasised, they continue to change as brick dissolves and stone cracks as 'part of a continually moving lithosphere' that will eventually contribute to the formation of new geologic strata.[72] Such histories also belong to the assemblage. This sense of a deep past, when things were wholly otherwise, and the ceaseless change that characterises the site, conjures up another temporality: the future fate of this heritage assemblage.

Heritage futures

Efforts have been made to stabilize the arch, underlining its significance as a legible heritage artefact for the immediate future. While this may be a way stop on the road to eventual dissolution, it impedes decay from proceeding apace. Rather, like the sites discussed by DeSilvey, heritage management has involved 'improvisation and innovation in the face of uncertainty'.[73] The installation of the buttress acknowledges that soon, this part of the arch will probably crumble, yet its potential disassembly, storage and refabrication suggests that many years hence, it may once more be a whole structure. Yet although its form could be preserved indefinitely, its entire composition would need to be replaced as the remaining original lithic materials will inevitably decay and crumble. While this would produce something of a simulacrum of the original arch, a sense of its aesthetic contribution to the landscape would persist.

The future of the tree is more certain: it will die and fall, but when fungi will weaken it to the point of collapse, when a gale will force it to topple is indeterminate. Global warming may make the southern UK climate inhospitable for beech trees or the beech leaf disease currently emergent in North America may spread through British woodland. Moreover, As David Humphries acknowledges, 'We've had some spectacular failures with some of our big veteran trees, and that's part of nature, we can't guard against that completely, although we'd like to'. Yet alternatively, he conjectures that the beech's life might be prolonged by advances in knowledge:

> We're constantly learning and adapting what we learn and what we see, and I think what's key is what we see over periods of time - managing a tree over 30, 40 years and seeing those cyclical changes in the site. And knowledge is constantly adapting.[74]

[65] Bartolini, Rome's pasts.

[66] P. Cloke and O. Jones, *Tree Cultures: The Place of Trees and Trees in their Place*. London, 2020, 62.

[67] Cloke and Jones, Tree Cultures, 87.

[68] A. Garner, Living history: Trees and metaphors of identity in an English forest, *Journal of Material Culture*, 9 (2004) 88-89.

[69] J. Lee, A walk in the long grass: agriculture, aesthetics, and wildness on Hampstead Heath, *Landscape Research* 44 (2019) 846-856.

[70] P. Gillen, Notes on mineral evolution: life, sentience, and the anthropocene. *Environmental Humanities*, 8 (2016) 215–234, 217.

[71] G. Brierley, Landscape memory: the imprint of the past on contemporary landscape forms and processes, *Area* 42 (2010) 76–85.

[72] J. Cohen, *Stone: An Ecology of the Inhuman*. Minneapolis, 2015, 34.

[73] DeSilvey, Curated Decay, 6.

[74] Humphries, interview, 6 March 2021.

Stabilising measures to secure the tree may be persistently enacted until they seem futile or until falling branches render it dangerous to the public. Then, given the vast quantity of dead wood that will eventuate from its demise, the beech will potentially have a valuable afterlife as a rich saproxylic environment. Out of its decay will emerge future life and new possibilities. Perhaps new beech trees will be planted.

In shaping the destinies of heritage projects, as Bartolini and DeSilvey claim, 'envisioning a future state involves consideration of a complex network of agents, factors and disciplines, and requires stakeholders to work together towards a future goal agreed to in the present'.[75] On Sandy Heath, heritage and environmental managers have collaborated in securing the short-term persistence of the arch and the tree. They have become aware of the multiple human and nonhuman agents that have shaped the assemblage in the past and that may participate in its ongoing emergence in the future. Such considerations draw on an expanded notion of heritage that apprehends 'processes of care, inheritance, sustainability and connectivity *in excess of the human*, as a way of thinking through the entangled and dialogical nature of all heritage processes'.[76] Accordingly, in looking forward, they may be primed to 'find meaning in transition, transience, and uncertainty'.[77]

In this paper, in learning about the ongoing emergence of the arch-tree assemblage through its multiple entanglements with non-humans and humans over variable temporalities, I have been moved to tell diverse historic, current and future stories. In refusing to privilege highly selective, androcentric tales, heritage interpretation might similarly adopt far broader narratives about the objects they seek to care for over time. The figure of the assemblage, especially as interpreted by critical heritage and archaeology scholars, offers a conceptual basis from which to transcend such narrative stasis.

My focus exemplifies how heritage is one arena in which Henri Lefebvre's pluralist declaration that 'the most important thing is to multiply the readings of the city' might be addressed to contest reductive, conservative story-telling conventions.[78] Yet though important, the narratives of entanglement I have told tend to be overwhelmed by the exceptional affective and sensory intimations sparked by an encounter with the arch-tree assemblage. This affective potency is generated by their unique, unplanned juxtaposition, for the melding of the two forms accentuates the qualities and form of each. The material constituency of the arch is underscored by the ways in which the tree highlights its fragility, fragments its structure and envelops parts of the brickwork. The tree's enormity is accentuated by how it dwarfs both the arch and surrounding trees. Crucially, this assemblage has emerged at a particular time. Ageing and decay will eventually erase their special relationship, but thankfully, maintenance and management has ensured that they will be entangled together for some time yet.

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[75] Bartolini and DeSilvey, Landscape futures, 9.

[76] R. Harrison and C. Sterling, Introduction: of territories and temporalities, in R. Harrison and C. Sterling (Eds), *Deterritorializing the Future: Heritage in, of and after the Anthropocene*. London, 2020, 19–54, 28.

[77] DeSilvey, Curated Decay, 16.

[78] H. Lefebvre, The right to the city. In: E Kofman and E Lebas (Eds), *Writing on Cities* Oxford, 1996, 63–184, 159.