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Changeability, Variability, and Malleability: Sharing Perspectives on the Role of Change in Time-based Art and Utilitarian Machinery Conservation

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ABSTRACT

This paper explores concepts of changeability, variability, and malleability in the different heritage genres of time-based artworks and utilitarian machinery. Case studies bring to the surface differences in understandings, norms, and boundaries, but also demonstrate similarities between the two areas of practice, showing that they can be viewed as poles of practice within a shared field of theory and practice rather than as separate and unrelated endeavours. The key issues for all communities caring for changeable objects are how to preserve the intangible sensory, cultural, and immersive experiences created by change, and how the practical actions required to maintain this intangible heritage interact with concepts of authenticity, performativity, and intention. This paper explores how these relationships evolve as time and contexts change, and how best practice in the conservation of changeable objects must acknowledge and manage the tension between the activation that preserves intangible, embodied experience, and the static maintenance that preserves the tangible components of an object with minimal physical change. Viewing objects through the lens of change opens the door to the development of a new field of conservation expertise, one focused on the challenges and opportunities presented by an object's changeable qualities rather than by its original field of use. A lens of change has the capacity to draw together not only those working with time-based artworks and utilitarian machinery but also other communities of people caring for and activating changeable objects, such as horologists, roboticists, musicians, car enthusiasts, people activating historic costumes, and people managing still-active historic utilities such as water and transport infrastructure.

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Introduction

An historic steam locomotive and a contemporary time-based artwork do not, at first glance, seem to have much in common. Their materials, appearance, and perceived significances are usually dissimilar, and the ways in which they are displayed, maintained, and used are also usually very different. They do, however, share a quality that is unusual within historic collections – they are made to be changeable. This does not merely mean that they can change, but that, without the element of change, the most fundamental aspects of these objects, the activation that gave them roles in people's lives and which made them memorable, ceases to exist. All that remains is the enabling structure which allows the cultural object to come into being when the appropriate functions are activated (Sherring, Murphy, and Catt 2018, 7).

The importance of change to the experience of such objects is described in relation to installation artworks by Tatja Scholte:

As a spectator, one physically enters the space of the installation and undergoes a combination of sensory,

aesthetic and psychological experiences. Inside that space, anything can happen: projections, machines making noises and motions, an accumulation of countless objects, smells or other sensations and, in some cases, a live performance. Words such as 'theatrical', 'immersive' or 'experimental' are often used to indicate that the artist intends the installation to create a total experience. (Scholte and Wharton 2011, 11)

Preventing, or failing to facilitate, change profoundly alters the impact of such objects, and promotes the loss of the intangible heritage associated with the object.

Many museum objects and artworks can be made to move, but most are not inherently changeable. This norm of lack of change has led to the development of a negative paradigm in which change is understood primarily as deterioration; an event or action that results in loss of originality, loss of evidence of life history, and a consequent degradation of authenticity (Jones 2009). This in turn has driven the development of codes of ethics and standards that recommend against the interventions that are required to sustain the capacity for change:

... there are many types of modern and contemporary artworks for which the guidelines have become an obstacle rather than a solid base. When it comes to conserving installation art, media art, or performances—experimental works that are inherently variable because of their concept, technology or materials—preservation and restoration of their material components might [be seen to] interfere with their artistic identity. (van de Vall 2015, 287)

For both changeable artworks and machines, change is fundamental to understanding their meaning and to sustaining their social value. Preventing change in these objects causes the immediate loss of the intangible experience of their movement and function, and in machines it also causes rapid loss of the intangible and embodied knowledge of how to maintain and operate the object, as well as the cultural practices based around the understanding and maintenance of the object's ability to change.

This creates a dilemma for people caring for changeable objects: if the objects are *not* kept active the intangible heritage that is a major part of their identity and significance will be lost. If they *are* kept active, however, their original components and material will become worn, requiring interventions such as restoration or replacement that are frequently identified as unprofessional conservation practice.

The art world has spent considerable time and money grappling with these issues, looking for new theoretical underpinnings that bridge the gaps between different practices and enabling them to be seen more constructively as different points on a continuum with a consistent underlying philosophy and value system. Referring again to van de Wall, 'For more than two decades, the field of contemporary art conservation has in fact been looking for new methods and strategies to preserve such works without compromising their artistic integrity (2015, 287–288). This has led to a significant body of work (see for instance Hummelen and Sillé 2005; Laurenson 2006; Scholte and Wharton 2011; van de Vall 2015; Rivenc and Bek 2016; and Hölling 2017) that, because of the similarity of issues and challenges, is highly relevant to the conservation of machinery.

This paper will first explore what forms change can take, why its preservation is important, and how it interacts with concepts of authenticity and originality. The paper will then discuss emerging ideas in the conservation of time-based artworks and utilitarian machinery heritage, including the relevance of theories of performance, the separate roles of 'sculptural' components that are valued for their material uniqueness versus components that are merely enabling equipment, and the notion of authenticity as a process-based quality that is enhanced and kept present through attention, intention, and extension. It is worth noting that while display of any object is

likely to cause change – even a traditional artwork, such as a painting carefully hung on a wall, will be subject to cumulative light damage and the potential for catastrophic damage through accident or vandalism – this paper will focus on objects where activation involves intentional and readily discernable change in an object.

Further, this paper approaches the idea of change in objects from a perspective of value rather than risk. Risk management is a paradigm framed around fear of loss, and the development of practices of avoidance that are required to prevent that loss (May 2020). Henderson, however, notes that

... The [conservation] profession's concern for the careful management of change results in the situation where it often falls to the conservator to articulate the negative consequences of some activity rather than the one considering the activity in terms of the opportunities it presents for learning, self-actualisation or fun. (2020, 9)

Value is a paradigm framed around appreciation and involves the recognition and enhancement of aspects that are seen to contribute to an object's usefulness and worth. The authors see risk management as a process that can follow, and help to implement, decisions about the value of change in an object but, like Henderson, feel that conservation decision making regarding change would benefit from being grounded in a positive appreciation of value and opportunity rather than a negative lens of potential loss.

Two definitions are important for reading this paper. Firstly, machines start their lives with a period of functional use that will be referred to as their 'service life'. This may include multiple sub-periods, in which they may have different owners and may even be adapted to perform different functions. When their service life is over, they may be re-defined, as 'heritage items' (often after a phase of abandonment and neglect). As heritage items, they cease to be used primarily for their original function, as their primary function becomes transmitting messages about heritage. Even if they are still being operated at this point, as heritage objects they are usually not required to perform at the same rate and under the same loads as during their service life, and there is no necessity for them to perform their original functions except to prompt discussion or memories of past times.

Secondly, changeable art works are referred to by a number of different terms, including (but not limited to) kinetic art (Rivenc and Bek 2016), multimedia installations (Hölling 2017), and time-based media installations (Laurenson 2004). These artworks share the features that they have a durational dimension (Tate n.d.) and 'unfold to the viewer over time' (Guggenheim

n.d.). This durational element might involve a physical change, such as a movement or action, the activation of media or sensory effects, or elements of performance or audience interaction. Importantly, the common feature in all these cases is that, without this durational element and associated changes, the artwork that the audience has come to see and to experience does not exist. This paper will follow the Art Gallery of New South Wales (AGNSW) in using the term 'time-based art' (TBA), noting that the AGNSW has

... decided to adopt a variation on the Tate's definition of the medium ... defining TBA as art that has a durational dimension thereby including analogue and digital artworks across a range of media such as video, film, kinetics, computer-generated interactives, slide works, sound installations as well as iterative works and performance. AGNSW has also decided to adopt Tate's acknowledgement of the intangible aspects of time-based works ... recognising the significance of the visitor's experience of a work as it unfolds over time (Sherring, Murphy, and Catt 2018, 3–4).

What are changeability, variability, and malleability and why are they important?

Recent literature on TBA conservation has used the terms 'changeability' and 'variability' to describe a number of qualitatively different types of change. Hanna Hölling (2017, 76–77) defines changeability as 'an artwork's potential to transform from one condition, appearance, or constitution to another', suggesting that changeability can include 'not only alteration, decay, and obsolescence but also a fundamental change to a multimedia work of art that can come about in disseminating, curating or archiving it.' She distinguishes 'changeability' (which she sees as representing transformative change) from 'variability', which she sees as representing 'sameness, within a prescribed range related to some kind of mean value, rather than difference'. Variability, she says 'denotes the extent of change possible within limits set out ... in a score or instructions.' Murphy understands Hölling's argument to mean that changeability is different from variability because it allows the transgression of the limits of this score or set of instructions and therefore allows the work to unfold over time, while variability 'is generally understood in the conservation literature in terms of the need to vary a work within limits to ensure its continued operation or installation' (2019, 25).

Including utilitarian machinery in this analysis offers some additional insights. During the service life of machinery, it is intended that the components of the machine will be activated. During this activation it is expected that they will change their positions and relationships to one another while working, and that they may undergo physical change (for example metal components will change in volume, plasticity,

colour, and even smell as they heat up during operation). Changeability, in this sense, is activation that is inherent to the *normal* operation of the object, and does not represent either conceptual change in the role of the object, or alteration of parts to ensure continued operation or installation of the object. Changeability is *intrinsic* to the object, in that it is enabled and bound by the inherent qualities of the object.

Variability, in Murphy's sense of actions taken to 'vary a work within limits to ensure its continued operation or installation', is also normal for machinery, but it is a normality of practice rather than physicality, and it represents the continual maintenance, renewal, and conversion of components that is required to enable a machine to continue to carry out its function successfully, safely, and with relevance throughout an extended working life. Relevance, here, refers to the fact that machines are generally required to 'pay for themselves' in some way; to perform a service that makes them economically viable. This means that they are very sensitive to context, and when the service they perform is no longer required they are either adapted to perform a new function or discarded. Those which have survived from the past thus typically have a history of functional conversion, which has almost always involved some elements of physical renewal and adaptation. This context-driven practice of initiating variability is therefore a normal part of the intangible heritage of utilitarian machinery, but in contrast to changeability, this notion of variability is *extrinsic* to the object, in that it is initiated by agents external to the object.

A third type of change is introduced in this paper – that of malleability. We define malleability as spontaneous change in the experience of an artwork or machine caused by its interaction with the outside world. This can be interaction with humans (or other animals); with forces of nature (a process that is *intrinsic*, for example, to the work of artist Andy Goldsworthy – Artnet n.d.); and with processes of decay, as is essential to the Wim Delvoye artwork *Cloaca Professional* (Patterson 2016). Interaction with humans is almost a given in the machinery context, while the ability of many machines to be self-powered and self-mobile also means they interact with natural forces through encounters with a wide range of surfaces, topography, and environmental conditions.

These concepts can be summarised as follows:

Changeability: activation that is *intrinsic* to the normal operation of the object and is enabled and bound by the inherent qualities of the object.

Variability: *extrinsic* but normal practice of agents external to the object initiating changes to use or display conditions, obsolete or ageing components, and configuration.

Malleability: spontaneous changes in response to interaction with the outside world, including humans

(or other animals), natural forces, or processes of decay.

These different aspects of change can be demonstrated by considering the examples presented below.

The artwork *Arboria* (Figure 1) can be used to illustrate all three aspects of change defined above. This work, created by the Architects of Air group, is an inflatable plastic structure. Experiencing this artwork involves going inside the inflated structure, walking through its meandering galleries, feeling the movement of its walls, listening to its soundscape and experiencing the colours and changing patterns of sunlight diffusing into the different zones of the structure. The inflation mechanism, and indeed the inflatable structure itself are not the artwork; they are merely structural elements that bring the artwork into existence, which in turn enables the audience interaction to occur that completes the intangible experience of the work. The artwork that is created has changeability (its components are meant to undergo change during the normal operation of the artwork), variability (the physical components may have to be replaced due to wear and it is made to be reconfigurable for installation in different places¹), and malleability (because the endlessly differing human interactions make the experience of the artwork different for each audience member).

Old people's home by Sun Yuan and Peng Yu (Figure 2) also illustrates the concepts of changeability, variability, and malleability. As viewed at the National Gallery of Australia (NGA) in 2018 this artwork consists of 13 mannequins representing political figures as elderly people in a nursing home, confined, and yet made mobile by electric wheelchairs. The wheelchairs traverse the gallery 'crashing into each other at random in a grizzly parody of the U.N. dead' (Saatchi Gallery, n.d.).

Changeability is integral to the performative nature of the work, as it is the artists' desire that the sculptures appear to move themselves around the available

space, reconfiguring the layout of the work in ways that appear as though the figures 'are set on a collision course ... as they roll about the gallery at snail's pace' (Saatchi Gallery, n.d.). Variability is also integral to the artwork, as maintaining the functionality of the wheelchairs in this work will require many of the routine practices of mechanical maintenance and parts replacement that are required for wheelchairs in normal life. Malleability is critical to both the safety and impact of the work, as visitors move freely among the moving chairs which stop and move to avoid them. The motions of visitors thus affect the position and motion of the chairs and their occupants, and the experience of almost being run into by a wheelchair is a startling aspect of the experience of the artwork.

In a utilitarian machinery setting, changeability, variability, and malleability are demonstrated by the Molonglo radio telescope (otherwise known as Mills Cross, or MOST), a telescope near Canberra, Australia that began operating in 1965 and which is still performing cutting edge research (Figure 3). Made to move, so that it can track a specific point in the sky to make observations, it is also a metal structure that expands and contracts as it heats up and cools down with the diurnal cycle. This expansion and contraction have to be accounted for both in its engineering – so that it continues to move smoothly and precisely as it changes – and in its data collection and signal processing. Signals received at the same moment by receivers on different parts of the structure suffer time delays introduced by the different distances between each receiver and the collecting/detection point. These distances change with the expansion and contraction of the materials the cables are made of and affect the efficiency at which the detector system operates. Originally, copper cables were used for signal transmission and now the telescope uses fibre optic cables, but both are sensitive to differences in temperature and humidity, both over the day and at different locations on the telescope. These inherently changeable aspects of the telescope must be



Figure 1. *Arboria* by Architects of Air, being experienced by a varied audience in 2018 in Federation Square in Melbourne, Australia. Image: Wain 2018.



Figure 2. *Old people's home* by Sun Yuan and Peng Yu, 2007, being experienced by visitors in 2018 at the NGA in Canberra, Australia. Image: Wain 2018.



Figure 3. An overall image of the East-West arm of the Molonglo radio telescope showing the length and complexity of the metal structure and the motors and gearing systems required to make it move. Image: Wain, 2018.

understood and factored into the processing of the signals to synchronise them and eliminate variations that are caused by the machine rather than the radio waves from space (Duncan Campbell-Wilson, manager of MIST telescope, University of Sydney, 2019, personal communication). Describing the way the telescope behaves, Campbell-Wilson said 'The machine lives and breathes', a comment that resonates with theories that objects are not merely passive but have life and agency, for which see Bennett (2010) on vibrant materiality.

Malleability is evident in the changing extent and timing of the telescope's movement which is directed through interactions with humans.

Variability in the telescope is evident in the routine maintenance required to keep it operational. This involves the replacement or reconditioning of deteriorating processing components, maintenance of the structure and motor and gearing systems that enable it to move, and regular upgrades of components to keep up with changes in technology, the change from copper to fibre optic cable being a case in point. The telescope is also variable in a more fundamental way. The point of this instrument is to be reconfigured as necessary to support new experiments, a process that has over time required the wholesale replacement of analogue recording and processing systems with successive generations of digital instruments, and the decommissioning and eventual recommissioning of the north-south arm of the structure (Duncan Campbell-Wilson, manager of MOST telescope, University of Sydney, 2016, personal communication). To prevent such reconfiguration from happening would be to stop the telescope performing the research function for which it was made, and to terminate and thereby lose the intangible heritage of innovation and scholarship, the community of research practice, and the embodied knowledge of how the instrument performs.

The experimental nature of the telescope is unusual, but the variability is not. Most machines are expected to be reconfigured and refurbished to perform new functions (or adaptations of their original functions) in new contexts. Engines, for example may be used to power different machines according to what is needed at the time; and conversely, individual machines may be adapted to run on quite different power sources, for instance to take advantage of the price and availability of different fuels or to meet evolving health and safety standards. Paint layers provide another example of variability. They both protect machines from harsh working conditions and can be used to advertise their owner's identity and services, and they are regularly renewed both for maintenance purposes and to reflect changes in ownership or function. Variability in all these contexts is an active and vital process, a key element in the interaction between these objects and their human makers and users.

At first glance such variability may seem very different to the alterations made to adapt artworks to new contexts, but in fact the processes are directly comparable. For much of the twentieth century codes of ethics and standards in heritage and conservation have emphasised the need to maintain the integrity of objects (meaning to keep them as physically unchanged as possible). As Laurensen (2006, 2) states in relation to artworks

In conservation the prevalent notion of authenticity is based on physical integrity and this generally guides judgments about loss. For the majority of traditional art objects, minimising change to the physical work means minimising loss, where loss is understood as compromising the (physical) integrity of a unique object.

Actual practice, however, has typically been very pragmatic, including for artworks which have often been adapted to fit new display spaces and conditions – see for example Sarah Hughes' *Torpedo* (Murphy 2019). They have even been changed as a result of developments in their originating artists' practices or through collaborative co-production relationships between artists and display teams, processes that destabilise the traditional understanding of what an artwork work is and how it should be preserved and displayed (Sommermeyer 2011, 146–8). For example, for the 20th Biennale of Sydney in 2016, AGNSW worked with artist Mike Parr to re-present his artwork *The Side I least like* (164 drawings on cardboard), as a contemporary art installation, where the drawings were placed on the floor and the audience was invited to walk on the work, thus achieving new effects and affect through interaction with humans (Murphy and Treacy 2019).

Changeability, variability, and malleability should not, however, be seen as rigid or mutually exclusive

categories, and in some cases the qualities of change in artworks and machines can be viewed in multiple ways. Robert Andrew's work *A Connective Reveal – Land* (Figure 4), for instance, begins as a compacted soil and ochre column which is slowly reduced to rubble by a string suspended from an electromechanical pulley (McDaniel 2019). If the string is considered to be an integral part of the artwork it would be considered to be changeable, as the change in the artwork is inherent to the normal operation of the object. If the string is considered to be an unpredictable external element, akin to a force of nature, the artwork could also be understood as malleable. The artwork is certainly variable as it is expected that wear on the string will require its replacement, but the installation of the artwork in 2019 at AGNSW, as a part of *The National: New Australian Art* showed that the precise way in which a new string was installed significantly affected the deconstruction of the column, which also suggests malleability. Cases such as this demonstrate that changeability, variability, and malleability can be seen as intertwining understandings, the importance of which is not to categorise but to help us appreciate and care for changeable objects more effectively.



Figure 4. Robert Andrew, *A Connective Reveal – Land*, presented in *The National: New Australian Art*, 2019. Courtesy and Copyright of the artist. Photograph by AGNSW, Diana Panuccio.

The examples discussed above show that there are art and machinery objects for which the capacity to change is essential for their proper meaning and significance to be appreciated, but how does maintaining this capacity for change affect the qualities of originality and authenticity in these objects?

The relationship between changeability, variability, malleability, and authenticity

As was noted in the Introduction, conservation codes of ethics and standards typically recommend minimising the physical variability that is required to maintain changeability, because physical change is viewed as representing a loss of originality and authenticity in the form of the object, and therefore in its direct representation of, and linkage to, its historic past. These codes and standards rarely give equal recognition, however, to the loss of sensory authenticity and intangible cultural heritage that is caused by failing to maintain changeability. It is the continuity and survival of the intangible aspects of both time-based artworks and machines that gives them much of their meaning, and which therefore links them securely to their past and to concepts of originality and authenticity. This can be illustrated by the hypothetical 'Grandfather's axe', which has had its head and its handle replaced regularly throughout its service life to enable it to keep functioning effectively. If neither the head nor the handle is the original one that the eponymous Grandfather used, in what sense is it 'Grandfather's axe'? And in what sense is it either original or authentic? This age-old philosophical question, variations of which are found in a number of different cultures and time periods (Levin 2019), illustrates the idea that an object is more than merely the sum of its parts, and that the materials of which it is made contribute only one aspect (and perhaps not even the most important one) of its identity and meaning. The Grandfather's axe version is particularly relevant to questions considered in this paper as it makes clear that, for items of cultural heritage, the answer lies not in the physical fabric of the object – which has been changed numerous times – but in its intangible heritage, its continuing history of use and association. An example of this concept operating in a machinery heritage context is the court case brought by the owner of an historic Bentley racing car known as 'Old Number One' against buyer Middlebridge Scimitar Ltd for reneging on the purchase of the car after the company became aware of allegations that the car they were purchasing was not the authentic 'Old Number One'. The seller, Edward Hubbard, did not dispute that most, if not all, the components of the car had been substituted throughout the car's service life, but he argued that the constant experimentation and adjustment required to keep a car capable of

winning races at the highest levels was an essential part of what made the car authentic. The judge agreed, saying in his summation that the present day car could not be described as the 'original' (because it was not composed of the parts which initially left the racing shop), or the 'Genuine' Old Number One (because it had changed its character when it was finally retired from racing and converted to a touring car), or as a mere 'resurrection' of the car (as it had never 'died' in the sense of being abandoned or cannibalised for parts), or as a reconstruction (which the judge categorised as 'a car which stems from a single original component, or a collection of components from a variety of cars and where there is little left of the original racing car'), but rather that

the entity which started life as a racing car never actually disappeared, so that the results of all the labors can justifiably be described as 'authentic' ... Any new parts were assimilated into the whole at such a rate and over such a period of time that they never caused the car to lose its identity ... (Hubbard v. Middlebridge Scimitar Ltd (1990) EWHC 1 QB)

The need for intangible heritage to be performed and experienced to survive makes conserving changeable items very different from conserving non-changeable items. The tangible parts of an object can be boxed up and sent away to a conservator to be 'treated', but preserving the intangible heritage of changeable items means preserving the opportunity for people to participate in the lived experience of using, feeling, hearing, smelling, and working with them. This sharing and experiencing must also be done by the people for whom it is culturally and emotionally relevant, which might mean that the role of a conservator – if they are not personally part of this community of relevance – may be limited to facilitating opportunities for relevant communities to be able to do this.

The case of machine changeability also creates the opportunity, conditions, and situations for practicing the skills of operating and maintaining the objects, as well as for maintaining the cultural activities and communities associated with those skills. Without these opportunities this intangible cultural heritage may vanish with the passing of just one generation of skilled artisans, and once the machines are stilled the opportunity of experiencing the sensory effects and affect produced by change will be lost to skilled artisans and lay people alike. When this point is reached, all that remains will be the tangible structure, the 'bones' of the object, the parts that allowed the intangible elements – the 'flesh and blood' – to come into being.

These are challenging ideas. They have the potential to redefine the roles of conservators and collection managers, and to require preservation ethics and standards to recognise the facilitation of heritage

performance and experience as a conservation intervention that is just as valid and real as the traditional physical intervention to preserve heritage materials. Implementing these ideas will require thinking about the limits of changeability, variability, and malleability, and the relationship of these ideas to notions of authenticity. One way of understanding these limits and relationships is by examining analogies with performance arts, which will be considered in the next section.

Grounding changeability by understanding performance

Hölling asks 'if a work is infinitely changeable, how does it retain its identity, its authenticity?' (2017, 48).

As discussed above, authenticity is found not just in physical fabric but in intangible heritage, and intangible heritage needs to 'happen' to be experienced and to survive. This 'happening' is a performative act and can be understood through analogies to performance arts such as music, drama, and dance (Laurenson 2006; Lista 2014).

Performances are, to use the terminology defined above, changeable, variable, and for live performances, often malleable. Performance scholar Peggy Phelan, writing in 1993 (146) regarded the quality of malleability, the potential to change spontaneously during the performance, as essential:

Performance's only life is in the present. Performance cannot be saved, recorded, documented or otherwise participate in the circulation of representations of representations: once it does so, it becomes something other than performance.

As time has moved on, however, the quality of malleability has arguably become less essential to the definition of performance, with recorded performances encompassing experiential effects that could not be achieved by merely recording a live performance. Examples of this are recorded music, where the voice of one performer is overlaid repeatedly to develop sound depth and harmony, and films that consist largely of computer-generated imagery. These are changeable (activation is inherent to the normal operation of the object), and variable (they are subject to a normal practice of external agents initiating changes to display conditions and technology), but they are not malleable, in that each iteration of the performance is the same (excluding alterations resulting from variability) and cannot change spontaneously. Although these performances are not malleable, and they exist as recordings, they are not understood as mere documentation of live performances but are experienced and judged as artworks or entertainment objects in their own right.

The majority of early performance art works were brought into the museum context not as live

performances, but as recordings of performances, using media such as photography, video, film, or installation. More recently it has become common to acquire the rights to ‘stage’ or ‘activate’ performance artworks rather than acquire recorded representations of earlier activations (Lawson, Finbow, and Marçal 2019). This means that both live and recorded examples of performance artworks are present in collections, a situation that is acknowledged in the current Tate definition of performance artworks as items ‘created through actions performed by the artist or other participants, which may be live or recorded, spontaneous or scripted [emphasis added to] Lawson, Finbow, and Marçal 2019, 122). In the art context, whether a recording of a performance is seen as being itself a performance artwork is most accurately defined by reference to the artist’s method and intention. Tino Seghal, for example, refers to his ephemeral practice as the creation of ‘constructed situations’. He explicitly forbids the creation of the documentation that would normally support a collected artwork, such as photographs, videos, catalogues, wall text, and conservation reports, believing that ‘mementos of his work would threaten its purity, which could weaken its effect’ (Collins 2012). Marina Abramović, however, from the beginning of her career in the 1960s has documented her performances using photography and video and views these recordings as being themselves as much artworks as her live performance works (Wixon 2014).

In the utilitarian machinery context, performances and recordings involve, but are distinct from, the physical object itself. A recording of a steam engine, for instance, could never be imagined to be, itself, a steam engine – it will always be considered a recording of a steam engine. On the other hand, the physical object is still considered a steam engine even when it is not operating, or even when it has lost the capacity to operate. The same engine, when activated, can also be considered as a component of a performance: demonstrating changeability, subject to variability, and affected by the humans who run it and the world it interacts with to produce a malleable ‘happening’.

Further examples of performative objects which – like Abramović’s recorded artworks mentioned above – are changeable and variable but *not* malleable can be found amongst both artworks and machines. Factory robots, for instance, are in normal operation changeable and variable, their successful functioning depending upon the performance of precisely calculated movements facilitated by the regular maintenance of their components. They are explicitly designed not to be malleable, or at least malleability can only be produced by deactivating and reprogramming them. Similarly, Robert Andrew’s artwork *A Connective Reveal – Language* (Figure 5) is changeable and

variable but not malleable. The audience that views the work on the first day of the exhibition will see a white wall with a motorised arm slowly depositing red and black ochre. By the end of the three-month exhibition the bold red and black word ‘Budowa’ will have accreted on the wall. An audience member who returns to view the artwork on multiple occasions will witness a changing work, supported by maintenance of its technological components, but the changeability is the result of carefully programmed movements rather than malleability introduced by spontaneous interactions.

Lawson, Finbow, and Marçal (2019) distinguish between ‘performance art’ and ‘performance-based art’. They argue that performance artworks consist entirely of performative elements, which must be activated, while performance-based artworks may also contain ‘more perennial materialisations—such as a sculpture or an installation’ (2019, 122). Using this distinction, an example of a performance artwork is teamLab’s (2017) interactive digital installation, *Moving Creates Vortices and Vortices Create Movement* (teamLab 2017). While this artwork is activated using equipment such as motion sensors, projectors, and other componentry, none of this is valued for its material uniqueness as it is considered to be merely enabling equipment. The artwork can only be

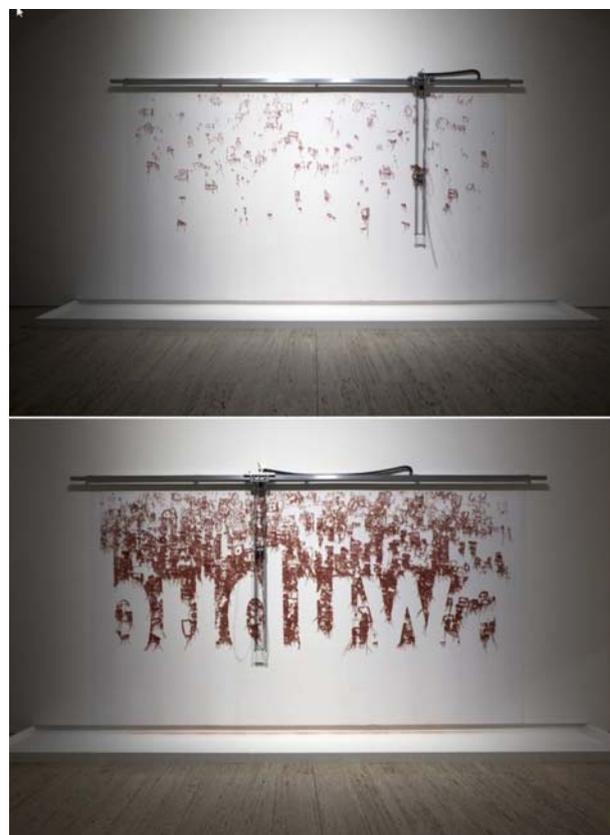


Figure 5. (a) (upper) and (b) (lower) Robert Andrew, *A Connective Reveal – Language*, presented in *The National: New Australian Art*, 2019. Image courtesy and copyright of the artist. Photograph by AGNSW, Diana Panuccio.

experienced when such enabling equipment is installed in the gallery, the algorithms that initiate the changeable effects are run, and malleability is triggered by the audience walking into the space to engage with the created environment. Without the audience the work is in limbo, waiting to be activated. Unlike performance-based artworks, this work does not have a perennial, sculptural component that exists independently of the performance, but which is considered a key part of that performance. It is therefore purely a performance artwork.

Considered in this context, machines are more like performance-based artworks, in that they have perennial sculptural components that are valued for their material uniqueness; that exist independently of the activation of the object; and that are considered a key part of any activation for the full sensory qualities and capabilities of the object to be experienced and comprehended. An example of this is the 1925 Sundowner Bean 14hp car driven by Francis Birtles on his record-breaking journey from London to Melbourne in 1927. The body of the car, and particularly its exterior surfaces which bear the colourful remains of sponsors' advertising for the trip, as well as 'traces of Middle-Eastern sand and South-East Asian mud caked on its underside' (National Museum of Australia n.d) has been preserved as a sculptural element that, through its physical form, establishes a direct connection to the most significant period in the object's life, and to explicit events within this period. The object's capacity to operate as a working car, with the attendant preservation of the intangible heritage (the opportunity to experience the sensory qualities of it moving – its sound, smell, feel, and appearance – and the knowledge of how to properly maintain and run it), has been preserved as a performative aspect of the object (Figure 6). By combining these two aspects of the car a more holistic, authentic experience has been preserved than would be captured through a more traditional conservation approach of merely



Figure 6. The NMA's 1925 Sundowner Bean 14 car being driven in Canberra by conservators Col Ogilvie and David Thurrowgood. Image: George Serras, National Museum of Australia.

preserving the physical, 'sculptural' elements as a static display.

Clarifying the differences between performative and sculptural elements is therefore not just a theoretical exercise. Understanding the differences between them provides an understanding of their different contributions to maintaining authenticity in the experience of an artwork or machine, and allows the development of different conservation approaches that enhance and prioritise the contributions that are seen as most significant to the object. Which of these different conservation approaches is chosen is a matter of attention and intention, of deciding what is most important to preserve and communicate about these objects. As will be discussed in the next section, the things that command attention, and that direct intention, can change over time and through the involvement of new people, which raises the question of who has the authority to make these decisions and to determine relevant priorities.

Activation, authority and intention

Returning to Hölling's question 'if a work is infinitely changeable, how does it retain its identity, its authenticity?', it is clear that if artworks and functional objects can be understood as performance or performance-based objects, then the relationship between authenticity and changeability in these objects can be illuminated by consideration of these qualities in other performance arts, such as theatre, dance, and music.

In particular, works in these performative traditions are expected to be changeable, variable, and malleable, but their capacity to be changed is not considered to be infinite. To be considered iterations of the same work, performances must be grounded by a shared tradition; a continuity of content, meaning, and relationships. Laurenson (2006) calls this a set of 'work defining properties', while Hölling (2017) terms it an 'instruction set'. For the purposes of this paper the authors will use the term 'instruction set', as it is a term that aligns well with the manuals and other instructional documents commonly found in machinery contexts.

In music the instruction set may be a written score, or music (and often accompanying words) passed from person to person as intangible knowledge; for a play it may similarly be a written script or an oral tradition; in dance the sequence of movement is generally developed and transferred from body to body as intangible knowledge and is only relatively rarely recorded in any form of notation. In all these art forms the instruction set is usually established by the work's creator (whether this is an individual or a group) and reflects the creator's intentions for the work. It may also specify some key elements which the creator deems essential for an iteration of the piece to be considered

authentic. In many instances, however, elements that are not strictly specified in the instruction set are regarded as being open to re-interpretation or adaptation. In fact the instruction set itself may explicitly include alternative possibilities (see Gann's discussion of John Cage's 4'33', 2010), or a performance tradition may have evolved in which certain elements are expected to be varied, as in the patter song 'As some day it may happen' from the Gilbert and Sullivan opera *The Mikado*, the lyrics of which are typically adjusted to reflect topical events when it is performed (The Gilbert and Sullivan Very Light Opera Company, n.d.).

In all these art forms it is expected that the instruction set will be re-interpreted each time it is performed, as it will be influenced by the character, abilities, and experience of the people involved, the limitations and opportunities of the performance space, and other constraints relevant to that specific performance (van Saaze 2009; Latour and Lowe 2010). In the same way, each time a machine or changeable artwork is activated, the people who are involved will bring their own bodies and bodies of experience to that involvement, and they will adapt the activation to meet the needs of the space, environment, and audience available. This can be understood as an additive process of developing meaning rather than a destructive process of reducing authenticity, with the multiplicity of viewpoints and inputs increasing the complexity and robustness of the work or object. Jadzińska (2011, 26) notes that the 'approach, knowledge and professionalism of the people who surround the work at every stage of its development determine the manner in which it will survive'. Latour and Lowe (2011, 10) discussing the 'careers' or 'trajectories' of art works, comment that 'For a work of art to survive, it requires an ecology just as complex as one needed to maintain the natural character of a natural park.' Louise Curham (University of Canberra, 2020, personal communication) also draws analogies between performance iterations and natural environments, likening these accumulations of meaning and interpretation to the growth of tree rings – each one adding to what went before. Authenticity is conceived by these authors as being underpinned by growth, extension, and relatedness.²

A score is created by a composer, a script by a playwright, a dance by a choreographer, and in the time-based art sphere the instruction set is developed by an artist (and of course in each of these cases the creative impulse may actually come from a group rather than a single person). In each case the creative source is seen to be a distinct initiating identity, and that identity (or its representative, which may be a trusted collaborator or an artist's estate) is seen as the first point of contact for determinations about what constitutes an authentic performance or iteration of the work.

In the machinery context, the originator of the object is harder to identify, as most machines are the product of design and manufacturing decisions made by multiple, usually unidentified, individuals, sometimes over an extended timespan involving many design iterations. The creative source for machines can therefore perhaps be more usefully compared to the shared, iterative, community-based creative processes that underpin folk music and oral traditions and which are also developed over time and with many layers of input. (We draw a distinction here between traditions that are strongly linked to the custodianship of one particular community, which is the case for most First Nation traditions, and broader knowledge 'commons' that have no clear originating or custodianship body and are available for anyone to perform and adapt for their own times and purposes.) Machines and the knowledge they embody (once it has passed out of copyright or patent) can be owned and modified by anyone, and the individual uses to which they are put by their various owners are of as much importance in determining their story, significance, and authenticity as the original design and manufacturing work. Ownership and usage may therefore be more important to the determination of authenticity in machines than they are for artworks, where the artistic creator is the primary authority on authenticity.

The importance of ownership and usage, however, becomes more similar for artworks and machines as detailed knowledge of their original use or performance fades with such influences as the passing of time, the death of relevant and skilled people, and the disappearance of original contexts of use and maintenance. Interpretations also change in response to the development of new knowledge, new concerns and new mores within society, as well as ongoing changes in the design of display spaces (both in museums and in public spaces), enabling technologies and the financial resources available for maintenance and presentation of the object. Murphy (2019) suggests that over time museums become co-producers of a changeable artwork, participants in the development of what Van de Wall et al. (2011) – drawing on theories of the cultural biographies of objects – call the trajectory of the life of the artwork, as the complex relationships between material, artist concept, (re) installation, stakeholder decision making, and institutional memory progressively impact and re-shape the original instruction set for the work. Curham (University of Canberra, 2020, personal communication) calls this process 'tending', noting that each activation of a work provides new knowledge about it, particularly in 'the gap between what can be made explicit and ... tacit knowledge' which cannot be easily recorded. Use of the word 'tending' is particularly relevant to contexts of private ownership of machines,

where owners and volunteers typically look after a small number of objects which they know very well, and which they activate, polish, oil, repair, and update constantly (Figure 7). This process has a personal, caring quality to it that (as noted by Curham in the art context), goes beyond the prescribed actions and efficiency required for technically good maintenance. In the machinery context, such tending appears to cement relationships between carers and their machines, and to become the foundation of meaning-making narratives about the shared and evolving lives of people and objects in the present (Wain 2014).

In the machinery context the owners and operators of machines can be seen to have always been co-producers in the use and interpretation of an object, and it is often the move from a service role to a heritage role that brings the largest changes in the co-production environment, as the object's primary purpose changes from utilitarian service to fulfilling heritage and leisure needs. Again, this development of meaning can be likened to the interpretive creativity that is expected in new performances of music, dance, and drama. New interpretations do not change or replace the original instruction set, but they can add to its possibilities and maintain its relevance as a source of new ideas (Latour and Lowe 2011). Eamonn Seddon, CEO of the Puffing Billy Railway, made the connection between performance and the presentation of changeable heritage machinery explicit:

My background before I got involved in playing trains was in the theater. I was a professional actor, stage manager. And you go to the theater to have an experience, you read a book to have an experience, you go



Figure 7. Henry South tending his 1922 Austral engine at the Campbelltown Steam and Machinery Museum near Sydney, Australia. Image: Wain 2008.

to a film to have an experience. Why not go to a railway to have an experience? So it needs to become far more than a train trip. (Eamonn Seddon, CEO of Puffing Billy Railway, Victoria, Australia, 2009, personal communication).

But the question remains – is there is a level of change beyond which an object or artwork is unrecognisable? A point beyond which new interpretations bear so little likeness to its past form that they can no longer be considered iterations of the same thing? Hölling (2017) discusses this in relation to different instantiations of the Nam Jun Paik work *Zen For Film*. The original 1962 work consisted of a loop of blank celluloid film running endlessly through a projector: as Hölling notes this has similarities to John Cage's musical work *4' 33"* as both artworks bring to the fore the sensory qualities of the here and now. In the case of the original *Zen for Film* these sensory experiences included ambient noises in a performance space, dust marks and scratches accumulated on a loop of film, and the noises of an analogue projector. This type of presentation was used in 2010 at Museum Ostwall, Dortmund, Germany. In 2010 at Tate Liverpool, a different presentation of *Zen for Film* consisted of a digital projection of a white rectangle, an image which remained unaffected by the world around it, and with the only sound being a faint hum from the digital projector. A third presentation at the Guggenheim Museum, New York, 2009 displayed the original physical film strip in its can beside an activated replica of the work consisting of a loop of new film passing through an 'historically appropriate projector' (Hölling 2017, 68). In each case the institution labelled its display as a presentation of *Zen for Film*, and presumably each considered its presentation of the work to be authentic. Each presentation was, however, substantially different from the others.

The differences between these instantiations of *Zen for Film* reflect differences in intention – what each curatorial and exhibition team perceived as being most important about the work, and how they thought that aspect of the work could best be conveyed to the audience. Paik's original 1962 version and the Museum Ostwall and Guggenheim presentations prioritised the sensory experience of the material qualities of the analogue film, and its evolving physicality. The Tate version prioritised what Hölling refers to as the 'imageless and anti-illusionist' qualities of Paik's original work, 'the effect of pure electric light meeting the flat surface on which it was projected, filtered only by a transparent film leader' (2017, 69). When the original work was first displayed these two qualities came together, as the film leader was clean and the projected image clear. As the work moved on in time, however, the film became scratched and dusty and the image was no longer clear. As it is no longer possible to exhibit both the imageless

moment and the cumulative materiality of the work concurrently, each exhibiting institution has had to make a choice about what it intends to prioritise. In carrying out its intention, however, each institution has reached out to past iterations of the work for the understanding and inspiration to ground their own presentation of the work.

Similar differences in intention underpin approaches to the conservation, restoration, and presentation of machines. Machines might leave the showroom in new condition and pristine paint, but they too gradually acquire the visual and functional evidence of their working lives, including changes wrought by normal maintenance, through reconfiguration, and as a result of refurbishment by new owners or for new purposes. As these changes accumulate it becomes impossible to represent a single point in the object's life without destroying evidence of the many other points in its life, or to maintain its material form unchanged without losing the intangible heritage that is associated with the changeable form. Decisions and choices have to be made, and which values are prioritised by those choices depends on what the owner perceives as being most important about the object, and how they think that aspect of the object can best be represented and communicated.

In the utilitarian machinery context, public owners such as state museums typically prioritise the history of the object, and feel that this is best preserved and communicated by maintaining and displaying the material form of the object with as little change as possible. Private owners more often prioritise their relationship to the object and its role in enriching life in the present, and they typically choose to enhance those relationships and enrich their lives by running the objects, tending them, and often making practical or creative physical changes (see Figure 8) that make them easier to manage or more personally fulfilling (Wain 2014). Corporate private owners do much the same thing, prioritising the development of feelings of connection and engagement between visitors and objects, and the leisure experiences their objects can offer through being operated, and where necessary making changes to facilitate access to those experiences (Eamonn Seddon, CEO of Puffing Billy Railway, Victoria, Australia, 2009, personal communication).

In both the art and utilitarian machinery contexts it was possible at one time to experience the original historic material fabric and the working object together, but as time has moved on it is no longer possible to preserve both of these things at the same time. Either the originality of the physical fabric must be allowed to erode so that the object can continue to play an active role in the lives of its owners and visitors, or the changeability of the object must be allowed to erode so that as much original physical evidence can be preserved as possible. There is an inherent



Figure 8. Steve Deacon with the steam traction engine that he fitted with new gears so that he could run the machine without going deaf. Campbelltown Steam and Machinery Museum. Image: Wain 2008.

conflict here. Traditional conservation approaches seek to preserve authenticity by inactivating things; by inhibiting changeability; by arresting process. Intangible heritage, however, *is* process, and can only be preserved by being regularly activated.

As these approaches are in direct opposition, the consequence of doing one of them perfectly is doing the other badly. 'Perfect' authenticity can never be achieved because it requires elements of both of these approaches, a condition that was only possible in the past when the original physical condition of the object and its original service functions could be experienced together. Authenticity is therefore always an approximation, a construct based on what is considered most important about the object in the present. This approximation can only be achieved by compromise, by making the choice to preserve some elements of the past at the expense of others. Whether the choice made is to prioritise lack of change in the physical fabric of the object; or to prioritise maintaining changeability in the intangible heritage of the object; or to attempt to find a balance between the two, neither is a matter of being right or wrong. It is always a matter of intention, of deciding to prioritise different aspects of authenticity and therefore different ways to communicate a selection of the diverse values that can be expressed through the object.

Conclusion

Different approaches to the conservation of changeable objects can be seen as separate but connected points within a continuous and consistent theoretical landscape of meaning and intention. Exploring this landscape through case studies in time-based artworks and utilitarian machinery – two very different genres of heritage – has allowed us to test the boundaries and

applicability of different theoretical and philosophical approaches and develop a more robust understanding of the nature and importance of changeability, and the multi-faceted nature of authenticity, in objects that must be activated to exist or to be fully experienced.

Formal heritage conservation approaches typically view change in the physical fabric of an object as degradation, a process of alteration that reduces the historical evidence embodied in the object and therefore its authenticity. This approach, though, contains an enormous value judgement, an assumption that true authenticity is held in, and maintained by, the physical material of the object. It is just as valid to see true authenticity as lying within the intangible heritage of a changeable object; the experiences, skills, and culture that are generated and maintained when it is activated. To preserve the operational capacity of a changeable object, components must inevitably be maintained, reconditioned, or sometimes replaced, and to preserve the performative aspects of their intangible heritage they are often creatively reconfigured and re-interpreted. Does this reduce the object's authenticity as is assumed by formal conservation approaches? Or does it actually preserve a different, and equally important, aspect of authenticity?

The professional and private communities who look after heritage utilitarian machinery and contemporary artworks share these dilemmas. Among people who volunteer with, or own, historic machinery, the practices of tending, reimagining, and reactivating their machines continue traditions that have always been part of the world of functional objects. Conservators caring for time-based art have more recently moved towards practices of collaborative maintenance and reconfiguration that acknowledge the importance of changeability to the authenticity of changeable artworks. In both contexts these practices of maintaining the changeability of objects foster skill development and transfer, creativity, collaboration, community and audience building, and life enhancement.

Change is being re-evaluated as an essential aspect of objects that are made to be active. Accordingly, the loss of intangible and sensory heritage that occurs when their changeability, variability, and malleability are lost is being re-evaluated as the causing of significant damage. These re-evaluations inform new decision-making paradigms and provide theoretical underpinnings for approaches that permit change in the *material* of the object to preserve authenticity in the *experience* of the object. Authenticity can be seen to lie not in keeping things the same, but in understanding how and why things have changed.

This presents us with a challenge as there is a conceptual contradiction in our current approaches to conservation. Formal conservation processes seek to

preserve authenticity by making as little alteration to the physical fabric of objects as possible, which effectively means deactivating things. Changeable, intangible, performative aspects of heritage, however, can only be conserved by preserving process, by doing, which usually entails change to the fabric of an object. These two approaches are in direct opposition: as discussed above, to do one perfectly is to do the other badly. To achieve the best solution we must compromise, accepting that authenticity will always be a matter of balancing the physical with the intangible, of valuing the understandings that changeability brings, and of recognising the contribution of differing intentions, practices, and iterations to the richness with which we perceive our past.

Notes

1. Architects of Air note specifically that their works are 'modular to adapt to different sites' (<https://www.architects-of-air.com/luminaria>).
2. Wain (2011) has previously noted that authenticity is not necessarily connected to the past. Using the Oxford English Dictionary as a reference point, to be original means to be underpinned by something from a point of origin, but authenticity is the value conferred when a thing is judged to be entitled to belief and acceptance by a recognised authority.

Authenticity is thus based on legitimacy rather than a past point of origin, which means that developments in the present (and into the future) can be seen to contribute significantly to the ongoing determination of authenticity.

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