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Modelling a cam track for the *Silver Swan* automaton at Bowes Museum: a cross-disciplinary reflection on 'what things are'

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Modelling a cam track for the *Silver Swan* automaton at Bowes Museum: a cross-disciplinary reflection on 'what things are'

Abstract

This article reports the interdisciplinary conservation investigation of a dynamic object, the *Silver Swan*, an eighteenth-century automaton presently in the collection of The Bowes Museum, County Durham in England. Taking account of recent proposals for 'disruptive' conservation, we reflect on how a conservator's practice is, necessarily, built on philosophical and, specifically, ontological commitments. In other words, commitments to ideas about what objects 'are'. As such, the practice of conservation requires interpretation, investigation, analysis and teamwork, as well as the facilitation of dialogue across multiple temporal, social and disciplinary contexts. The article attempts to demonstrate that what the Swan 'is' depends on its physical and philosophical environment, and that these conceptualisations in turn provide a context for what a conservator does and also 'is'. The article concludes with some practical suggestions for how a collaborative dialogue about what things 'are' might be initiated.

Introduction

In this article we propose that technical and practice-based questions of what conservators can, and should, do are part of a wider ontological question about 'what things are'. We illustrate our proposal with some ways of thinking about what the *Silver Swan* 'is', and how various ways of thinking about the Swan have created the conditions for judgements about its 'performance', placement and proposed treatment. Evidence for this variety of understanding is provided from sources including curatorial notes, the Bowes Museum visitors' book, the Bowes Museum website and catalogue, conservation records, film-making and historical descriptions. The discussions on its conservation that we report here began with a project conducted in 2008 which involved the complete disassembly and cleaning of the mechanism that drives the Swan. This project led to a proposal for a physical change to the zig-zag cam track profile that actuates the rotation of the Swan's neck.[1] A further phase in the treatment, a week-long study event, took place in October 2021,[2] and during this phase, and in dialogue with its owners and audience, the authors considered how reflection on what an object 'is' might influence both the treatment of objects and the presentation of that treatment.

The exploration presented here of what the Swan 'is' comes out of a collaboration between an applied linguist and a conservator. Applied linguistics is a discipline concerned with the role that language and languages play in perceived problems of, for example, communication, social identity,

1 Matthew Read, 'The Bowes Swan, Eighteenth Century Automaton: Analysis of Historic Evidence and Modern Data Leading to the Design and Prototyping of New Parts for the Safer Operation, Greater Longevity and Fidelity of the Object' (unpublished MA thesis, West Dean College, University of Sussex, 2009), https://www.clockmaker-conservator.co.uk/publications. See also, Matthew Read, 'A Conservator's Perspective on the Approach to Historical Clocks', *Chinese Annals of History of Science and Technology* 4, no. s (2020): 39–60.

2 Bowes Swan Automaton 2021 Study Week, https://youtu.be/T7kmsiQpTaE (accessed 25 March 2023).

3 Christopher J. Hall, Patrick H. Smith, and Rachel Wicaksono, *Mapping Applied Linguistics: A Guide for Students and Practitioners* (Abingdon, Oxon: Routledge, 2017).

education, health, and in the development of ways to remediate or resolve these problems.[3] Professional practitioners who may describe themselves as applied linguists include: translators, forensic linguists, additional language educators, and speech and language therapists. In these professions, working towards an understanding of the role of language and languages, in a range of contexts, requires thinking about what language 'is', what it does and how it is used. The first part of that thinking, about 'being' (ontology), is what is being done here. In asking what the Swan 'is', the authors are framing the actions that a conservator can take when designing a treatment for a perceived problem and demonstrating how conservators are, and should, acknowledge their role as interpreters, investigators, analysts and team-players who facilitate dialogue. The article concludes with some suggestions for how this dialogue might be initiated.

What is the *Silver Swan*?

The *Silver Swan* is a late-eighteenth-century, life-sized automaton in the form of a male mute swan (Fig. 1). The body, neck and head of the Swan are formed in chased, repoussé silver. In operation, the Swan appears to swim on a river, or stream, of contra-rotating twisted glass rods. Below the rods, within a metal framework or chassis, are three clockwork mechanisms. These motors are a product of the eighteenth-century English clockmaking trade. The main motor causes the Swan to rotate and lower its neck and to perform a display of preening, followed by the apparent trick of catching and swallowing one of the seven silver fish swimming in the stream below. The automaton was originally accompanied by a 'costly dome of great magnitude' (see the catalogue entry below), which is believed, at some point in the early 1800s, to have been separated from what remains today, and is now lost.[4] It is also possible that a structure described in a 2008 unpublished conservation record as 'a copper-rivetted bath tub' (inventory number X.4653.i.001, currently exhibited in the Silver and Metals gallery of The

4 Sale catalogue entry, 26 May 1864, lot 184, Christies.

Fig. 1 The *Silver Swan* at The Bowes Museum from the side seen by eighteenth-century audiences. The proper left-hand side, the side from which the automaton is wound and initiated would not have been seen by audiences until the Swan was transferred to a vitrine during the nineteenth century. Image credit: The Bowes Museum, Barnard Castle, County Durham, England.

Bowes Museum), was designed to accompany the automaton and the dome. The 'bath tub' may have been intended to allow the Swan to float on real water, perhaps even accompanied by real swans.

It is believed that the Swan was created for James Cox, a London-based eighteenth-century jeweller, and leading producer and exporter of British-made 'fancy goods': clocks and toys, including automaton.[5] The maker(s) and exact date of production of the Swan, as well as its intended market, is not known. However, the design and management of the construction of the mechanism that drives the Swan is often attributed to Cox's chief workman (up until 1773), John Joseph Merlin. Merlin was a mechanician born in 1735, near Liege in what is now Belgium.[6]

Cox's publicity tactics for his fancy goods included paying for newspaper notices that hint at the international demand for his 'rich pieces of machinery', describing them as, 'a present to some great men in the Eastern parts of the world'.[7] By the time the Swan was completed these types of objects were part of a rather more prosaic, and declining, trade in fancy goods between the UK, and India and China. The advertorials which described Cox's items as worthy of being gifts, were more likely, at this time, to have been part of a marketing strategy to increase the value of the items in the eyes of buyers much closer to home. At the same time as the Swan emerged, the East India Company (EIC), aiming to regulate prices, brought in a two-year ban on the sale of 'jewelled clocks' to China.[8] It is also possible therefore that this export ban, and the subsequent decline in the EIC clock trade to China, is the reason why the Swan remained in the UK and was unable to realise the expectation of it being a 'gift'.

Cox opened a museum in Spring Gardens in London and a contemporary account of the Swan exists in its 1773–1774 catalogue. The entry focusses on the 'life-like' size and movements of the Swan, the attention to detail in the external silverwork, the intricate mechanics of the interior and the reaction of the 'many illustrious personages' who said 'it must have been created not by humans but by magic':

> 'A Swan as large as life. It is made of silver, the plumage finely copied, and the whole so nicely, closely, and artfully imitated, as at a distance to deceive the most accurate observer. It is represented as upon the water, and is fill'd with mechanism, communicated even to the bill; it turns its neck in all directions, extending it backwards and forwards, and moving round on each side to the very tail, as if feathering itself; during the playing of the chimes, that are heard from beneath, it beats time with its bill, to every note of the music; and as the tunes change from swift to slow, or from slow to swift, its motion changes with surprising exactness. This Swan is seated upon artificial water, within the most magnificent stand ever made, and is reflected by mirrors, which produce the appearance of several Swans. Under the seat is a rock of christal [sic], finely constructed and ornamented; it is mechanically set in motion, to represent the flowing down of water, which is also reflected by mirrors, as to multiply the appearance of water works in different directions. The rock likewise is embellished with a profusion of jewellery, and other elegant designs. Above the mirrors is a costly dome of great magnitude, on the top of which is a rising sun, that terminates the whole, and makes it near eighteen feet high. The rays and points of the Sun seem to extend from a body of fire in the center [sic], and this piece is so astonishingly executed, that many illustrious personages that have seen it, even in its unfinish'd state, have pronounced it rather the creation of absolute magic, than the production of human mechanism.'[9]

The object was seen at the Paris exhibition (Exposition Universelle de Paris, 1867) by another illustrious personage, the American writer Samuel Clemens (Mark Twain). Twain describes the experience as one that was, unlike many of the other sights he records on his travels, of interest because of what he describes as its simple 'truth':

5 Roger Smith, 'James Cox's Silver Swan: An Eighteenth Century Automaton in the Bowes Museum', *Artefact* 4 (2016): 361–5.

6 Roger Smith, 'British Clocks in Eighteenth-Century China: Presents, Tributes, or Trade?', *Chinese Annals of History of Science and Technology* 4, nos (2020): 26–38.

7 *Whitehall Evening Post*, 1769, cited in Smith, 'British Clocks in Eighteenth-Century China', note 8.

8 Roger Smith, 'Eighteenth Century Clock Exports from Britain to the East Indies', in *A General History of Horology*, ed. Anthony Turner, James Nye and Jonathan Betts (Oxford: Oxford University Press, 2022), 458.

9 James Cox, *A Descriptive Inventory of the Several Exquisite and Magnificent Pieces of Mechanism and Jewellery, Compriz'd in the Schedule Annexed to an Act of Parliament for Enabling Mr. James Cox, of the City of London, Jeweller, to Dispose of his*

Museum by way of Lottery, MDCCLXXIII Year of the Reign of George the Third (Gale ECCO, Print Editions, 1774/2010).

10 Mark Twain, *The Innocents Abroad*, https://www.gutenberg.org/files/3176/3176-h/3176-h.htm (Project Gutenberg, 1869/2006), chapter XIII (accessed 28 March 2023).

'I watched a silver swan, which had a living grace about his movements and a living intelligence in his eyes—watched him swimming about as comfortably and as unconcernedly as if he had been born in a morass instead of a jeweller's shop—watched him seize a silver fish from under the water and hold up his head and go through all the customary and elaborate motions of swallowing it.'[10]

At the same Paris exhibition, the Swan was also seen, and, in 1872, bought for £200, by John and Josephine Bowes, the founders of The Bowes Museum. The museum, completed some years later in the market town of Barnard Castle, County Durham in the UK, comprises a purpose-built French-style civic building styled in the manner of the Hôtel de Ville at Le Havre. The museum was opened in 1892 after the deaths of John and Josephine Bowes. The placement of the Swan in a museum, the early advertorials, Cox's museum catalogue entry and Twain's account, all offer versions of the Swan as it was conceptualised by its owners, early marketeers and travel writers.

How the Swan works

The following description of the Swan is summarised from the main author's Master's thesis from 2009. The observations and measurements reported in the thesis are not offered here as technical 'facts' about the Swan, but as one version of what the Swan is, alongside other versions, such as Cox's catalogue entry, the early advertorials and Mark Twain's travel writing.

The *Silver Swan automaton* is driven by three, independent clockwork motors. One motor is for the musical work, another is for the inter-connected, rotating glass rods that simulate water, and the third, the largest (Fig. 2), drives a multi-function cam that generates all the actions of the Swan's bill, head and neck. This third motor also operates the sub-automaton of the seven silver fish that swim in front of the Swan, one of which the Swan appears to catch and swallow.
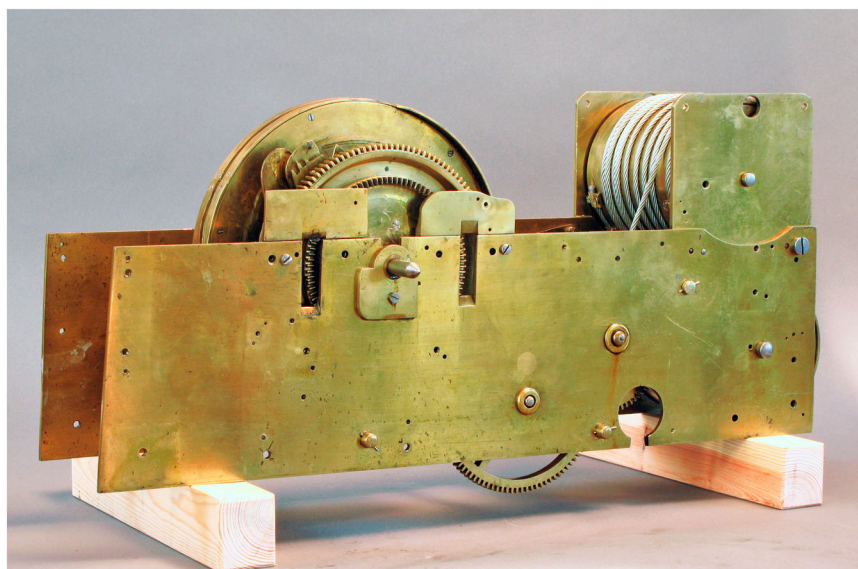
Fig. 2 The Swan main driving movement with (from R to L): tandem mainspring barrels, gear wheels, multi-function cam. This mechanism differs from many eighteenth-century automaton clockwork drive-units in the sense it is bespoke for this application, not converted or adapted from regular clockwork. The structural stability of this mechanism relies on it being fixed within the wider structure that forms the chassis for the Swan; it is not stand-alone.

The multi-function cam

Screwed to the axle of one of the gear wheels of the largest motor is a 239mm diameter, 27.5mm-wide brass drum forming the body of the multi-function cam (Fig. 3).[11] Screwed parallel to the flat faces of this drum are a series of lobed and shaped brass cams that operate, via rollers, levers, chains and lines: the vertical movement of the Swan's neck; the preening action of the lower element of the Swan's bill; the ejection and retrieval of the gilt-metal fish that normally is inside the bill; and the linear movement of the sub-automaton of seven fishes.

Around the periphery of the brass drum is screwed a further brass cam in the form of a zig-zag track. The zig-zag track works in conjunction with a pin, or pins, fixed to a toothed sector (Fig. 4), which in turn engages with a gear or pinion axial with the vertical orientation of the Swan neck. As a result of the rotation of the multi-function cam, this mechanism causes the neck to rotate in a reciprocating action about a vertical axis (Fig. 5). Details about the current design of the cam and any conjectured historic, and future, alterations to the design of the cam, are central to this article because any changes to the cam—past, present and future—alter how the Swan appears in operation. What a thing *does* contributes to a definition of what it *means*; therefore, any change to an object will necessarily alter the meaning of that object, for the conservators, owners and the audiences that observe it.

The 2008 Swan conservation project

In 2007, following a meeting of museum management, curatorial and conservation staff, together with external advisors, a plan for an investigation and comprehensive mechanical servicing of the Swan mechanism was

Fig. 3 The multi-function cam that controls all actions of the Swan's neck, head and bill. It can be seen that the zig-zag track overlaps the body of the supporting drum. This overlap impinges on other eighteenth-century components, arguably adding to localised and more general wear and likelihood of change/damage within the wider mechanism. The zig-zag cam differs significantly in design ethos from the radial lobed cams that dictated the movement of the Swan's neck in the vertical axis.
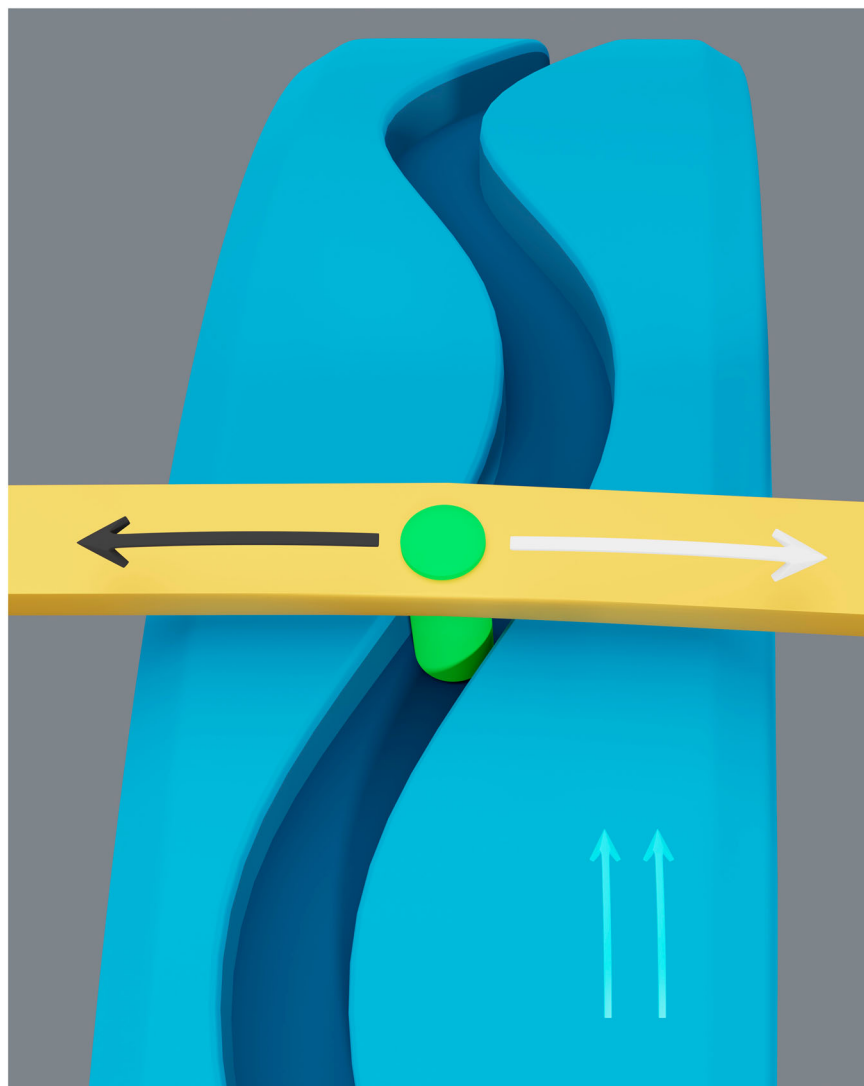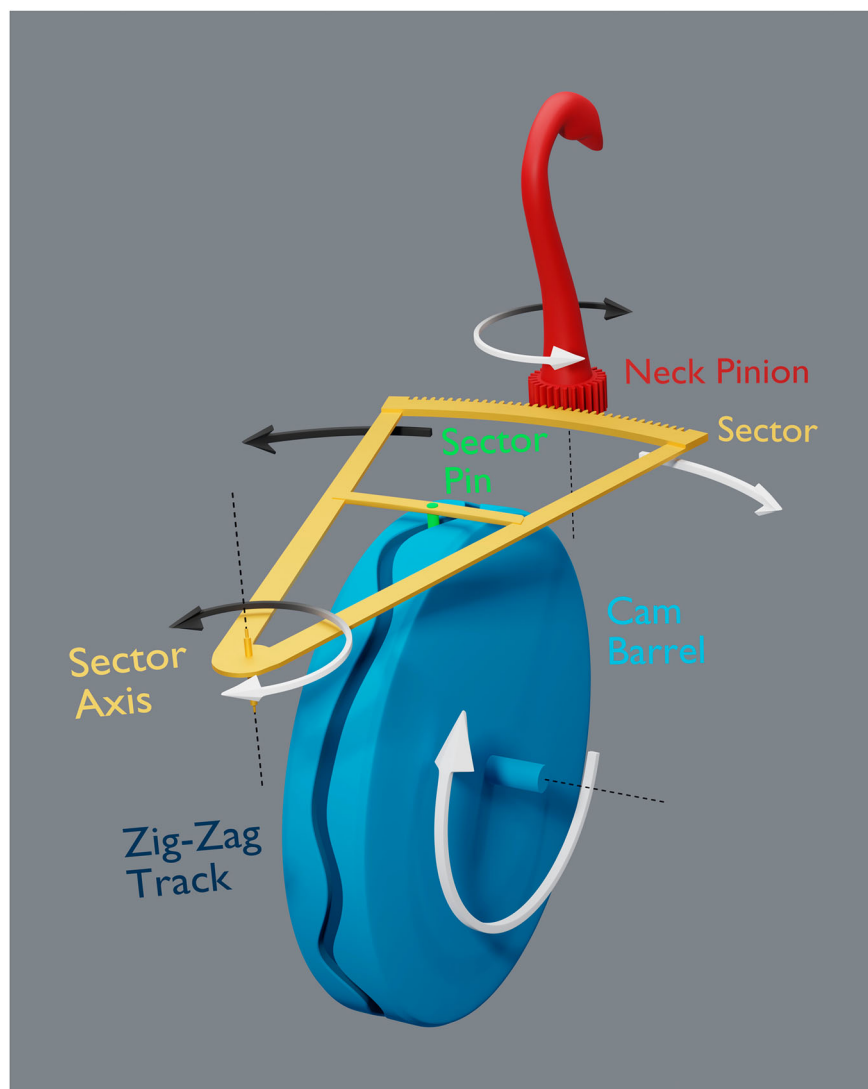
Fig. 4 Schematic showing the relationship between the rotating zig-zag track and the sector actuating pin. Here the zig-zag track profile is represented as a more flowing set or curves in contrast to the present, relatively angular version. Illustration by Eliott Colinge, https:// vecthor.be 2022.

12 See, for example, correspondence between Camerer Cuss and Curator Frank Atkinson, 4.3. 19.1.65. Unpublished curatorial records. Also see Theodore P. Camerer Cuss, 'The Silver Swan', *Antiquarian Horology* 4, no. 11 (1965): 330–4.

13 The maker was Tom Bryson-Smith. Beyond the application of an engraved plaque to record the restoration, no

proposed, including complete disassembly, documentation and cleaning. Curatorial files show that a previous major overhaul was carried out between January 1968 and June 1972.[12] This programme of work included the manufacture of a new mild steel, tubular supporting frame for the Swan assembly and a new display case.

As is typical of the conservation treatment of objects, an integral aim of the project was to make a written and photographic record of every part of the mechanism. During this process of documentation, it was discovered that a number of components appeared to have been manufactured or re-manufactured between 1968 and 1972. One such component was the zig-zag cam track. Evidence for the identification of components as later manufacture include the dimension, material, colour, texture and type of screw fixings, as well as the design. In addition, several of the new components were signed and dated by the restorer.[13] One group of the new components (Fig. 6), elements of the zig-zag track, were found during operation to be fouling the eighteenth-century components and it was

Fig. 5 Schematic of the multi-function cam body, zig-zag track, sector, sector pin and neck pinion, the design of which dictates the reciprocating rotation of the Swan's neck around the vertical axis. Illustration by Eliott Colinge, https://vecthor.be 2022.

earlier components nor those considered original appear to have been signed in this way.

conjectured that they were almost certainly causing unnecessary wear and had the potential to cause more unpredictable and extensive damage.

Track profile

There is evidence to suggest that a pre-twentieth century track would have been more flowing, less angular and less symmetrical than the one recorded during the disassembly. Firstly, the description of the Swan by Mark Twain as having 'a living grace', and the careful reproduction of a swan, down to the modelling of the silver feathering and the overall form of the automaton, would be consistent with a more 'swan-like', flowing movement. Secondly, the modern display arrangement, in a glass case with the winding and starting of the mechanism taking place in full view of an audience, presumes a broad symmetry of operation. In contrast, the historic zig-zag cam following pins suggest an amount of asymmetry that is more likely to be consistent with the description of the Swan as being originally housed in a 'temple' (Fig. 7), and therefore only visible to an audience from one side. Thirdly, it seems unlikely that the mechanism
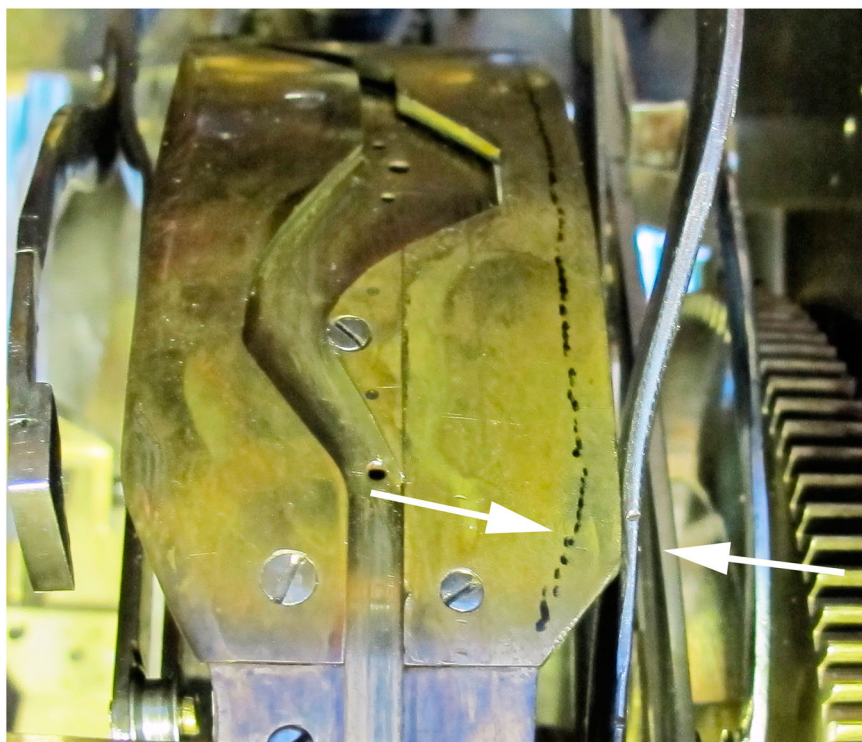
Fig. 6 Image shows one overhanging element of the zig-zag track rubbing against and deflecting one of the eighteenth-century iron cam-following levers. A dotted line (author unknown) in black ink indicates the issue was identified prior to 2008.

that generates the raising and lowering of the Swan's head and neck would be of one design concept and the mechanism that rotates the Swan's head and neck would be of another.

There has not yet been an opportunity for a controlled experiment using the Swan itself to quantify what additional wear the later cam-track sections may have caused since 1972, or what the future wear values and patterns would be, if the 1968–1972 alterations are left in place and the Swan continues to be operated on a regular basis. However, it does seem reasonable to suppose that a more sinuous design of track would reduce localised loads and friction. According to the mechanical digital counter fitted to the Swan's push-to-start mechanism, the push-to-start was operated 33,259 times between 1972 and 9 September 2008. This number of operations meant that any avoidable localised loads on the mechanism were worth investigating, as wear is generally considered cumulative and irreversible. It is interesting to note that the majority of people alive at the time of writing have seen the Swan working post-1972, meaning that the present cam track plays a central role in defining what the Swan 'does', and therefore currently 'is'.

In 2009, as part of the Swan conservation project, an experimental test bed, called the 'Swanulator' (Fig. 8), was developed to investigate the possibility of reducing localised loads on the mechanism and the potential impact on the overall appearance of the Swan. The Swanulator was a plywood box with a transverse axle carrying a drum-shaped cam body that was made to the same size as the automaton (Fig. 9). The geared sector rack and neck pinion were made using off-the-peg nylon gears, reproducing the gear ratio of the automaton.

The Swanulator demonstrated that, from a technical perspective, and respecting historic fixing points and methods, the zig-zag cam could be

Fig. 7 Artist's impression of the Swan in its eighteenth-century temple based on eighteenth and nineteenth catalogue descriptions. Image © Stephen Conlin 2009, based on the advice of scholars and curators. Commissioned by *Country Life Magazine*.

re-designed, made and fitted to reduce localised load and perceptions of wear, yet maintain the outward appearance of movement as described in earlier documents. Questions remain, however, of whether these changes should be made, exactly how they could be made and what effect they would create, including their impact on what the Swan is considered to 'be'. The Swanulator generates its own perspective on these questions and, in doing so, arguably 'flattens' the hierarchy of conceptualisations of what the *Silver Swan* 'is'.[14] This is a hierarchy that may, prior to the development of the concept of disruptive conservation, have traditionally included elements such as trustees, museum directors, curators, conservators and technicians. Near the 'bottom' of this hierarchy, but above any individual part or any models of parts, are the objects themselves. The Swanulator, the authors suggest, makes as important a contribution

14 For an exploration of 'flat ontologies' as facilitating more inclusive and dynamic understandings of language and meaning see, for example, Suresh Canagarajah, 'English as a Resource in a Communicative Assemblage: A Perspective from Flat Ontology', in *Ontolo-*
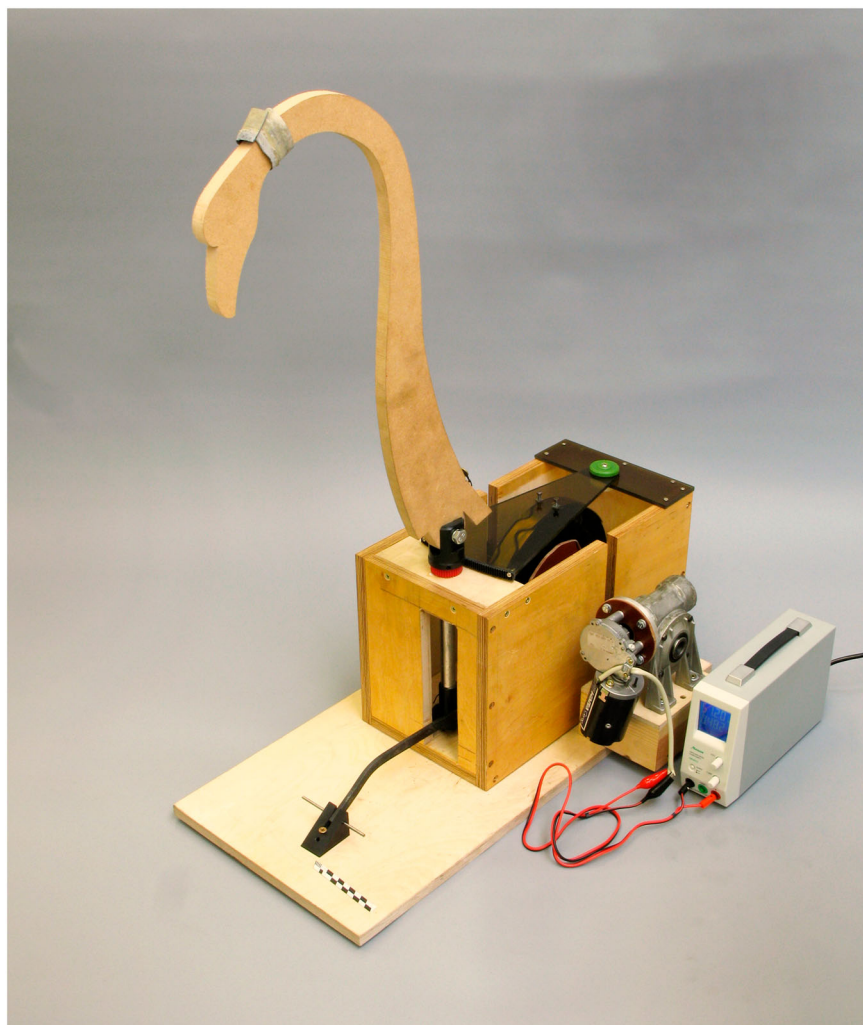
Fig. 8 The Swanulator provided not only a technical test-bed to demonstrate revised zig-zag track profiles, but also provided alternative versions of what Swan is, eliciting different audience reactions from its silver counterpart.

to the question of what the Swan 'is' as any other element of the hierarchy involved in decision-making about the Swan's conservation.

The 2021 Swan study week

After the 2008 project, the Swan was operated on a revised regime of one operation per day, with no further major work by conservators on the mechanism until 2021. In October of that year, a further phase in the conservation of the Swan began, which aimed to build on the 2008 project's thinking about what the Swan 'is', and how this thinking might influence the treatment of the object and the presentation of this treatment.

The 2021 independent project team comprised four curator-conservators, Daniela Corda, Matthew Read, Anna Rolls and Dale Sardeson, together with watchmaker Seth Kennedy, and writer and curator David Rooney. The team met at The Bowes Museum for a week-long investigation of the mechanism of the Swan, taking into account various conceptualisations of what the Swan 'is'.[15] The study week featured two, hour-long panel discussions with live in-museum and online audiences open to the general public. The study week demonstrated that the

15 It is worth noting that the partial disassembly of the Swan mechanism took place in The Blue Picture Gallery at

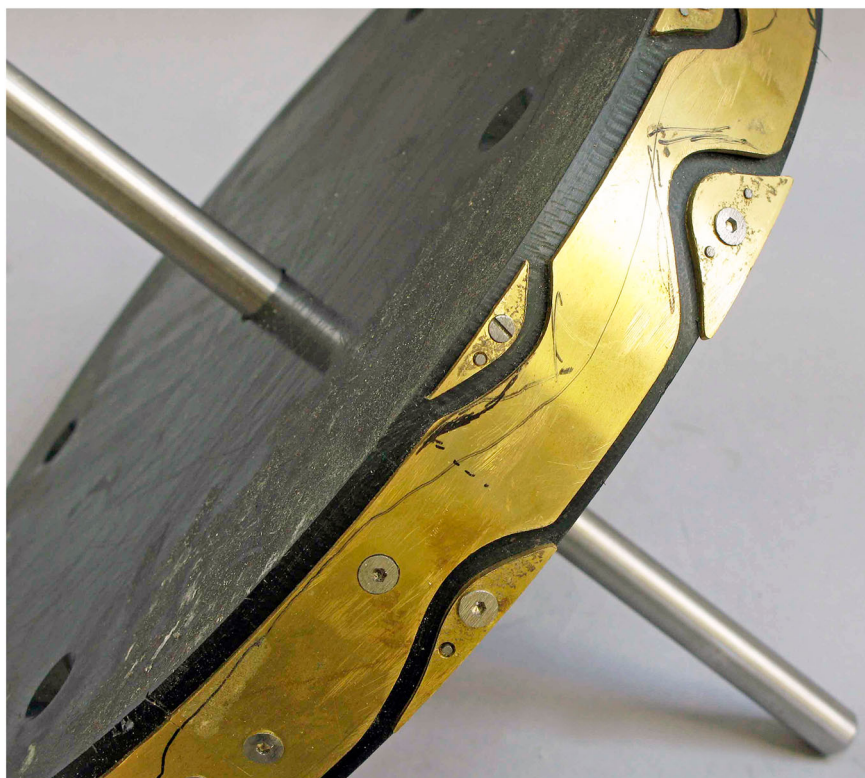**Fig. 9** The Swanulator prototype two-pin zig-zag cam track profile offers neck rotation amplitude and frequency comparable to extant, with very little cam body overhang.

Bowes, adjacent to The Music Room, where Kit Haigh's '*Song*' installation is currently playing. '*Song*' is a generative soundscape based on sampled sounds from the historic instruments that are housed in the same space. The installation was a commission by The Bowes Centre as part of the #Untitled10 series, and provides an example of how artist interpretation and digital outputs can provide a safe haven, and a creative context, for hitherto overtly 'dynamic' objects.

process of generating dialogue can be creatively presented as a product in its own right, rather than merely being a preparatory part of an end product.

The study week approach to questions about what the Swan 'is' was inspired by recent challenges to conservation orthodoxy, including Eleanor Sweetnam and Jane Henderson's convincing case for reflective thinking where 'for conservation to be a mature and reflective profession, we must be able to generate philosophical ideas and present them in our practical treatments'.[16] The study week team concurred that critical, reflective and dialogic conservators have the potential to demonstrate how they are not only interpreters, but also, through these processes of interpretation, creators, of objects. This article shows how the discussions from the Swan study week can be organised into a systematic framework for the generation of ideas about what objects 'are'. In the next section of this article, the authors consider the questions about the Swan that led to the development of the framework, including 'who owns it?', 'what value does it have to the owners?' and 'what are the consequences of the owners' idea of value for the object?'. Arguably, thinking about what objects 'are' is an essential part of *all* conservation projects, and such thinking needs to take place prior to, during and following any treatment given that the meaning of an objects is, necessarily, both contestable and fluid.

Questions of ownership and value
The current owners of the Swan, and their agents, include the funders of The Bowes Museum (Durham County Council and the UK Government's Department for Digital, Culture, Media and Sport); the Director, management and trustees of the museum; the curators; the marketing department;

16 Eleanor Sweetnam and Jane Henderson, 'Disruptive Conservation: Challenging Conservation Orthodoxy', *Studies in Conservation* (2021): 63–71.

and visitors to the museum, with the addition of non-visitors, irrespective of whether they are aware of the museum and its collections, or not.

The iconic and economic value of the Swan to its current owners, as not only an attraction but the museum's major attraction, is clear. The Bowes Museum's marketing materials imply some of the economic benefits of the Swan to the museum, linked to an assumption of benefits to the community of visitors, referring to the Swan as 'much loved' (by visitors) and, 'the icon of the Bowes Museum'. Furthermore, in December 2020, in a COVID-19 update on the visitor information page, a reference was made to the Swan's entertainment value:[17]

> 'Due to the Silver Swan being out of action for the past few months she has ceased working. Maintenance is being scheduled so she can once again entertain by early 2021.'

17 The Bowes Museum, https://www.thebowesmuseum.org.uk/Visit/Visitor-Information# (accessed 2 October 2021 —page no longer available).

A line drawing of the Swan is used as a logo on all digital and printed materials produced by the museum and brass studs, imprinted with a swan shape, are embedded in Barnard Castle pavements, perhaps to help visitors to the town navigate their way to the museum. In 2020, the town's Christmas lights were a series of swan-like shapes. The Bowes Museum's social media outputs for Christmas 2020 included an image of the museum's management standing around the Swan, which, we suggest, acts as a resource for interactions between staff (and staff and visitors), while also constituting and reinforcing the identity of the museum as 'owners' of the Swan.

The accounts of the Swan automaton used here are all written in English, a language in which the construction of 'aliveness' and gender is constrained by the pronouns that are available to the writers of the various descriptions of the object. Cox's museum catalogue uses 'it' (in English, this is usually a pronoun for things that are lower ranking on a hierarchy of sentiency than most humans and animals); Twain uses 'he'; and the Bowes Museum's marketing team use 'she'. Animacy, a grammatical and semantic feature of English and some other languages, is an example of the complex mechanisms which underpin our present cultural and social order, and which designate aspects of culture and history as 'nature'. Descriptions of what objects 'are' that depend for their justification on 'nature', such as, 'it's common sense', have the potential to hide the benefits and drawbacks of such thinking for some individuals and groups of people, and to discourage further questions. These complex and powerful mechanisms do not, however, go completely unchallenged. By showing their workings, we can open up space for dissenting voices to provide evidence of how any generalised idea of value does not always align with an individual experience. For example, in correspondence collected as part of a curatorial file dated 5 May 1982, there is a 'woman from Sunderland' who describes the Swan as neither entertaining, graceful, life-like or magical, but as 'abysmal':[18]

18 The Bowes Museum, 'Miscellaneous enquires, comments etc.', unpublished curatorial file dated 5 May 1982.

> '[WFS] writes saying visited Museum with some friends from Australia—we and they most impressed "However I feel I must protest about the abysmal performance of the elegant Silver Swan. I had expected to see something more exciting thatn [sic] the Swan eat only one fish and we never heard any music at all".'

Despite the current use of the Swan to symbolise both The Bowes Museum and the town of Barnard Castle, past owners have not always demonstrated such confidence in its value. For example, in an earlier guide to the museum, from between 1958 and 1970 when the museum was under the directorship of Frank Atkinson CBE,[19] the Swan is mentioned only briefly and at the end of a list of many other items. At this time, the

19 Cf. Martin Wainwright, 'Frank Atkinson Obituary', The Guardian, 2015,

Swan was on display, not in the main body of the museum, but in the 'Children's Room' with the text from the guide stating:[20]

> 'In a Museum with collections so sophisticated as those of the Bowes Museum many children become bored and tired. As a relief this room shows a variety of dolls, dolls houses, models and birds which may amuse or refresh the weary young visitor. It includes the well-known silver swan: a life-size "swan" made entirely of silver (…).'

Each of the past, present and future 'owners' of and audiences for the Swan are likely to have a range of reasons for wanting the Swan to be operated/played/conserved in a certain way; reasons which are underpinned by their ontological commitments to what they believe the Swan 'is'. As the linguist Ferdinand Saussure suggested, the 'object [of investigation] is not given in advance of the viewpoint … Rather, one might say that it is the viewpoint adopted which creates the object'.[21] Ontological commitments, or answers to the question 'what is the Swan?', suggested by the accounts reviewed here include: the Swan as a 'toy' to amuse children; as institutional capital, a symbol ('icon') of the Bowes Museum and of the town of Barnard Castle; and as individual 'cultural capital' for travellers such as Twain to impress readers back home with their ability to discern 'truth' and for 'WFS' to bond with her friends from Australia in disappointment at the 'abysmal' Swan.[22]

The multiple and changing meanings of heritage objects, and the idea of conservation as a social process, is acknowledged by conservator and educator Jane Henderson.[23] Henderson reminds us that the value of an object lies not only in its tangible form, but also that different beliefs about 'value'—between individuals, groups and over time—can have very important consequences for what is determined as 'change', 'damage' or 'loss'.

Where the ontological commitments that provide the foundations for notions of the Swan's ownership are pre-supposed and unarticulated,[24] they can obscure important questions, such as, 'why do owners decide to "preserve" certain objects and not others, which are taken out of use?' and 'what rights do owners have to restore, that is, change, these objects?'.[25] On the first question Sara Ahmed reminds us that, 'the politics of preservation so often involves the rights of some to appropriate what is of use to others, because they assume that they alone have the technologies needed to preserve things … taking care can mean taking things'.[26] In the case of the Swan, the current display case, perhaps designed with 'protection' in mind, minimises the perception of the overall size of the object, particularly its height so potentially limiting the visitor's visual and aural experience. On the second question, Jane Henderson cautions that, 'human evaluations [of whether an alteration to an object is non-beneficial, that is, "damage"] are complex and difficult and tie damage to an equally broad category of perceived value'.[27] These evaluations may be associated with where the object is displayed—in the case of the Swan in the Children's Room, the entrance hall, or the Silver and Metals gallery.[28] The evaluation of alterations may also depend on whether the object is considered 'art' or 'merely' an example of 'craft',[29] designations which are sensitive to fashion and are likely to change over time. Evaluations of alterations may also contain apparently contradictory views about 'damage', 'dirt' and 'evidence' of age and therefore of financial and cultural value. These contradictions have been explained by the theory of dirt as 'matter out of place' according to socially, culturally and temporally accepted norms.[30]

In a detailed account of the entangled relationships between questions of what objects 'are' (ontologies), how we know about things like value and ownership (epistemologies), and how we decide what to preserve and con-

https://www.theguardian.com/culture/2015/jan/02/frank-atkinson (accessed 2 October 2021).

20 The Bowes Museum, *The Bowes Museum Barnard Castle Guide* (no date).

21 Ferdinand de Saussure, *Course in General Linguistics*, trans. Roy Harris (London: Bloomsbury, 1916/2013), 9.

22 See Pierre Bourdieu, *The Field of Cultural Production: Essays on Art and Literature* (New York, NY: Columbia University Press, 1993) in which the theory that cultural knowledge acts as a resource, 'cultural capital', is presented. For applications of the theory to museum work see, for example, Samantha Evans, Rebecca Whiting, and Kate Mackenzie Davey, 'Struggles for Distinction: Classing as Discursive Process in UK Museum Work', *Gender, Work and Organisation* 28 (2021): 992–1007. For a critique of the theory of cultural capital as reproducing of the status quo and limiting of our ability to imagine less unequal futures, see Lew Zipin, Sam Sellar, and Robert Hattam, 'Countering and Exceeding "Capital": A "Funds of Knowledge" Approach to Re-Imaging Community', *Discourse: Studies in the Cultural Politics of Education* 33, no. 2 (2012): 179–92.

23 Jane Henderson, 'Beyond Lifetimes: Who do We Exclude When We Keep Things for the Future?', *Journal of the Institute of Conservation* 43, no. 3 (2020): 195–212.

24 See, for example, Christopher J. Hall and Rachel Wicaksono, 'Approaching Ontologies of English', in Hall and Wicaksono, *Ontologies of English*, 3–12.

25 Or 'hiding' in other ways by, for example, not supporting open digital access. For more on this see, for example, Douglas McCarthy and Andrea Wallace, 'The Case for Open Access', *Medium* website, June 2020, https://medium.com/open-glam/the-

case-for-open-access-7f8686c642f (accessed 2 October 2021).

26 Sara Ahmed, *What's the Use? On the Uses of Use* (Croydon: Duke University Press, 2019), 33.

27 Henderson, 'Beyond Lifetimes', 197.

28 For an example of how the location within a museum or in different types of museums alters the 'value' of an object, see Mikel M. Asensio and Elena Pol, 'The Never-Ending Story about Heritage and Museums: Four Discursive Models', in *Palgrave Handbook of Research in Historical Culture and Education*, ed. Mario Carretero, Stefan Berger, and Maria Grever (London: Palgrave Macmillan UK, 2017): 755–80.

29 For a discussion of whether objects in museums are 'ordinary', like cars, chairs and clothes—and can therefore be repaired with new parts that maintain the same function of the 'original' object—or whether they are primarily aesthetic objects whose meaning is thought to be changed by a 'repair', as in the example of the later restorations of the missing arm on the Hellenistic sculpture *Laocoön and His Sons*, and John Ruskin's metaphysical assumption that restoration is a form of deceit, see Rafael de Clerq, 'The Historical Ontology of Art', *The Philosophical Quarterly* 70, no. 279 (2020): 268–81.

30 Cf. for example, Mary Douglas, *Purity and Danger: An Analysis of the Concept of Pollution and Taboo* (London and New York: Routledge, 1966), 196–220.

31 Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham and London: Duke University Press, 2007), 3–38, 353–96.

32 Cf. Hall, 'An Ontological Framework for English', 13–36.

serve (ethics), Karen Barad asks us to think about how what we 'know' about things makes them into what they 'are'.[31] Barad asks questions about how 'objects' of knowledge are also agents in the production of knowledge. The Swan creates the context for our understanding of the present as, for example, manifested in visitor books ('abysmal') and marketing materials ('icon'). In this sense the objects we 'care for', as Ahmed suggests, are not only the passive products of our viewpoints, as argued by Saussure, but also, to paraphrase Barad, have *agency* in the decisions we make about what work to do on them and not on others. There is, at least, co-dependency here; the 'care' we take, and the changes we make, generate a context for future decisions about changes to the Swan and such 'evaluations', following Henderson, are projections.

The lost dome, the copper-rivetted bathtub, the water that the bathtub may have floated on, the zig-zag cam track and related traces of the 1970s conservation project—information about all of these—are potential disrupters of the present understandings of the Swan. We propose that the context in which meanings are assigned, and in which the object becomes 'itself', is not something fixed, but is multiple, fluid and changing; a *phenomenon* with the power to influence other phenomena, including the actions of a conservator on an object that is no longer only ours to control.

The objects in our care

Given the importance of articulating, negotiating and documenting our ontological commitments, how might we begin to organise our thinking about what the objects in our care 'are'? One approach, as articulated in this article, would be to ask how has the object been described in the past, by whom and with what consequences? Where is it now, how is it used, what is written and said about it? We might also ask if there is a sense of imperative to 'preserve' it for an imagined future, built on an imagined past, and what would the consequences of any conservation decisions be for the present? What follows next is an attempt to map a possible set of ontological commitments, with the Swan at the centre of the map, followed by a series of linked questions to aid reflection (Fig. 10).[32]

Using this framework conservators could generate wider debate and document some of the following questions and their answers before embarking on any treatment programme. It is important to note that the suggested questions about what an object 'is' are offered as a stimulus for dialogue. The nature and length of the dialogue, and the extent to which it is documented and made publicly available, will vary between contexts. There may be some objects, treatments and contexts that require detailed, documented, ongoing and public dialogue. Others may require only brief reflection and a few private notes. The length and complexity of the dialogue is not necessarily related to the scale of the intervention. Indeed, it is possible that a process of thorough reflection, comprehensive dialogue and detailed documentation may equally result in a 'simple' intervention as in a complex and difficult one. This dialogue is likely to be an ongoing process, forming part of the context which also changes the meaning of the object.

As an example of how the framework below might be translated into questions that begin this dialogue, the following is suggested, albeit with the emphasis that these are only suggestions and that there will be many other questions that could usefully be asked depending on the context in which the dialogue takes place:

In the *social* domain:

(1) In what ways does the object represent an idea, an identity or brand to which the 'owners' have the right to protect in order to preserve their reputation or economic status?

SOCIAL		COGNITIVE	
The object as a *process*	The 'contingent' object, which is produced by its observers, and whose being is fluid	The understood meanings that have been and are assigned to the object by individual owners/viewers	The object as a *process*

OBJECT (SWAN)			
NOTIONAL		**PHYSICAL**	
The object as a *product*	The object as a collection of classifiable parts that combine in 'predictable' ways	The 'permanent' object, which exists as a result of its past and whose meaning is inherent to the object and widely believed to be static, preservable, authentic	The object as a *product*

Fig. 10 Table mapping ontological commitments.

(2) How might the relationship between the object's biography and its meanings be displayed?

(3) How might we decide who owns the object, in the past, present and future? What are the ownership rights of different types of owners (including if we are able to think of the past as not finished and of the future as not ours, or not only ours)?

In the *cognitive* domain:

(4) What are the ideas, experiences or feelings that have been or currently are assigned to the object? How do we know? Who have we (not) asked? How have these ideas affected how the object has been conserved, and how has this treatment affected later representation and use?[33]

(5) What potential is there for ideas, experiences or feelings to be associated with the object in the present or future? How could these be predicted? How might new and emerging technologies help predict these?

In the *notional* domain:

(6) Can or have the parts of the object been described, documented, labelled and catalogued and by whom?

(7) Can the object be considered to belong to a category of similar objects, based on its appearance, origin or age? How is this categorisation evident in, for example, the physical location of the item and its description in the catalogue? How was this categorisation arrived at?

In the *physical* domain:

(8) What has been recorded—in writing, speech, sign or image—about the object?

(9) What is the potential for the distribution of any documentation about the object in order to serve a wider audience?

[33] For an account of the relationship between how heritage objects are represented and how they are preserved, which in turn affects their future representation and use, see Joel Taylor and May Cassar, 'Representation and Intervention: The Symbiotic Relationship of Conservation and Value', *Studies in Conservation* 53, no. 1 (2008): 7–11. Similarly, on how the value of heritage objects depends on them being symbols to which people give meaning, see Lisa Giombini, 'Respect in Conservation Ethics: A Philosophical Enquiry', *Studies in Conservation* 67, no. 1–2 (2022): 100–8.

34 For an example of a framework for the documentation of the 'real' meaning of an object as experienced by an individual or a group, and the demonstration of significance analysis as a communal method, see Heikki Hayha, Sari Jantunen, and Leena Paaskoski, 'Analysing Significance', *Finnish Museums Association* no. 75 (2015), http://icomfinland.fi/app/uploads/2022/05/Analysing-Significance.pdf (accessed 4 February 2023).

(10) What are the aspects of the object which are considered authentic, original and unchanging or unchangeable? Who has designated them as such?[34]
(11) In what ways does the object appear to have a static being, a permanence to which audiences may feel that they have the right to access, understand and influence?
(12) How might the relationship between the object's biography and its current physical condition be represented?
(13) How might changing the object's physical condition obscure the economic, social or political structures that gave rise to it?

Exploring ontological commitments in such a way can both quickly and usefully lead the conservator and other stakeholders to further questions about knowing (epistemology) and doing (ethics/professional standards). Getting closer to forms of 'knowing' can involve experimentation with, for example, carefully designed and evaluated conservation interventions. It can also involve the inclusion of different audiences in discussions to acknowledge diverse opinions about what the object 'is'/means, and why and how it should be conserved. Getting towards ways of 'doing' can involve further questions about how our choices might support or alleviate what may be described as 'cultural disadvantage' in the wider society. An important point here is that the avoidance or suppression of reflection and dialogue, through silence or 'inaction', is also an active part of this process and if effected is likely to limit or reduce the possible meanings accessible to those caring for the object. Avoidance or suppression of dialogue may also exclude audiences and hide the ways in which what the object 'means' have been, or are, classed, gendered and racialised. For conservators specifically, silence may have the additional effect of appearing to reduce their role to a 'doer of conservation', without the resources (or the power) to direct and develop their work. For individuals and institutions who style themselves as the owners of objects, silence and inaction have the potential benefit of preserving the status quo. Nostalgic versions of culture, including heritage objects, can create a version of the-past-in-the-present that can be marketed in the present as an 'authentic' true account of the objects, about which 'objective' decisions can be made.

35 Including, for example, the status and meaning of gifts, animals, robots, bathtubs, gender and pronouns.

In contrast, taking a process-based approach to thinking about what the objects in our care 'are' encourages conservators to articulate the fluid and changing boundaries between their objects, themselves and other audiences. Conservation notes can be made, papers written, changes to the zig-zag cam can be proposed, debated and taken forward. All these are contributions to the object, which is as changed by thinking about 'it', just as 'it' is changed by inserting a new mechanical part into 'it'. So, by making or not making a new zig-zag cam track, regardless the Swan is changed by both.[35]

The conceptualisation of the objects in the care of conservators provides a context for the understanding of the profession and ourselves as professionals. If we can try to think about the multiplicity, the fluidity and the agency of these objects, then their own contribution to our work in understanding, caring for and changing them may be able to be better articulated and more fully realised.

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Résumé

«Modélisation d'un suiveur de came pour l'automate du Cygne d'argent au Bowes Museum: une réflexion transversale sur 'ce que sont les choses'»

Cet article rend compte de l'enquête interdisciplinaire sur la conservation d'un objet dynamique, le Cygne d'argent, un automate du XVIIIe siècle actuellement dans la collection du Bowes Museum, au Comté de Durham en Angleterre. Tenant compte des récentes propositions de restauration 'perturbatrice', nous réfléchissons à la façon dont la pratique d'un restaurateur est, nécessairement, construite sur des engagements philosophiques et, plus précisément, ontologiques. En d'autres termes, des engagements envers des représentations de ce que les objets 'sont'. En tant que telle, la pratique de la restauration nécessite une interprétation, une enquête, une analyse et un travail d'équipe, ainsi qu'une simplification du dialogue dans de multiples contextes temporels, sociaux et disciplinaires. L'article tente de démontrer que ce que le Cygne 'est' dépend de son environnement physique et philosophique, et que ces conceptualisations fournissent à leur tour un contexte pour ce que fait et 'est' un restaurateur. L'article se termine par quelques suggestions pratiques sur une manière d'initier un dialogue collaboratif autour de ce que les choses 'sont'.

Zusammenfassung

„Modellierung einer Kurvenbahn für den Silver Swan Automaton im Bowes Museum: eine interdisziplinäre Reflexion über das, 'was Dinge sind'"

Dieser Artikel berichtet über die interdisziplinäre Restaurierungsuntersuchung eines dynamischen Objekts, des 'Silver Swan', eines Automaton des 18. Jahrhunderts, der sich derzeit in der Sammlung des Bowes Museum in der County Durham, England befindet. Unter Berücksichtigung der jüngsten Vorschläge für eine 'disruptive' Konservierung reflektieren wir darüber, wie die Praxis eines Restaurators notwendigerweise auf philosophischen und insbesondere ontologischen Verpflichtungen beruht. Mit anderen Worten, sie beruht auf Vorstellungen darüber, was Objekte 'sind'. Als solche erfordert die Praxis der Restaurierung Interpretation, Untersuchung, Analyse und Teamarbeit sowie die Erleichterung des Dialogs über verschiedene zeitliche, soziale und disziplinäre Kontexte. Der Artikel versucht zu zeigen, dass das, was der Schwan 'ist', von seiner physischen und philosophischen Umgebung abhängt und dass diese Konzeptualisierungen wiederum einen Kontext für das liefern, was ein Restaurator tut und auch 'ist'. Der Artikel schließt mit einigen praktischen Vorschlägen, wie ein gemeinsamer Dialog über das, was die Dinge 'sind', initiiert werden könnte.

Resumen

"Modelando un trayecto de leva para el autómata 'El cisne plateado' en el museo de Bowes: una reflexión interdisciplinaria sobre 'qué son las cosas'"

Este artículo contiene la investigación interdisciplinaria de conservación de un objeto dinámico, 'El cisne plateado', un autómata del siglo XVIII que actualmente se encuentra en la colección del Museo Bowes, en el condado de Durham, en Inglaterra. Tomando en cuenta recientes propuestas de conservación 'disruptiva', reflexionamos sobre cómo la práctica del conservador se construye, necesariamente, sobre compromisos filosóficos y, específicamente, ontológicos. En otras palabras, compromisos con las ideas sobre lo que 'son' los objetos. Y por esto la práctica de la conservación requiere interpretación, investigación, análisis y trabajo en equipo, así como la facilitación del diálogo a través de múltiples contextos temporales, sociales y disciplinarios. El artículo intenta demostrar que lo que el cisne 'es' depende de su entorno físico y filosófico, y que estas conceptualizaciones por otra parte proporcionan un contexto para lo que hace y también 'es' un conservador. El artículo concluye con algunas sugerencias prácticas sobre cómo se puede iniciar un diálogo colaborativo sobre lo que 'son' las cosas.

摘要

"为鲍威斯博物馆的机器银天鹅建模：对'事物是什么'的跨学科思考"

本文记述了对动态物体 "银天鹅"的跨学科保护调查，这是一个18世纪的自动装置，目前由英国杜伦郡的鲍威斯博物馆收藏。考虑到最近关于"破坏性"保护的提法，我们反思了保护人员的实践。它应建立在哲学上，特别是承认本体论，即承认关于客体是什么的观点。因此，保护实践需要解释、调查、分析和团队合作，以及促进跨越多个时间、社会和学科背景的对话。本文试图证明，天鹅"是什么"取决于它的物理和哲学环境，而这些概念反过来又为保护人员的工作和保护人员"是什么"提供了一个背景。文章最后提出了一些实用建议，即如何启动关于事物"是什么"的合作对话。

Biographies

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