Towards queer tours in science and technology museums

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Abstract

This paper argues that the *Queering the Science Museum* tour series (2018) provides an example of a conceptual pathway for translating queer tour guiding approaches found in socio-historical and arts museums into STEMM spaces. I use participatory methods and qualitative and quantitative participant data to reflect on my work on the tours in the context of wider practices of tour-guided interventions. I highlight how the *Queering the Science Museum* tours, at the Science Museum, London, moved beyond existing models of queer engagement in socio-historic and arts museums by introducing an explicitly critically queer approach to science and technology, which has the potential to expand the possibility of queer interventions in museums generally. I close by examining the limitations of tour-as-intervention for change within the museum, while exposing the tensions around how resolving such issues would challenge queer theory's call for rejecting the making of queer 'normal' within displays.

Key words: queer, science museums, tour guiding, participatory research

Introduction

Around the edges of the work I did as a science communicator at the Science Museum, London, there were little gaps and spaces – moments of walking around the museum, preparing props for demonstrations in a backstage room, show training, leaving the museum after work – where friendships, collegial relationships, and collaborations were born. Meandering through galleries, I would stop with friends and look and critique objects, texts, and pictures, such as a model of the Pill (SMG object number 1994-1329) and Alan Turing's ACE computer (SMG object number 1956-152 Pt1). We looked for interest; we looked to develop our knowledge of the building that visitors expected us to direct them round. I looked for queer feminist stories. This position of being an insider to the building, spending many hours there a week, but an outsider to the construction of the galleries, was the basis of feeling for and finding the 'cracks and fissures' (Sanders 2008: 24) in the normative narratives in the museum's spaces, and filling them with capacious queer narratives.

Built from these informal wonderings, *Queering the Science Museum*[1] grew into guided tours of the Science Museum. The intervention was developed, led and reviewed by myself with contributions by Damien Arness-Dalton, external to our work at the museum. The tours ran for around an hour every Saturday and Sunday in July 2018 free of charge to attendees. Arness-Dalton and I co-ran two tours, he ran one alone, and the remaining six of the tours I led. We welcomed approximately 100 people over the course of the tours, which were advertised on social media and by word of mouth. In constructing the tours, Arness-Dalton and I responded to two questions we asked ourselves:

1. Can we begin to unpack our [queer] identities and lived experiences through the science museum collections?

2. Can we use them to reach new perspectives and understandings of ourselves by looking at these collections through a fresh queer lens?

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Both of these questions allowed us to spend time thinking not only about queer or LGBTQ+ identity, but also about the ways that we might bring in queer feminist approaches – particularly around dismantling norms – to science and technology material culture.

Heritage – scientific or otherwise – is not something that 'is', but rather something we do (Smith 2006). The actions (such as curating) to decide what constitutes knowledge worth knowing in the museum is one manifestation of such power, bringing into being particular knowledges that are worth sharing with publics. Establishing what counts as heritage knowledge and the power to decide what constitutes such knowledge intertwine – the power acts of displaying things within the museum itself creates heritage knowledge (specifically, here, science) as being *the* valuable knowledge for visitors.

Here we see the educative potential of the museum, one that teaches visitors about 'national identity and progress, [in these] sites of civic education' (Macdonald 1998: 8) even while presenting such pedagogies as being a 'detached representation' of 'scientific and political certainty' (Macdonald 1998: 9). This certainty is produced in many ways – including through the 'temporal stability… and… spatial fixity' (Macdonald 1998: 5) of placing objects in galleries. Queer practice[2] urges us to reject this normative stability and certainty, challenging the unidirectional communication that is traditionally implied in the museum – instead embracing changeability, active development of ideas, and a subversive counter narrative that takes pride in queer identity and queer approaches.

Through exploring the *Queering the Science Museum* tours, this paper maps how others might consider interventions in museums of science and technology and what the possibility of innovation by a queer feminist intervention is or can be within such a museum. I first contextualize this work with existing queer interventions that challenge narratives in museums. I then describe the construction and delivery of the *Queering the Science Museum* tours showing the conceptual pathway from queer approaches found in socio-historical and arts museums to developing projects in science, technology, engineering, mathematics and medicine (STEMM) spaces. I present the methods for the data collection from participants that are used in the paper. In the discussion I reflect on the queer successes, innovations and limitations of the tours, and resolve the paper by holding together the tensions of queer practices and permanent change to the structures and politics of the institutions.

Existing 'alternative' narratives in STEMM museums

Science, technology, engineering, mathematics and medicine (STEMM) museums will be, in this paper, characterized as museum spaces with the aim of educating and developing scientific knowledge (e.g. Moser 2006). Such museums have many plural histories (e.g. Schiele 2008), as well as being characterized in a variety of ways in the present (e.g. Macdonald 1998; Falk and Dierking 2016; Dawson 2019), a discussion of which is beyond the scope of this article.

STEMM museums have remained remarkably isolated from theorizing on activist actions in museums around representation and social justice that has taken place in other parts of the museums sector. For example, Janes and Sandell's edited collection (2019) includes only one chapter on a STEMM topic – climate change – which was not related to any action in or about a STEMM museum, and no examples of social justice practices in other STEMM museums. While Adair and Levin's edited (2020) collection does include some discussion of LGBTQ+ or queer related curatorial interventions and activist practice, these are almost exclusively around HIV/AIDS, and medicalization of women's bodies – with little inclusion of gender or sexuality activism in STEMM beyond these spaces. Other recent investigations into queer practices in museums, such as Sullivan and Middleton's *Queering the Museum* (2019), do not explicitly grapple with doing queer practices in STEMM museums. While they explain that STEMM museums are indeed 'all connected and shaped by larger sociocultural systems that are particular to a given time and place' (Sullivan and Middleton 2019: 31), the authors do not include any examples of queer practice in STEMM museums throughout the book.

Scholars integrate queer theory and science and technology studies (e.g. Cipolla *et al.* 2017) with a growing field that is moving beyond queer theory in biological sciences. This move to foreground queer approaches to science has not permeated public arenas of

science communication, such as museums, to date. Researchers have demonstrated that such public STEMM spaces continue to (re)produce gendered (Machin 2008), racialized (Das and Lowe 2018), sexualized (Cassidy *et al.* 2016), and ableist (Dodd *et al*. 2010) performances that reiterate the 'ideological role' of STEMM museums (Das and Lowe 2018). Inspiration for these tours was taken from other activist interventions in STEMM museums. For example, *Bricks and Mortals*, initiated by Subhadra Das in the Grant Museum of Zoology, highlighted eugenics and 'the racist and colonialist roots' of modern science[3] at University College London[4] by critiquing the built environment that celebrates the eugenicists of UCL. *Where are all the Women?* (at the London Transport Museum) intervened by displaying plaques about 'female family members, ancestors or employees who may have worked in the transport industry',[5] inserting stories that act as counterpoints to the hegemonically masculine narratives about who worked on, travelled by and invested in public transport. Miles' work calls attention to how 'genders and sexuality are performed, as a product of power relations' (Fry 2012). The tour and zine of *Slavery and the Natural World*[6] detailed the interlocking and reproducing mechanisms of natural history and subjugation, making the museum 'a site of rediscovery as much as passive observation'.[7] In each case, active learning about and restive engagement with the existing power structures are central to the projects. Including dissenting narratives, the interventions highlight the exercises of power, (re)inscription of cultural hegemony, and the ideas of 'truth' in the gallery (Bennett 2017). These interventions prise open a path to a Foucauldian (1982) idea of a museum as a space where alternative narratives about society can emerge, challenging the way that subjects are formed in the museum space, a precedence that the *Queering the Science Museum* tours sought to follow.

Leading up to the summer of 2018 there was significant interest across the heritage sector in the UK to make queer histories more visible and to empower queer museum subjects in seeing their histories in public. The summer coincided with the 30th anniversary of enacting Section 28 – a 1988 British law which prohibited local authorities from 'intentionally promot[ing] homosexuality or publish[ing] material with the intention of promoting homosexuality' and also did not allow them to 'promote the teaching in any maintained school of the acceptability of homosexuality as a pretended family relationship'.[8] 2018 also followed a year after the 50th anniversary of the partial decriminalization of homosexuality in England in 1967, where exhibitions created ran across the two years. Exhibitions included, but were not limited to, *Queer Art at the Tate*,[9] *Gay UK: Love, Law and Liberty at the British Library*,[10] *Desire Love and Identity: Exploring LGBT Histories at the British Museum*[11] and the *Prejudice and Pride*[12] programme at National Trust properties across the UK. Alongside these installations, many institutions ran guided or self-led tours around permanent collections including Tate's *Queer Walk through British Art*,[13] Oxford University Museums' *Out in Oxford*,[14] University of Cambridge Museums' *Beyond Binaries*,[15] Victoria and Albert Museum's *LGBTQ Tours*[16] and Brighton Museum's *LGBTQ Trail*.[17] Such interventions in 2018 follow in the footsteps of earlier queer activism within UK museums, including the LGBTQ+ tours at the Victoria and Albert Museum (convened by Dan Vo), and the Little Queer History tours at the British Museum (run by and latterly documented in a book of the same name by Rob Parkinson (2013)). This is a clear, and growing, collection of platforming queer histories and heritages, as well as a body of literature situating these within queer theory and museum studies. I could not at the time find evidence for other, similar, interventions in science or natural history museums in 2018.[18] It was this gap that the *Queering the Science Museum* tours sought to address.

Methods

I drew on participatory action research methods to develop the tours and theorize the tour as part of the method of knowledge (co-)creation with tour participants. Throughout the paper, I fold in my autoethnographic data from delivering the tours, as well as incorporating the voices of participants through their completion of a quantitative and qualitative survey following the tours. I specifically draw attention as well to the particular parts of developing the tours that were strongly informed by my queer feminist methodology. This methodology foregrounds how feminist understandings of being, doing and knowing in the world are integrated with queer critiques that reject binaries, certainties and normative categorizations, instead understanding

these constructed subjects and social contexts as contingent, plural, multiple, unstable. I theorize these knowledges as constituted within specific social, geographical, and historical relations (see, e.g. Browne and Nash 2016). These orientations shaped the creation and delivery of the tours that are the subject of this paper as well as the overarching structures in which my research is developed.

There was one tour route we walked each time, with several stops. We included the model of the double helix, a Billy Doll, trans healthcare items in a cabinet titled 'Boy/Girl' which also had some vole rats beneath it, the Spitfire plane, the Enigma machine, statistics used in nursing, and a drawing of the Pioneer Plaque. It is notable that at this time the medicine galleries were closed, so our tour was not able to include this material that might have been the obvious choice for a queer tour. In the interests of space, I will describe one stop in detail, but further in the paper I draw on experiences at other stops on the tour.

Constructing the tour: an example object

One of the stops we made on the tours was the Spitfire plane in the third floor Flight Gallery at the Science Museum (2020). The Science Museum has used this object to illustrate, variously, R.J. Mitchell, the engineer behind the Spitfire;[19] uses of aircraft in the military; and the desire for speed in a military race to go ever faster. However, by queering the question of what the use of this object could be and by whom,[20] we instead discussed pilot and engineer Roberta Cowell.[21] Cowell had studied Engineering at University College London from 1936-39, where she met her wife, Diana Carpenter, a fellow Engineering student, with whom she had two children. Cowell was a keen racing car driver, competing in the 1939 Grand Prix. By 1942 she was flying Spitfire planes for the Royal Air Force.[22]

Roberta Cowell had gender confirmation surgery in 1951. It was through her friendship with Michael Dillon, the first man to receive phalloplasty surgery, that she was introduced to the Harley Street doctors who performed then-pioneering gender confirming vaginoplasty surgery on Cowell. Her friendship with Dillon and access to affirming surgery speaks to intersecting privileges of her racialization, class, and nationality – such surgeries were neither common nor global at the time. Many resources about Roberta Cowell's life, written from 1952 until after her death in 2012, are problematic sources for learning about Cowell's life. They frequently use a mixture of pronouns and gender identities (for example referring either to Cowell using he/him before 1952 and 'she/her' after) or draw on and quote sources that do. Perhaps demonstrating a shift in public discourse, from 2017 onwards sources I found in my research tended to use only she/her pronouns, as I have here, and moved away from dead-naming Cowell (i.e. using the name Cowell had prior to transition), instead asserting her identity as a pioneering woman.

Telling this story on the *Queering the Science Museum* tour allowed us collectively as a tour group to think critically about which stories we are able to tell in the museum space at all. We are able to know so much about Cowell, and to discuss her life in detail, because of her autobiography: *Roberta Cowell's Story by herself* (Cowell 1954). There are other individuals in the history of STEMM whose lives are much less well known: we pointed to people such as the medics Alan Hart (O'Hartigan 2002) and James Barry. Both of these individuals have at various points been discussed as trans, intersex, gender non-conforming, or cross-dressing (see, for example, the discussion in O'Hartigan 2002) – and ongoing historical debate seeks to situate them in such a way that their 'identity' is firm, fixed, and legible as a modern identity category. Take James Barry. Widely believed to have been born in around 1789 and identified female at birth in Ireland, Barry moved to Edinburgh to study medicine in 1809 under the name James Barry (presumed to have been inherited from uncle and Royal Academician, James Barry). Unlike many women contemporary to Barry, who also studied and practised medicine at the time under masculine names and pronouns to circumvent gendered regulations about who could train in medicine, but who later in their lives reverted to feminine names, pronouns and gendered identities in retirement, Barry retained both name and pronouns (he/him) until death – signing his will this way.

In *This Vexed Question*, an exhibition about Women in Medicine at the Royal College of Physicians (2018), another UK STEMM heritage site, a caption described Barry thus:

> James Barry had an extremely successful international career as a military surgeon in the British Army, rising to the rank of Inspector General.
>
> When Barry died in 1865, their body was revealed to have the biological characteristics of a woman. Barry was born [deadname], but from around 1808 onwards lived as a man. We do not know whether Barry identified as a man, or obscured their gender as assigned at birth in order to become a surgeon.[23]

As we discussed with our participants, compared to our presentation of Barry on the tours, there are notable differences. The caption writer chooses not to use pronouns that the individual had expressed at the time of his death (in this case, he/him), is ambiguous about what 'biological characteristics of a woman' are (we might be meant to assume a vulva, breasts, or possibly the absence of a penis – which in itself collapses the ideas of gender/sex into a single dimension), and obfuscates the fact that Barry had explicitly asked for his body not to be examined upon his death. Most of all, we highlighted the fact that Barry was included in an exhibition about women in medicine at all. This is characteristic of erasing trans and/or gender non-conforming folk as being a valuable or valid identity in its own right, rather than as 'woman-lite', as Procter noted:

> YOU DON'T GET TO BE SMUG ABOUT INCLUSIVITY WHEN IT'S ACTUALLY TRANSPHOBIA IN DISGUISE.[24]

Although we took the Spitfire as a point of departure, the instance allowed us to explore queer feminist historiography. We asked whose identities are valued in the historical record, who is honoured in the way that they recorded themselves, and who is privileged to be discussed as they thought of themselves while they were alive? What is the role of having the power to write an account of oneself rather than being recorded by others during your life or in death? We pulled to the fore the idea that queer historiography does not require us to have a firm answer, but established that uncertainty around historic identities, and open ended questions that apply in other heritage contexts, are queer heritage practices in action. Over the course of the tours we covered a range of identities and positionalities, and we attempted to discuss a wide range of identities, perspectives, and critical angles, equipping participants with knowledge and skills for future heritage sites.

Qualitative Survey Data

The qualitative data for this paper comes from a survey circulated to the participants (n=113) of the tour over the course of the month that it ran. It is likely that the respondents (n=23) skew towards those who were most interested in the content, or personal contacts of the guides who felt most invested in responding. The survey asked respondents a series of long-form, open ended questions about motivations, existing knowledge, and perceived absences or lackings on the tour. It concluded with questions about the participants' own identities and interest in seeing more events that celebrated queer identity in STEMM in the future. The respondents to the feedback were young (less than 10 per cent described themselves as over 36) and 43 per cent identified themselves as being LGBTQ+. It is difficult to know if this sample reflected the population of the tour as we did not collect these data on the whole group. There are likely to be interviewer effects on the responses as, despite the survey being administered anonymously online, the participants had attended the tour and knew the guides (who would be reading the responses). Our race, gender, and physical appearance (e.g. Hill 2002; Flores-Macias and Lawson 2008, Eisinga *et al*. 2012) are likely to have shaped the completion rate and content of the responses. The survey was only administered once, and thus characterizes the sample at the time, rather than long-term impacts. During the trial of the tour, the survey was tested (Shaughnessy *et al*. 2011). Consequently, we changed the order of data collection – moving the gathering of demographic data to the end of the questions, so that respondents would be less likely to self-censor as a result of having to early on identify as LGBTQ+ (or not) (McInroy 2016) – and made clarifying revisions to the wordings of the question.

Discussion

Drawing on arts and socio-historic practice to develop the tour

In constructing the tour, we faced the question Ferentinos asks:

> What is it, exactly, that makes an object queer? Does the fact that a queer person owned an object qualify it as a queer artefact, or must it be related explicitly to its owner's sexual identity? (Ferentinos 2015: 112)

Winchester (2013) argued that there are three ways to include objects in the tour: either the subject depicted was queer, the maker was queer, or the object is important to the LGBTQ+ community. Indeed, the LGBTQ tours at the Victoria and Albert Museum are constructed explicitly within this framework. Inspired by the tours across Exhibition Road, many of the objects on the *Queering the Science Museum* tours fit into these categories. For example, our tour included queer nurse Florence Nightingale's statistical methods because she, their developer, was queer. We highlighted how packing materials, testosterone patches and a binder belonging to 'Alex' were artefacts of relevance and importance to queer communities.

However STEMM artefacts do not often depict 'subjects' in the same sense as in a work of art that Winchester talks about. In Parkinson's *A Little Gay History* (2013), subjects depicted on the Greco-Roman Warren cup are shown engaging in same-sex sexual acts. By contrast, science collections contain significant content that does not in any figurative manner depict 'subjects'. One innovation of the tour was to operationalize 'subject' to be the position of the user – i.e. someone who did not necessarily make the artefact but was engaged with it in some way. We drew on how the National Trust's *Prejudice and Pride* (a 2017 intervention to include queer histories) included the stories of the owners of the houses (Dodd *et al.* 2018). Exploring the queer lives of those who lived at the National Trust properties frames people in those spaces as subjects, rather than the workers (craftspeople, builders, land farmers) of the houses whom we might consider in Winchester's rubric to be equivalent to 'makers'. Thus, in this tour, the inclusion of Roberta Cowell demonstrated how exploring the user of the Spitfire plane allowed us to see the museum artefact as LGBTQ+ heritage. This focus on creating queer STEMM narratives was noted as something different:

> It took something – science – which we don't often look at through a queer lens (Respondent to *Queering the Science Museum* Survey 2018)

Our queer feminist activism developed new audiences by rejecting a normative history of science. 57 per cent of respondents to our questions expressed that they would not have come to the Museum had the tours not been running, and 41 per cent of respondents who did not work at the museum had not been to the museum within the past year. We here demonstrate how these stories were of interest to participants.

Queer feminist critiques of STEMM as an innovative component of Queering the Science Museum

Another innovation of this project was the introduction of a fourth 'queer feminist critique' category to engaging with queer heritage through a tour. Our discussion of vole rats and biological research around the construction of monogamy/polyamory (Cipolla *et al.* 2017), or the inclusion of ideas around the 'gay gene' in the discussion of genetic research centred on DNA (SMG object number: 1977-310), sit outside the maker/subject/community triad as posited by Winchester (2013) and exemplified in both the Victoria and Albert Museum LGBTQ+ Tours, and the British Museum Tours. This arose, in part, through a shift from an 'LGBTQ' framing towards a 'queer' framing of our tours – explicitly no longer focusing only on individuals and communities, but instead on the potential of theory to illuminate how norms of cis-heterosexuality pervade STEMM. Framing the tour towards inspiring critical change within the permanent galleries allowed us to use queer theory to challenge the authority of the institution – reclaiming it for an alternative, disruptive, narrative about STEMM. The queer feminist methodologies I used to underpin the tours can challenge the location of the subject

(Green 2007), normative practices (McCann 2016) and fixed identities (Jagose 2009). This was noted in the responses from participants on the tour:

> I liked the fact that it wasn't just about queer scientists (although that was very interesting) but also flawed scientific studies/the lack of scientific studies on sex/gender issues (Respondent to *Queering the Science Museum* Survey 2018)

As such, this fourth category moves the tours away from simply recounting stories towards a queer critique of the collections that constitute the tours.

Location of the subject/learner

Our commitment to queer feminist practice challenged the hegemonic motif of the experience of the tours. To explicitly challenge and destabilize the idea of the authority of a guide, I innovated by opening the discussion at the start of each tour by valuing contributions of anyone else who came on the tour. Everyone introduced themselves, and we encouraged contributions (which were forthcoming) and co-creating knowledge and experiences with each other as we moved around the museum together. Through queering the tour format as well as the tour content, we encouraged a queer approach by participating 'in the general shift from object-centered to experience-centered understandings of museums' (Mills 2008: 50).

Not only did we encourage queer voices, queer narratives, and queer expressions around the museum, but through stops such as the summative critique with the Pioneer Plaque we encouraged a call-to-action to apply these questions and approaches to future contexts. By drawing attention to these absences and suggesting modes of actions, participants reflected that they:

> liked the combination of queer histories and critiques of the Science Museum's presentation (or lack thereof) of queer content (Respondent to *Queering the Science Museum* Survey 2018)

This mode of participation and development of 'queer space' within the museum can also be seen in the opening action of the Victoria and Albert Museum LGBTQ tours, where one of the tour guides for the day asks everyone attending the tour to shout 'queer' in the gallery space – claiming the gallery space for (queer) action and community rather than simply objects. The participants found queer activism a novel motivation for learning about the history of science:

> I was expecting it just to focus on figures from the history of science who'd been over looked [sic] / discriminated against (like Alan Turing) (not that focusing on these is a bad thing) but it went into much more detail (Respondent to *Queering the Science Museum* Survey 2018)

Over 70 per cent of people who responded to our survey knew either only one (and every time it was Alan Turing) or none of the seven stops we made on the tours. Whilst many participants indicated both in person during the tours and through the feedback we received that they were interested and versed in queer heritage, there was a distinct lack of knowledge about queer STEMM heritage. These tours filled this gap, rejecting the exclusive co-location of queer or LGBTQ+ identity and socio-historic or artistic spaces.

Foucault (1982) argues that knowledge and power transform human beings into subjects but that this occurs in a context-specific manner depending on the time and place where the knowledge and power are encountered. These tours enabled individuals to make themselves a 'subject of sexuality' through which individuals come to know themselves. In the space of the museum, the *Queering the Science Museum* drew attention to the narratives that allowed participants to conceive of themselves as 'queer' and 'scientific' – two parts of an identity that might otherwise be held separately.

Although we featured and queerly critiqued science research around polyamory and monogamy in vole rats, and discussed subversive relationships created and maintained by the Gay and Lesbian phonelines, most of the stories featured had (homo)normative[25] dimensions. Queer representation in public STEMM learning settings frequently normalize specific dimensions of queerness within them, providing 'yet another set of messages – this

time about appropriate forms of homosexuality and other sexual behaviours' (Cassidy *et al*. 2016: 232), and our tour was likely received no differently. This is likely to have been a result of a number of factors: the selection of objects on display; it being our first attempt at challenging the museum narrative in this way; our uncertainty about perceived expectations when returning a project write up to the funder after the intervention; and, personally, insecurity in being the leader of more explicitly queer tours.

Such reflections highlight a difficult and non-linear power structure (and construction of subjects) at play in the development and production of these tours. Arness-Dalton and I were not funded or supported internally by the Science Museum, despite working there, but ran the project outside the official remit of the museum. I still required the income and job security of the role I held there, and whilst the collections are public and do not require official permission to lead tour groups, there was the potential (not realized) for the museum to look unkindly on our critique, which led to self-censorship.

Even so, the tour groups did draw the attention of the security guards and others in the museum. Our queer bodies touring around the museum had been 'successfully defined as deviant [and therefore] subject to intense surveillance' (Tomsen 1996: 191), such that on entering each gallery our groups were followed round by security, who radioed ahead to the next gallery on overhearing where we were going. Thus, as much as the tour *content* allowed us to pluralize the identities and subjectivities of those who are considered appropriate in STEMM galleries, the museum *institution* maintained an 'in' group and an 'out' group, where we were understood as a group that was deviant and to be surveyed in the galleries. This understanding of making insiders and outsiders allowed me to pluralize what is meant by 'the museum' to myself. Motto (2016) theorizes that people working in a variety of departments in the museum have divergent understandings of what the museum should be and to whom. This pluralizing can be extended over a durational frame: as time passes, the same person's relational positions to the museum and its projects may shift. I experienced the space very differently while leading the tour to how I did while doing a show or demonstration in an interactive gallery, making noticeable the ways the museum is a plural experience.

Narrative unity

Mills' theorizing of the queer museum – presenting 'queer [as entailing] a refusal of meaning, registering a kind of disruptive negativity and incoherence at the heart of identity, language, and law' (Mills 2008: 46) – invokes the potential to challenge normative stories. Disrupting the fabric of narrative by attending to the absences in the story, queer critique challenges the 'coherence, objectivity, clarity, and narrative unity, ordering the objects of human or natural history' (Mills 2008: 46). The *Queering the Science Museum* tours took up this challenge by selecting items that were spaced around the museum across galleries, floors, themes and zones, disrupting the unity of any intended single narrative in the galleries. Within particular galleries we also juxtaposed or pointed out the 'incoherence' (Mills 2008: 46). For example, we directed attention to the incongruity of positioning vole rats as examples of promiscuous animals used for studying sexual activity at the bottom of a case that otherwise presented information about trans healthcare, gender and sex in humans. Focusing on the incoherence created space within the tours to think critically about how this reflected queer experiences and sexual expectations about queer lives with our audience.

These selections and choices – particularly as they deviated from the scripted meanings of the artefacts within the galleries – had their use queered[26] as pedagogical objects, in doing so refusing the meaning of the objects and galleries as dictated by the museum. Rather than simply telling participants information not in the narrative to the gallery, queer practice encouraged purposefully drawing attention to our refusal of meaning. With both the Billy Doll and the Boy/Girl Cabinet stops, participants read the exhibit labels aloud and we encouraged them to discuss the exhibit's construction, soliciting their thoughts about the wording and display. Our introduction of queer feminist approaches in the tour rejected unidirectional knowledge transmission, pluralizing which knowledges and experiences are considered valid by creating dialogue with the object and other participants.

However, in order for the tours to make sense while delivering them and to provide a kind of storyline structure to the event for participants, the tours did not reject connected meaning making across the tour entirely. This is particularly clear in our final stop at the Pioneer Plaque, which we used as a summative reflection of ideas developed over the different stops on the tours. Throughout the tour stops we internally referenced both forward and backwards to other objects that had been discussed, evoking queer, non-linear time, but also a connected narrative. Unlike tours that queer a space by entirely rejecting narrative and continuity,[27] *Queering the Science Museum* instead created its own internal narrative by rejecting the narratives within the museum galleries themselves.

Insider/outsider

Museums tend to prioritize the stories of the 'centre' or the 'insider'. By instead focusing on the Other, 'outsider' or 'periphery' we demonstrated how:

> a focus on outsiders has the potential to reveal a great deal about the society as a whole. Various eras and cultures have defined the boundaries of what is considered "normal" differently, and by exploring those differences – and the experiences of those who were considered "abnormal" – we can catch a glimpse of the assumptions and priorities of the larger group (Ferentinos 2015: 7).

While the Science Museum galleries have tended to focus on the insiders of STEMM – typically white, western, cis, straight men – our *Queering the Science Museum* tours prioritized the stories of queer 'outsiders' such as nurses, pilots, or technical engineers, and especially queers of colour. Our queer feminist focus on absent stories of STEMM professionals resisted the normative structures of the museum's authority and power to decide for the public who and what is deemed to be 'STEMM'. Moreover, this attention to norms highlighted the choices made in both collecting and displaying. Mills imagines that a queer museum:

> not only draw[s] attention to the normalizing dimensions of collecting and classification as cultural activities … but reveal[s] collecting itself as a potential site of queer affect and desire … [Such] projects would turn, self-reflexively, on the notion that the objective, narratorial voice of museum authority is not the only voice to be heard (Mills 2008: 48).

Thus, we featured the Billy Doll (SMG object number: 2000-584/2 Pt1) in the Museums' collection, narrating the impacts of medicalization and government policy on LGBTQ+ communities in the USA in the late twentieth century. In *Making the Modern World* the doll, found next to Barbie, is labelled in the cabinet as being 'relevant to communities' (Making the Modern World 2018) without specifically noting which community. The doll highlighted the affect and desire as well as silence and death for LGBTQ+ communities 'in the know', but did not provide an 'in' for others to learn. By celebrating and telling this story, not only were we revealing this queer desire in the collecting and classification of the museum, but also demonstrating the absence of narratorial authority (i.e. no description of this artefact as a Billy Doll) in the gallery. This ability to challenge the narrative through these queer tours was picked up by participants on a tour, one of whom commented:

> It gave an alternative history in a space where the stories told about objects are often accepted without question. It really opened my eyes to the ways in which history is shaped by those who have the privilege to tell their stories from their perspectives (Respondent to *Queering the Science Museum* Survey 2018).

Another participant noted that it was not just that a singular 'alternative' narrative was presented but rather '[m]ultiple perspectives were explored and discussion was encouraged' (Respondent to *Queering the Science Museum* Survey 2018). This demonstrated how queer interventions could create plural interpretations in addition to the normative narratives around artefacts in the museum. Particularly, this showed which stories were permitted and which voices were allowed to tell them.

Limitations of *Queering the Science Museum*

Studies elsewhere in the literature show tour guiding or live interpretation providing museums with a mechanism for high quality engagement (Gammon and Mazda 2003). Crucially, many of the challenges to normative lives, narratives, and practices were facilitated *by* the tour format. However, the tour format has many challenges when viewed from the position of those beyond the tour. Whilst many issues of delivery are known implicitly to professionals who engage in tour guiding[28] – a term that encompasses multiple parties from those leading the tours, management, escorts, writers and audiences (see Weiler and Black (2014) for a longer discussion of terms in this area) – I here explore them in the context of our tour.

Access

Tours, by their nature, are only accessible at a given time, and to a limited number of individuals. The same limitations of distance, cost of entrance, and perception that shape museum attendance (Dawson 2019) impact tours attendance too. Additionally, we must attend critically to the accessibility of tours: are the tours that contain content 'extra' to the gallery signed and visually interpreted? Do they permit movement of persons of disability around the whole tour as a result of the museum infrastructure? While many museums do tours that are signed or visually interpreted, these will often be to allow access to the content as it stands in the gallery rather than 'extra' guided content that could build empowerment within the spaces. The only LGBTQ+ tour content from around this period in London museums available in a signed format was the *Queer British Art* tour at the Tate (n.d.). One colleague also discussed with me the challenge of visitors deeming a queer tour of another UK museum 'age inappropriate' for children. Tours on sexualities, in particular, are often presumed to be inappropriate for younger visitors (see, for example, Dodd *et al*. 2018), which creates a perception of them being inaccessible to families.

While exhibitions may change over a period of months or years, reflecting funding, special events, or touring exhibitions, guided tours are transient over a much shorter period of time. This means that over the course of a given day they may only run at specific times: for *Queering the Science Museum*, we ran the tours at 4pm on Saturdays and Sundays in July. Many tours led by volunteers are not advertised in print or online in advance, and typically begin during the middle of the day. By isolating the content, especially content on racialization, class, sexuality, gender, or (dis)ability to a guided tour that is transient, groups least likely to know the 'rules of the game' (Dawson 2019), to be able to find the tours, are further disenfranchised by the museum and are unable to access the content of the tour. Some museums address this challenge by introducing e-guides. Studies claim positive impact on the experience of visitors because of the e-guides' flexibility for the visitor and the benefits to the museum, while acknowledging that the impact of the e-guide is significantly correlated with how confident visiting individuals are with technology in general (Kang and Gretzel 2012), as well as being inaccessible to those who are deaf and/or blind. While some museums make tours available and free online (for example, at the Museum of Modern Art, New York), there are many where the audio guide is only available by borrowing it from the museum (e.g. the Royal Academy, London), often for a cost, changing the type of barrier but not removing the additional steps that must be taken by the visitor to access the information. Providing e-guides circumvents the temporal access concerns of tours but does not fundamentally change the structure of the knowledge being communicated in the institution.

Objects and Themes

Macdonald (1998) describes the power of objects to construct what is 'knowledge' and thus appropriate in the science museum space. Tours are tied to the objects within the gallery space (e.g. Gammon and Mazda 2003). While they may highlight artefact absence,[29] slights of textual interpretation,[30] and (mis)attributions or stories of the artefacts,[31] at its heart a tour is framed by the galleries it passes through. This means that tours are, by necessity, constructed relationally to what is in the space already – even if the tour's work is to demonstrate exclusions. The Science Museum, London, tried to address this through its 2005-6 tours around the

non-displayed collections of the Museum at Blythe House. Caeser's (2007) documentation of the tours indicates that they were developed and delivered by the same Museum's curators who are at least in part responsible for the curation of the museum galleries, allowing similar narratives to those on display at the museum to reappear on these tours. Secondly, Caeser reports that tour visitors broadly reflected the Museum's South Kensington adult visitor profile (average age 45-65, high income, 63 per cent male identifying, 88 per cent from London, Greater London or the Home Counties (Caeser 2007)). Showing objects in store alone will not remedy the exclusion of 'progressive' or 'controversial' narratives that could be told by disrupting the content of the museum.

To attract attendees, tours are often themed. Around London in the past two years, in addition to the LGBTQ+ tours mentioned, there have been decolonial tours, Black history tours, repatriation tours, and women's history tours. This 'thematizing' of tours presents dual challenges: the tours are separate to the canonical material in the gallery, thereby 'othering' these narratives; and the themes are presented as separate to each other, allowing intersectional inclusion to be skipped over. Further, the set-up of these interventions continues to assert who should be subjected as the 'Other' within the gallery – delineating that the proper place for the 'alternative' history is in a transient tour. This problem of separation is certainly visible in *Queering the Science Museum*, but we made a concerted effort to highlight intersectional narratives to address this second criticism.

Who is delivering the content

Best (2012) argues that 'tours are not pre-scripted monologues' but instead 'best viewed as being interactive and shaped around the moment's unfolding challenges and opportunities' (Best 2012: 47), allowing guides to tailor their material. Curran explores describing the spontaneity and reactions in the moment encouraged in their tour guiding at one National Trust property: 'our delivery should be "enthusiastic, but tongue in cheek"' (Curran 2019: 147). However, these 'challenges and opportunities' (Best 2012: 47) are also laden with the tour guide's judgement of their audiences' comprehension, base knowledge, and engagement. Guides may ask their groups about the knowledges they bring to the tour, as we did on *Queering the Science Museum*, but may also make racist, sexist, classist or homophobic assumptions about what their audiences want to hear and adapt their material accordingly. Potter notes, in understanding the work of tour guides on plantation sites, that 'the level to which slavery is discussed is … guide dependent' (Potter 2016: 256) and that level:

> can often be something they adapt based on the composition of the tour group … [one guide] provided more information on the topic of slavery depending on the racial composition of his tour and what he assumes the group would like to hear (Potter 2016: 256-7).

In particular, Potter notes that guides report changing the stories (e.g. *Gone with the Wind*-style narratives, balanced narratives, Afro-centric narratives), changing the word usage and developing the performativity of historical empathy depending on their audience's racialized and age composition. Whilst this is a single study of plantation site tour guides, it would be remiss to assume that the reshaping of tours in response to the guide's perception of a group's needs or desires are isolated to this case study. Framing tour-guiding as the mechanism to access 'hidden' knowledges for those in the gallery (co-)creates the guide as expert (De Stefani and Mondada 2017) who selects what information is appropriate for which audience.

Thus, while at the start of the paper I initially positioned a queer intervention as having the potential to develop, change and subvert narratives of museums, I have shown here that this mode of queer practice can be limited. I have illustrated a non-exhaustive set of problems about this mode of delivery, methodology and the construction of what norms are expected where in the museum: fundamentally, the construction of the tours as being 'additional' in the gallery, thus remaking the Other (both as an insider and an outsider) through the way that the guide can deliver or engage with the material and the participants. It is urgent and important that, while tour guiding might be understood as a space that introduces queer feminist narratives for inclusion in the gallery space, this cannot be where those narratives

are regulated forever. Instead, incorporating plural and diverse narratives into the fabric of the institution (both physical and digital) allows visitors to integrate them into their knowledge as central parts of the politics of the institution. Additionally, challenging the narratives in the STEMM museum is not necessarily the same as changing the practices of STEMM fields. Further work to investigate the impact of such cultural interventions on STEMM professionals and their epistemic work would enable understanding about the way in which interventions might shape how people think about and relate to STEMM.

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Notes

1 The tours were supported by the British Society for the History of Science Outreach and Education Grant in 2018.

2 For example, Sarah Ahmed, 'Queer Use', Feminist Kill Joys 2018. https://feministkilljoys.com/2018/11/08/queer-use/, accessed 4 December 2019.

3 Buddhini Samarasinghe, 'Bricks + Mortals: Mapping the Racist Roots of Science : A View From the Bridge', Nature 2017. http://blogs.nature.com/aviewfromthebridge/2017/12/15/bricks-mortals/, accessed 23 May 2020.

4 UCL, 'Bricks + Mortals: A History of Eugenics Told through Buildings', UCL CULTURE 2017. https://www.ucl.ac.uk/culture/projects/bricks-mortals, accessed 12 September 2022.

5 Ellie Miles, 'Where are all the Women?', London Transport Museum Blog 2019. https://blog.ltmuseum.co.uk/2019/02/05/where-are-all-the-women/, accessed 23 May 2020.

6 Natural History Museum, 'Slavery and the Natural World', 2019. https://www.nhm.ac.uk/discover/slavery-and-the-natural-world.html, accessed 23 May 2020.

7 Florence Okoye, 'Considering Futurities Beyond the Anthropocene through Decolonising Narratives of Natural History Collections', 2017. https://slides.com/sapphonouveau/considering-futurities-beyond-the-anthropocene-through-decolonising-narratives-of-natural-history-collections#/, accessed 23 May 2020.

8 Local Government Act 1988, 'Prohibition on Promoting Homosexuality by Teaching or by Publishing Material', 1988. http://www.legislation.gov.uk/ukpga/1988/9/contents, accessed 12 September 2022.

9 Tate, 'Queer British Art 1861-1967 – Exhibition at Tate Britain', 2017. https://www.tate.org.uk/whats-on/tate-britain/exhibition/queer-british-art-1861-1967, accessed 12 September 2022

10 The British Library, 'Gay UK: Love, Law and Liberty', n.d. https://www.bl.uk/events/gay-uk-love-law-liberty, accessed 23 May 2020.

11 The British Museum, 'Desire, Love, Identity: LGBTQ Histories', n.d. https://www.britishmuseum.org/visit/object-trails/desire-love-identity-lgbtq-histories, accessed 23 May 2020.

12 National Trust, 'Prejudice and Pride: Exploring LGBTQ History', n.d. https://www.nationaltrust.org.uk/features/prejudice-and-pride-exploring-lgbtq-history, accessed 23 May 2020.

13 Tate, 'A Queer Walk Through British Art – In the Gallery', n.d. https://www.tate.org.uk/visit/tate-britain/queer-walk-through-british-art, accessed 23 May 2020.

[14] Oxford University Gardens, Libraries and Museums, 'Out in Oxford: Oxford University's first cross-collections LGBTQ+ trail', n.d. https://www.glam.ox.ac.uk/out-oxford, accessed 23 May 2020.

[15] University of Cambridge Museums and Botanic Garden, 'Bridging Binaries LGBTQ+ Tours at Cambridge Museums', n.d. https://museums.cam.ac.uk/bridgingbinaries, accessed 23 May 2020.

[16] Victoria and Albert Museum, 'V&A · LGBTQ Tour', n.d. https://www.vam.ac.uk/event/Xy3EDlGv/lgbtq-tour-2020, accessed 23 May 2020.

[17] Brighton Museum, 'LGBTQ Museum Trail', n.d. https://brightonmuseums.org.uk/brighton/trails-hands-on/lgbtq-museum-trail/, accessed 23 May 2020.

[18] At the time of delivery of *Queering the Science Museum* this was the case. Currently (2020) the 'Bridging Binaries' tours have expanded to include tours at the Whipple Museum for the History of Science, and the Sedgewick Earth Sciences Museum in Cambridge, which I wrote during 2019 for tour guides to deliver. In 2022 the Technical Museum in Vienna began running queer tours of their collection.

[19] Science Museum, 'Seaplanes To The Spitfire', Science Museum Blog 2009. https://blog.sciencemuseum.org.uk/seaplanes-to-the-spitfire/, accessed 23 May 2020.

[20] Ahmed, 'Queer Use'.

[21] Consistent with community norms, I use the pronouns that Cowell used to describe herself throughout this text.

[22] UCL, 'Roberta Cowell', n.d. https://www.ucl.ac.uk/campaign/roberta-cowell, accessed 12 September 2022.

[23] Royal College of Physicians (2018) exhibit label, transcribed from *This Vexed Question: 500 Years of Women in Medicine*.

[24] Alice Procter, 'YOU DON'T GET TO BE SMUG…', Twitter 6.21pm 14 September 2018. https://twitter.com/aaprocter/status/1040649479781789697, accessed 18 February 2021.

[25] (homo)normativity describes the privileging of heteronormative practices (e.g. being coupled, having monogamous relationships) within homosexual relationships and cultures. See Duggan (2012) for more details.

[26] Ahmed, 'Queer Use'.

[27] Tate, 'David Hoyle Queer Tour – Performance at Tate Modern 18 May 2012', 2018. https://www.tate.org.uk/whats-on/tate-modern/performance/david-hoyle-queer-tour, accessed 23 May 2020.

[28] I reflect in what follows on visitor participation in tour guiding in both the *Queering the Science Museum* and other tours at the Victoria and Albert Museum and The Polar Museum, Cambridge, and have written guided tours for the Whipple Museum of the History of Science, and the Sedgwick Museum of Earth Sciences.

[29] Miles, 'Where are all the Women?'

[30] See both Alice Procter, 'Uncomfortable Art Tours', The Exhibitionist n.d. https://www.theexhibitionist.org/, accessed 4 August 2021; and Shelly Saggar, 'The Decolonial Dictionary', n.d. https://decolonialdictionary.wordpress.com/, accessed 23 May 2020.

[31] Okoye, 'Considering Futurities'.

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