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Queering Science Museums, Science Centres, and Other Public Science Institutions

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Queering the scene at the science institution

While approaches to queer interrogation/integration within arts and socio-historical museums are well documented (e.g. Sullivan & Middleton, 2019), there is little yet written on the value of extending this approach to public science institutions. In this chapter, we think about queering public science institutions. Here we argue that that queer/ing can (and should) be an equally valuable lens for science, technology, engineering, mathematics, medical (STEMM) institutions. We use the phrase 'public science institutions' to describe a myriad of locations where everyday STEMM learning is performed and received publicly through science communication. We also recognise that many of these public science institutions are active sites of scientific research (e.g. Singapore Botanical Gardens, American Museum of Natural History); and as such they are not only representing science but also creating the very knowledge they represent. Thus, we collate here some ideas and directions spanning zoos, botanical gardens, natural parks, farmyards, makerspaces, aquaria, open air science sites, as well as science museums and science centres, that are aimed to direct the reader to ways of engaging queer theory in science communication practices and institutions in all these contexts. However, in writing this chapter we acknowledge that any queer work can never be definitive: thus we encourage unpicking and redeveloping these in any future queer interventions into science institutions.

Public science institutions have multiple valences for publics as sites of leisure, sites of learning, or sites of (un)official pedagogy. Underpinning these, such institutions are also part of projects to create and uphold the social and structural norms of societies they claim to represent. This

can be seen in existing science institution theorising focuses on who is in the audience at the institution, which highlights who is not 'learning' to be part of the society, or interrogating what norms are being communicated as knowledge to learn (Dawson, 2019). As per other scholars (e.g. Cassidy et al., 2016), we thus recognise the political implications of 'rendering things up to be viewed — [as] a key means of apprehending and "colonizing" reality' (Macdonald, 1998, p. 10) in the process of display and representation of (scientific) knowledge. Indeed, representing 'facts' or 'truths' about knowledge in displays is itself a form of political governance, in turn shaping how publics understand, act, and permit themselves to act.

Thus, science communication as a process of sharing (scientific) knowledge is not separated from the power of creating (social and scientific) norms. A critical queer lens might draw attention to the colonial origin of public science institutions, where the politics of display were inherently tied in with politics of nationalism, the nation-state, reproductive obligations, and imperial fantasies of control over the world. Public science institutions were and continue to be intimately tied up with the production and maintenance of racialised (e.g. Das & Lowe, 2019); classed (Wong, 2012), ableist (e.g. Rieger, 2016), and gendered (Dawson et al., 2020) hierarchies and norms. Knowledge that maintains the perceived moral deviancy of queer people, normalisation of binary gendering and heterosexuality (which were and are tools of empire) are reinforced through places of scientific education such as public science institutions.

In doing such queer work it is also crucial that we recognise our positionality. As white scholars of the Global North¹ we are attentive to the ways that 'queer' can operate as a neo-colonial knowledge project. Queering science communication through postcolonial practices should allow, encourage, and support the circulation and normalisation of pluralised genders and sexualities². In the rest of this chapter we extend Macdonald's (1998) analysis of the politics of display in museums as a framework for understanding the potential for queering public science institutions. We consider both the frontstage (for example, the final exhibit as a text to be analysed, the physical infrastructures of the sites, the publics' encounters with knowledge in these sites) alongside the backstage (for example, the production processes which go into building the exhibition), while suggesting that we might extend the latter to consider the broader politics of such institutional contexts.

Queering the Frontstage - what the public sees

Queer practices in public science institutions might first consider the space that publics are being invited into. We might, for example, reject the assumed gendered, cis-heterosexual physical infrastructures, pluralising what constitutes a 'family' for family admission policies and

¹ SJL uses he/they pronouns and is a queer white British academic in their 40s, they are genderqueer and polyamorous. ESA uses she/her pronouns and is a queer, dyslexic, white British academic (living in the USA) in her 20s.

² In putting this chapter together, we are particularly aware that there is a Euro-American-centric bias in the existing literature on this subject, where the same bias is not as marked in other areas of queer museum scholarship.

its costings that are predicated on a (implicitly heterosexual) nuclear family (Robert, 2014); or using gender-inclusive language (“kids” instead of “boys and girls”) to describe the imagined visitor or activity participant (Kingsley et al, 2016). Visual representations might include flying a LGBTIQ+ community or Pride flag on the building itself, on social media, or allowing employees to wear rainbow lanyards or pronoun pins. Changes to the materiality of the buildings are also possible, including building gender neutral toilets (e.g. Mulvey, 2019 - where these infrastructures are both oriented to disability and queer inclusive practices), or using queer inclusive signage for, for example, changing rooms, or lifts that “puts focus on the facility not the user” around the building (e.g. Middleton, 2021, Leitch et al., 2016). Such work communicates queer-inclusivity publicly, which might materially facilitate queer publics attending such institutions.

If we move from the space to consider what is on display, we find queer ‘issues’ are very often localised to medical displays. These often centre on medicalised interpretations that historicise HIV/AIDS (Parry & Schalkwijk, 2020); which incorrectly constructs queerness (and more often, specifically cis-male gayness) as inherently tied to illness, deviance, and medical regulation (Sequeira, 2020). Otherwise, queer identity is often tied to repression or the oppression by the law, as seen in the 2013 ‘Codebreaker’ exhibition, which discussed Alan Turing’s suicide. Such norms around representations of gender or sexuality extend beyond discussions about science and scientists into broader structural issues of knowledge. Animal displays rely heavily on representations of ‘natural’ animal behaviours, which are usually heavily gendered and heteronormative (Machin, 2008). Anthropomorphised displays obscure the socially-constructed gendered and sexual norms being communicated. Even when explicit attempts to disrupt these norms are made they can also remain flawed reproducing homonormative ideals rather than queering gender and sexual binaries (Cassidy et al., 2016).

A range of examples demonstrate how visitors use content in institutions to make sense of their own lives and identities. This can be seen in a number of ways. Hird (2004) demonstrates how overlaying of social gendered norms onto natural history collections - in their example, of birds - obfuscates knowledge of queer behaviour that these animals do exhibit to visitors. In zoos, research by Garner & Grazin (2016) has shown that visitors employ animal behaviours that they see to describe heteronormative family relationships regardless of the actual nature of the animal behaviours they are observing. Rejecting the gender binary and the heterosexualisation of natural and scientific worlds when communicating science is a vital queer practice. For example, The Field Museum have explicitly embraced SUE (a dinosaur skeleton) as a non-binary t-rex in their public communications. This is not only instructional about queer identities for visiting publics, but has the potential to educate incoming workers in the institution too (Fleenor, 2018).

This is also seen in the ways visitors engage in institutions. Gendered behaviours are often encouraged by visiting publics - for example by better supporting boys in learning science than girls even within the same family (Crowley et al., 2001). To counter this, we encourage interventions that highlight queer (re)interpretations and absences in these institutions. These include guided tours, drag science demonstrations, queer family events, or LGBTIQ+ ‘lates’ (see for an example of these practices, Davis, this volume). These examples allow publics to

co-create scientific and queer identities; and to see queer as being something that both relates to science and themselves.

Queer/ing “frontstage” practice can go further than including queer content to consider the surrounding infrastructure of display and the commitment to queer approaches. How are labels written and by/for whom? Where are these objects displayed within the structure of the gallery or the museum as a whole? Is discussion about queer identities included in the temporary display, but not in the permanent display? In temporary displays, how are the queer expressions or potentials of the content reconfigured for local audiences as they tour nation-states where cultural norms and acceptability of discussing and representing queerness varies (see, e.g. Cassidy et al., 2016)? How have interactive exhibits been conceptualised along feminine/masculine learning patterns, to support learners that are not usually included in these museums (Dancstep & Sindorf, 2018)?

In thinking about “selling” science in the shop and elsewhere we not only contend with the politics of power and knowledge, but also the politics of capitalism and reproduction. Frequently, these shops are hyper-gendered - with sections that focus on “science for girls” (codified frequently by pink and sparkles) and “proper” science toys for boys (see Onion, 2016). Inclusion of queer-friendly items for sale - for example such as books like ‘And Tango Makes Three’ - both find favour with and aim to extract capital from queer-inclusive visitors. The museum can also sell itself as a ‘queer friendly’ venue. Queer advertising, such as ZSL London’s “Some penguins are gay get over it” (ZSL, 2019) draw on visual tropes of LGBTIQ+ activism to project a queer-inclusive environment through museum content. Including visibly queer couples or family units in advertising for a public science institution is rare however (e.g. California Academy of Sciences, 2021). In the twenty-first century, the experience of the public science institution runs beyond the physical location of the institution. Thus, digital content - social media, websites, podcasts, traditional media coverage, advertisements - are also an important “frontstage” dimension for queer participation and science communication. Are queer and gender diverse stories highlighted by the institution? Are attempts at Pride month inclusion more than a change to a rainbow logo? Participation in hashtags, demonstrating accountability for intersectionally-queer commitments, or promoting queer content for more than a single month of the year, are part of demonstrating public science institutions commitment to queer approaches as central to their mission rather than a cynical attempt at virtue signalling or segmented audience inclusion.

Our selection of examples which explore how public institutions have engaged and unpacked particular dimensions of the science they display demonstrate how this allows them to trouble norms that are upheld within the institution, and to retell queer narratives and imaginaries in displays. The paucity of examples suggests to us, however, that public science institutions face greater resistance/reticence to engage in queer (and other identity-oriented) interventions than commensurate arts or socio-historical institutions where we see much more work being documented. Lingering notions of the need for scientific ‘objectivity’ (Cassidy et al, 2016), and a public image of science that sees identity and by extension, relating social norms, as unimportant to the research work in science remain. Thus, institutions continue to reify white cis-

male-heterosexual observers as the most 'objective' researchers without concern (Prescod-Weinstein, 2020). Resisting acknowledgment of the material impacts of social norms on the identities of queer scientists by public science institutions is ongoing. See for example, recent protests around naming large scientific instruments such as telescopes after homophobic leaders (e.g. Prescod-Weinstein et al 2021) or calls for eugenicists' names from buildings (e.g. UCL, 2020). Pushback against such moves continues to perpetuate an artificial separation between the knowledge produced in science, and the social contexts and views of the scientists that produce it. Similarly, efforts to decolonise science museums have called for the historical, social and cultural context of white settler colonialism to be told as part of the narratives of how scientific knowledge was, and is, shaped. A queer approach here might depart from including queer scientists, to unpick the cultural and historical context of, for example, the medicalisation of homosexuality in the 19th century, or complicity of physical scientists in developing and enforcing homophobic cultures in scientific and state workplaces.

Queering Backstage: Behind the scenes

Recent attempts within public science institutions towards the inclusion of queer publics, and/or the reinterpretation, of their collections, frequently overlook deeper structural change within the organisation. As a result, these can be dangerously tokenistic or to be solely driven by audience engagement and marketing concerns (Liddiard 2004). A more radically queer approach calls for us to not only think about the content and publics but also the institutions themselves. In this section we consider what it might mean to queer some of the other dimensions that are less "public" in public science institutions, organised along three dimensions - people, funding, and the constituent parts of the institution.

People are fundamental to the functioning of any institution. Across the science museum sector there is not much existing data on LGBTIQ+ employment. Sector-wide LGBTIQ+ demographics and institutional organisational documentation (e.g. workforce surveys) have the potential to illuminate institutional gaps in support and employment of LGBTIQ+ folk. In addition to this, better organisational support is required within structures of the institution. This includes community networks, or organising events for Pride, which should be financially supported rather than institutions expecting this as additional free work from already marginalised staff. Further, inclusive physical infrastructures and staff policies for queer staff (e.g. equal parental and medical care leave, insurance cover, and navigable instructions for name changes) are also vital for those employed at institutions (e.g. Vincent, 2016).

Institutional support of queer employees must pay attention to the uneven politics of safety and inclusion within the LGBTIQ+ communities where queer people of colour and trans communities are less well supported (LGBTQ+@cam, 2019). The Exploratorium's "Striving for Trans-inclusion and Anti-Racism in Science learning" (STARS) programme specifically employed trans and queer youth to undertake research and education on inequities foregrounding their perspectives and understanding of community needs (Exploratorium, 2021). Who (if anyone) within the LGBTIQ+ community occupies positions of responsibility and

decision making within the organisation is also key. LGBTIQ+ employees are underrepresented in decision making positions (such as at the board level) in arts and sociocultural museums (Arts Council, 2016) and we anticipate this to be the equivalent in public science institutions. Active learning within (and between) communities is also important. Platforming work at international forums, supporting networks of LGBTIQ+ employees between institutions, and developing networks of practice can support emotive and collegiate growth and learning within and between similar contexts.

Public science institutions are costly to run. Funding primarily comes through either state funding and/or private or corporate donors. Both streams may present limitations on queer possibilities for the museum - state regulation of what the money can be spent on (Adams, 2021) or state level regulation of displaying and discussing queer identities can limit what is deemed appropriate for “the public” and how narratives within these public institutions can be constructed or challenged through a queer science communication. We know too, that private or corporate donors can censor the materials that are permitted on display (Culture Unstained, 2021). Awareness of both of these tensions may additionally lead to self-censoring on the part of the employees of the institution.

Finally, we turn to the collections that underpin these public science institutions and how they might also be developed with a queer orientation. We see this possible in many different ways. Reinterpreting existing collection displays (Wellcome, 2021) and updating research practices (Leitch et al., 2019) can work to improve existing records that are publicly accessible as well as the material content of the collection. When considering digital collections, Clelow (2021) has demonstrated how different terms bias searching within online archives, showing that terms such as ‘couples’ returned primarily heterosexual results; whereas ‘gay’ returned mostly results to do with HIV/AIDS in The Science Museum Group’s digital records. These biases shape the perception of what is even available within the archive to use in displays, as well as directly shaping normative understandings of what these keyword terms mean. Critical reflection on the process of collecting objects, creating records, and digitising collections, focuses in on who has the power to do this, and how knowledge is produced about queer people and the world.

Conclusion

We feel there is, in general, significantly greater interest, activism, and research on what we have described as “frontstage” queer practices than there is on the “backstage” activities at public science institutions. While we celebrate all the work that is being done to queer public science institutions globally, we also call for further research and practices across the board. In contrast to both arts and socio-historic museums, STEM institutions lack the depth and breadth of research. Public science institutions have also thus far fallen out of the literature on broader queer-oriented institutional critiques, including those on academia or STEM fields; which may also be reasons that activities in public science institutions are less well theorised.

We also urge researchers to resist separating “frontstage” practices of science communication from the “backstage” institutional context from which it is produced. Our authorial sleight of hand

to set up this chapter does not reflect a material difference: it is the queer people employed or volunteering in institutions or activists lobbying for change from outside that push forward public-facing changes. We have extended Macdonald's theorising of the political tensions that run through public science institutions to explicitly focus on the entanglements of queer politics in institutional contexts that shape and constrain their potentials. We have used queer as a method to direct our disruption of the sanctification of particular representations of knowledge that support the colonial, capitalist, white supremacist, heteronormative, gendered ideas that are both created by science and then reproduced in communication by public science institutions. We reiterate the tensions of assimilatory practices that might attempt to subsume queer identities under the colonial auspices of the public science institution via the flying of a pride flag ('pinkwashing'); and instead direct the reader to the potentials of radical structural changes that could take place within the institution via queer action.

Queering the practices of the public science institution can disrupt the power of the knowledge structures the institution itself is intended to uphold. If, as we argued at the start of this chapter, these public science institutions are mechanisms for educating and inducting publics into conforming to the (neo)colonial norms through scientific logics, what would rejecting these norms through queer approaches look like in practice? Wayne Modest (Taking Care, 2019) argues that public institutions have the potential to radically reimagine what 'caring' for artefacts might look like. What if, instead of thinking about 'care of the collection', institutions were 'caring and careful spaces'? Through this reorientation towards care for communities, individuals, histories, heritage, or memories, there is the possibility to reject often violent acts of categorisation, within colonial, cis-heteronormative disciplining of scientific knowledge systems. What would the queer science institution look like if we, as encouraged by Muñoz (2009), rejected the idea that these archives were complete and represented 'truths', and instead fundamentally reimaged the institution outside of colonial practices? Might we instead accept multiple readings of 'science', 'technology', 'engineering', 'mathematics' and 'medicine'? Queering science communication in the context of public science institutions invites us to be provocative about what constitutes "science", who practices it, and how these are operationalised as educational tools of the state.

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