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Technoheritage

In October 2015, two artists, one armed with a hidden 3-D scanner under a cashmere scarf, walked into the Neues Museum in Berlin. After allegedly defying the no-photography rule by using a modified, low-cost motion sensor called the Kinect360, they walked out with a scan of the famous bust of Nefertiti[1]. The artists then 3-D printed their own version, entitling it *The Other Nefertiti*, and claimed it was a precise scan of the original. Two months later, they released the scan online with a Creative Commons license, enabling anyone with a 3-D printer to download and replicate the bust for their own purposes[2]. Their project had two motivations: first, to display the 3-D-printed version in Egypt as a statement against the historical theft of cultural properties by Western nations, and second, to protest the strict limitations that museums often place on sharing the informational data regarding their works with the public[3].

Ironically, a few weeks later, a few tech-savvy bloggers suggested that the scan had most likely come directly from the museum's own archives[4]. But the purported falsity of the story, it seems, only further underscored the value of what the artists were trying to say about the relationship between technology, cultural artifacts, and private property. «We need to get over the stigma of the copy», explained a curator who chose to showcase *The Other Nefertiti* in a show about reproduction at the Victoria and Albert Museum[5]. «We should no longer be asking, "should we or should we not copy?" The question is, "What should we be copying and for what purposes?" And that inevitably brings you to political questions», he argued.

Today's era can be characterized by three overlapping and yet conflicting themes regarding the changing role of art, law, and interactivity in the face of technology. The first of these themes involves the outright destruction of antiquities, which reduces the pool of available cultural heritage resources for public viewing and appreciation. Their obliteration captured the attention of Congress, which passed the Protect and Preserve Cultural Property Act in April 2016[6]. The second, almost conflicting pattern, is one of marked, mass reproduction. While there is a seemingly endless array of attacks on cultural property and antiquities, there are also more ways to replicate those antiquities than ever before. With the advent of 3-D printing, mapping technologies, and other sophisticated forms of information technology, the preservation and replication of antiquities has never been easier. An entire swath of 3-D enterprises is based on the simple principle that what one group destroys or seizes, technology can recreate and duplicate, creating copies that are more enduring, more sustainable, and more user-friendly than the original antiquities that inspired them. «This is the moment we have been waiting for», said Roger Michel, the founder and executive director of the Institute for Digital Archaeology. «If they knock it down», he said, «we will rebuild it. If they knock it down again,

1. Wilder C., *Swiping a Priceless Antiquity … With a Scanner and a 3-D Printer*, N.Y. Times (1 Mar. 2016), available at www.nytimes.com/2016/03/02/arts/design/other-nefertiti-3d-printer.html (perma.cc/NR29-YDDC) (last accessed 20 Sept 2023); see also Docherty P., *Nefertiti Hack – Questions Regarding the 3D Scan of the Bust of Nefertiti*, Amarna3d Blog (26 Feb. 2016), available at www.amarna3d.com/nefertiti-hack-questions-regarding-the-3d-scan-of-the-bust-of-nefertiti (perma.cc/BBB2-UQYL) (last accessed 20 Sept 2023), describing questions raised regarding the scanning incident.
2. Al-Badri N., Nelles J.N., *Nefertiti Hack*, available at nefertitihack.alloversky.com (perma.cc/TP3T-68BE) (last accessed 20 Sept 2023).
3. Voon C., *Artists Covertly Scan Bust of Nefertiti and Release the Data for Free Online*, Hyperallergic (19 Feb. 2016), available at hyperallergic.com/274635/artists-covertly-scan-bust-of-nefertiti-and-release-the-data-for-free-online (perma.cc/5X29-L4RL) (last accessed 20 Sept 2023).
4. Wilder C., *Nefertiti 3-D Scanning Project in Germany Raises Doubts*, N.Y. Times (10 Mar. 2016), available at www.nytimes.com/2016/03/11/arts/design/nefertiti-3-d-scanning-project-in-germany-raises-doubts.html (perma.cc/9BXF-484E) (last accessed 20 Sept 2023); *see also* Docherty P., 2016; Kahl F., *There's Something Fishy About the Other Nefertiti*, Great Fredini (6 Mar. 2016), available at thegreatfredini.com/2016/03/06/theres-something-fishy-about-the-other-nefertiti (perma.cc/PLW8-4S3Y) (last accessed 20 Sept 2023); Wenman C., *The Nefertiti 3D Scan Heist is a Hoax*, Cosmo Wenman (8 Mar. 2016), available at cosmowenman.wordpress.com/2016/03/08/the-nefertiti-3d-scan-heist-is-a-hoax (perma.cc/W2K4-5HCF) (last accessed 20 Sept 2023).
5. See Murray Brown G., *Art in the Age of Digital Reproduction*, Fin. Times (20 May 2016), available at www.ft.com/content/74ffab6e-1b55-11e6-b286-cddde55ca122 (last accessed 20 Sept 2023) (quoting Brendan Cormier).
6. See generally Pub. L. No. 114-151, 130 Stat. 369 (2016); H.R. 1493, 114th Cong. (2016) (implementing United Nations Security Council Resolution 2199; the President signed the bill into law on May 9, 2016); Fincham D., *The Syrian Conflict and the Proposed 'Protect and Preserve International Cultural Property Act'*, Santander Art & Culture Law Review 2, 2015, p. 63; *see also* Gerstenblith P., *The Destruction of Cultural Heritage: A Crime Against Property or a Crime Against People?*, John Marshall Review of Intellectual Property Law 15, 2016, p. 385 note 195.

we will rebuild it again»[7]. In other words, ISIS and others may contract the pool of cultural resources, but technology expands it[8].

However, while we might applaud technology as a remedy to the problem, there is also a third theme that focuses on the distributive and social justice questions raised by these technologies. Control and ownership of these technologies seldom coincide with that of the cultural heritage that they preserve. Here, digitization highlights uneven resource distribution, attribution, and economic inequality, particularly with respect to indigenous peoples and developing nations, who are often rich in cultural heritage and yet saddled with a legacy of colonialism and exploitation.

These issues underscore why the Nefertiti episode is so revealing. It demonstrates – to a significant degree – both the limitations and the possibilities behind the marriage of technology and cultural heritage, a phenomenon called 'technoheritage'. This phenomenon, while embraced by museums, poses difficult legal challenges because of its relationship to both cultural and intellectual property[9]. «While precise digital imaging of such politically and emotionally fraught cultural properties as the Dead Sea Scrolls and the Elgin marbles have not stilled the protests about the legalities of their current physical possession», stated expert Neil Silberman, «they have nevertheless created a new kind of cultural property – a kind of meta-cultural property that represents a shared global culture that we are creating today»[10].

A central area of uncertainty is how law will govern technoheritage, both inside and outside of the museum. The issues surrounding the changing museum implicate everything from critical digital theory to cognitive science, social research, information management, and indigenous studies, in addition to a variety of other fields[11]. Indeed, there is also a great need for legal scholarship to address the issues raised by technoheritage, since they are intrinsically relevant to anyone who studies the intersection of user participation, tangible cultural property, and intellectual property. Just as technology has the power to preserve and protect tangible artifacts in our physical landscape, it also invites a dizzying array of legal conflicts over their digitization, particularly regarding the intersection of intellectual property principles and cultural identity. The more these cultural properties become digitized, the more likely intellectual property law, with all of its restrictions and limitations, will rear its head[12].

The more interesting question, then, is whether the intersection of cultural heritage and technology will produce reruns of the same intellectual property disputes that have beset other emerging technologies, or whether new, unanticipated conflicts will arise. Answering this question requires a fundamental rethinking of interactivity within the changing institutional framework of a museum.

While technoheritage raises issues that are similar to the other issues that surround disruptive technologies, the uniquely complex nature of cultural heritage creates new challenges. Consequently, to understand the changing legal field that museums face, we must specifically address how technology has changed the legal and cultural role of museums, as well as the limitations and possibilities of technoheritage's place in public culture.

Back in 1947, André Malraux, France's first Minister of Cultural Affairs (also a former prisoner of war, art critic, and novelist), wrote a book titled *Musée Imaginaire*, loosely translated to a 'museum without walls'[13]. The idea was both simple and beautiful: photography, he wrote, made it possible to view art suddenly free of context, pulled from its location and historical origin[14]. By extracting art from its geographical and temporal identity through reproduction, Malraux predicted that viewers could curate their own experience, viewing art from Africa next to art from

7. Farrell S., *If All Else Fails, 3D Models and Robots Might Rebuild Palmyra*, N.Y. Times (28 Mar. 2016), www.nytimes.com/2016/03/29/world/middleeast/3d-models-robots-rebuild-syrian-sites.html (perma.cc/NBR9-7DUK) (last accessed 20 Sept 2023).
8. See Voon C., *In Acts of Resistance, Artists and Scholars Digitally Reconstruct the Past*, Hyperallergic (27 Jan. 2016), available at hyperallergic.com/270503/in-acts-of-resistance-artists-digitally-reconstruct-the-destroyed-past (perma.cc/6DHZ-P6ZW) (last accessed 20 Sept 2023).
9. Katyal S.K., Ross S.C., *Can Technoheritage Be Owned?*, Bos. Globe (1 May 2016), www.bostonglobe.com/ideas/2016/04/30/kaytal/jUr7WJ5XdIUm5yLLB7HGFP/story.html (last accessed 20 Sept 2023).
10. Cronin C., *3D Printing: Cultural Property as Intellectual Property*, Columbia Journal of Law and the Arts 29, 2015, p. 37 (quoting Silberman N, *From Cultural Property to Cultural Data: The Multiple Dimensions of 'Ownership' in a Global Digital Age*, International Journal of Cultural Property 21, 2014, pp. 365, 367).
11. Cameron F., Kenderdine S., *Introduction*, in Cameron F., Kenderdine S. eds., *Theorizing Digital Cultural Heritage*, Cambridge (MA): The MIT Press, 2007, p. 2. For more perspectives on the digital museum see Kidd J., *Museums in the New Mediascape*, London: Routledge, 2014; Knell S.J., MacLeod S., Watson S. eds., *Museum Revolutions: How Museums Change and Are Changed*, London: Routledge, 2007.
12. See generally Cronin, 2015.
13. See *Malraux and the* Musee Imaginaire*: the 'Museum Without Walls'*, Culture in Virtual Spaces Blog (17 Jun. 2014), available at culturalvirtualspaces.wordpress.com/2014/06/17/malraux-and-the-musee-imaginaire-the-museum-without-walls (perma.cc/8C9J-X9QG) (last accessed 20 Sept 2023).
14. Consider this quote: «[I]n our Museum without Walls picture, fresco, miniature and stained glass window seem of one and the same family[…]. In the process they have lost their properties as objects; but, by the same token, they have gained something: the utmost significance as to style that they can possibly acquire […]. It is the same with figures that in reproduction lose both their original significance as objects and their function (religious or other); we see them only as works of art and they bring home to us only their makers' talent». Malraux A., *Museum Without Walls*, in Id. *The Voices of Silence* (trans. Gilbert S.), Princeton: Princeton University Press, 1978, pp. 44-46 (emphasis removed).

Europe, or by inventing their own themes of selection and arrangement[15].

While Malraux's observations have led to a wealth of commentary from art historians, they also reveal a timeless prescience when applied to today's themes of digitization in our information-rich society[16]. As museums are increasingly viewed as spaces for civic engagement and education, they have moved from concentrating on objects to stories, and from collections to audiences[17]. As a result, their objectives have moved beyond mere display of artworks to encompass conservation, digital cataloging, and archiving, in addition to building a number of possibilities for user participation[18].

Today's 'museum without walls' is also made possible by the advent of digitization and 3-D reproduction technologies. Many museums are now digitizing their collections in order to offer greater access to the public, raising a host of complex questions as intangible images increasingly replace tangible items of cultural heritage. For example, UNESCO's 2003 Charter recognized the importance of «digital heritage», consisting of information and its forms of digital creation, distribution, access, and preservation[19]. Further, museums now often encourage user participation[20]. One scholar, Nina Simon, wrote that «[s]upporting participation means trusting visitors' abilities as creators, remixers, and redistributors of content»[21]. She noted that «regular people – not just artists or academics – appropriate cultural artifacts for their own derivative works and discussions»[22].

But I would argue that this shift towards interactivity also portends a transition from tangible property and real space into intellectual property and digital space, respectively. Things that were once tangible cultural properties have essentially become intangible, intellectual properties[23]. Their metamorphosis raises a host of questions about how law can and should be employed to regulate this process.

Yet, despite the way that interactivity has upended the fields of media and communication, only a small portion of legal scholarship has really studied its nature or complexity in the institutional context of a museum. But this work is deeply relevant to a broad cross-section of individuals who care about access, art, and culture since it reveals some of the obstacles and opportunities faced by both institutions and the private and public regulatory paradigms that govern interactivity.

More than twenty years ago, media theorist Peter Lunenfeld identified two paradigms of interactivity in his influential article *Digital Dialectics*[24]. The first model is 'extractive', because technology enables users to gather, curate, and navigate from a menu of stored information, like a database[25]. The second model, by contrast, is 'immersive', because it moved from a model that was premised on access to data to a model that focused on a deeper engagement with interactivity. It enables users to experience rather than just access information so that they can explore and navigate particular spaces in virtual reality[26].

Both these paradigms aptly characterize the changing role of technology, user participation, and the institutions that govern them. But they also raise complex legal questions about how institutions produce, construct, and regulate interactivity. Unlike innovators that change specific products in ways that might diverge from their creators' intent, some forms of institutionalized interactivity are wholly constructed by museums, raising interesting intersections between participation and proprietary concerns[27].

Today, thanks to technology, the modern museum has moved from a space that casts visitors as spectators, spaced apart from one another by gallery walls, into a world of collaboration. Rather than being passive observers, visitors

15. *See Malraux and the* Musee Imaginaire 2014, cit.
16. See, e.g., Crimp D., *On the Museum's Ruins*, October 13, 1980, p. 41; Zerner H., *Malraux and the Power of Photography*, in Johnson G.A. ed., *Sculpture and Photography*, Cambridge: Cambridge University Press, 1998, p. 116 commenting on the nature of the museum and the role of Malraux, respectively.
17. See Shannon J., *Artifacts of Collaboration at the National Museum of the American Indian*, New Proposals 7, 2015, p. 38.
18. For a rich discussion of the changing museum, see Carpenter M.M., *Drawing a Line in the Sand: Copyright Law and New Museums*, Vanderbilt Journal of Entertainment and Technology Law 13, 2011, p. 468.
19. UNESCO, Charter on the Preservation of the Digital Heritage of 17 October 2003, article 1.
20. For an excellent set of projects relating to 3-D participation, see the work of Cosmo Wenman, who has observed that «[t]here are millennia of beautiful physical forms that can be digitized, propagated, and remixed over and over again in perpetuity», Chan N., *Maker Profile: Cosmo Wenman's 3D-Printed Art, Tested* (18 Mar. 2013, 9:00 AM), available at www.tested.com/inventern/454188-maker-profile-cosmo-wenmans-3d-printed-art (perma.cc/P9KK-FQEV) (last accessed 20 Sept 2023) discussing the artist's 3-D projects.
21. See Simon N., *The Participatory Museum*, Santa Cruz: Museum 2.0, 2010, p. 3.
22. *Ibid.*
23. See Cronin, 2015, p. 1.
24. The author here was referring to hypertextual navigation. See Lunenfeld P., *Digital Dialectics: A Hybrid Theory of New Media*, Afterimage 21, 1993, p. 5.
25. *Ibid.*
26. *Ibid.* See also Lister M. et al., *New Media: A Critical Introduction* (II ed.), London: Routeldge, 2009, describing Lunenfeld's immersive navigation paradigm of interactivity.
27. See von Hippel E., *Democratizing Innovation*, Cambridge: The MIT Press, 2005; Field C., *Copyright, Technology, and Time: Perspectives on 'Interactive' as a Term of Art in Copyright Law*, Journal of the Copyright Society of the U.S.A. 50, 2003, p. 67; Fisher W.W. III, *The Implications for Law of User Innovation*, Minnesota Law Review 94, 2010, p. 1417; Lemley M.A., *The Economics of Improvement in Intellectual Property Law*, Texas Law Review 75, 1997, p. 997; Samuelson P., *Freedom to Tinker*, Theoretical Inquiries in Law 17, 2016, p. 563; Felten E., *The New Freedom to Tinker Movement*, Freedom to Tinker (21 Mar. 2013) available at freedom-to-tinker.com/2013/03/21/the-new-freedom-to-tinker-movement (perma.cc/89FK-Z4KS) (last accessed 20 Sept 2023).

can participate with media in ways that a museum might predict and design. The museum no longer houses a static collection of objects, but rather a set of possibilities for human experience and participation between museum, artist, and user. While Lunenfeld's dual paradigm seems apt for a world that is comprised of two-dimensional viewing, I would also add an additional paradigm of interactivity that stems from the dramatic possibilities of 3-D printing. This third model is what I call a 'derivative' model, because it allows users to reproduce models of museum works through digital technology.

Each of these models – extractive, immersive, and derivative – dramatically transforms the institutional role of interactivity. These models are neither exhaustive nor exclusive from one another. Rather, they are meant to demonstrate particular flashpoints of user interactivity that deserve greater analysis and scrutiny because of the complex legal questions regarding the governance of technoheritage and traditional regulatory regimes.

In addition, the replication of these items of cultural heritage – when coupled with new technology – is priceless in its possibilities for preservation. For example, Morehshin Allahyari, a new media artist, relies on 3-D printing to reconstruct artifacts destroyed by ISIS, noting both its archival uses as well as its potential as a «tool for resistance, documentation and as a process for repairing history and memory»[28]. Unlike other 3-D reproductions, however, the artist includes a flash drive and memory card inside each entity that records the original images and location of the original artifact, and instructions to future generations on how to access the memory drives without harming the objects themselves[29].

Although the 3-D movement is often intimately linked to the free culture and digital maker movements of today, it is also subject to a wide degree of legal controversy due to its commercial potential and legal uncertainties[30]. Here, the sophistication of 3-D printing might also be its greatest challenge because it forces us to separate the value of the design of an object from the comparably lesser value of the material on which it is printed. As Charles Cronin explains, «In the digital age it is increasingly true that the economic and aesthetic value of a cultural artifact is generated more by the information it contains than by the substance in which it is embodied» – in other words, its intellectual property[31]. Put simply, a marble carving is far more valuable because of the design aesthetics of the carving itself, not because of the marble upon which it is carved[32]. As a result, 3-D printing creates incentives for intellectual property owners to become even more zealous in defending their creations, despite the current, uncertain state of the law governing 3-D printing.

In a famous essay entitled *The Work of Art in the Age of Mechanical Reproduction*, Walter Benjamin observed, «[e]ven the most perfect reproduction of a work of art is lacking in one element: its presence in time and space, its unique existence at the place where it happens to be», which he described as the «aura» of the original[33]. As Benjamin observed, mechanical reproduction challenges the dominance of the aura, but, at the same time, the power of technology makes it possible to democratize access to works of art since others can view a replica instead of the original[34].

This tension, therefore, between the reproduction and the original produces a number of underexplored issues for legal scholars who work on copyright law and the museum. I would argue that the models of interactivity discussed above produce a central conflict between the authenticity of the original, as Benjamin suggested, and public access. The more we reproduce artifacts and images, the more accessible they become to the public. However, if works become more accessible to the public, what effect does that have on the original and its copy? If 3-D printing makes it incredibly easy to replicate, then how should we value an original? In other words, how much should authenticity and provenance matter in an age of mass digitization – more, or less[35]? As Charles Cronin wrote, «If human eyes cannot distinguish, for instance, between the Getty's 'Victorious Athlete' and a bronze copy of it, why should we place greater value on the earlier object simply because it was submerged in the Aegean Sea for 2000 years?»[36]. These central tensions, I would argue, are at play in the very different legal regimes that govern cultural and intellectual property – and they are also implicated in the copyright regimes that have emerged to govern the museum.

Different motivations lie behind the protection of intellectual properties *versus* cultural properties. The late John Henry Merryman, the world's most prominent cultural property theorist, has argued that the twin elements of

28. *See* Sher D., *Iranian-American 'Additivist' Recreates ISIS Destroyed Artifacts with 3D Printing*, 3D Printing Industry (12 Jan. 2016), available at 3dprintingindustry.com/news/iranian-us-based-artist-and-additivist-recreates-isis-destroyed-artefacts-with-3d-printing-64692 (perma.cc/7TBX-ERCH) (last accessed 20 Sept 2023).
29. *Ibid.*
30. See Younan S., *Poaching Museum Collections Using Digital 3D Technologies*, CITAR Journal 7, 2015, p. 30.
31. See Cronin, 2015, p. 20.
32. *Ibid.*
33. *Ivi*, p. 21 (quoting and discussing Benjamin).
34. *See* Rimock M., *An Introduction to the Intellectual Property Law Implications of 3D Printing*, Canadian Journal of Law and Technology 13, 2015, p. 11, mentioning Benjamin; see also Benjamin W., *The Work of Art in the Age of Mechanical Reproduction* in Arendt H. ed., *Illuminations* (trans. Zohn H.), New York: Schocken Books, 1969 (original ed. 1936).
35. See Murray Brown G., 2016, discussing exhibit by the Victoria and Albert Museum, titled 'A World of Fragile Parts,' which raised questions about the value of reproduction.
36. Cronin, 2015, p. 23.

cultural property policy focus on access and preservation[37]. As Peter Yu has explained, cultural property laws are usually motivated by a desire to retain, repatriate, preserve, protect, and authenticate tangible artifacts of cultural heritage[38]. In contrast, the guiding focus of intellectual property involves an almost singular focus on profit from replication, involving the control of commercial exploitation, reproduction, and distribution[39]. Moreover, intellectual property laws are also limited, in part, by a recognition of the need to preserve 'building blocks' of raw materials for future creators[40]. That is why we have affirmative defenses, like fair use, to avoid impoverishing the public domain and allow for remixing and appropriation[41].

These differences between cultural and intellectual property have led some commentators to conclude that copyright is a fairly insufficient mechanism to address the complexities of digital cultural preservation and heritage. To take one example, the project of digital cultural preservation requires large-scale reproductions of entire copyrighted works, something that copyright law is not designed to enable or regulate[42]. Since the default rule of copyright is premised on the belief that the market is the appropriate infrastructure for the production and distribution of cultural goods, cultural preservation is usually considered to be outside of its parameters[43]. Further, within this scheme, copyright law tends to underestimate the importance of the public domain, in addition to other nonmarket values like historical veracity, open access, or collective identity[44]. Digitizing and replicating cultural properties, however, converts them into intellectual property, opening a host of possibilities for further restriction. Even when a museum does not assert copyright control over a work, the museum might try to extend control over the work through negotiating particular contract terms, imposing licensing restrictions, or making claims of property ownership over the work[45].

Of course, while we might be concerned about copyright-related limitations on the remix of cultural properties, we also need to be especially mindful of the way in which museums have tended to obscure the concerns of indigenous peoples – who have been used as objects of study and have faced misappropriation and misuse of their sacred artifacts. As Angela Riley and others have observed, unauthorized reproduction and distribution of indigenous cultural property can be a significant problem for indigenous communities today[46]. These concerns, again, go to the heart of cultural heritage. As a United Nations official explained, «for indigenous peoples, heritage is a bundle of relationships, rather than a bundle of economic rights»[47].

One key solution can be Creative Commons, used widely by the museum community and others. Creative Commons offers licenses that are meant to be an alternative to the rigidity of the copyright system; it does not provide copyright protection, but instead offers a licensing scheme that allows for a reallocation of rights under copyright's framework[48]. Holders can reserve certain rights for themselves, but they can also allow for a greater licensing of rights to third parties than traditional copyright might allow. Creative Commons thus blends copyright with contract law in order to allow for greater flexibility and sharing with the public through the mass redrafting of licensing protections[49].

There is a further reason for why these market-based solutions might be particularly attractive when they go beyond pure legal constraints: these solutions can be designed and particularized to be responsive to the concerns of different constituencies, particularly indigenous communities. In some circumstances, these guidelines can respond to the

37. See Merryman J.H., *Two Ways of Thinking about Cultural Property*, American Journal of International Law 80, 1986, p. 837; Pessach G., *Museums, Digitization and Copyright Law: Taking Stock and Looking Ahead*, Journal of International Media & Entertainment Law 1, 2007, p. 259.
38. See Yu P.K., *Cultural Relics, Intellectual Property, and Intangible Heritage*, Temple Law Review 81, 2008, p. 447.
39. *Ibid.*
40. *Ivi*, p. 449.
41. *Ivi*, p. 451.
42. See Pessach, 2007, p. 281.
43. *Ibid.*
44. *Ibid.*
45. See Crews K.D., *Museum Policies and Art Images: Conflicting Objectives and Copyright Overreaching*, Fordham Intellectual Property Media & Entertainment Law Journal 22, 2012, p. 806.
46. For additional commentary, see Aoki K., *Neocolonialism, Anticommons Property, and Biopiracy in the (Not-So-Brave) New World Order of International Intellectual Property Protection*, Indiana Journal of Global Legal Studies 6, 1998, p. 11; Dutfield G., *TRIPS-Related Aspects of Traditional Knowledge*, Case Western Reserve Journal of International Law 33, 2001, p. 233; Riley A.R., *Indigenous Peoples and the Promise of Globalization: An Essay on Rights and Responsibilities*, Kansas Journal of Law & Public Policy 14, 2004, p. 159; Riley A.R., Carpenter K.A., *Owning Red: A Theory of Indian (Cultural) Appropriation*, Texas Law Review 94, 2016, p. 859; Roht-Arriaza N., *Of Seeds and Shamans: The Appropriation of the Scientific and Technical Knowledge of Indigenous and Local Communities*, Michigan Journal of International Law 17, 1996, p. 919; Sarma L., *Biopiracy: Twentieth Century Imperialism in the Form of International Agreements*, Temple International & Comparative Law Journal 13, 1999, p. 107; Tsosie R., Response, *Indigenous Identity, Cultural Harm, and the Politics of Cultural Production: A Commentary on Riley and Carpenter's 'Owning Red'*, Texas Law Review 94, 2016, p. 250; see also Tsosie R., *Reclaiming Native Stories: An Essay on Cultural Appropriation and Cultural Rights*, Arizona State Law Journal 34, 2002, p. 339.
47. Daes E., *Intellectual Property and Indigenous Peoples*, Proceedings of the Annual Meeting (American Society of International Law) 95, 2001, p. 143.
48. *See* Anderson J., Christen K., '*Chuck a Copyright on It': Dilemmas of Digital Return and the Possibilities for Traditional Knowledge Licenses and Labels*, Museum Anthropology Review 7, 2013, pp. 108-09, discussing uses of the Creative Commons license for cultural heritage.
49. *Ibid.*

moral and ethical concerns associated with intangible cultural heritage[50]. The National Museum of the American Indian, for example, has long differed from other Smithsonian offices in that it actively «adheres to ethical precepts and standards that may not be legally necessary from the viewpoint of the other units»[51]. In addition, anthropologists Jane Anderson and Kim Christen have developed an innovative set of licenses and labels for traditional knowledge[52]. They developed this project after noting that Creative Commons, like traditional copyright law, was inappropriate for a communal, indigenous traditional knowledge framework, and also largely impossible to reconcile with the restrictions that exist in some indigenous communities on age, gender, initiation, and other categories[53].

So far, this article has suggested that museums face a new paradox in today's age of interactivity: the more participatory a museum becomes, the greater the threat to its proprietary control from an endless array of extractive, immersive, and derivative forms of user interactivity. These forms of interactivity can fall on a spectrum of proprietary control, some of which raise few intellectual property concerns if they are governed by expansive licensing restrictions, and others that call into question the reach of fair use protections in a context of unrestricted interactivity.

As I have suggested, these doctrinal questions have real life implications for not just the future of museums, but also for how technology will govern access to culture itself.

50. O'Neal J.R., *Going Home: The Digital Return of Films at the National Museum of the American Indian*, Museum Anthropology Review 7, 2013, p. 167.
51. *Ibid.*
52. See Anderson, Christen, 2013, p. 105.
53. *Ivi*, p. 110.