

## Provenance as accountability: transparent and verifiable cataloguing for the digital age

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## 26. Provenance as accountability

### Transparent and verifiable cataloguing for the digital age

*Lynn Rother, Max Koss and Fabio Mariani*

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#### INTRODUCTION

On August 16, 2023, the British Museum in London announced that it had dismissed a staff member for stealing objects from its collection.<sup>1</sup> Most of the items, the press release reads, were small pieces, including gold jewellery, gems, and semiprecious stones. To the consternation of experts and the public alike, the full extent of the theft at one of the world's largest so-called universal museums was not immediately apparent. The magnitude of the theft, estimated at about 2,000 objects by the BBC, only became known in the days and weeks following the museum's disclosure.<sup>2</sup> It emerged that a curator was thought responsible for the thefts, that they had occurred over the course of more than ten years, and that many of the objects had been sold, significantly below expert estimates, in an internet marketplace. Museum leadership subsequently appealed to the public to come forward with any information it may have about the stolen items, bespeaking the museum's embarrassment and desperation.<sup>3</sup> Only some could be recovered. The museum's inability to put a figure on the stolen objects results from a lack of proper cataloguing.<sup>4</sup>

This episode quickly became a cautionary tale not only for the British Museum but for all museums with such extensive holdings. Apart from the obvious problem of insufficient security measures, discussion of the case focused on issues pertaining to the cataloguing of the museum's collections. The thefts went unnoticed as long as they did because the curator had initially sold only objects that were not catalogued and, therefore, not published on

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<sup>1</sup> The British Museum, 'Announcement Regarding Missing, Stolen and Damaged Items' (16 August 2023) <[https://www.britishmuseum.org/sites/default/files/2023-08/Announcement\\_regarding\\_missing\\_stolen\\_and\\_damaged\\_items.pdf](https://www.britishmuseum.org/sites/default/files/2023-08/Announcement_regarding_missing_stolen_and_damaged_items.pdf)> accessed 9 November 2023.

<sup>2</sup> Sean Seddon, 'British Museum Recovers Some of 2,000 Stolen Items' (BBC, 26 August 2023) <<https://www.bbc.co.uk/news/entertainment-arts-66626619>> accessed 9 November 2023.

<sup>3</sup> Paul Glynn, 'British Museum Asks Public and Experts to Help Recover Stolen Artefacts' (BBC, 26 September 2023) <<https://www.bbc.com/news/world-us-canada-66921621>> accessed 9 November 2023.

<sup>4</sup> The Independent Review that the British Museum tasked to investigate the theft states: 'We estimate that there are approximately 2000 damaged or missing items. Within that the number that are missing or stolen is around 1500.' The British Museum, 'Press Release: British Museum Announces Completion of Independent Review' (12 December 2023) <[https://www.britishmuseum.org/sites/default/files/2023-12/British\\_Museum\\_announces\\_completion\\_Independent\\_Review.pdf](https://www.britishmuseum.org/sites/default/files/2023-12/British_Museum_announces_completion_Independent_Review.pdf)>.

the museum's website.<sup>5</sup> Eventually, however, he began to also sell objects that were, in fact, catalogued and published online. It was this online availability of information and the cross-referencing it facilitated that had first raised the suspicion of a buyer. As such, the investment in cataloguing eventually led to the discovery of the crime, demonstrating how such transparency measures protect art market participants from buying and selling stolen objects.

The British Museum theft has damaged the reputation of the institution because it failed to uphold its most fundamental commitment: being the best-possible steward for its collections. Indeed, this case has drawn the broader public's attention to the missing and insufficient cataloguing that affects nearly all museums. It highlights a manifold and ongoing lack of accountability on the part of museums. Museums owe this accountability to the public for whom they hold the works. They also owe it to art market participants, being not only a source for tracing objects but also a reference for setting research benchmarks and establishing state-of-the-art due diligence processes. The latter applies especially to the identification of forged, stolen, and looted objects. Moreover, museums also owe accountability to claimants, whether in relation to Nazi looting, colonial plunder, or other unethical appropriations.

Due to changed political priorities, the identification of objects wrongfully and/or unethically appropriated has become a responsibility for collecting institutions over the past three decades. Many museums have thus invested considerable resources in establishing detailed and scientifically vetted information about the ownership histories of the objects in their collections. This revived attention on provenance has created a new sensitivity in the art market and the public at large. It has made it harder to sell works without provenance and those with illegal and/or unethical transfers in their history. In this regard, it is important to point out that museums still have uncatalogued holdings, making them altogether inaccessible and thereby failing to provide even the most basic level of transparency. It is moreover remarkable that the digital records of those objects which have been catalogued in museum collection management systems remain shaped by analogue concepts, most evident in its ongoing use of free text. This lack of structured data is also true for the online presence of art dealers, auction houses, and catalogue raisonné projects. Recently, museums have embarked on exploring the possibilities of the digital in earnest. Their focus, however, is still limited to either their so-called tombstone data (maker, title, medium, dimensions, and accession number) or their exhibition records. Provenance information, on the contrary, has remained as analogue as ever, even if dressed in digital garb. Given how pivotal the best possible access to digital provenance has become and how many resources have been invested in researching these details, it is the cataloguing of this information that now equally requires a strategic rethinking and reprioritization.

In light of this need, our chapter focuses on provenance cataloguing. It proposes a rethinking of cataloguing practices in the digital age along the axes of both the transparency and the verifiability of information. Transparency of information indicates a system of shared digital provenance recording standards; verifiability of information specifies the sourcing of

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<sup>5</sup> Jo Lawson-Tancred, 'A Weak Cataloguing System Made It Easy to Steal From the British Museum. Institutions Around the Globe Are Reckoning With the Same Vulnerabilities' (Artnet, 7 September 2023) <<https://news.artnet.com/art-world/british-museum-cataloging-debacle-2356464>> accessed 9 November 2023; Alex Marshall, 'A Scandal and Its Fallout Compound the British Museum's Woes' (New York Times, 1 September 2023) <<https://www.nytimes.com/2023/09/01/arts/british-museum-thefts.html>> accessed 9 November 2023.

provenance information and the ways to do so in the digital realm. Combined in a strategic digital framework, the transparency and verifiability of provenance information are the prerequisites for any further expansion of provenance from a means of individual redress to a collective tool of accountability.

This discussion proceeds in three steps, addressing first the heterogeneity of vested interests in the cultural heritage field and how they continue to shape recording practices. Subsequently outlined are the processes of professionalization of the provenance field over the past thirty years as well as attempts at initiating the digital future of provenance. In its final section, the chapter examines the three fundamental concerns of the digital provenance system recommended for the future: what information to include in provenance records, how to write provenance published as data, and the benefits of making this data universally shareable.

## A SHORT HISTORY OF PROVENANCE: FROM BIAS TO ACCOUNTABILITY

Historical provenance records are an unreliable source of information. They are texts shaped by the motives and historical biases their writers and subsequent editors have brought to them. Such records are neither open to scrutiny (transparent) about their genesis nor do they comply with contemporary scientific standards of verifiability. However, as an important source of information about an object's ownership history, they play a central role in conceptualizing and developing a transparent and verifiable provenance system. They thus require critical investigation to ascertain their historical accuracy as well as the reliability of their sources, one of the tasks of contemporary provenance research.

Ever since historical ownership records of cultural objects first appeared as a tool of the Parisian art market in the early eighteenth century, the compiling and recording of provenance has furthered commercial and financial interests.<sup>6</sup> As the French bourgeoisie under the Ancien Régime began to increasingly engage in cultural consumption to open paths for social distinction, art market participants catered to this emerging trend. They borrowed from long-standing genealogical practices of establishing aristocratic descent for reasons of legitimacy to impute value to cultural objects—the 'pedigree' of art objects.<sup>7</sup> The motivations of art market actors were thus utilitarian, as were the details they included in their provenances, often omitting non-illustrious previous owners from the historical record.

Profit motives continued to be the main driver for producing provenances until the late twentieth century. For two and a half centuries, these records were compiled, published, and strategically used to increase an artefact's appeal to prospective buyers. And even though it was seemingly documentary in character, art market provenance did not conform to shared and transparent rules. Today, art market actors—auction houses, compilers of catalogues raisonnés, and galleries—continue to be involved in researching, documenting, and writing the

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<sup>6</sup> Sophie Raux, 'From Mariette to Joullain: Provenance and Value in Eighteenth-Century French Auction Catalogs' in Gail Feigenbaum and Inge Reist (eds), *Provenance. An Alternative History of Art* (Getty Publications 2012).

<sup>7</sup> Elizabeth A. Pergam, 'Provenance as Pedigree: The Marketing of British Portraits in Gilded Age America' in Gail Feigenbaum and Inge Reist (eds), *Provenance. An Alternative History of Art* (Getty Publications 2012).

provenance of artworks. This is due to the fact that creating and substantiating value remains provenance's foremost use as a commercial tool.

While provenance-as-pedigree, with its various biases, continued as a practice in the twentieth century, new ethical and moral understandings of provenance developed alongside it. Provenance-as-accountability has emerged as a means to moral and material redress where legal avenues were no longer available. Both national and international efforts to develop frameworks protecting cultural heritage over the past 50 years bear witness to these shifts.

A first pivot in documenting the origins of cultural heritage was the 1970 UNESCO 'Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property.' It states that 'cultural property constitutes one of the basic elements of civilization and national culture, and [...] its true value can be appreciated only in relation to the fullest possible information regarding its origin, history and traditional setting.'<sup>8</sup> The convention was particularly significant for newly independent countries that had not previously had in place the necessary infrastructures and safeguards to combat looting and illegal excavations of their cultural heritage. The UNESCO convention did not, however, prevent the trade in looted cultural heritage. This was partly a result of the cavalier attitude of buyers and collectors toward provenance which the convention did not explicitly address.<sup>9</sup> Some museum officials went so far as to knowingly collude with traffickers to obtain objects deemed relevant for their collections.<sup>10</sup>

The end of the Cold War brought another, more transformative caesura that reconfigured provenance practice into a means to an ethics of accountability. Delegates from 44 countries, representatives from 13 NGOs as well as members of the art market observing the proceedings gathered in the United States capital for the Washington Conference on Holocaust Era-Assets on November 30, 1998. The four-day conference established the Washington Conference Principles on Nazi-Confiscated Art, commonly referred to as the Washington Principles.<sup>11</sup> This set of 11 rules fundamentally altered the practice of provenance. It marked the beginning of contemporary scientific provenance research, especially for collecting institutions such as museums and libraries.

The Washington Principles acknowledged the profound changes undergone by the international order since the fall of the Berlin Wall in 1989. The opening of the Iron Curtain made possible cooperation across borders and facilitated the exchange of information between institutions. Archival materials that had previously been (near) impossible to consult were now

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<sup>8</sup> UNESCO, 'Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property' (14 November 1970) <<https://en.unesco.org/about-us/legal-affairs/convention-means-prohibiting-and-preventing-illicit-import-export-and>>.

<sup>9</sup> See recent news reporting, such as Graham Bowley and Thomas Mashberg, 'At the Met, She Holds Court. At Home, She Held 71 Looted Antiquities' (New York Times, 17 July 2023) <<https://www.nytimes.com/2023/07/17/arts/design/shelby-white-the-met-antiquities-investigation.html>> accessed 9 November 2023.

<sup>10</sup> Hugh Eakin, 'An Odyssey in Antiquities Ends in Questions at the Getty Museum' (New York Times, 15 October 2005) <<https://www.nytimes.com/2005/10/15/arts/design/an-odyssey-in-antiquities-ends-in-questions-at-the-getty-museum.html>> accessed 9 November 2023.

<sup>11</sup> US Department of State, Office of the Special Envoy for Holocaust Issues, 'Washington Conference Principles on Nazi-Confiscated Art' (3 December 1998) <<https://www.state.gov/washington-conference-principles-on-nazi-confiscated-art/>>.

accessible, including those related to the extensive and systematic looting of objects by the Nazis. Responding to these changed circumstances, the Washington Principles were a call to action: they demanded access to archives and funds for provenance research. Above all, they stipulated that Nazi-confiscated art not yet restituted be identified and publicized. The fact that many Holocaust survivors were still alive in 1998 added urgency to this call to action.

In 1999, the year following the Washington Conference, Germany reaffirmed its commitment to the restitution efforts, including provenance research, by signing its own declaration in addition to the Washington Principles. The so-called ‘Joint Statement’ was agreed upon by the federal government, state governments, and municipal governments.<sup>12</sup> The Arbeitskreis Provenienzforschung (Research Association for Provenance Research), a grass-roots initiative launched in 2000, marked the coming-of-age of provenance research in Germany.<sup>13</sup> Promoting the exchange of archival findings and other relevant information, the Arbeitskreis has since developed into an international forum for provenance researchers.

The Washington Principles’ focus on art made them particularly relevant to museums. The systematic researching and publishing of provenances became an integral part of their administrative as well as curatorial work in the late 1990s. Going beyond the lists of scant information, mainly produced by the art market until then, museums now had to establish provenances which met scientific standards of museum documentation, aiming to identify all transactions and stations of an object’s life—or at least those that occurred during the Nazi era. These events included, as a bare minimum, the names of buyers, dates, locations, and methods of transfer. What is more, it has become a necessity for museums to address restitution claims and to prepare for potential litigation. Making every possible effort to identify looted objects essentially is to effectuate the accountability laid down by the Washington Principles.

Accountability, then, has led to more documentation of provenance and to changes in what is being recorded. Provenance has developed into a complex historical record built on the basis of interdisciplinary research methods. The information recorded has also become more detailed for two reasons. Firstly, provenance researchers have expanded the range of their source materials which are increasingly available in digital form; secondly, the number of professional researchers documenting provenance is steadily growing.

More recently, as the post-1989 Western-dominated international order is turning into a more multi-polar world, decolonization has become a central concern for cultural heritage institutions and practitioners everywhere. Indeed, the public is questioning the legitimacy of museums’ ownership of objects from cultures around the globe based on their provenances. In the West, this has led to a reckoning with the legacy of collections of ancient, indigenous,

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<sup>12</sup> Federal Republic of Germany, ‘Erklärung der Bundesregierung, der Länder und der kommunalen Spitzenverbände zur Auffindung und zur Rückgabe NS-verfolgungsbedingt entzogenen Kulturgutes, insbesondere aus jüdischem Besitz’ (9 December 1999) <[https://kunstverwaltung.bund.de/DE/UeberUns/\\_documents/Gemeinsame-Erklaerung.html](https://kunstverwaltung.bund.de/DE/UeberUns/_documents/Gemeinsame-Erklaerung.html)> accessed 9 November 2023.

<sup>13</sup> Meike Hopp and Carolin Lange, ‘20th Anniversary of the Arbeitskreis Provenienzforschung e.V.’ (2021) 8 Newsletter of the Network of European Restitution Committees on Nazi-Looted Art <<https://www.restitutiecommissie.nl/wp-content/uploads/2021/12/Network-Newsletter-no.8-January2021.pdf>> accessed 9 November 2023.

and ethnographic objects amassed under conditions of colonial exploitation, extraction, and murder—facts that for too long have been studiously avoided by museums.<sup>14</sup>

Despite the progress of the past half-century—a rising awareness of the importance of provenance, an ongoing expansion of provenance research, and ever more detailed provenance knowledge published—the amount of provenance information hitherto generated pales in comparison to what remains to be researched. Hundreds of thousands of archaeological and ethnographic objects in museum depots and in the art market are still waiting to be properly studied—many of them for the first time. Nazi-era looting continues to be an important research field, with an unknown amount of stolen works still awaiting their return to their rightful owners. The task of provenance is as herculean as ever, given that countless objects still require research and new areas of research are receiving more and more attention.

## THE TRANSFORMATIONS OF PROVENANCE SINCE 1998: ACCOUNTABILITY AND GUIDELINES

The current cataloguing practices of provenance research are yet to reflect the field's newly defined ethos of accountability. On the one hand, the heterogeneity and format of provenance information hamper the consistency across institutions required for transparent provenance. On the other hand, cultural heritage institutions face the above-mentioned urgent questions of decolonization and epistemological injustice. At the same time, the recording of provenance finds itself at a crossroads between the legacies of analogue recording practices and the potential that digital data provides for the cataloguing of objects, including provenance. Provenance research as a whole has yet to fundamentally broaden the discursive and conceptual horizons underpinning its cataloguing practices. This section first highlights past efforts to streamline recording practices through guidelines. Second, it provides examples of attempted best provenance practices to overcome some of the current limitations. It turns lastly to the transformation of provenance into machine-readable data as the foundation for a transparent and verifiable provenance practice of the future.

Provenance researchers lacked a set of rules for how to record provenances until the field's professionalization in the aftermath of the Washington Conference. For museums to comply with the demands set out by the Washington Principles, the American Association of Museums [AAM] published the 'AAM Guide to Provenance Research' in 2001.<sup>15</sup> It gave researchers in the United States (and beyond) a comprehensive primer on how to research and record provenances. The guide's redefinition of provenance was a significant departure from the pedigree-oriented provenance practice and selective memory of the art market. The AAM Guide emphasizes a more comprehensive and, above all, consistent recording practice.

Based on the principles of clarity, completeness, and order laid down by the AAM Guide, best practice provenances today are written in a syntactical structure. Rather than providing a list of names with dates, contemporary provenances present detailed information on provenance events, i.e., ownership and socio-economic custody changes of the works in question.

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<sup>14</sup> See, for example, Bénédicte Savoy, *Africa's Struggle for Its Art: History of a Postcolonial Defeat* (Princeton University Press 2022).

<sup>15</sup> Nancy H. Yeide, Konstantin Akinsha and Amy L. Walsh, 'The AAM Guide to Provenance Research' (American Association of Museums 2001).

This information includes names of individuals or organizations, locations, methods (and modalities) of transfers, and time indicators. Organized chronologically and beginning with the earliest known owner, punctuation marks divide one event from the next. A semicolon signals a direct transfer of ownership. A period, on the other hand, shows a gap in knowledge. It is unclear when, where, and how the object circulated in that particular period of time and who was involved in its transfer(s). Parentheses indicate dealers, auctioneers, and other intermediaries; the life dates of owners are given in brackets.

The adoption of the AAM's best practice model on recording provenance has led to some convergence in provenance recording in the United States. However, an alignment across institutions that could be considered transparent in the spirit of a collective tool of accountability remains elusive.<sup>16</sup> Equally elusive in the recording of provenances remains the type of information the AAM has laid out in its 'Recommended Procedures for Providing Information to the Public about Objects Transferred in Europe during the Nazi Era,' also from 2001.<sup>17</sup> They specifically indicate that information such as lot numbers from auctions or sale prices should be included if known, as such information is particularly relevant for provenance researchers and claimants hoping to identify looted art. Yet, few provenances include them.

While the 'Recommended Procedures' do not provide advice on the sourcing of information, the AAM Guide states that 'footnotes are used to document or clarify information.'<sup>18</sup> It does not specify, however, whether or not all information in a provenance should be sourced. Its example has footnotes only for a select number of its provenance events. The incompletely sourced example notwithstanding, by emphasizing the role of footnotes and sources, the Guide acknowledges provenance research as a scientifically verifiable and hence social and publicly accountable practice. Conceived in such a way, it is aimed first and foremost at serving the public good, which in the case of looted or stolen art means establishing historical accuracy as the basis for restitution decisions and, ultimately, processes of historical reconciliation. Leading institutions in the United States have adopted a provenance format based on the AAM Guide, such as the National Gallery of Art [NGA] in Washington, D.C. or the Art Institute of Chicago. However, the variance the Guide allows in its implementation by individual institutions is also resulting in ongoing inconsistencies and heterogeneity.

The most recent manual offering instruction and examples for the process of writing provenance is the 'Leitfaden zur Standardisierung von Provenienzzangaben' (Guidelines for the Standardization of Provenance Information), published by the Arbeitskreis Provenienzforschung.<sup>19</sup> First issued in 2018, it is narrow in focus and specifically addresses questions concerning the actual written form of the provenance text. The document under-

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<sup>16</sup> The research project 'Modern Migrants: Paintings from Europe in US Museums' at Leuphana University Lüneburg, Germany, undertaken by the authors of this article, has brought together over 5,000 provenances of Impressionist, Post-Impressionist and Modern paintings from 79 institutions. It has shown that significant divergence in provenance recording remains an obstacle to greater accountability and transparency.

<sup>17</sup> American Alliance of Museums, 'Recommended Procedures for Providing Information to the Public about Objects Transferred in Europe during the Nazi Era' (2001) <<https://www.aam-us.org/wp-content/uploads/2018/01/nepip-recommended-procedures.pdf>> accessed 15 April 2024.

<sup>18</sup> Yeide, Akinsha, and Walsh (n 15) 33.

<sup>19</sup> Claudia Andratschke, Jasmin Hartmann, Johanna Poltermann, Iris Schmeisser and Wolfgang Schöddert (eds), 'Leitfaden zur Standardisierung von Provenienzzangaben' (Arbeitskreis

scores the idea of consistency within and across provenances. It also deals with the question of standardized wording for the writing of provenances. The ‘Leitfaden zur Standardisierung’ is aimed at museum professionals, but it explicitly addresses private collectors and art market actors, too. It thereby acknowledges the expanded purview of scientific provenance practice today that encompasses all stakeholders in the circulation of cultural heritage objects.

In the spirit of public accountability, the ‘Leitfaden Provenienzforschung’ published by Germany’s Lost Art Foundation emphasizes the need to create transparency regarding provenance research.<sup>20</sup> To this end, it proposes increased efforts to display provenances on labels and showcase provenance research in exhibitions. Provenance research and provenances have thus entered the museum galleries, spaces traditionally reserved for aesthetic contemplation.<sup>21</sup> They have now become exhibitable whereas in the past they used to be (and in certain quarters still are) best kept under wraps. Select museums have begun mounting exhibitions dedicated to the lives and trajectories of objects, replete with historical evidence to give a sense of the fundamentally archival nature of provenance research and published provenances. Other museums have opted for interventions in their permanent collection displays, with singular provenance narratives and high-profile cases being highlighted (and, perhaps, reinscribing the fixation on well-known individuals). Others still, even if their number remains low, have opted to include more or less extensive provenance information on their permanent wall labels, such as the Westphalian State Museum of Art and Cultural History in Münster, Germany. As laudable as they may be, these interventions are contained within the physical confines of the museum building or exhibition hall. They are characterized by the ongoing institutional impulse to control how the public encounters and perceives provenance. Moreover, a brick-and-mortar exhibition in 2024 is ultimately less accessible than many alternatives. The best-case scenario is a well-maintained and publicly searchable online collection catalogue that includes up-to-date provenance information.

Another strategy for making the results of provenance research more transparent is that of color coding, also first introduced by the ‘Leitfaden Provenienzforschung.’ It thereby seeks to categorize provenances according to their level of reliability: it is both the quantity and the quality of the research undertaken that contributes to transparency. An exemplary case of provenance color coding is the presentation of provenances at the Kunstmuseum Bern in Switzerland.<sup>22</sup> After accepting the inheritance of much of the Cornelius Gurlitt estate, the museum undertook extensive provenance research on the 1,661 artworks to determine which

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Provenienzforschung 2018) <[https://www.arbeitskreis-provenienzforschung.org/wp-content/uploads/2022/10/Leitfaden\\_APFev\\_online.pdf](https://www.arbeitskreis-provenienzforschung.org/wp-content/uploads/2022/10/Leitfaden_APFev_online.pdf)> accessed 9 November 2023.

<sup>20</sup> German Lost Art Foundation, ‘Leitfaden Provenienzforschung zur Identifizierung von Kulturgut, das während der nationalsozialistischen Herrschaft verfolgungsbedingt entzogen wurde’ (2019) <<https://kulturgutverluste.de/sites/default/files/2023-04/Leitfaden-Download.pdf>> accessed 15 April 2024.

<sup>21</sup> Lynn Rother, ‘Institutionalisierte Institutionskritik: Lynn Rother über “Wege der Kunst” im Museum Rietberg, Zürich, sowie, “Zerrissene Moderne” und, “Der Sammler Curt Glaser” im Kunstmuseum Basel’ (2023) 131 *Texte zur Kunst*.

<sup>22</sup> Kunstmuseum Bern, ‘Die Berner Ampel: Kategorien zur Bewertung von Erkenntnissen der Provenienzforschung’ (2021) <<https://www.kunstmuseumbern.ch/de/forschen/provenienzkategorien-2743.html>> accessed 9 November 2023.

may be considered Nazi-looted art.<sup>23</sup> The results are available in a dedicated online database where each provenance belongs to 1 of 5 categories visualized by means of green, yellow-green, yellow-red, red, and clear dots.<sup>24</sup> Red and green dots signal certainty about the object's provenance from 1933 to 1945, with red indicating a looted object and green indicating objects not thought to have been looted. A yellow-red dot marks a provenance that has not been 'conclusively clarified' and has 'implications of looted art.' The empty circle signifies works made after 1945, hence not susceptible to Nazi looting.

Out of the 1,661 works from the Gurlitt estate, only nine have a red dot and were unambiguously identified as looted. Two hundred twenty-six works have a green dot, 32 have a yellow-red dot, and 28 were made after 1945. This leaves 1,367 works with a yellow-green dot, by far the largest group of works (82.3%). A yellow-green dot, the Gurlitt estate website states, marks objects for which 'the provenance from 1933 to 1945 has not been unambiguously clarified; gaps in the ownership history remain. According to current research, there is no evidence of looted art. There are no implications of looted art and/or conspicuous circumstances.' In other words, for the vast majority of works from the Gurlitt estate (yellow-green + yellow-red = 1,399 works, or 84.2%), it was not possible to determine with certainty all of their ownership history between 1933 and 1945. And while the individual Gurlitt provenances are recorded in a best practice manner, with a date stamp and with each ownership event footnoted and sourced, the colour-coding seems at best redundant, given that so many of the works require further research.

The system implemented by the Kunstmuseum Bern highlights two of the dangers inherent in classifying provenances: first, the complexity of individual provenances may be flattened and, second, it implies that provenance research on a particular work can actually be conclusive.<sup>25</sup> As an internal system for institutions to prioritize research, colour coding may be useful. However, when applied in the context of communicating provenance research to the public, e.g., through the exhibitions explicitly encouraged by the German Guide to Provenance Research, it provides a reductive interpretation of the provenance when that process should be left to viewers. This is all the more true since the uneven distribution of provenance 'quality' underlines the fact that incomplete provenances requiring expert interpretation and further research are the rule rather than the exception. As the products of historical research itself situated in time, provenances are fundamentally subject to change: they require regular checking and potentially updating as new knowledge emerges and old knowledge may become obsolete.

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<sup>23</sup> Cornelius Gurlitt (1932–2014) was the son of Hildebrand Gurlitt (1895–1956), a German art historian, museum director, and one of the four art dealers designated by the Nazis to sell 'degenerate art.' Cornelius Gurlitt had inherited his art collection from his father.

<sup>24</sup> Kunstmuseum Bern, 'The Gurlitt Estate' (2021) <<https://gurlitt.kunstmuseumbern.ch/en/>> accessed 9 November 2023.

<sup>25</sup> One particularly jarring instance of flattening is the classification of the provenance of a West African ancestral mask formerly belonging to Gurlitt, which has been classified with a yellow-green dot, indicating provenance gaps for the period 1933–45 but without hints that it was Nazi-looted. The limited focus on Nazi-era provenance here creates a blind spot about the fact that this object also belongs to the category of objects potentially looted in a colonial context, an issue the Bern colour-coding does not address. See Kunstmuseum Bern, 'Ahnenmaske' <<https://gurlitt.kunstmuseumbern.ch/de/collection/item/154503/>> accessed 15 April 2024.

Given the ethics of accountability that underpins contemporary scientific provenance practice, many institutions, art market actors, and independent research projects have also begun to publish their provenance research online. These efforts complement and improve on the earlier, more centralized efforts undertaken to aggregate information on looted art from museums in large, searchable databases, created in response to the Washington Principles, which explicitly demanded a ‘central registry.’ Germany’s Lost Art Foundation went online with their ‘Lost Art Database’ in 2000, while the AAM’s ‘Nazi-Era Provenance Internet Portal’ [NEPIP] went live in 2003.<sup>26</sup> The problem with the latter, however, was that its usefulness for researchers and claimants was predicated on regularly updated entries, which were lacking, leading the AAM to archive the portal in 2024. The former, on the other hand, has been revamped and expanded under the name of ‘Proveana’ in 2020.<sup>27</sup> In addition to the contents of the ‘Lost Art Database,’ with its focus on Nazi-era looting, it now also aggregates provenance findings from various research initiatives and projects, while also including information on objects from different contexts, such as expropriation in the German Democratic Republic and colonial looting. More recently, still, Germany has created an online portal for bringing together object information and research related to collections from colonial contexts.<sup>28</sup> Home to 113,130 object records (September 2024), the portal offers filters and a complex search function to improve findability. The objects can thus be filtered according to five categories: society of origin, object type, locality, person/organization, and current location. They can also be searched according to seven categories: their designation in the language of origin, the language of origin, production, material/technique, change of physical custody and/or ownership, object genre, and determination, the latter referring to natural specimens. Importantly, the portal thus allows searching for specific names, while it also enables searches that combine up to ten search terms. And yet, German museums hold 40,000 objects from Cameroon alone, with the overall holdings of objects from colonial contexts in the hundreds of thousands, if not more.<sup>29</sup>

The seemingly apparent German lead in database publishing notwithstanding, it is particularly museums in the United States that have taken the lead in publishing provenances online, with many sharing provenances for parts of their collection, especially for works potentially affected by Nazi looting that have been well-researched. Auction houses have also been publishing detailed provenances for such works, particularly Western-style oil paintings. The situation is less satisfactory for other object groups as is evident from a closer look at their websites. Only minimal, if any, provenance information is provided, echoing the bias found in museum provenances available online.

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<sup>26</sup> German Lost Art Foundation, ‘Lost Art Database’ <<https://www.lostart.de/en/start>> accessed 15 April 2024; American Alliance of Museums, ‘Nazi-Era Provenance Internet Portal’ <<https://www.aam-us.org/programs/the-nazi-era-provenance-internet-portal-nepip-archive>> accessed 9 September 2024.

<sup>27</sup> German Lost Art Foundation, ‘Proveana’ <<https://www.proveana.de/en/start>> accessed 15 April 2024.

<sup>28</sup> See German Digital Library, ‘Collections from Colonial Contexts’ <<https://ccc.deutsche-digitale-bibliothek.de/>> accessed 15 April 2024.

<sup>29</sup> Collective, *Atlas der Abwesenheit: Kameruns Kulturerbe in Deutschland* (Reimer 2023). An open access version is available here: <<https://doi.org/10.11588/arthistoricum.1219>> accessed 15 April 2024.

Equally contributing to provenance transparency through increased accessibility is the publication of online catalogues raisonnés. The online catalogue raisonné of the paintings of Paul Cézanne (1839–1906) was published by the Société Paul Cézanne in 2014. It was expanded in 2019 to include the artist’s watercolours and drawings.<sup>30</sup> In 2021, the Wildenstein Plattner Institute [WPI] released the online catalogue raisonné of Paul Gauguin’s (1848–1903) paintings made between his arrival in Tahiti in 1891 and his death twelve years later.<sup>31</sup> Differences between the Gauguin and Cézanne catalogue raisonné projects are found in the published provenance information. The WPI provides methods of transfer when available whereas the Cézanne project omits these entirely, going against AAM best practice.

Several research projects have recently begun to tackle issues surrounding the question of decolonization, focusing specifically on knowledge hierarchies and the language used in object and provenance cataloguing.<sup>32</sup> Under the leadership of the MARKK Museum in Hamburg, a consortium of institutions, including the University of Benin, Benin City, collected information on ‘objects looted by British forces from the Kingdom of Benin (now Edo State, Nigeria) in February 1897 and distributed in its immediate aftermath.’<sup>33</sup> Digital Benin, as the project is called, ‘connects data from 5,246 objects across 131 institutions in 20 countries.’ The International Inventories Programme [IIP] took a similar approach.<sup>34</sup> The IIP was a research cooperation between the National Museum of Kenya, the Rautenstrauch-Joest Museum in Cologne, the Weltkulturen Museum in Frankfurt am Main, and two creative collectives, respectively, from France and Germany and from Kenya. Its database brings together over 32,000 historic Kenyan cultural objects from thirty institutions worldwide.<sup>35</sup> Both projects thus gather large amounts of information from across institutions in centralized, easily accessible databases that are valuable research resources.

The two projects are also notable for their emphasis on language. Digital Benin, for example, provides Edo language nomenclatures for featured objects in addition to the participating museums’ cataloguing details.<sup>36</sup> It also offers an Edo language glossary on its website.

<sup>30</sup> Société Paul Cézanne, ‘The Paintings, Watercolors and Drawings of Paul Cézanne: An Online Catalogue Raisonné’ (2014, 2019) <<http://cezannecatalogue.com/catalogue/>> accessed 9 November 2023.

<sup>31</sup> Wildenstein Plattner Institute, ‘Gauguin: Catalogue Raisonné of the Paintings, 1891–1903’ (2021) <<https://digitalprojects.wpi.art/gauguin/artworks>> accessed 9 November 2023.

<sup>32</sup> For the issue of object classification in collection management systems see Carlee S. Forbes and Erica P. Jones, ‘Shaky Foundations: Cultural Classifications in Museum Collections Management Systems and the Endurance of Colonial-era Terminology’ (2024) 13 *Artl@s Bulletin* <<https://docs.lib.purdue.edu/artlas/vol13/iss1/5/>> accessed 3 September 2024.

<sup>33</sup> Kokunre Agbontaen-Eghafona, Felicity Bodenstien, Imogen Coulson, Ermeline de la Croix, Krystelle Denis, Osaisonor Godfrey Ekhaton-Obogie, Jonathan Fine, Alex Horak, Anne Luther, Eiloghosa Obobaifo, Mabel Osaruemwinomwan Oviahon, Barbara Plankensteiner and Gwenlyn Tiedemann, ‘Digital Benin’ (Digital Benin 2022) <<https://digitalbenin.org/>> accessed 9 November 2023.

<sup>34</sup> International Inventories Programme, ‘International Inventories Programme’ (2018–2021) <<https://www.inventoriesprogramme.org/>> accessed 9 November 2023.

<sup>35</sup> International Inventories Programme, ‘The Database’ (2018–2021) <<https://www.inventoriesprogramme.org/explore>> accessed 9 November 2023.

<sup>36</sup> Eiloghosa Obobaifo, ‘Eyo Oto’ (2021) (Digital Benin 2022) <<https://digitalbenin.org/documentation/eyo-oto>> accessed 9 November 2023.

Furthermore, in instances where official museum cataloguing is deemed culturally insensitive or outright racist in its use of language, the project makes these terms invisible by boxing them out.<sup>37</sup> In a similar vein, the IIP states on its website: ‘A problem with this data is the common mislabelling of objects, especially regarding their cultural origin. Cultural groups are often misspelled and sometimes referred to by derogative terms. In the published data we have corrected misspellings and clearly marked derogative language.’<sup>38</sup>

The issue of provenance’s machine readability, that is, of structured provenance data to date has only been considered by the ‘Leitfaden Provenienzforschung’ in its latest version from 2019. It provides a detailed section on the question of making research available as freely accessible and interoperable data, as well as addressing questions of linking data, shared vocabularies, and standardized wording.<sup>39</sup> However, implementation of such technological parameters remains scant. Thus, the German portal for colonial contexts is a very rare case of an online repository providing structured data, including provenance information, as well as stable object identifiers.

Most provenance information published online continues to live in free text fields rather than as fully searchable data. This is true for museums as much as for auction houses and digital catalogue raisonné projects. The variance across institutions in recording provenances only adds to this problem. Furthermore, standing in the way of a digital provenance system is the lack of engagement with structured data, that is, with standardized data that can be accessed by machines and humans alike. In other words, not until provenance information is machine-readable can this data be linked on the required large scale and provenance become a transparent and verifiable practice.

There has been one notable exception to the general disregard by museums for structured, machine-readable data. In 2014, the Carnegie Museum of Art [CMOA] in Pittsburgh launched the Art Tracks Initiative whose original aim was to map object trajectories.<sup>40</sup> To this end, a suite of open-source software tools was developed, including a user interface that helped to transform textual provenance records into searchable and analyzable data. More significantly, in order to provide machine-readable data, Art Tracks developed a provenance data standard based on the AAM Guide, the CMOA Digital Provenance Standard.<sup>41</sup> The project also created a thesaurus of acquisition methods to enable greater data alignment between institutions. In this way, Art Tracks was an important museum-led initiative to make provenance data an accessible resource for cross-institutional research. Its actual impact on provenance

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<sup>37</sup> Chao Tayiana, ‘Use of Derogatory, Racist, and Harmful Language’ (Digital Benin 2022) <<https://digitalbenin.org/documentation/use-of-derogatory-racist-and-harmful-language>> accessed 9 November 2023.

<sup>38</sup> The issue of appropriate language extends to the collection management systems used by museums, see e.g., Quoc-Tran, ‘Standardization and the Neglect of Museum Objects: An Infrastructure-Based Approach for Inclusive Integration of Cultural Artifacts’ (2023) 50 Knowledge Organization <<https://doi.org/10.5771/0943-7444-2023-5-369>> accessed 3 September 2024.

<sup>39</sup> German Lost Art Foundation, ‘Leitfaden Provenienzforschung’ (2019) 84–86.

<sup>40</sup> Carnegie Museum of Art, ‘Art Tracks’ (Carnegie Museum of Art 2014) <<https://www.museumprovenance.org/>> accessed 9 November 2023.

<sup>41</sup> Art Tracks, ‘CMOA Digital Provenance Standard’ (Carnegie Museum of Art 2014) <<https://www.museumprovenance.org/reference/standard/>> accessed 9 November 2023.

recording and publishing remained, however, negligible as no other institution picked up on this forward-looking initiative.

Only when cataloguing details and provenances are published as structured data can they benefit from web technologies and be disseminated as widely as possible. Then, and only then, can this information be usefully searched across institutions and linked to other data on the web. In this regard, museums, auction houses, catalogue raisonné projects, and collaborative research projects are collectively failing to make use of the technological possibilities available. Chief among the ongoing technological insufficiencies is the lack of stable identifiers for the information provided, a basic prerequisite for linking data on the web.

The digital Cézanne catalogue raisonné, for example, provides permanent online identifiers for its object entries made up of numerical values. By contrast, the digital Gauguin catalogue raisonné works with object titles and numbers for the online location of individual works. However, these object titles are potentially subject to change over time. They also impose a particular language, often English, and thereby reproduce knowledge hierarchies. Consequently, titles must never be used to identify objects on the web—a rule that applies to anyone publishing online resources related to works of cultural heritage. This is all the more true for objects with generic descriptors such as ‘Roman glass bottle’ or ‘carved ivory box’ as titles. Auction houses, for their part, could significantly contribute to a system of structured provenance data if they provided stable online identifiers for individual auctions. Digital catalogue raisonné projects could, in turn, directly link to such entities, allowing researchers to easily see what other objects were offered or sold at the same auction.

The examples presented here illustrate that there is no common understanding of how provenance cataloguing will benefit from digital transformation. Similarly lacking is a strategy for making full use of digital technology in the recording, publishing, and distributing of provenances. At the same time, it is precisely provenance’s digital transformation that carries the promise of a transparent and verifiable source of information. Realizing this potential requires a collective understanding of provenance’s future direction. It calls for common foundational principles and a shared set of rules.

## ACHIEVING TRANSPARENT AND VERIFIABLE PROVENANCE DATA: DATA PRINCIPLES AND RECORDING STANDARDS

Achieving accountability through provenance requires agreement from all stakeholders on the architecture and functioning of a digital provenance system. As an integrated system, a digital provenance system requires data agreement between data from different sources. Thus being predicated on data consistency from all participants around the globe, the envisaged provenance system must be based on a set of clearly defined data principles with a corresponding set of rules for implementation. The former addresses the technological design of digital provenance, that is, the format provenance data should take so as to be transparent and verifiable. The latter concerns shared provenance-specific recording and cataloguing standards in a web environment of linked data. It needs to answer the three interrelated questions we have raised at the outset: ‘What to include in provenance data?’, ‘How to write it?’, and ‘How to share it?’

Two kinds of data principles must be taken into consideration: a technical one that enables seamless linking of data and an ethical one that addresses the question of knowledge equity in data. The scientific community has developed a set of general data principles, the

‘FAIR Guiding Principles for Scientific Data’ that are applicable to all kinds of scientific data.<sup>42</sup> Creating FAIR-compliant provenance data means that it will be findable, accessible, interoperable, and reusable. For findability and automatic data discovery, data and its metadata should be easily findable by humans and machines. To this end, they require globally singular and permanent addresses, that is, unique resource identifiers [URIs]. Accessibility means that users know how the data and its metadata can be retrieved from their location after having been identified by their URI. Data interoperability refers to the feasibility of its integration with other data. In the provenance context, this allows stakeholders, such as museums or auction houses, to link information in their digital provenance, such as names or places, to thesauri and shared vocabularies. For the purposes of cultural heritage data linking, the Getty Research Institute, to cite a prominent example, has built the Art & Architecture Thesaurus [AAT], the Thesaurus of Geographic Names [TGN], and the Union List of Artist Names [ULAN].<sup>43</sup> Lastly, for data to qualify as reusable, it must have data provenance (i.e., an indication of who created it and when), meet domain-relevant community standards, and be published with a data usage licence.

However, publishing provenance according to FAIR principles alone is insufficient for creating a digital provenance system that ensures the transparency and verifiability of information. Although these principles were drawn up in the spirit of open science, they ‘explicitly and deliberately do not address moral and ethical issues pertaining to the openness of data.’<sup>44</sup> Indeed, while the FAIR principles provide clear standards for how data should be made accessible and reusable, they do not require the data to be open. Provenance data must, therefore, comply with FAIR principles *and* with the open data principle. This means the data licence of provenance data must be open and thus ‘allow use, redistribution, modification, and compilation for any purpose.’ Furthermore, its ‘license must not restrict anyone from making use’ of the data.

The data standard that bridges FAIR principles and the open data principle is linked open data [LOD].<sup>45</sup> LOD relies on data structured in a standardized format, which is published and interlinked on the web, allowing for data to be queried across institutions. In an LOD framework ‘every entity and every relationship between entities in a given dataset can be identified by a discrete URI.’<sup>46</sup> In provenances, these entities can be people, organizations, objects, or geo-temporal events. Verbs usually express relationships between entities. Publishing provenance as linked open data thus means to structure and publish every element of a provenance event as a separate entity, identified by a URI, and linked with other entities.

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<sup>42</sup> Mark D. Wilkinson et al., ‘The FAIR Guiding Principles for Scientific Data Management and Stewardship’ (2016) 3 *Scientific Data* <<https://doi.org/10.1038/sdata.2016.18>> accessed 9 November 2023.

<sup>43</sup> Getty Research Institute, ‘Getty Vocabularies’ <<https://www.getty.edu/research/tools/vocabularies/index.html>> accessed 9 November 2023.

<sup>44</sup> GO FAIR Initiative, ‘FAIR Principles’ <<https://www.go-fair.org/fair-principles/>> accessed 9 November 2023.

<sup>45</sup> Lynn Rother, Max Koss, and Fabio Mariani, ‘Taking Care of History: Toward a Politics of Provenance Linked Open Data in Museums’ in Emily Lew Fry and Erin Canning (eds), *Perspectives on Data* (The Art Institute of Chicago 2022) <<https://doi.org/10.53269/9780865593152/06>> accessed 9 November 2023.

<sup>46</sup> Rother, Koss, and Mariani, ‘Taking Care of History.’

The primary goal of the CARE principles, the second data standard that needs to be taken into account, is to acknowledge differences in power and differing historical contexts: by way of this data standard, it is possible to address an ethical dimension related to injustice in the creation and use of knowledge.<sup>47</sup> Its four principles are Collective Benefit, Authority to Control, Responsibility, and Ethics. These four principles were designed to complement the open principle by protecting the interests of Indigenous communities and their right to their data.

Any future provenance data practice must incorporate the FAIR and CARE data standards we have just laid out as the foundation for provenance data to become transparent and verifiable. However, these two data standards are insufficient for tackling the details, complexity, and specificity of provenance information. Therefore, provenance experts from the international cultural heritage community need to agree on additional recording rules for digital provenance with these particular challenges in mind. They need to address the scope of information that digital provenance should cover ('What to include?'), the format ('How to write it?'), and its role as a shared resource ('How to share it?').

In conceptualizing the structure and semantic logic of provenance data, provenance experts can rely on existing ontologies for the integration of cultural heritage data, such as CIDOC CRM, the conceptual reference model developed by the International Committee for Documentation of the International Council of Museums [ICOM]. CIDOC CRM consists of a base ontology, i.e., a data framework, that provides the data classes and relations devised for cultural heritage information on the web. The Linked Art Application Profile, designed specifically for the needs of art museums, extends this foundation to offer a comprehensive and usable framework for such institutions.<sup>48</sup>

Along with the data model used for provenance data, provenance experts need to agree on definitive writing rules—as opposed to mere guidelines—for digital provenance. Such rules will need to be applicable across institutions and disciplines and anticipate both human readers and machine-readability. This is relevant because provenance records are dynamic documents shaped by multiple authors across decades, if not centuries. Well-defined rules and regulations for recording information will not only provide consistency in future digital provenances constructed from existing provenance records but also ensure that newly researched provenances will be published as provenance linked open data.

Complete and unambiguous provenances are the exception rather than the rule, as demonstrated by the Gurlitt case. In the conceptualizing of digital provenance, gaps and ambiguous information consequently are equally important as known facts. Since provenance research and the writing of provenances are iterative processes, they must avoid foreclosing future interpretations through the omission or falsification of information. Much of the historical information available to researchers is ambiguous and factual statements can only be derived from it with some degree of uncertainty. Doubtful and/or indeterminate elements of provenance have been delineated as information that is VISU: vague, incomplete, subjective, and uncertain. Experts need to come to a shared understanding of this type of information so that

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<sup>47</sup> Stephanie Carroll et al., 'The CARE Principles for Indigenous Data Governance' (2020) 19 *Data Science Journal* <<https://doi.org/10.5334/dsj-2020-043>> accessed 9 November 2023.

<sup>48</sup> Linked Art, 'Linked Art Profile of CIDOC-CRM' <<https://linked.art/model/>> accessed 9 November 2023.

provenance records will retain the complexity of their own evolution when transformed into provenance linked open data.<sup>49</sup>

Vague information refers to approximations of temporal and geographical data, such as ‘ca. 1939’ or ‘near Paris.’ Incomplete information denotes gaps in provenance knowledge that have yet to be filled in. Subjective information concerns those instances in which the author of the provenance makes an expert judgement to arrive at a more or less plausible hypothesis based on historical evidence. Uncertain information is indicated by formulations such as ‘possibly,’ ‘probably,’ and similar expressions. They mark the degree of plausibility of the historical hypotheses experts construct in provenances. For the transparency and verifiability of provenance, it is essential that instances of VISU information are clearly identified and made visible. Only then can they be easily revisited and expanded upon when new evidence comes to light. If new archival findings give rise to a novel hypothesis, this interpretation should coexist with the previous one in the proposed future provenance practice. An approach in line with the categories of VISU must also ensure its provenance data is consistently footnoted and sourced.

For a digital provenance system to function as a system of decentralized accountability, transparency and verifiability of historical information alone are not sufficient. The system must also encompass the transparency and verifiability of the published data. As emphasized earlier, provenance records are inherently dynamic and susceptible to ongoing changes and diverse interpretations. To foster and manage such dynamism, the publication of provenance linked open data requires supplementing metadata as per the FAIR data principles. The metadata needs to include information such as the responsible publisher, the publication date, and versioning information. To incorporate metadata, provenance linked open data should be published in three layers. The factual layer records historical information regarding the provenance of an object. The interpretive layer encompasses data describing the processes through which the information in the first layer was acquired, specifying the individuals who formulated hypotheses, and the evidence upon which these hypotheses are grounded. This second, interpretive layer enables the verification of the accuracy of the first layer. Lastly, the third layer, the metadata layer, serves as a certification for the other two layers, establishing the origins of their data.

The three-layer structure is conceptualized and modelled as a nanopublication—a data structure designed for circulating information and using a method akin to that of a scientific publication.<sup>50</sup> Each layer in this structure aligns with the elements of a nanopublication, ensuring that historical information, interpretation, and metadata are systematically organized and presented. A nanopublication also serves as an appropriate structure for disseminating provenance linked open data within a decentralized setting where there is no central authority or control point in place. In fact, each nanopublication can be associated with a cryptographic

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<sup>49</sup> Fabio Mariani, ‘Introducing VISU: Vagueness, Incompleteness, Subjectivity and Uncertainty in Art Provenance Data’ in Yannick Rochat, Coline Métrailler and Michael Piotrowski (eds), *Proceedings of the Workshop on Computational Methods in the Humanities 2022 (COMHUM 2022)* (CEUR Workshop Proceedings 2023) <<https://ceur-ws.org/Vol-3602/paper5.pdf>> accessed 3 September 2024.

<sup>50</sup> Paul Groth, Andrew Gibson and Jan Velterop, ‘The Anatomy of a Nanopublication’ (2010) 30 *Information Services & Use* <<https://doi.org/10.3233/ISU-2010-0613>> accessed 9 November 2023.

hash value.<sup>51</sup> This value acts as a digital signature, allowing anyone to verify that the content has not been altered since its publication and thus making it immutable, verifiable, and permanent.

The provenance linked open data standard—the most promising to deliver on the transparency and verifiability of provenance data—implies the shared use of data by different stakeholders. The provenance community must thus develop and agree on a defined vocabulary for provenance data. Only when digital provenances are written on the basis of a shared provenance language can they be reused by others as they see fit in their own data. The goal must be an accessible and unambiguous terminology that anticipates the requirements and demands of the various constituents and disciplines. For example, what constitutes a sequestration and how does it differ from seizure or confiscation across time and jurisdictions? It may also relate to issues raised by the CARE principles, including the perspectives of indigenous and other marginalized communities. Moreover, a consistent, shared provenance vocabulary is crucial because it can be integrated into existing shared resources such as the vocabularies and thesauri mentioned earlier. It thus resolves the question of how provenance should be shared. Consistent rules for recording provenance, meanwhile, provide clarity on how to write digital provenance. Finally, what to include in digital provenance is addressed through the focus on VISU information.

## CONCLUSION

The thefts from the British Museum, mentioned at the outset of this chapter, were a wake-up call for museums. The episode highlighted in dramatic fashion the importance of recording information. Indeed, insufficient cataloguing, in both quantity and quality, has emerged as a central criticism of museums and the art market which have neglected their basic duties for too long. All too often, moreover, they lack the resources and/or expertise to research and catalogue all their holdings—a fact that is true for small, medium, and large institutions alike. Located predominantly in the Western hemisphere, also they are staffed by experts trained at Western institutions, meaning that knowledge hierarchies and biases are reproduced.

This chapter has laid out a framework for a digital provenance system that promises to overcome the limitations in stewarding cultural heritage and to ensure the accountability rightfully demanded by the global public. Combining the principles of linked open data with the necessary ethical considerations of knowledge production, this system will provide access to

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<sup>51</sup> Tobias Kuhn and Michel Dumontier, 'Making Digital Artifacts on the Web Verifiable and Reliable' (2015) 27 *IEEE Transactions on Knowledge and Data Engineering* <<http://dx.doi.org/10.1109/TKDE.2015.2419657>> accessed 9 November 2023.

transparent and verifiable provenance information to anyone, for any purpose. For provenance to come into its own as a tool for accountability, it must become digital. The time has come for a revolution in provenance cataloguing.

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