PEER-REVIEWED ARTICLE

TRAVEL TALES: VISUALIZING PROVENANCE AS DATA

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ABSTRACT | Provenance—the history of an artwork's locations and ownership over time—has been particularly resistant to analysis in the form of data. Especially large amounts of provenance material is difficult to regularize since provenance is often rather fragmentary and has been recorded in semi-narrative form. Our project has regularized the provenance data for 765 paintings by Baroque artist Jan Brueghel and then visualized it. This article discusses what those data can tell us about the artist's patrons in his home city of Antwerp and elsewhere in Europe, and then about the travels of his works and how their movement registers shifts in taste.

KEYWORDS | Provenance, fine arts, painting, data visualization

Introduction

In this article we explore how a moderately large body of provenance data can reveal and clarify trends in the popularity of a single artist's work chronologically and spatially. This use of provenance as data contributes to histories of collecting and taste. It demonstrates that, despite the nearly inevitable gaps that will appear in the provenance of a single artwork, treating the provenance of a large corpus of works as a body of data—and visualizing that data—can produce art historically significant results.

Provenance is the history of an artwork's or an antique's ownership that is used as a guide to authenticity or quality. It describes not only people and institutions as owners, but also the means by which the object was moved from one person or place to the next. Even when ownership has remained stable, a work could have been transferred from one setting to another. Such was the case with works in the Habsburg collections, which moved among the family's palaces; those moves are listed in modern provenances. An essentially narrative practice, provenance is often referred to as the biography or "life story" of an object, echoing the arguments of Arjun Appadurai and especially of Igor Kopytoff in *The Social Life of Things* (1986).[1] An interest in such biographic attention to artworks began in eighteenth-century France, where the growing art market first saw the names of previous owners listed in sales catalogues since the taste and social distinction of those owners translated into a value indicator of a given artwork.[2]

For the next two and a half centuries, art dealers continued to record and research provenance for works they were selling, trying to make the story as complete as possible in order to affirm the authenticity of the object, as if to say, "obviously, this well-known collector from the early eighteenth century would not have owned a *copy* of a Rubens painting, but the real thing." The best possible scenario was if an object's history went back to the original owner or commissioner. Careful provenance research was also carried

out by scholars compiling catalogues of an artist's works, the *catalogue raisonné.* There, thorough provenance work could disambiguate originals from copies, an essential process in defining the overall shape of the artist's oeuvre.[3] Exhibition catalogues also included provenance as guarantors of authenticity, and museums compiled histories of ownership for the works in their collections.

In recent decades, provenance research has moved beyond the realm of the art market and cataloging in several ways. First, ethical issues now motivate significantly larger amounts of provenance research, turning what was once conceived of as a rather dry record of facts into something that matters at a fundamental, cultural level. Ownership registers power as well as taste, and the record provided by provenance has always, as Anne Higonnet has pointed out, had the ability to serve as a mask for violence and for acts of dominance as great works of art have frequently been stolen from the powerless by the powerful.[4] In Europe, rulers from Napoleon to Hitler made the theft of artworks from conquered lands a key measure of success and a means of displaying the reach of their power.[5]

At the end of a conflict, the return of appropriated artworks sometimes occurred through treaties, but not always. And of course, in World War II, many works were appropriated from Jewish owners who would never return to retrieve their property. In 1998 the U.S. Department of State and the Holocaust Memorial Museum jointly hosted a conference on this issue, which was attended by representatives of forty-four countries as well as NGOs, art museums, and auction houses. The result was a declaration of basic principles on reuniting objects with surviving family members.[6] Provenance research on a huge number of items suddenly became truly urgent, for current owners now had the responsibility of restituting such items in their possession. While museums had been well aware of restitution issues, the American Association of Museums hastily put together a remarkably useful guide to provenance research, a key goal of which was to instruct those who were not accustomed to dealing with the sources and intricacies of that field.[7] It covered both the major types of sources a researcher could consult and the standard vocabulary with which provenance should ideally be recorded. The other important new area in ethical provenance is works taken by colonial powers; however, that topic is beyond the scope of this article, which deals with European art.[8]

The other way in which provenance research has begun to modernize is through changing its nature from single-object biography to data. In doing so, it takes what has often been dismissed as one of the most old-fashioned, conservative forms of art history and moves it, potentially, into the digital world. The change is particularly radical because provenance has always been understood as being attached to and about individual objects. But treating provenance as data can involve separating the components of a provenance into categories to be studied and compared. Dealers, sales, cities, nations; types or genres of work, genders of collectors or artists: all of these can be grouped and studied over time through provenance data.

Some people have been collecting provenance information for a long time: their collections are important sources that researchers have often turned to. But as it became possible to put provenance material online, digitally inclined scholars saw how this information could become data, not just collections or indexes. Some museums made their provenance materials openly available; the Rijksbureau voor Kunsthistorisch Documentatie (RKD) in The Hague, the Witt in London, and the Frick Art Reference Library in New York, have made or are currently making their vast photo archives and metadata, including provenance, available online; in Germany, the Deutsches Historisches Museum's website offers access to data on artworks seized under Hitler;[9] and, most ambitiously, the massive Getty Provenance Index (GPI) converted from printed volumes to an online database in the mid-1990s.[10] This was greeted with joy even by such a conservative publication as *The Burlington Magazine*, where an editorial envisioned the many questions that researchers would be able to ask of what were, already at that time, 519,646 auction records and 189,659 inventory listings.[11] The counts are much greater today: 2.1 million objects in the Witt's collection alone.

Making provenance into usable data has proved a considerable challenge to all who have attempted it. Because provenance had traditionally comprised object biographies, there was no need to standardize its format, which tended to be narrative. Some provenances were told principally as a sequence of periods of ownership, while others foregrounded transfers from one owner to another. Here, as an example, is a partial modern provenance entry for *Woman with a Child Feeding a Parrot* from Peter Sutton's *catalogue raisonné* of the works of Pieter de Hooch:

> (Poss) Sale, Paris 9/12/1811, no.54 — 560 frs; (poss) Sale C. Perrier, Paris, 18-21/4/1838, no.17 (w/o m.) – 3000 frs; Duc de Berri Collection; imported to England by Hume, 1840; dlr. Chaplin, London, by 1854; (sold to) Thomas Baring by 1857, who died in 1873 leaving his collection to his nephew, the Earl of Northbrook, London . . .[12]

The record raises a host of questions. Where was this mid-seventeenth-century painting before 1811? Was it in the same collection between 1811 and 1838? Do these early sales catalogues, unillustrated and often vague in their descriptions, really refer to the same painting? How did it get from the Duke's collection to Hume's, and when did it reach

the London dealer? Provenance is nearly always somewhat fragmentary; this example is actually unusually thorough. But each of the individual points has emerged, with varying degrees of certainty or doubtfulness, from some catalogue or inventory, and each emerged with a different format. For the data scientist, the question that stands out might be how this uneven, semi-narrative material can even begin to be transformed into viable data.

In the past decade, most of the digital work on provenance materials has simply involved the search for systematization and structure. In spite of the various museum organizations that exist, shared standards beyond those the *AAM Guide* already offered have not been developed: the contents of collections are too varied, and they have gathered their data too differently already. Thus when David Newbury and Louise Lippincott envision the future of provenance, they see a long-term shift toward simply reconciling identities so as to enable computation across very varied sources of data, because basic data standards will never be uniform across institutions.[13] Newbury was the lead developer, working with curator Lippincott, on a pilot project called Art Tracks, which transformed one museum's provenance texts into structured data.[14] It is, thus far, a unique project, although it has the potential to be replicated.

Larger data collections have proved even more resistant, but Maximilian Schich and his collaborators did use network analysis on a group of GPI records from 1801–1820 to look at actors in the art markets of four countries during that period.[15] And most recently, a group of researchers at Leuphana University in Lüneburg has used deep learning to transform the provenance text of 11,504 objects from the Chicago Institute of Art into structured data.[16] They were then able to visualize trends in the museum's acquisitions made by purchase versus those made by gift; they were also able to compare the behavior of women and men in giving or selling an inherited object to the museum. On a smaller scale, Jodi Cranston has mapped provenance for all of Titian's paintings to visualize how these works traveled, thereby making their itineraries more impactful. As she points out, though, you cannot really put too much provenance data onto a map: even one very productive artist with well documented works, like Titian, is almost too much.[17]

Jan Brueghel and Provenance

Our work on data comprising the provenances of paintings by Jan Brueghel (1568–1625) initially came about through a more haphazard route. Over the course of about eight years, we developed a web-based catalogue of Brueghel's work, including 365 drawings, 35 prints, and 765 paintings—more than Titian executed, but fewer than the larger data sets with which others had been working.[18] We gathered our initial provenance data from two sources: the RKD photo archive, which was not online when we began this project, and Klaus Ertz's *catalogue raisonné* of Brueghel's works (Ertz does not seem to have used the RKD for at least the first edition of the catalogue).[19] In using both of these sources, we could check the material from one against the other. We went on to consult the Witt and the Frick photo archives, museum collection catalogues and archives, exhibition catalogues, the GPI, and dealer records. We also went through published inventories from sixteenth- and seventeenth-century Flemish and Italian collections. The resulting provenances still contained gaps, but they represented the best possible outcomes from material we could access.

Our provenances were initially formatted similarly to the way Peter Sutton had written his in 1980 for de Hooch's paintings. However, eventually the time came to migrate to a new platform, and we needed our data in a format that could be exported and reimported via spreadsheets. We therefore manually transformed thousands of provenance entries for a thousand artworks into structured data. When the site was built using Drupal at stage two of this process, we included country and city for every entry because Drupal enabled us easily to present the provenance for each painting in the form of a map as well as in tabular format.[20] We thereafter added new information on our works' provenance in the Drupal-mandated format. By stage three, the current website, the provenance data was more fully structured but still displayed in a way art historians recognized, with narrative elements as well as dates and places.[21] Locations for provenance are not certain: today, for example, a collector in Germany may keep his art in a Swiss bank vault. Therefore, our locations were those of the owners, as far as we could pinpoint them; but for judging a history of taste and collecting, this seemed adequate. In total, we now have a statistically significant dataset of 2,267 items of provenance information for 800 paintings, having eliminated drawings from the present study.[22]

Figure 1 shows the provenance of Brueghel's *Allegory of the Five Senses* from our spreadsheet. We included extra material before and after it to show that we do have paintings with ominous gaps in their provenances, like the break at 1939 in the previous entry, and also paintings that only moved from one royal palace to another, like the following entry for a work which was probably in the Spanish royal collection well before the inventory of 1734 and just stayed there. But the provenance of the *Allegory of the Five Senses* itself has its own problems, strengths, and fascinating elements in biographical terms. Unlike many of Brueghel's paintings, the subject is a unique one. Not just a landscape with cattle, which he painted by the dozen, or even an Adoration of the Magi, also a rather frequent subject for this artist. When an Antwerp inventory of 1654 lists *de vijff Zinnen van Breugel ende Van Bael* (the five Senses of Brueghel and Van Balen), it is clear which painting is being described;

194	179	65		Allegory of Winter (Neuburg an (	allegory	1730	1822	Mannheir	Germany	Galerie Mannheim, inv. #10
195	180	65		Allegory of Winter (Neuburg an (	allegory	1822	1939	Munich	Germany	inv. #2122
196	181	65		Allegory of Winter (Neuburg an (	allegory	1966	2022	Munich	Germany	Returned to Germany in 1966
197	182	66	66	Allegory of the Five Senses	allegory	1654		Antwerp	Belgium	Emerentiana Gallo de Salamanca
198	182	66		Allegory of the Five Senses	allegory		1979		Belgium	Private Collection
199	183	66		Allegory of the Five Senses	allegory				Germany	Private Collection
200	184	66		Allegory of the Five Senses	allegory		1987	Muenster	Germany	On loan to Westfalisches L‰ndesmuseum, Ir
201	184	66		Allegory of the Five Senses	allegory		1990		Japan	Private collection
202	185	66		Allegory of the Five Senses	allegory	2001		New York	United Sta	Sale, Christie's, Lot #10
203	186	66		Allegory of the Five Senses	allegory	2001	2002	London	England	Johnny van Haeften Ltd.
204	186	66		Allegory of the Five Senses	allegory	2002	2022	London	England	Private collection
205	187	67	67	Allegory of the Four Elements	allegory	1734	1747	Madrid	Spain	Collection of Alcazar of Madrid
206	188	67		Allegory of the Four Elements	allegory	1747	1772	Madrid	Spain	Retiro, inv. #138

Figure 1: Provenance of Jan Brueghel and Hendrick van Balen, Allegory of the Five Senses, as it appears on our spreadsheet.

Figure 2: Jan Brueghel and Hendrick van Balen, Allegory of the Five Senses (1617–18). Oil on panel; 61.5 x 100.2 cm. Private collection. Artwork in the public domain.

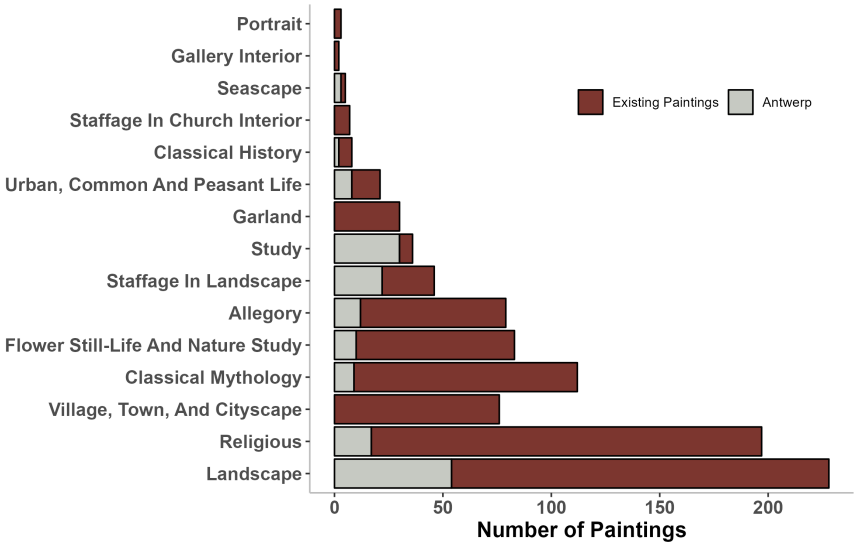

Figure 3 : Works by Jan Brueghel listed in Antwerp inventories by 1655, by genre, compared to his currently surviving works.

and since this was a major collection whose owner acquired pieces during Brueghel's lifetime, we can assume the work was from the hands of the two masters and no mere studio piece (fig. 2).[23] The owner was Emerentiana Gallo de Salamanca, widow of Don Leonel de Lima. Her house was filled not just with paintings but also with objects from the Indies, small statuettes, and works made from ivory, coral, agate, and amber; walls were covered with tapestries and Turkish silk hangings. Brueghel's painting appropriately represented how humankind gains knowledge of the world by employing the five senses, and it hung in her house's main collection room, facing the street, in which no fewer than seventy-five other pictures were displayed—not uncharacteristic for an important collection. Emerentiana's brother, Antonio Gallo de Salamanca, Lord of Noirmont, was present when the inventory was taken to help identify and describe his sister's property. This is a perfect record of initial ownership.

Unfortunately, after that impeccable beginning, the painting's provenance becomes much messier. Indeed, the picture is not recorded again for over three hundred years. At that point, it was in a private collection in Belgium. Since it was still in the same country, perhaps it had never moved, or even remained in the family's collection. But we cannot know that. All we know is that from Belgium it went to a private collection in Germany (by sale? by inheritance?), was on loan to a museum in Münster, and then passed to a collector in Japan. Next, it appeared on the art market in New York, where it was bought by the London dealer Johnny van Haeften, who then sold it to a private collector.[24]

The De Lima–Gallo de Salamanca collection had three other paintings by Brueghel: a landscape, a pot of flowers, and a Temptation of Saint Anthony. But we could not trace those works' biographies from that moment onward, even with gaps, because we do not know which version of those subjects they owned. Our online catalogue lists ten Saint Anthonies, twenty works that could be called "a pot of flowers," and scores—even hundreds—of landscapes. Here, and throughout Brueghel's work, documentation and extant objects fail to fit neatly together. Early inventories also mention works that seem to no longer exist, judging by their descriptions. Put differently, we have a lot of data points, some of which can be part of (usually incomplete) object biographies, but others that are impossible to attach to an object. Nevertheless, it is possible to use all these points together to reveal additional information about Brueghel. Using his provenance data—and some information from published sources about his travels, markets, and early collectors—we have tried to make provenance speak to us about populations of artworks rather than individual biographies.

Besides the four paintings in the De Lima–Gallo de Salamanca collection, there were 163 other paintings recorded in Antwerp collections within thirty years of Brueghel's death. These works were probably bought directly from the artist or entered the collection during his lifetime. That is less than 20 percent of Brueghel's full oeuvre, but the small number is not surprising. Brueghel was popular among European international elites and his paintings were channeled to princely collections. Of the 167 paintings in Antwerp, only eleven can be securely identified as specific works known today, although all can be identified by genre. This is a discouraging proportion, but if we treat the Antwerp paintings as data points within a larger body of provenance information, we can learn much more.

Figure 3 breaks down all the works in Antwerp inventories by genre and then compares them to all the surviving works by Brueghel, with the gray area representing Antwerp inventories and the brown beside them representing

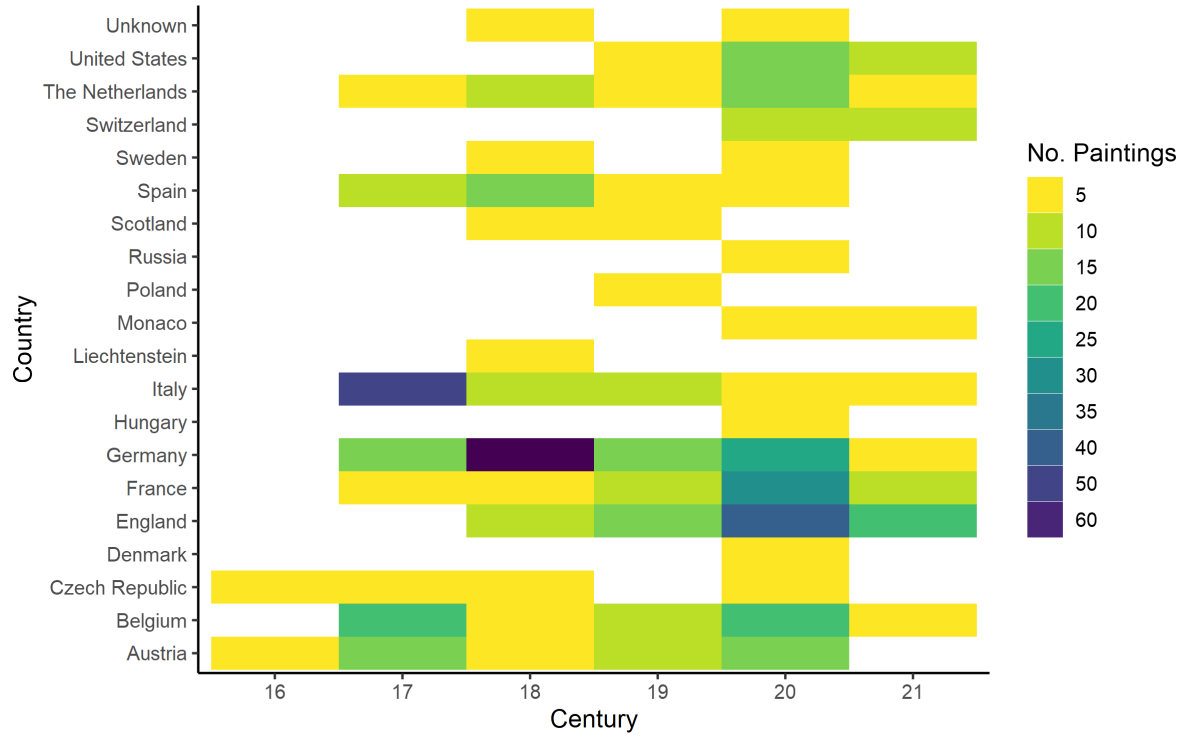

Figure 4 : Where Jan Brueghel's surviving paintings are first documented.

everything that survives. The most obvious oddity is "studies," or oil sketches of elements to be used in future paintings. Far more of these were listed in Antwerp collections than are extant today. Many had been kept by Brueghel's son for use in his own work, or perhaps by other artists; but eventually, the oil sketches must have been simply disposed of because they were not considered worth saving.[25] Then, proportionately many images of "urban and common life"—about half—were owned by collectors in Antwerp, as were most of his few seascapes. The proportion of landscapes in early Antwerp collections, while not enormous, is fairly high. Even more popular were paintings in which Brueghel painted the figures, or "staffage," into somebody else's landscape: nearly as many of those were in Antwerp inventories as are known today, although not a single work with his figures in a church interior remained in Antwerp. In all the genres that were disproportionately popular in Antwerp, Brueghel's work echoed that of his famed father, Pieter Bruegel, who was active during Antwerp's Golden Age. On the other hand, not a single garland painting is mentioned in an Antwerp inventory, although that is a type of work Brueghel invented and is probably most famous for today. Equally, Antwerp collections contained relatively few scenes of classical mythology, flowers, religious subjects, or allegories. All of these are genres that would not have reminded buyers of his father's work. This chart thus suggests that at home, Brueghel's popularity relied to a measurable degree on his being his father's son, while this was much less of a factor abroad.

Fully 80 percent of Brueghel's paintings are not represented in Antwerp inventories, and it is more difficult to determine where they had gone and who was buying them. Non-provenance documentation can give us answers on only a fraction of those works. But data can give some clues, by telling us where every painting is first documented. The farther back the location documentation occurs, the more probable it is that the work was originally sent to that location and had simply remained there. Figure 4 shows that Italy is the location where the most works by Brueghel are first mentioned in the seventeenth century, beating out those first recorded in Antwerp collections as well as the Habsburgs in Austria and princely collections in Germany.[26] The reason for this is that Brueghel spent some years working for patrons in Rome and Milan in the 1590s, and those collections were first inventoried in the seventeenth century. Still, the very large number in this data suggests that he continued to ship works to buyers there when he was back in Antwerp. Furthermore, in figure 5 we see that religious paintings are by far the most represented type of work in the Italy of the

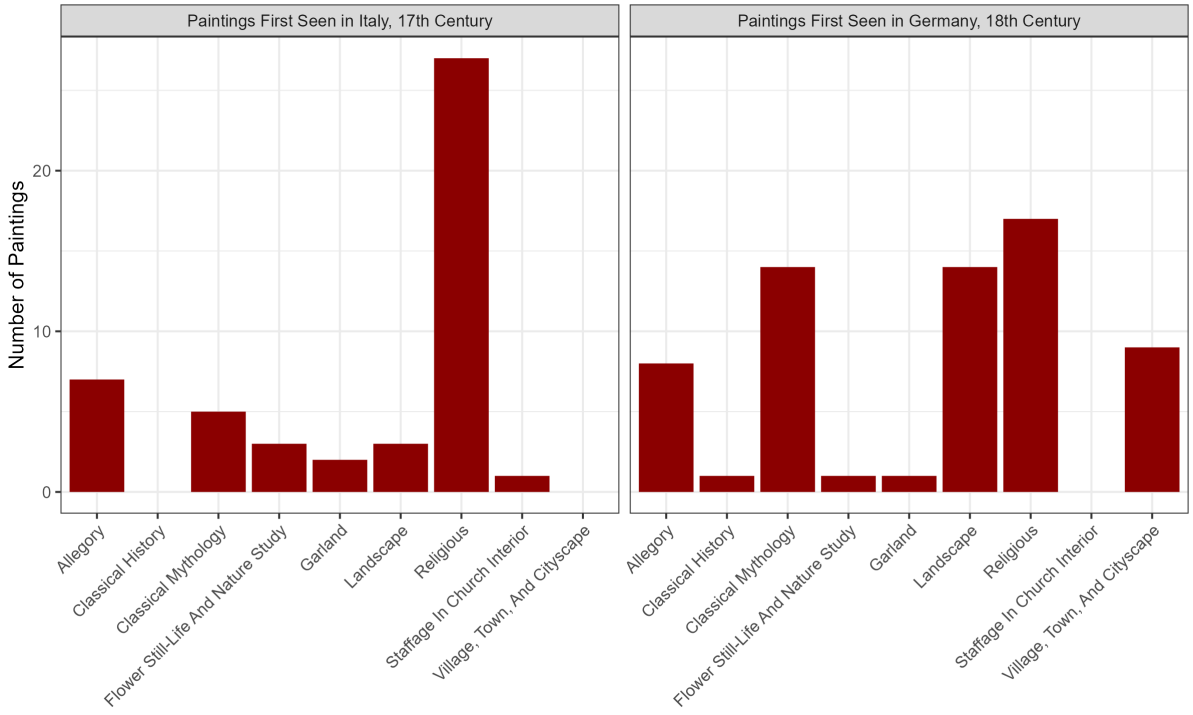

Figure 5 :Paintings first seen in Italy in the 17th century.

Figure 6 : Paintings first seen in Germany in the 18th century.

Counter Reformation, but allegories and even mythologies also did well. Patrons there liked them, even if ones at home did not. On the other hand, landscapes—Brueghel's largest output overall—were relatively unpopular in seventeenth-century Italy.

In the eighteenth century, regions of what is now Germany are the main locations where works by Brueghel emerge (fig. 6). As had been the case with Spain, these collections were probably the original destinations for many works but are only now being inventoried. While paintings have had time to move among owners, the data are still revealing. Figure 6 shows the genres of the works that are first documented in Germany, demonstrating the prevalence of landscape, but also a significant number of allegories and religious and classical histories. Since these were all subjects that had not appeared much in Antwerp collections, it suggests that these latter genres were intended more for export to Germany and Italy, while landscapes were both exported to Germany and intended for local collectors. Village, town, and cityscapes also emerged as popular genres in Germany.

France has not appeared much yet, which is curious. We know from Brueghel's correspondence that he was shipping works made by his studio assistants to the fairs in Paris.[27] They do not appear in our data as first appearances of known artworks, which aligns with the documented fact that many of the paintings that went to France were not of the best quality, and also suggests that there were not discerning collectors there who wanted his finer, unique paintings. Those would have been the kinds of collections on which early French inventories provide provenance data. It is possible that less costly, more repetitive works by Brueghel himself went to France as well, so probably some of the landscapes that cannot otherwise be accounted for in the early years were circulating in France. But since, as we have seen, inventory mentions of just "landscape" cannot be identified with a specific painting, they slip through the early provenance data. More works appear in France in the nineteenth century, including some that Napoleon brought back from Italy.[28] Their presence in museums may have encouraged the taste for Brueghel in the next century as well.

Figure 7 shows where Brueghel's works have appeared most recently. This is not per se the location in which they currently reside, as works last recorded at auction could have gone to anonymous foreign buyers. That is probably the case for the many works noted as being in England, a major hub of the market for Old Master paintings. Germany's number includes some works that were destroyed or disappeared

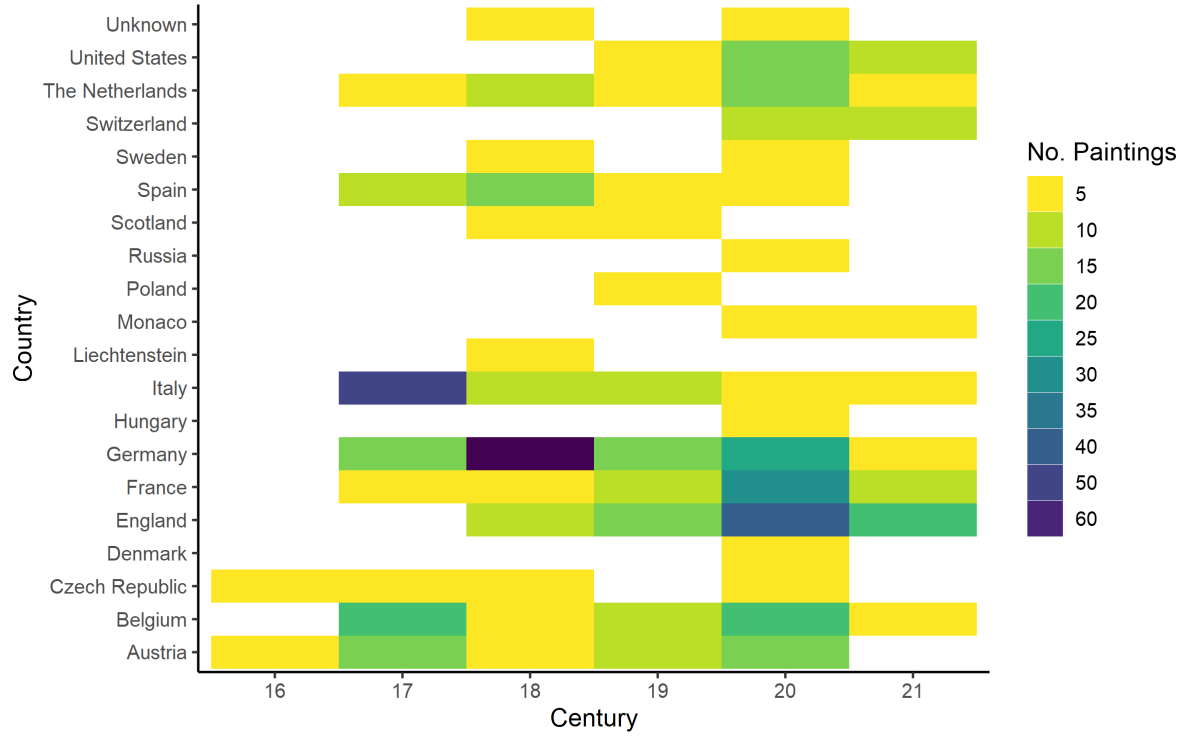

Figure 7: Last known location of Brueghel's paintings.

during World War II. Apart from a significant number in the United States, most works remain in Western Europe, in some cases in the countries where they were first documented. Most of Brueghel's paintings have, however, moved over the centuries. Apart from those that have remained in their original collections—mostly those in Italy, Spain, and Germany—Brueghel's paintings are well-traveled. He was a prolific artist, and the majority of his works were and still are valuable albeit not canonical. Thus, they have frequently moved from one private collection to another; rarely does a major auction of Old Master paintings not include a work by Jan Brueghel, and they can bring over $10 million.

Our data shows the known paths of each painting over the course of its life to date. Often, they entered and left the same country, sometimes multiple times. Again, this reflects often fragmentary provenances, but there are things to be learned from the whole data set. Belgium and Italy , two early homes of Brueghel's work, have both seen many works leave for other countries. Very few new works have come to Italy, nor have old ones returned there, but Belgians continue to acquire works by Brueghel from other countries. "Self-loops," that is, transfer events that occurred within the same country occurred as well. For example, England frequently contains "self-loops," but also sends works out to many other countries, most significantly to the United States. This is, again, a reflection of the London market for Old Masters.

Treating the somewhat fragmentary lives of paintings as data points instead of as narratives can help art historians understand trends in collecting, interest, and taste. It has become clear in our study that Jan Brueghel, like other artists in his milieu, painted different kinds of works for varying publics in different locations over the course of his career—landscapes and genre scenes for Antwerp, religious histories for Italy, mythology and more landscapes and religious works for Germany. Supplying markets abroad with different genres of work was most often carried out by dealers, as studies of dealer archives have shown; but very high-level artists like Brueghel (and Rubens) had independent sales connections.[29] The works sent abroad in their lifetimes would form the foundations for national collections, so that we still find, for example, many of Brueghel's religious works in Italy. But countries where collections were formed later were affected by those nations' tastes long after Brueghel's lifetime. England, land of Constable and Turner, has more than its share of landscapes; the straightforward United States has no allegories. The corpus of a single prolific painter like Brueghel registers for us not just shifts in taste

but in economic as well as political power, as valuable works are seen to travel as spoils of war to Napoleon's France and as prize purchases to twentieth-century America.

Cleaning large amounts of provenance information and making it into data that can be studied and visualized is never going to be simple and will often be frustrating. Unless a scholar is dealing with terribly well-studied artists or highly valuable artifacts, works that were famous when they were created and ever since, their provenances will have lacunae and will be uneven. The scholar will have to deal with them carefully, bringing knowledge from other sources to bear on the interpretation of their results. Each group of researchers who have tried to work with provenance as data, be it data from particular artists, periods, or collections, has asked different questions of it and used different means of visualization. But the results have been, and will continue to be, enlightening. Provenance data gives us a world-eye view of artistic transfer and artworks' ever-increasing mobility in a changing artscape.

NOTES

1 Igor Kopytoff, "The Cultural Biography of Things: Commoditization as Process," in *The Social Life of Things: Commodities in Cultural Perspective*, ed. Arjun Appadurai (Cambridge: Cambridge University Press, 1986), 64–91; and Arjun Appadurai, "Introduction: Commodities and the Politics of Value," in Appadurai, *Social Life of Things*, 3–63.

2 Sophie Raux, "From Mariette to Joullain: Provenance and Value in Eighteenth-Century French Auction Catalogues," in *Collecting and Provenance: A Multidisciplinary Approach*, eds. Jane C. Milosch and Nick Pearce (Lanham, MD: Rowman and Littlefield, 2019), 86–103. See also Christian Huemer, "The Provenance of Provenance," in Milosch and Pearce, *Collecting and Provenance*, 3–15. Huemer traces the history of provenance from that beginning until today.

3 On the status of originals and copies and their valuation in historical terms see most recently Elizabeth Alice Honig, Jessica Stevenson Stewart, Yanzhang (Tony) Cui, "Economic Histories of Netherlandish Art," *Journal of Historians of Netherlandish Art* 15, no. 2 (Summer 2023) DOI: 10.5092/jhna.2023.15.2.4, especially the sections on "Pricing and Paradigms of Value" and "Copies, Variants, and Derivatives," 30–39. The production of copies was an essential part of work in the artist's studio but neither then nor now were copy and original valued equally.

4 Anne Higonnet, "Afterword: The Social Life of Provenance," in *Provenance: An Alternate History of Art*, eds. Gail Feigenbaum and Inge Reist (Los Angeles: Getty Research Institute, 2012), 197.

5 A key early work on the movements of artworks during World War II is Lynn H. Nichols, *The Rape of Europa: The Fate of Europe's Treasures in the Third Reich and the Second World War* (New York: Alfred A. Knopf, 1994).

6 U.S. Department of State, "Washington Conference Principles on Nazi-Confiscated Art," released December 3, 1998, https://web.archive.org/web/20170426113213/https://www.state.gov/p/eur/rt/hlcst/270431.htm.

7 Nancy H. Veide, Konstantin Akinsha, and Amy L. Walsh, *The AAM Guide to Provenance Research* (Washington, DC: American Association of Museums, 2001). The guide is especially useful for those searching for provenances of things possibly stolen by the Nazis, including lists of "red flag" individuals whose names in a provenance are a likely sign of theft. But it is also very useful for anybody new to provenance research, and it goes some way to regularizing how that information should be recorded.

8 A key text here was Felwine Sarr and Bénédicte Savoy, "The Restitution of African Cultural Heritage. Toward a New Relational Ethics," trans. Drew S. Burk (Paris: French Ministry of Culture, 2018), https://www.about-africa.de/images/sonstiges/2018/sarr_savoy_en.pdf.

9 Deutsches Historisches Museum, "Datenbanken," accessed July 3, 2024, https://www.dhm.de/sammlung/forschung/provenienzforschung/datenbanken. See also Margareta von Oswald, *Working Through Colonial Collections: An Ethnography of the Ethnographical Museum in Berlin* (Leuven: Leuven University Press, 2022), esp. chap. 6; and Deutsches Zentrum Kulturgutverluste, "Lost Art-Datenbank," accessed July 3, 2024, https://www.lostart.de/de/start.

10 Getty Research Institute, "Collecting and Provenance Research," Accessed August 25, 2023, https://www.getty.edu/research/tools/provenance.

11 "Editorial," *The Burlington Magazine* 143, no. 1176 (March 2001): 131.

12 Peter C. Sutton, *Pieter de Hooch: Complete Edition* (Oxford: Phaidon, 1980), 103.

13 David Newbury and Louise Lippincott, "Provenance in 2050," in Milosch and Pearce, *Collecting and Provenance*, 106–09.

14 On Art Tracks, see "Art Tracks Digital Provenance Project," Carnegie Museum of Art, accessed July 3, 2024, https://northbrook.cmoa.org/about/art-tracks "Publications & Articles," Carnegie Museum of Art, accessed July 3, 2024, http://www.museumprovenance.org/pages/press; and the articles linked there.

15 Maximilian Schich, Christian Huemer, Piotr Adamczyk, Lev Manovich, and Yang-Yu Liu, "Network Dimensions in the Getty Provenance Index," preprint, *arXiv*, June 9, 2017, https://doi.org/10.48550/arXiv.1706.02804. Another wonderful project combines data from one set of stockbooks in the Getty database with *The London Gallery Project*: Pamela Fletcher and Anne Helmreich, "Local/Global: Mapping Nineteenth-Century London's Art Market," *Nineteenth-Century Art Worldwide* 11, no. 3 (Autumn 2012), http://www.19thc-artworldwide.org/autumn12/fletcher-helmreich-mapping-the-london-art-market.

16 Lynn Rother, Fabio Mariani, and Max Koss, "Hidden Value: Provenance as a Source for Economic and Social History," *Jahrbuch für Wirtschaftsgeschichte* 64, no. 1 (2023): 111–42, https://doi.org/10.1515/jbwg-2023-0005.

17 See Jodi Cranston, "Mapping Paintings, or How to Breathe Life into Provenance," in *The Routledge Companion to Digital Humanities and Art History*, ed. Kathryn Brown (New York: Routledge, 2020), 109–19. The site is described and linked at https://dahd.hcommons.org/digital-art-history-directory/mapping-titian-2.

18 The website development and data gathering involved

far more people than the authors of the current article. The names of everybody involved can be found at http://janbrueghel.net/team. We would particularly like to mention Amina Yee and Jess Bailey as people who played large roles in gathering provenance material.

19 The most recent published catalogue is Klaus Ertz, *Jan Brueghel der Ältere (1568–1625): Kritischer Katalog der Gemälde*, 4 vols. (Lingen: Luca Verlag, 2008–10). Ertz had previously published a one-volume catalogue in 1979.

20 On the site at this stage of its development, see Elizabeth Alice Honig, "Art History and Access: The *Catalogue Raisonné* as Collaborative Research Site," *NANO: New American Notes Online* 5 (2014): 1–8, https://nanocrit.com/issues/issue5/art-history-and-access-catalogue-raisonne-collaborative-research-site. This essay also explains and illustrates our Image Investigation Tool, which is still contained within the present site.

21 "Allegory of the Five Senses," Jan Brueghel the Elder, accessed April 18, 2025, http://janbrueghel.net/janbrueghel/allegory-of-the-five-senses.

22 While some items in our data could be from unreliable sources, we believe that we are working within a reasonable margin of error.

23 The inventory of goods of Emerentiana Gallo de Salamanca from May 2 and 15, 1654, is partially published in Erik Duverger, *Antwerpse kunstinventarissen uit de zeventiende eeuw*, vol. *7*, *1654–1658* (Brussels: Koninklijke Academie voor Wetenschappen, Letteren en Schone Kunsten, 1994), 36–40.

24 Our thanks to Johnny van Haeften, who has been extremely generous with his archives for our work.

25 Brueghel's surviving oil sketches are very rough, and most are simply animal studies. Unlike those of his friend Peter Paul Rubens, none show a full composition. This will be why they did not become collectors' items as those by Rubens did immediately after the latter's death. On Rubens's oil sketches in early collections, see Marjorie E. Wieseman, "Pursuing and Possessing Passion: Two Hundred Years of Collecting Rubens's Oil Sketches," in Peter C. Sutton and Marjorie E. Wieseman, *Drawn By the Brush: Oil Sketches by Peter Paul Rubens* (New Haven: Yale University Press, 2004), 44–71, esp. 46–48.

26 The number for Belgium is lower than the total from Antwerp inventories because so many of those were studies, which have vanished, and landscapes or staffage, which are nearly impossible to precisely identify among extant works.

27 Letter of December 12, 1608, in Giovanni Crivelli, *Giovanni Brueghel pittor fiammingo o sue lettere e quadretti esistenti presso l'Ambrosiana* (Milan: Boniardi-Pogliani di E. Besozzi, 1868), 114.

28 The *Allegory of Air* and the *Virgin and Child in a Flower Garland*, both now in the Louvre, were taken by Napoleon from the Ambrosiana in Milan.

29 On dealer archives and the shipment of specific genres to markets where there was demand for them, see for example Sandra van Ginhoven, "Exports of Flemish Imagery to the New World: Guilliam Forchondt and His Commercial Network in the Iberian Peninsula and New Spain, 1644–1678," in *Jaarboek Koninklijk Museum voor Schone Kunsten* 2011 (Antwerp: Koninklijk Museum voor Schone Kunsten, 2013): 119–44; Sandra van Ginhoven, *Connecting Art Markets: Guilliam Forchondt's Dealership in Antwerp (c. 1632–78) and the Overseas Paintings Trade*. Boston: Brill, 2017; Sandra van Ginhoven, "Flemish Dealers and a Thriving Transatlantic Art Trade during the 17th Century," in *Trading Paintings and Painters' Materials 1550–1800*, ed. Anne Haack Christensen and Angela Jager (London: Archetype Publications, 2019), 15–25. See also the section "Art Dealers, Export Markets, and Artists' Mobility" in Honig, Stewart, and Cui., "Economic Histories," 25–29.

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