**[title]Is There an Ultimate Authority in Authenticity? Testing and Retesting Alexander the Great**

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[A-head]Abstract

[abstract]

Many different methods of analysis—art historical, technical, and scientific—must be considered at one time in order to determine the authenticity of an ancient metal artifact. But what should we do when multiple analytical methods are employed but no consensus can be reached? In this paper, we consider this question as applied to the Alexander Nelidow (inv. 1956.20), one of the most confounding and often-questioned copper-alloy pieces in the collection of the Harvard Art Museums.

The piece has been examined and debated by art historians, conservators, and materials scientists for decades with no clear consensus having been reached about its authenticity. Thought by some to be a Roman-period copy of an original bronze statue of Alexander the Great created by Lysippos in the third century BC, the piece has also been attributed on stylistic grounds to the Renaissance. Although the surface of the statuette was stripped and partially recarved in the late nineteenth century, patches of thick cuprite remain in many areas. While the alloy is consistent with a Roman date (leaded bronze with only a trace of zinc), the lead isotope composition is not consistent with known ancient ore sources.

In this paper, we discuss the sometimes-conflicting results of the visual and analytical tests that have been conducted on the Alexander statuette. We compare these with results from other pieces in Harvard’s collection of equally uncertain date and of known replicas in order to achieve a better understanding of the different methods of authentication.

[main text]

On display in the Harvard Art Museums is a statuette of Alexander the Great, sometimes referred to as the Alexander Nelidow after its first known owner.[[1]](#endnote-1) The statuette first appeared in the Istanbul bazaar sometime before 1897.[[2]](#endnote-2) The original condition of the surface when excavated can only be guessed at: the surface had already been cleaned of any unsightly burial accretions by the time the first images appear.[[3]](#endnote-3) Alexander is depicted as a nude youth, standing with his left arm raised, probably to grasp a spear. His head is turned sharply toward the left, while his right arm is bent with hand placed on his right hip (**fig. 47.1**). His torso is heavily muscled on the front and back. The legs below the knee are restorations. The statuette was sold at auction in 1911.[[4]](#endnote-4) By 1954, it was in the possession of C. Ruxton Love, Jr.,[[5]](#endnote-5) who donated it to Harvard’s Fogg Art Museum in 1956.[[6]](#endnote-6)

The Alexander statuette’s authenticity as an ancient work has been called into question on occasion, most recently in 2014 when the results of lead isotope analysis indicated that the statuette had an isotopic composition distinct from that of ore sources believed to have been used in Graeco-Roman times and from that of published copper alloy and lead objects of the period.[[7]](#endnote-7) These analytical results provided the impetus to reevaluate the Alexander and to wonder if there is a final authority in authenticity studies. Is there ever going to be a point where one can look at objects and say, definitively, this one is fake and this one is an authentic antiquity?

Some light can be shed on this question using the work that curators, conservators, and material scientists have been doing for almost fifty years on bronzes at the Harvard Art Museums, particularly on the almost 1,300 copper alloy objects in the museums’ Ancient Art department in preparation for the online special collection, *Ancient Mediterranean and Near Eastern Bronzes at the Harvard Art Museums*.[[8]](#endnote-8) All objects were examined by members of the Straus Center for Conservation and Technical Studies for information on manufacture and condition, almost 1,000 were written up by art historians, and about 900 were tested for alloy composition using a variety of destructive and nondestructive methods. These techniques included ICP-MS/AAA, XRF, EMPA, SEM-EDX, ICP-OES.[[9]](#endnote-9) For this paper, we shall also draw on the data of a group of modern copper-alloy objects and pieces of uncertain antiquity for comparison with data from the Alexander, in order to explore issues that might help determine the statuette’s authenticity.

Previous doubts about the Alexander Nelidow have come from the art historical perspective. The statuette has been published about thirty times between 1897 and the present.[[10]](#endnote-10) In his 1898 monograph on the statuette, Oskar Wulff suggested that it is a copy of a statue known to us as “Alexander with a Lance” by Lysippos (a work that was possibly described by Plutarch[[11]](#endnote-11)). The identification is based on the arrangement of his hair, the stance­—holding a spear now lost—and the left turn of his head, which would fit the possible descriptions of the statue.[[12]](#endnote-12) Although most publications of Harvard’s statuette accept that it does represent Alexander the Great (or a Hellenistic ruler), that it may be a copy after a Lysippan original, and that it was made in the Hellenistic or Roman periods, questions remain as to whether it is a copy based on “Alexander with a Lance,” and indeed if such a statue even existed. A few of these publications reascribed the Alexander Nelidow from an ancient date to a more recent, even modern, one. The most important of these was by Diana Buitron, who suggested that the Alexander is a Renaissance piece based on stylistic similarities, particularly in the musculature, that she saw with certain fifteenth to sixteenth century AD bronze statuettes.[[13]](#endnote-13) Stylistic criteria can be highly subjective, however, and Buitron’s arguments are not concrete enough to securely date the Harvard statuette.

**[A-head]Copies**

When looking at comparative pieces for more objective criteria by which to identify fakes, one fact that has emerged is that some of the statuettes in Harvard’s ancient art collection are modern or likely modern copies (exact or only slightly adapted) of other statuettes. Of course, close copies of large-scale bronze sculptures are known,[[14]](#endnote-14) but the statuettes in question are not copies of standard statue types. It is worth stressing that the antiquity of these statuettes was not called into question based solely on their status as duplicates, but based on a combination of criteria including lack of corrosion or alloy composition that is inconsistent with securely dated ancient pieces.

There are statuette types that are known “souvenir” replicas, like Harvard’s copy of the Dancing Faun from Pompeii, which was probably made as a souvenir of the Grand Tour.[[15]](#endnote-15) Its corrosion pattern does not suggest long-term burial, and its alloy composition is inconsistent with that of ancient pieces. Another example of this type may be a plaque of a sacrificial ram with attendant, which entered Harvard’s collection as an antiquity.[[16]](#endnote-16) This piece lacks corrosion and contains over 5% zinc, both of which are red flags for fakes;[[17]](#endnote-17) it was nevertheless accepted as likely ancient until a very similar version from Pompeii was identified in the Museo Archeologico Nazionale, Naples. The similarity of the pieces suggests that the Harvard version was copied from the Naples bronze. As a result, the Harvard example was reclassified as modern.[[18]](#endnote-18)

Another questionable object, of a Sardinian shepherd and ram group,[[19]](#endnote-19) is probably a forgery meant to appear ancient. Its constituent alloy is completely unlike other Sardinian pieces, containing around 15% zinc: of about 130 such objects with published alloys, only one other has more than 1% zinc.[[20]](#endnote-20) The corrosion is thick, up to 1.5 mm in some areas, but jumbled and uneven, sometimes lacking the usual layer of red cuprite under the green corrosion. It was found to have great similarities to a wrestler group in the Museo Archeologico Nazionale di Cagliari: the Harvard statuette mimics one of the wrestlers and replaces the other figure with a ram.[[21]](#endnote-21) A draped female figure in the Harvard collection, which also lacks indications of corrosion from long-term burial and has an alloy containing over 30% zinc, is identical to at least 4 and up to 11 other statuettes.[[22]](#endnote-22) It is also uncertain which statuette in this case would be the original upon which the others are based.

While the authenticity of a statuette is not immediately confirmed or undermined by being a close copy (or not) of another piece, this is often a cause for concern, particularly when combined, as in the above cases, with other reasons to doubt the objects’ antiquity. In contrast, although it has close cousins, both large and small scale,[[23]](#endnote-23) the Alexander Nelidow is not an exact copy of any other known statuette, so we must turn to other evidence to support, or refute, its antiquity.

**[A-head]Manufacture**

In the process of examining objects for the ancient bronzes special collection, the conservation team identified some oddities related to methods of manufacture that have implications for the authenticity of some objects. One piece that has been difficult to authenticate portrays a comic actor in the role of a kitchen slave (inv. 2001.257).[[24]](#endnote-24) The raised ridges along the exterior of the legs appear to be traces of piece-mold lines, a feature one would not expect to find on a Graeco-Roman bronze and which may be an indication that it was cast from a mold taken from an existing copper-alloy statuette. Filed-down mold lines were also observed on the statuette of the draped female figure mentioned above (inv. 1932.56.27).

The conservation team was recently able to compare Harvard’s statuette of the orator Demosthenes (inv. 2007.221), based on a famous statue of the third century BC by Polyeuktos,[[25]](#endnote-25) with an aftercast of the statuette made in Germany in the early twentieth century.[[26]](#endnote-26) Comparison of X-radiographs of the ancient Demosthenes statuette and the aftercast reveals very different interiors, with a clear armature on the inside of the aftercast (**figs. 47.2–3**). Study of the object at the Straus Center for Conservation and Technical Research revealed that the thick corrosion on the surface of the original is replicated on the aftercast as a rough, bumpy surface with no indication of corrosion products; a similar surface also appears on the draped female statuette described above (inv. 1932.56.27).

In terms of manufacture, there is nothing unusual about Alexander: the statuette is solid cast, probably by a lost-wax technique, although due to the surface condition it cannot be determined with certainty whether it was a direct or indirect cast. Again, the Alexander shows none of the concerns that were noted for other suspect pieces and were used to help condemn these as modern.

**[A-head]Corrosion**

The presence of corrosion cannot be used by itself to authenticate or date an object, but its total absence is a very good indication, in combination with other data, that a piece may not be ancient. The mineralized surface of the Alexander statuette was pared down to the interface of preserved metal before its earliest photograph was published in 1898.[[27]](#endnote-27) In spite of this extensive “restoration” treatment, Alexander retains thick patches of red and green corrosion products usually associated with cuprite and malachite, although we have tended not to use analysis to confirm the identification of corrosion products (**fig. 47.4**). Thick corrosion layers and intergranular corrosion can both be good indicators of long-term burial—and thus great age—but it is impossible to extrapolate from these the exact length of time an object was buried. That said, one must bear in mind that corrosion or patination can be created or enhanced artificially.[[28]](#endnote-28) The cuprite on another Harvard bronze—a modern copy of half of a fifth-century BC Etruscan candelabrum group portraying a standing warrior—also has some red and green corrosion; in this case, the red corrosion was confirmed by Raman spectroscopy to be cuprite (**fig. 47.5**).[[29]](#endnote-29) As with the Sardinian shepherd-and ram-group, the thickness of the corrosion varies. The corrosion on the standing-warrior bronze could be mistaken for evidence of long-term burial if we did not know that the piece was a copy of an original candelabrum group excavated at Marzabotto, Italy, held in private hands, which the owners had reproduced for the Marzabotto Museum.[[30]](#endnote-30) Harvard’s warrior could easily have been made at the same time as the other known copies. Harvard also owns a copy of another candelabrum finial from Marzabotto of a youth carrying an amphora, which was also replicated and sold.[[31]](#endnote-31) Results of compositional and isotopic analysis indicate that the metal composition of the two replicas of Marzabotto bronzes at Harvard is very similar, perhaps from the same batch of metal, though not the same pour.

**[A-head]Metal Alloy**

The usefulness of alloy analysis to date bronzes has been debated, due, among other things, to the recycling of metal throughout history.[[32]](#endnote-32) Nevertheless, alloy analysis has revealed broader patterns and helped to identify anachronisms. Certain alloys seem not to have been used during specific periods: brass, an alloy of copper and zinc, for instance, has long been thought to be uncommon in antiquity before the Roman times. Yet, even there, as we use different tools to gather more data on the composition of copper alloy objects, the overall picture becomes more complex. Brass, we now know, does occur before the Roman period—but is still rare and occurs only in certain contexts or in certain types of objects.[[33]](#endnote-33)

In the 1970s, Harvard’s Alexander was sampled and tested by X-ray fluorescence spectroscopy (XRF), which suggested that it contained 1% zinc. More recent tests give quite different results, with only a trace or no zinc detected.[[34]](#endnote-34) The variation between the datasets probably reflects improvements in analytical methods since the 1970s and the benefits of sampling for clean metal versus surface analysis, as the readings of surface composition are often distorted by the presence of corrosion. As a leaded bronze with trace zinc, Alexander’s alloy composition is entirely normal for a Roman statuette. Based on data gathered at Harvard and further afield, it can be noted that the presence of (1) zinc above a few percent, (2) cadmium above the detection limit, and (3) high zinc without tin are all suspicious for ancient copper-alloy statuettes.[[35]](#endnote-35) Of the 600 Harvard objects tested, around 80 objects had 5% zinc or higher (with a maximum of 48% zinc): 80% of these high-zinc pieces are known or suspected to be fakes or are known to date from the Byzantine to Islamic periods, and almost all of the statuettes with zinc above 5% are believed to be fake based on analyses of their corrosion products and art historical comparanda.[[36]](#endnote-36)

**[A-head]Lead Isotope Analysis**

Lead isotope analysis relies on the fact that ore sources containing lead have a characteristic isotopic “fingerprint,” which can help to pinpoint the source of a lead-containing copper alloy or lead deposit. However, interpretation of the isotopic composition of an object is complicated because more than one lead-containing source may be present, either due to mixing of metal ores in the original alloy or (more commonly) as a result of mixing from the recycling of metal objects. Lead isotope analysis of Harvard’s Alexander and Demosthenes statuettes was performed in 2014. Both of these statuettes contain over 5% lead, so the measured isotopic composition of both reflects the ores of the lead that was deliberately added as an alloying ingredient, rather than being inherited from trace lead within the copper ores. A comparison of the lead isotopes of the two statuettes to known Graeco-Roman lead ore sources shows that the Demosthenes and the ores plot along the same line, while Alexander’s lead is notably separate (**fig. 47.6**).[[37]](#endnote-37) In order to better understand the lead isotopes of modern or fake copper-alloy objects, we sampled several known and suspected later copper-alloy objects at Harvard, as well as a few authentic pieces for comparison (**fig. 47.7**).[[38]](#endnote-38) While the modern pieces and replicas cluster to higher values, they still plot along the line of possible Graeco-Roman lead ores. Even when we enlarged the plot to include more exotic ores from outside Europe and the Mediterranean, such as those from India[[39]](#endnote-39) and Australia,[[40]](#endnote-40) and modern gasoline lead[[41]](#endnote-41) (from lead added to gasoline, which gives a good average for available modern lead) (**fig. 47.8**),[[42]](#endnote-42) the isotopic composition of lead from the Alexander Nelidow remained separate. This separation cannot be explained by the melting down and reuse of metals with different lead sources: recycling would simply give values that plot along the same line. The only way to produce such an anomalous value is to find an exotic source plotting above the line. One such possibility is provided by lead ores from Morocco, which do fall in a distinct field above the main isotopic line close to the value of the Alexander statuette (**fig. 47.9**).[[43]](#endnote-43) Although, more research is needed to determine whether Moroccan ores were actually exploited in the Roman period, studies of lead curse tablets from Roman Carthage show that Tunisian lead was used in these objects, proving exploitation of at least some lead sources local to North Africa in the appropriate period.[[44]](#endnote-44)

In the end, this unusual lead isotope analysis result is not enough to condemn the statuette, as it had seemed at first, but neither should one use this result to make statements about its date, origin, or authenticity. There is still a surprising lack of available lead isotope analysis of Roman copper-alloy objects. In order to better interpret the isotopic composition of suspect pieces, a reliable database of well-provenanced Roman bronzes (ideally statuettes and similar objects) on the one hand, and of modern and late bronzes of similar typology on the other, is required to characterize more clearly how the data may vary. This would seem to be an ideal research project for the future.

**[A-head]Conclusions**

This paper has given a very brief overview of a large trove of data in order to explore issues of authenticity in relation to copper-alloy objects generally, and to revisit earlier doubts concerning the antiquity of the Alexander Nelidow in particular. Research into the style, method of manufacture, surface corrosion, alloy, and lead isotopes produces no definitive evidence that this statuette is other than ancient. While a copper-alloy artifact can never be completely vindicated once questions have been raised about its authenticity, the systematic collaboration between curators, conservators, and material scientists can significantly elucidate and clarify our understanding of the piece. But it is important that these professionals work closely together, understanding each other’s methodologies, aims, and conclusions.[[45]](#endnote-45) More careful examination of objects under microscopes, more sampling, and more research and analysis by such interdisciplinary teams can vastly improve knowledge of our collections.

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1. Aleksandr Nelidov/Nelidow (1838–1910), a Russian ambassador, had a substantial collection of ancient art; see Pollak 1903 and Galerie Georges Petit 1911. [↑](#endnote-ref-1)
2. Arndt and Amelung 1897, 30; Wulff 1898, 2. [↑](#endnote-ref-2)
3. Wulff 1898, 65; Pollak 1903, 3, 139, 184, and 198. [↑](#endnote-ref-3)
4. Galerie Georges Petit 1911, lot 43. [↑](#endnote-ref-4)
5. *Ancient Art* 1954, 118. [↑](#endnote-ref-5)
6. Inv. 1956.20. For the statuette’s full provenance and publication history, see the object page at <http://www.harvardartmuseums.org/collections/object/312306>. The records for all Harvard Art Museums objects mentioned in this paper can be accessed by searching their accession numbers at <http://www.harvardartmuseums.org/ancientbronzes>. [↑](#endnote-ref-6)
7. See infra, section on Lead Isotope Analysis. [↑](#endnote-ref-7)
8. See [www.harvardartmuseums.org/ancientbronzes](file:///C:\Users\KAe062\AppData\Local\Microsoft\Windows\Temporary%20Internet%20Files\Content.Outlook\EAXCURIK\www.harvardartmuseums.org\ancientbronzes). [↑](#endnote-ref-8)
9. Some objects were tested with multiple techniques, in-house and externally. For more information on these techniques, please see the special collection pages concerning “Alloy Analyses” (see supra n. 8). [↑](#endnote-ref-9)
10. See <http://www.harvardartmuseums.org/collections/object/312306>. [↑](#endnote-ref-10)
11. See Buitron 1973, 395; and Stewart 1993, 161–71. [↑](#endnote-ref-11)
12. See ibid. [↑](#endnote-ref-12)
13. Himmelmann 1989, 135–36, also argued that the statuette was a late copy, in which case it was influenced by the rediscovery of the Terme Ruler, which had come to light approximately a dozen years earlier. [↑](#endnote-ref-13)
14. See, for example, the Apoxyomenoi or the Getty and Mahdia Herms in the *Power and Pathos* exhibition; Daehner and Lapatin 2015, 270–85, nos. 40–46. [↑](#endnote-ref-14)
15. Inv. 1930.351, <http://www.harvardartmuseums.org/collections/object/310752>. [↑](#endnote-ref-15)
16. Inv. 1952.21, <http://www.harvardartmuseums.org/collections/object/312303>. [↑](#endnote-ref-16)
17. See above at n. 36. [↑](#endnote-ref-17)
18. See Kreilinger 1996, 199, no. 194, plate 41, with earlier bibliography. [↑](#endnote-ref-18)
19. Inv. 1984.798, <http://www.harvardartmuseums.org/collections/object/304153>. [↑](#endnote-ref-19)
20. See Balmuth and Tykot 2002. [↑](#endnote-ref-20)
21. See Lilliu 1966, 56–57, no. 10. [↑](#endnote-ref-21)
22. Inv. 1932.56.27, <http://www.harvardartmuseums.org/collections/object/303869>. Some of the reported versions may be duplicates, as the ownership histories of these pieces are not entirely clear. For references to the other pieces, see the statuette’s object page. [↑](#endnote-ref-22)
23. Along with the Terme Ruler (see Himmelmann 1989, 135–36), see the Fouquet Alexander and the Stanford Alexander in Stewart 1993, 163, figs. 32 and 39. [↑](#endnote-ref-23)
24. Inv. 2001.257, <http://www.harvardartmuseums.org/collections/object/146546>. [↑](#endnote-ref-24)
25. Inv. 2007.221, <http://www.harvardartmuseums.org/collections/object/4842>. [↑](#endnote-ref-25)
26. Private collection. Another copper-alloy aftercast made in Munich in the 1920s is kept in the Staatliche Antikensammlungen, Munich; see Ohly-Dumm 1973, 240 and 245, fig. 13­. It is likely that both aftercasts were created at the same time, in the early twentieth century when Harvard’s statuette is known to have been in Germany. The aftercast from the private collection is a mixed copper alloy; it was tested with XRF (alloying elements: copper, lead, zinc, tin; other elements: nickel, iron, antimony) and ICP-OES (Cu, 80.09%; Sn, 5.17%; Pb, 2.55%; Zn, 7.81%; Fe, 0.20%; Ni, 0.28%; Ag, 0.01%; Sb, 0.24%; As, 0.10%; Co, 0.001%; Au, not detected; Cd, 0.003%). The second aftercast in Munich was also tested by XRF and has a similar composition to the aftercast from the private collection. Thanks are due to Susanne Ebbinghaus and Josef Riederer for providing information about the aftercast in Munich and to Josef Riederer for providing the analysis of the Munich piece. [↑](#endnote-ref-26)
27. See n. 3 above. [↑](#endnote-ref-27)
28. See Bewer and Lie 2014, 60–61; Eggert 2008, 74. [↑](#endnote-ref-28)
29. Inv. 1961.143, <http://www.harvardartmuseums.org/collections/object/311124>. [↑](#endnote-ref-29)
30. See Muffatti 1969, 264–66, no. 489, plate 55.a–b. The owners also had a colossal copy of the woman and warrior group made for their villa (see <http://www.federgev.it/primosito/Docs/parchi/montesol/completo.html> under “Misa”). A statuette replica of the woman from the group was on the art market in the 1960s, but its present whereabouts are unknown. [↑](#endnote-ref-30)
31. Inv. 1962.62, <http://www.harvardartmuseums.org/collections/object/304002>. For the original finial, see Muffatti 1969, 266–67, no. 490, plate 56.a–b. [↑](#endnote-ref-31)
32. Eremin and Riederer 2014, 71 and 88. [↑](#endnote-ref-32)
33. See Eremin and Riederer 2014, 76–78. [↑](#endnote-ref-33)
34. Buitron 1973, 393. For the recent results, see the object record. [↑](#endnote-ref-34)
35. Eremin and Riederer 2004, 89. [↑](#endnote-ref-35)
36. Inv. 1932.56.29, a statuette of Ares, has 44–48% zinc. Other statuettes with high zinc are: **1930.351**, 1932.56.2, 1932.56.13, 1932.56.16, **1932.56.27**, 1932.56.28, **1952.21**, 1955.122, 1960.485, 1972.328, 1973.18, 1973.19, 1973.20, 1977.216.3411, 1977.216.3418, **1984.798**, *1987.132*, *1992.297*, and **1994.8** (objects mentioned elsewhere in this paper are in bold; late objects or objects not currently suspected to be fake are in italics). [↑](#endnote-ref-36)
37. The lead isotope signatures of the two statuettes were compared to a database of lead ores and copper ores compiled by one of the authors (P. Degryse) from published data. For a subset of these publications, see <http://oxalid.arch.ox.ac.uk/bibliography/bibliography.htm>. [↑](#endnote-ref-37)
38. This includes all the comparative pieces mentioned in this paper as well as inv. 1956.19, an authentic large-scale late second to early third century AD Roman head of the empress Julia Domna; inv. 1992.256.108, a Roman period Egyptian statuette of a cat that seems suspicious but is probably authentic; inv. 1994.8, a Roman period (or modern) statuette showing Odysseus escaping Polyphemus’s cave strapped to a ram; and a pig purchased from the Chiurazzi foundry, which copied many of the bronzes from Pompeii and Herculaneum. For the full lead isotope analyses of these objects, see their object pages at [www.harvardartmuseums.org/ancientbronzes](file:///C:\Users\KAe062\AppData\Local\Microsoft\Windows\Temporary%20Internet%20Files\Content.Outlook\EAXCURIK\www.harvardartmuseums.org\ancientbronzes). [↑](#endnote-ref-38)
39. Srinivasan 1999; Pryce et al 2014. [↑](#endnote-ref-39)
40. Gulson 1984. [↑](#endnote-ref-40)
41. Monna et al. 1997; Kober et al. 1999. [↑](#endnote-ref-41)
42. Figs. 47.8–9 use a subset of the database shown in fig. 47.6, removing isotopes for lead in copper ores and other low-lead copper alloys, adding from artifacts provided by Kuleff et al. 2006. [↑](#endnote-ref-42)
43. Jébrak et al. 1998. [↑](#endnote-ref-43)
44. Skaggs et al. 2012. [↑](#endnote-ref-44)
45. For an essay dealing with the problems that can arise when these specialists come to conflicting conclusions, see Muscarella 2008. [↑](#endnote-ref-45)