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The Uncertain Authenticity of an “Etruscan” Bronze Statuette*



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In the Mediterranean basin bronze, an alloy of copper and tin, was used in a range of objects from weapons and tools to domestic utensils, from the third millennium B.C.E. onward.¹ The practice of producing bronze statuary in the form of gods, humans, and animals was a significantly later development, not appearing in Egypt until around the seventeenth century B.C.E. The Minoans made bronze figurines by the Neopalatial period (roughly the mid-second millennium B.C.E.), but the practice did not appear in mainland Greece until the early Geometric era, possibly as early as the ninth century.² It spread to the Villanovan civilization in central Italy by the seventh century and from there to their successors, the Etruscans.³ The earliest archaic human and divine figurines largely mirrored the stylistic trends of Greek archaic statuary, featuring stiff poses, expressionless countenances, or occasionally abstract and stylized forms. Artistic developments starting in the sixth and fifth centuries B.C.E., which reached an apogee in Hellenistic Greece in the third century, led to figurines with a greater degree of expression and realism.⁴ These trends greatly transformed Etruscan statuary, which began to move toward a more naturalistic style before the civilization and its arts were largely subsumed into the growing influence of Roman culture in the first century B.C.E.

Small-scale figurines and statuettes were used in a number of different contexts in Etruscan Italy. Depending on their size and shape, they could be attached as ornament to other objects, from furniture to tripods to knives and mirrors.⁵ Freestanding statuettes could represent gods, goddesses, or demi-gods, which almost certainly served a ritual or religious function. There are, additionally, representations of non-divine men and women in various



Fig. 1. Statuette, front view. "Etruscan," bronze. Museum of Art and Archaeology, University of Missouri (62.66.3). Photo: Jeffrey Wilcox.

guises, both nude and clothed.⁶ While there is some debate as to the identity of a few of these statuettes, especially those without a known provenance, most are clearly identifiable as worshipers or offerants through their costume and pose or through their deposition as votive offerings at sanctuaries and temples.⁷ A bronze statuette in the Museum of Art and Archaeology, University of Missouri, has been identified as such a votive priest/priestess or worshiper (Fig. 1). It has been classified in museum records as Roman (although this is not correct and will be discussed below) and dated from the mid-second century B.C.E. to 50 C.E.

This article will outline the results of a thorough examination of the statuette, including a formal analysis and comparison with other ancient pieces as well as detailed technical investigations of the composition of the metal. Together, these examinations show that there are some significant stylistic and compositional problems with this Missouri statuette that raise serious doubts about its authenticity. The article proposes that instead of being ancient, the statuette is a modern forgery made in the early part of the twentieth century.

Finally, by placing this particular piece in a larger contextual framework of fakes and authenticity, this study will conclude with some insights into the purpose and conceptual role of modern forgeries of ancient works.

Background on the Study of Ancient Bronze Statuettes

Until relatively recently, classical bronzes—Greek, Roman, and Etruscan—were analyzed primarily in terms of style. Fabrication technique was considered, but only marginally to formal aspects. This is evident especially in Winifred Lamb's foundational 1929 book tracing the development of ancient bronzes, where technique was considered fairly superficially and which only dealt with major compositional issues like casting or engraving.⁸ This paradigm continued largely unchanged into the 1960s, at which point a more scientific approach to archaeological material began to develop.⁹ This shift was facilitated by the contemporaneous development and spread of technologies necessary for the scientific analysis of ancient metals. Such new approaches were first arguably seen in a symposium held at the Massachusetts Institute of Technology in 1967 that accompanied the first major international exhibition of Greek, Etruscan, and Roman bronze sculpture.¹⁰ A number of the studies included in the symposium used works from the exhibition as a springboard for substantially technical discussions, like the role of microscopic analyses, spectrometry, and x-ray photography, and surveys on topics like bronze joints, patinas, and trace metal analysis.¹¹ The study of bronze statuary since then, while continuing a level of stylistic examination, has leaned heavily on detailed scientific investigation, which has grown even more specialized and sophisticated.¹² Most often these modern analyses are used to determine authenticity, although some have been used for determining the provenance of ancient bronzes.¹³

Etruscan bronzes were originally included either in general surveys of Etruscan art or alongside Greek and Roman bronzes in studies of ancient metalwork. This latter approach is in fact very useful for allowing cross-cultural comparison, which is fitting in light of the influence that Greek statuary had on Etruscan style and how they both influenced Roman statuary. It tends to minimize some of the important differences among the traditions, however, and to lack some depth. As a result, a new, more focused way of studying Etruscan bronzes was developed in the mid-1980s, with the completion of several large surveys of these works in museums around the world.¹⁴ These overviews helped

to establish the broad developments in Etruscan bronze statuary over time, as well as to highlight regional differences among the major production centers. There has been comparably little work done on the topic since then, however, especially in the last fifteen or so years, except for a few studies on the large famous bronzes like the *Chimera of Arezzo* and the *Capitoline Wolf*.¹⁵

Physical Description

The Missouri statuette is freestanding, has a human form, and wears a mantel draped over the left shoulder and left arm (Fig. 1).¹⁶ The head is turned slightly to its left and upward (Fig. 2). Eyes, lids, and brows are visible on either side of a prominent nose and nasal bridge. A small mouth sits above a jutting chin. A substantial quantity of hair is parted down the middle in the front and is drawn into three curls on each side of the face. There is a slight ridge running

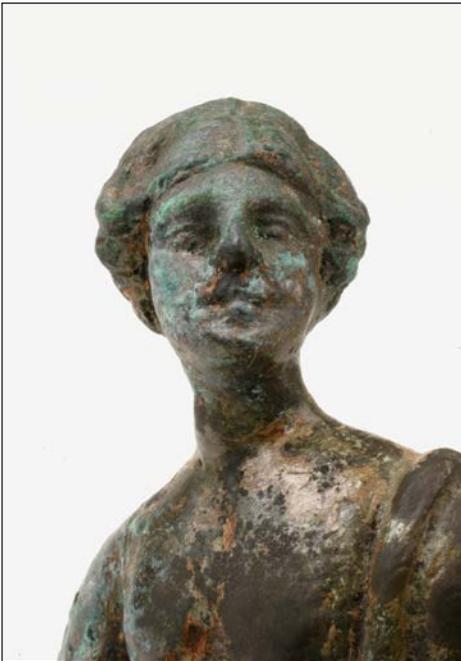


Fig. 2. Statuette, detail of face. "Etruscan," bronze. Museum of Art and Archaeology, University of Missouri (62.66.3). Photo: Jeffrey Wilcox.



Fig. 3. Statuette, detail of back of head. "Etruscan," bronze. Museum of Art and Archaeology, University of Missouri (62.66.3). Photo: Jeffrey Wilcox.

transversely across the head connected to both of the side curls that may indicate a fillet or diadem of some type or may in fact be the hair pulled up, in some type of braid, to the top of the head. The back of the hair is separated into a number of individual locks that fan out from a central part (Fig. 3). The remaining hair is drawn up off the neck and appears to be bunched together in a small bun on the nape of the neck. The figurine's neck is thin and long and set on sloping shoulders (Fig. 4). The right arm of the statuette is missing from just above the elbow (Fig. 5). The chest of the figurine is bare and shows little musculature, with flat pectoral muscles, yet the abdominal muscles are well defined, indicated by two pronounced, indented lines in the middle of the chest (Fig. 1). Below this, the belly is rounded and bulges slightly. The figure wears a large pleated garment draped in two segments—one around the left shoulder and another around the left arm, down to the wrist, and around the waist and legs. Under this garment, which hangs down to the mid-shin, the left knee is bent slightly forward and inward, lifting the left foot up from the modern mounting (Fig. 6). Both feet are damaged—the right is missing from just below the ankle and the left is lacking toes.

The surface of the figure is covered completely in a brownish patina seemingly resulting from the natural surface oxidation of the metal. This patina is



Fig. 4. Statuette, rear view. "Etruscan," bronze. Museum of Art and Archaeology, University of Missouri (62.66.3). Photo: Jeffrey Wilcox.



Fig. 5. Statuette, detail of arm. "Etruscan," bronze. Museum of Art and Archaeology, University of Missouri (62.66.3). Photo: Jeffrey Wilcox.

reasonably tenacious and does not easily peel away from the underlying surface. Distinct from the overall patina, there are splotches of aquamarine and brick red spread over the entire surface of the statuette. The blue patches are particularly prominent on the face and upper chest while the red spots are more apparent in the folds of the garment; both have previously been identified as corrosion. There are no obvious casting flaws or repairs to the surface of the statuette.

Provenance and History of Study

Very little is known about the provenance of this statuette. Museum records indicate that a Mr. Leonard Epstein donated it in 1962. Nothing is noted about the donor, except that he resided in New York, probably in Manhattan. Research has shown that, in addition to gifts to the Museum of Art and Archaeology at the University of Missouri, he also gave a number of Egyptian and Classical artworks to various other museums, such as the University Museum at the University of Delaware and the Metropolitan Museum of Art. He is known to have had a connection to Albert Eid, a Belgian antiquities dealer who is best known for selling a codex of the Nag Hammadi library.¹⁷ Beyond these few details, almost nothing is known about the donor.

In the preliminary museum appraisal, there are few specifics noted besides the monetary value and a question of whether it is a male or female figure. The record does report that Mr. Epstein informed the museum that the dealer from whom he had purchased this piece claimed it was from Italy, but there is no documentation from the dealer to elaborate on or to substantiate these claims. No paperwork was provided concerning the statuette from before it was in Mr. Epstein's possession, and his statement gives no indication of when it was discovered or of its particular provenance, or even when or where he acquired it from the dealer. It is not completely uncommon for a museum object to

have a questionable or altogether unknown heritage, especially before the 1970 UNESCO convention on the Means of Prohibiting and Preventing the Illicit Import, Export, and Transfer of Ownership of Cultural Property. Still, the complete lack of any documentation or evidence from an ancient artifact sold in the second half of the twentieth century is somewhat troubling. The statuette has never been studied, and there is no record of it ever having been on display in the Museum of Art and Archaeology.

Iconographic and Stylistic Analysis

The exact identity of this figure—beyond “Roman votive statuette”—has never been proposed. Museum records, however, do note a type of priest figurine found at Lake Nemi south of Rome as a stylistic comparison. When the figures from Nemi were first discovered in the early part of the twentieth century, they were thought to have come from the pleasure galleys of Caligula, which sank in the lake in the first century C.E. It is much more likely, however, that the majority, or even totality, of this type came from the well-known Shrine of Diana on the shores of the lake.¹⁸ As a result of the misunderstanding over their find-spot, there has been some confusion as to whether these figures were Etruscan, Republican, or Imperial Roman. In the late 1960s, several studies demonstrated convincingly that they were Etruscan or Etrusco-Latin, from the second century B.C.E., meaning that the museum’s identification of this style as Roman is not strictly correct.¹⁹ The Nemi bronzes were made in a context of declining political and cultural autonomy of Etruscan

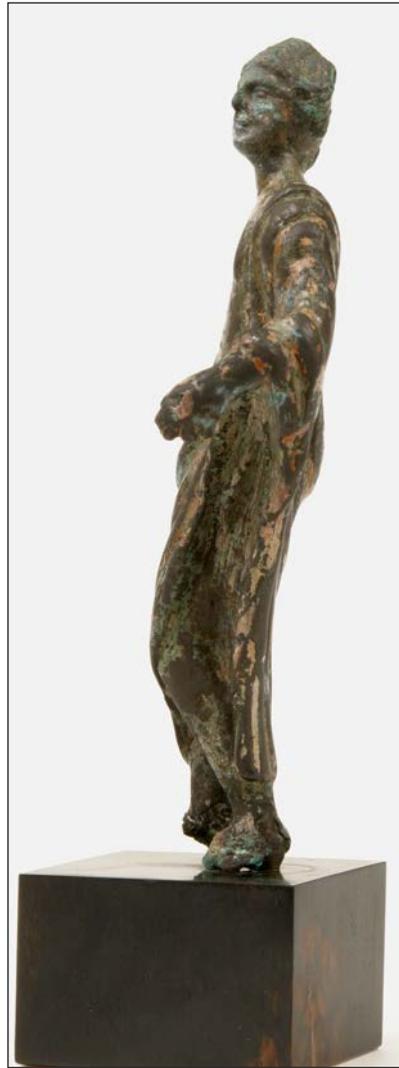


Fig. 6. Statuette, side view. “Etruscan,” bronze. Museum of Art and Archaeology, University of Missouri (62.66.3). Photo: Jeffrey Wilcox.

cities and the corresponding rise of Rome and were deposited in a sanctuary well within Roman territory, but within a long tradition of Etruscan votive statuary, making them slightly hybridized figures representative of a changing situation.²⁰ These Nemi statuettes are all bronze and generally small (ca. 17–26 cm in height) and depict both males and females. They represent priests, priestesses,



Fig. 7. Statuette of a solar deity. Etruscan, third–second century B.C.E., bronze. The Metropolitan Museum of Art, Rogers Fund, 1916 (16.174.5). Image: Metropolitan Museum of Art, www.metmuseum.org.

or worshipers, indicated by their radiate crowns and the offerings carried in their hands; this can be seen, for example, on a Nemi-type figure in the Metropolitan Museum, currently misidentified as a solar deity (Fig. 7).

The similarities between the Missouri statuette and the Nemi type include stance, costume, and general style. Upon closer inspection, however, these superficial similarities begin to break down, and it is clear that the Missouri statuette is not a Nemi priest. First, the Nemi figures generally hold a *pyxis*, or small cylindrical box, in their left hand and a *phiale mesomphalos*, or libation bowl, in the right. The Missouri statuette holds no such object in the surviving hand, which is in fact turned downward, suggesting that it was not intended to hold anything. More substantially, there is the issue of the sex of the figurine. The female Nemi priestesses all wear a sleeveless *chiton*, a garment held together at the shoulders.²¹ The Missouri figurine is bare-chested suggesting that it is a male, which is further supported by the relatively flat chest and pronounced

upper abdominal musculature. The rather soft facial features, sloping shoulders, abundant hair, and rounded belly are, however, all largely female physical characteristics. The hair of the Missouri statuette, parted down the middle and

pulled into curls along the side and back of the head, is more regularly seen on the female Nemi statuettes. The female statuettes also wear some type of fillet or diadem, the remains of which might be the band running across the head of the Missouri statuette. The male priests all have much less tidy hair and wear a large wreath of leaves. There is the possibility, in light of the more female hairstyle and male body, that the head of the Missouri statuette may have been replaced at some point. While there is a fine line with some discoloration where the neck meets the torso on the front of the statuette, it does not continue onto the back, indicating that the head has not been replaced. Further, Kurtz argues that because of the nature and difficulty of reworking the metal, an exchanged head is very unlikely for bronze statuary.²² Overall, there is no clear indication of the sex. Ortiz notes, in discussing a similar fake Etruscan statuette without any clear sex, “It is difficult to put in [a marker of the] sex, [the faker] might not get it quite right, but the Etruscans always put it in.”²³ We should expect to see a clear indication of the sex of this figurine if it is authentic.

A further problem concerns the garment the statuette wears, which differs from those worn by almost all Greek and Roman statues or statuettes.²⁴ Greek portrait statuary tended to show males nude (Fig. 8), in military garb (Fig. 9), or in the civic *himation*.²⁵ The *himation* was constructed from a large rectangular piece of cloth and could be worn around the entire upper body (as on a Hellenistic bronze statue, Fig. 10), over the shoulder (as on a marble statuette, a Roman copy of a

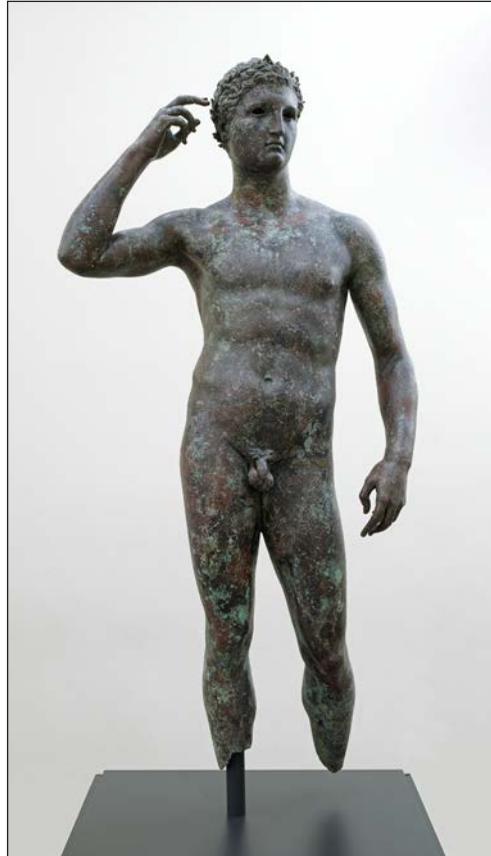


Fig. 8. Statue of a victorious youth. Greek, 300–100 B.C.E., bronze with inlaid copper. The Getty Museum (77.AB.30). Image: Courtesy of the Getty’s Open Content Program.

Greek portrait of a philosopher, Fig. 11), or just around the waist (as on a Roman marble statue of Jupiter, Fig. 12). It fell low and straight across the legs, with a good deal of excess material hanging freely from the side. The Roman version of the *himation* was the *pallium*. It was rectangular and could be worn in a number of fashions, most often with a tunic underneath.²⁶ The Etruscan *tebenna*, in contrast, was constructed from a semi-circular piece of cloth that made the front edge of the garment always appear round (Fig. 13).²⁷ The mantel on the Missouri statuette seems to be round and there is no extra material hanging loosely to the side. The



Fig. 9. Grave stele of Philoxenos with his wife, Philoumene. Attic Greek, about 400 B.C.E., marble. The Getty Museum (83.AA.378). Image: Courtesy of the Getty's Open Content Program.



Fig. 10. Statue of a man. Hellenistic, ca. mid-second–first century B.C.E., bronze. The Metropolitan Museum of Art, gift of Renée E. and Robert A. Belfer, 2001 (2001.443). Image: Metropolitan Museum of Art, www.metmuseum.org.

Roman toga—the descendant of the *tebenna*—was also rounded in the front but was a fairly large garment that from the second century B.C.E. onward was always worn with an undergarment.²⁸ By the Augustan period, the toga had become an even bulkier garment with more excess cloth than is seen on the Missouri statuette.

In all, it is most likely then that the statuette is wearing something most akin to (although not exactly the same as) the Etruscan *tebenna*, further confirming that it is almost certainly not Greek or Roman. In addition, this statuette's garment comes up and over the shoulder, covering the left arm with a rounded bottom edge, and falls below the right hip, revealing flesh below the waist. This is problematic in terms of the sex of the figure. For male figurines of the Nemi



Fig. 11. Statuette of a seated philosopher. Imperial Roman, first or second century C.E., marble. The Metropolitan Museum of Art, Fletcher Fund, 1924 (24.73). Image: Metropolitan Museum of Art, www.metmuseum.org.



Fig. 12. Statue of Jupiter (Marbury Hall Zeus). Roman, first century C.E., marble. The Getty Museum (73.AA.32). Image: Courtesy of the Getty's Open Content Program.

type, the *tebenna* generally sits high on the waist, as can be seen with the priest statuette from the Metropolitan Museum (Fig. 13). And yet, the clothing of the Nemi priests is notably different from that of the Missouri statuette. The *tebennae*



Fig. 13. Statuette of a priest or offerant. Hellenistic, third–second century B.C.E., bronze. The Metropolitan Museum of Art, Purchase 1896 (96.9.411). Image: Metropolitan Museum of Art, www.metmuseum.org.

that the Nemi figures wear have many small folds and have no obvious break between the two edges of the garment. This stands in contrast to the large folds and very clear split in the Missouri statuette's garment, which is generally much less detailed.

The Missouri statuette overall shares some characteristics with the Nemi figures, but there are also pronounced differences in terms of the garment and sex. It, therefore, cannot be clearly identified as either a Nemi priest or priestess on iconographic and stylistic grounds, although it does bear a vague, overall resemblance to Etruscan statues. The identification of this statuette thus remains unclear. Bronze statuettes in the ancient world could depict both humans and divinities. If it is a human figure, it is unclear what type or kind it is, or even what it represents. The features are not unique enough to be a portrait, which are, in any case, generally on a larger scale. There are no readily identifiable characteristics that indicate its type, and no immediate parallels for the style, beyond the loose, yet problematic resemblance to the Nemi types. If the statuette cannot be readily identified as human, we may, therefore, consider the possibility that it is a representation of a divine or mythical figure. The statuette has

no attributes, however, that immediately identify it as a particular god, such as Mars' weapons, Apollo's lyre, or Neptune's trident. If it is meant to be a divinity, which one is not immediately clear.

The sex of the statuette is also a problem for identifying it as a divinity. As noted, it seems to have both masculine and feminine physical characteristics and clothing. For such an ambiguous figure, Hermaphroditus—possessor of both male and female corporeal traits—comes to mind. In all depictions of Hermaphroditus, however, it is depicted with both a visible penis and breasts, to emphasize its dual nature; both of these sex markers are lacking in the Missouri statuette. Further, the hair on this statuette is not helpful for determining anything about its identity. It has a similar hairstyle to those found on Greek and Roman depictions of Aphrodite; for example, a marble statue at the Metropolitan Museum of Art (Fig. 14) has distinct locks of hair parted in the middle, pulled back and covering the ears. The band or diadem that possibly runs across the head of the Missouri statuette (if it is not just gathered-up hair) might lend credence to its identification as a female figure, but too little of it is preserved to be able to fully ascertain this. Additionally, a similar hairstyle is also seen on representations of Dionysus and Apollo, as with a bronze statue head that has been identified as either god (Fig. 15). There are differences in the medium, details, and execution among these examples and the Missouri statuette, but they are reasonably similar, meaning that the hairstyle can suggest either sex. In any case, these hairstyles are more regularly seen on Greek or Roman statues rather than Etruscan.

More important, the clothing of the statuette seems to be immediately masculine, with a bare chest and garment around the shoulder and arm. There are many Etruscan bronze statues of divinities that are bare-chested, but they always wear their garments high on the

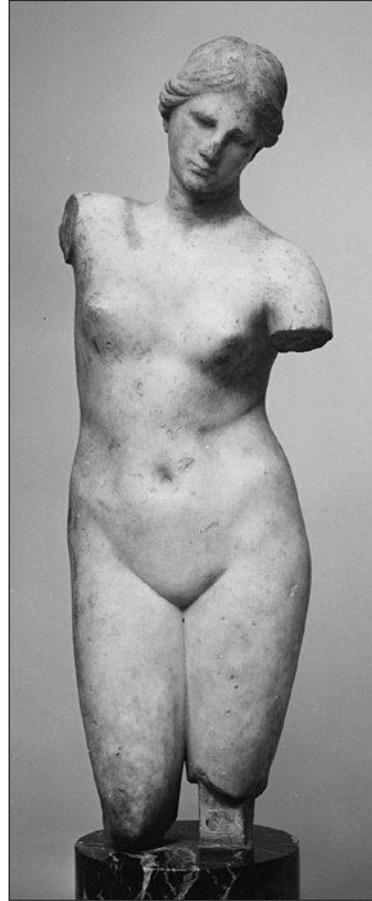


Fig. 14. Statuette of Aphrodite Anadyomene (rising) type. Hellenistic, late second century B.C.E., marble. The Metropolitan Museum of Art, Gift of John W. Cross, 1950 (50.10). Image: Metropolitan Museum of Art, www.metmuseum.org.



Fig. 15. Head of Dionysus or Apollo. Classical Greek, third quarter of fifth century B.C.E., bronze. The Metropolitan Museum of Art, Fletcher Fund, 1929 (29.48). Image: Metropolitan Museum of Art, www.metmuseum.org.

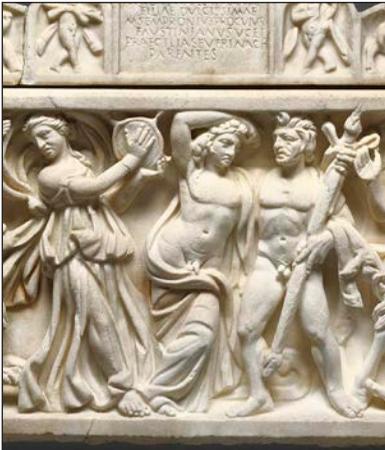


Fig. 17. Sarcophagus, detail. Roman, third century C.E., marble. The Getty Museum (83.AA.275). Image: Courtesy of the Getty's Open Content Program.



Fig. 16. Statuette of Aphrodite leaning on a pillar. Hellenistic, third century B.C.E., terracotta with polychromy. The Getty Museum (55.AD.7). Image: Courtesy of the Getty's Open Content Program.

hip.²⁹ In contrast the top edge of the mantle on this statuette drops below the hip, which is problematic. Such a drooping garment is occasionally seen on goddesses, especially Aphrodite, as for example with the terracotta statuette shown in Figure 16. But in the case of goddesses, the presence of breasts makes the identification of the sex absolutely clear. There are also examples of roughly

similar clothing on statues of Apollo, Dionysus, and Hermaphroditus. Yet the key difference is that any male figure that wears a drooping garment (as opposed to one worn high up above the hips) wears it low below the groin, revealing the penis and confirming the sex. This can be seen in a detail from a relief on a Roman sarcophagus showing Dionysus (Fig. 17). The sex of a figure wearing a low-hanging mantle, either male or female, is never dubious.

Overall, the formal features of this statuette provide no clear identity. The gender remains ambiguous, seemingly taking cues from male and female traits, both in physical features and clothing. In reality, the statuette seems to combine features and elements from a number of different ancient works in a variety of media from, most obviously, the Greek and Etruscan traditions. The statuette has the closest parallels with the Etruscan Nemi-type priest figurines. There are problems with this comparison, however, such as the details of the garment and the absence of a radiate wreath around the head and votive items in the hands.

An examination of the manufacturing technique can also be helpful for identifying a time and place of production. Casting was the most common method for making bronze statuary in the ancient world; this was done most often using the lost-wax method, also known as *cire-perdue*.³⁰ In this process, a wax model was formed and then covered by a sand and clay mold or mantle, which was heated to melt out the wax. Molten metal was poured into the mantle, which held the negative impression of the original wax figure. Once cooled, the mantle would be broken apart to reveal the rough metal figure that would be finished by hand. The Missouri statuette was almost certainly cast in this method. There are no indications of any seams along the sides of the statuette, which would indicate a two-sided, reusable mold. Also, the level of detail, especially on the hair, would have been difficult to achieve with any other method of casting. Lost-wax statues could be cast solid or hollow. In antiquity, works of less than 15 to 23 cm would typically be cast solid, and works larger than that would be cast hollow to conserve metal and to produce a more uniform cast.³¹ This statuette stands at 12.5 cm and is solid cast, presenting no difficulties. Cast bronzes could be finished and detailed by hand through chasing and engraving the surface or through gilding or inlaying the bronze with other materials (although these latter are generally reserved for larger works). The surface of the Missouri statuette bears no trace of any of these finishing processes.

The break in the right arm is, however, problematic (Fig. 5). While there has been subsequent damage around the area, the U-shaped indentation at the

break resembles a tongue-and-groove joint. The central position of the groove and the flat face suggest that this mechanical joint was cast. Most likely, the statuette was made in more than one piece and then joined together. Casting a figurine in several pieces, even one as small as this, is not unheard of in antiquity. It happens most often with limbs, since it is often challenging to get bronze to flow into a long, narrow tube without trapping a pocket of air that would ruin the cast. In the ancient world, joins were either metallurgical (i.e., soldering or fusion welding) or mechanical (i.e., the addition of physical force, or designing two pieces to interlock).³² The most common form of mechanical joint was a socket that was then secured with a rivet, dowel, or peg.³³ There is no evidence for any kind of socket and peg or solder on the Missouri statuette that would indicate such a technique. Instead, there is a tongue-and-groove joint, for which there is no parallel in ancient bronze working. The presence of this kind of joint is indeed problematic and suggests, in conjunction with the eccentric stylistic qualities (particularly the sex, dress, and hairstyle of the figurine), that the statuette is not ancient.

Technical Analysis

The stylistic problems of this statuette led to further scientific investigations of its metallic composition, in order to determine first its authenticity and second, if possible, its origin. On the level of superficial visual examination, the figure appears to reflect light rather strongly, at least more than other bronze statuettes with a similar patina and level of corrosion. And when subjected to strong light, the surface of the statuette gives a strong silvery reflection, which is unexpected in a bronze. First investigations took place in 2007 at the University of Missouri's Museum of Art and Archaeology. The initial step was to examine the surface corrosion microscopically. Seen through a microscope, the surface has a fairly regular patina, or surface corrosion layer, although there is much additional incrustation. The compounds that make up a patina are a natural result of the reaction of the copper in the bronze with atmospheric carbon dioxide. This reaction creates two kinds of copper carbonates, malachite and azurite, which give a normal patina its green and blue tones.³⁴ These two compounds seem to be visible in the brownish and green-blue patches that coat the entire statuette. The next type of typical bronze corrosion is called red cuprous oxide and has a distinct brick-red color.³⁵ This type of corrosion

is typically beneath the two surface oxidations and can be seen in patches on microscopic views of the surface of this statuette (Fig. 18). Below these corrosion layers should be the natural, un-corroded bronze. Instead, a bright, silvery metal is apparent when the surface is cleaned. It is clearly not standard bronze, as un-oxidized bronze should have a naturally reddish gold hue.

This unexpected surface led to further testing to calculate the approximate density of the statuette in order to give an indication of the metallic composition.

The volume of the figurine is calculated by the displacement of water (i.e., by the Archimedes principle) to be approximately 35 cubic centimeters. The weight of the figurine, 272.5 g, is then divided by the volume, which provides an average density of approximately 7.785 g-cm³. It is important to note that this number is only approximate due to the impossibility of more precise measurement in determining the volume since the cylinder used for measurement was only graduated down to 10 ml. Furthermore, while the base was taken off to conduct the test, the screw that mounts the figurine could not easily be removed. Copper alone has a density of 8.9 g-cm³ and the density of an average bronze, being primarily composed of copper, is 8.3 g-cm³. This suggests that the alloy of the statuette has a relatively high amount of a lighter metal, which was presumed to be zinc, with a density of 7.13 g-cm³, or possibly tin, at 7.310 g-cm³. Knowing the exact composition of the interior metal is critical in trying to secure a date and provenance for this object because certain metals or alloys were used more often at specific points in history in specific regions. For example, zinc, which when combined with bronze creates brass, was rarely added in significant quantities—above a few percent—to statuary in the ancient world.³⁶ High antimony content

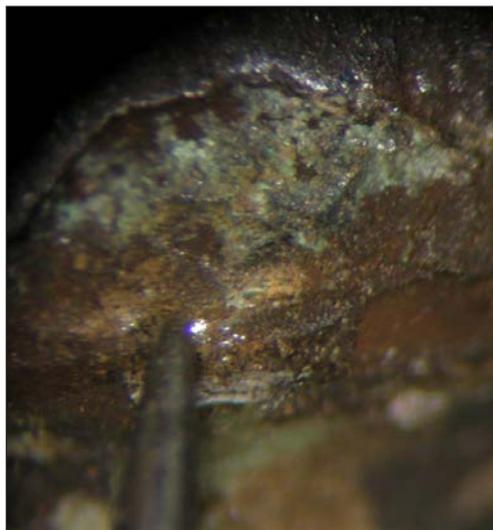


Fig. 18. Statuette, back fold under microscope. “Etruscan,” bronze. Museum of Art and Archaeology, University of Missouri (62.66.3). Photo: Douglas Underwood.

would suggest a Medieval or post-Medieval date.³⁷ Similarly, later bronzes (Hellenistic and onward) often contain notable amounts of lead, whereas earlier specimens do not.³⁸

The significant uncertainty about this statuette, both iconographically and then compositionally, led to more detailed scientific testing. This analysis was carried out in November 2011 at the University of Missouri research reactor, a 10 thermal megawatt highly enriched uranium aluminide fuel reactor. The object was subjected to X-ray Fluorescence (XRF) and Neutron Activation Analysis (NAA) over a period of two weeks. In basic terms, XRF works by bombarding a sample with X-rays or gamma rays; the sample then radiates a lower-energy form of the primary radiation. This secondary radiation, which is characteristic of the materials present in the sample, can be read and analyzed to allow the identification of the source elements. NAA operates somewhat comparably, but samples are irradiated with neutrons instead of X-rays or gamma rays. Neutrons interact with the nuclei of the elements in the sample, making them radioactive and causing the emission of a particular gamma ray spectrum over a period of time, which can be measured and used to calculate the composition of the sample.

For the XRF test, a portable energy-dispersive X-ray fluorescence (ED-XRF) spectrometer (Bruker Tracer III-V) was used at a number of surface locations on the statuette. X-rays from such handheld machines are only able to penetrate 35–40 μm , about half of the thickness of an average piece of paper, so this test is suited for surface analysis only. For NAA, seven samples of metal between 1 and 6 milligrams were obtained by using a tungsten drill bit to remove a small amount of material from a variety of locations and depths without significantly damaging the object. The seven sample spots (illustrated in Figure 19) are:

- #1. Foot next to the screw (surface)
- #2. Foot next to the screw (deeper into interior)
- #3. Patina from back and shoulder area
- #4. Encrustation from fold in mantle
- #5. Back of right ankle on mantle (surface)
- #6. Back of right ankle on mantle (deeper into interior)
- #7. Back of right ankle on mantle (deeper into interior – shiny metal)

For the purposes of calibration, quality control, and comparison, standard samples made from SRM-37e brass and SRM-400 copper alloy were also prepared. The samples and standards were irradiated in two separate tests. The first test was a five-second bombardment followed by a twenty-five-minute

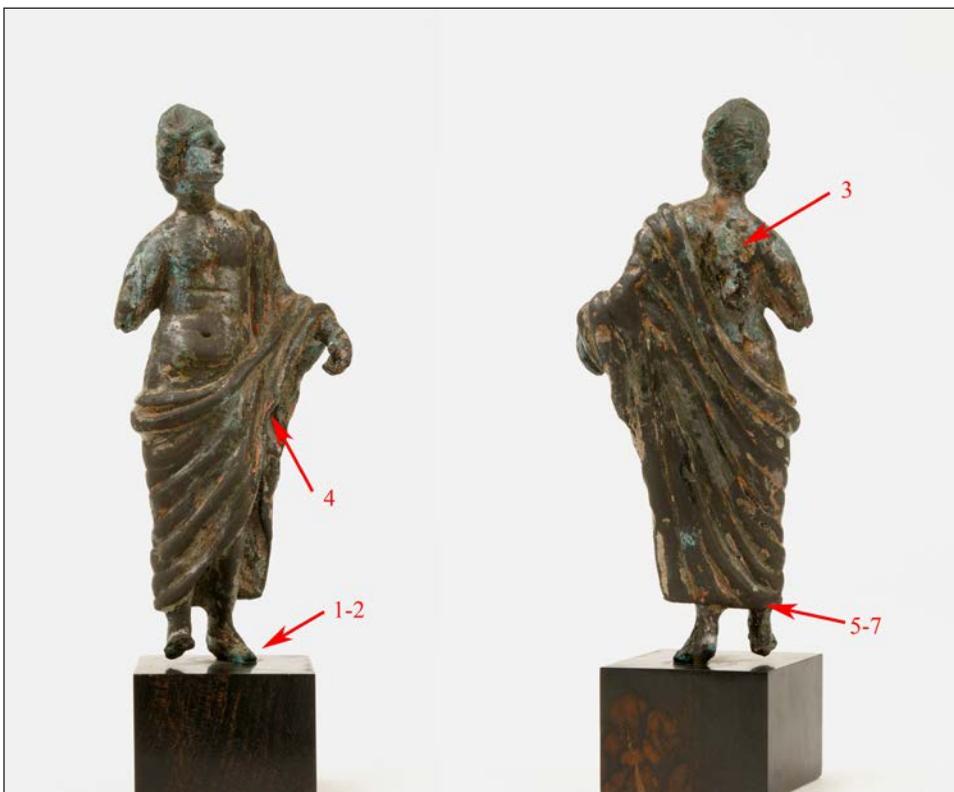


Fig. 19. Statuette, sample spots for NAA. “Etruscan,” bronze. Museum of Art and Archaeology, University of Missouri (62.66.3). Photo: Jeffrey Wilcox; Illustration: Douglas Underwood.

period for decay and ten-minute counting time, which provided measurements for copper and tin. A second, three-minute irradiation was followed by decays ranging from 24 to 96 hours. One-hour measurements were made on each sample in order to determine the amount of copper, antimony, arsenic, silver, and gold. For all of the measurements, the precision calculated from the standard samples was better than 5 percent of the measured value.

The XRF revealed that the primary compositional elements of the statuette’s surface were copper, tin, and antimony. When the machine was pointed at a thick patch of the brown-red surface encrustation in the folds of the statuette’s garment, calcium was also reported. The NAA reported the six most significant elements in the statuette as copper, tin, arsenic, antimony, silver, and gold (Table 1). Lead cannot be directly measured by NAA, but it is assumed to account

for the portion of the metal that was not composed of other elements. More important, zinc was not directly observed by XRF or NAA. Engineers at the Research Reactor calculated an upper limit for the amount of zinc that might be present but not show up in the analysis—up to 1 percent of the overall composition. Any amount of the element above that would have been detected. Somewhat similarly, the signal from the base metals copper and tin made the detection of small levels of iron (Fe) impossible. It is likely, however, that the upper limit for iron is less than 0.5 percent.

Table 1: NAA Composition Report

Element	Chemical Signal	Compositional Range
Copper	Cu	70–75%
Tin	Sn	10–15%
Arsenic	As	0.12–0.14%
Antimony	Sb	0.10–0.12%
Silver	Ag	0.020–0.025%
Gold	Au	0.0015–0.0020%
Zinc	Zn	Possibly less than 1%
Lead	Pb	10–20% (not measured directly)

These tests show that the statuette is composed of bronze, albeit a highly leaded form (hence the silvery color of the un-oxidized metal), with some trace impurities. Such leaded bronzes are known from both antiquity and the modern period, and added lead would have lowered the melting point of the alloy and made it more fluid and thereby easier to pour into molds. Because of this added malleability, leaded bronze was less appropriate for

applications where strength was critical, such as for weaponry, but would have been suitable for figural work. Yet as noted, lead was almost entirely absent from any Greek or Etruscan bronzes from before the Hellenistic era.³⁹ There are some exceptional early Etruscan statues with especially high lead content, like a fifth-century kouros from the Getty that has been measured at 14.41 percent.⁴⁰ This statue is only 6.23 percent tin, however, considerably lower than the Missouri statuette. Lead became increasingly common in later phases of Etruscan bronzes—after the fourth century B.C.E.—and is found in a wide variety of quantities (up to 27 percent in one case).⁴¹ Yet like the early kouros, most of these high-lead bronzes have a tin content below 10 percent; there are, however, several atypical examples (eleven in Craddock's extensive catalog of 700 Etruscan bronzes from all periods) with lead and tin contents over 10 percent, like the Missouri statuette.

Despite these few outliers, the quantity of tin in the statuette raises suspicion. In Caley's early analysis of seventeen Roman leaded statuary bronzes, only three have a tin content above 10 percent, with the highest, a large gilded statue of uncertain provenance, at 10.77 percent.⁴² The Missouri statuette is composed of 10–15 percent tin. In one analysis of classical (i.e., Greek, Etruscan, and Roman) bronzes at the Getty museum, only five of sixteen bronzes have tin levels close to or above 10 percent.⁴³ And bronzes with high tin content generally do not have similarly high lead content (and vice-versa, as noted above), especially small figurines. In Caley's list, four of the five high-tin bronzes have a lead-to-tin ratio of slightly under 1 (the Missouri statuette's ratio is between 2 and .66), and only one of those is a small object. Similarly, in the five Getty bronzes only two have ratios in the same range as the Missouri statuette (1.6 and 1.15), and these are both large-sized Herms. A look at late (post fourth century B.C.E.) Etruscan statuette bronzes—perhaps the closest parallel for style—shows this group of forty-six to be, on average, 7.9 percent tin; eleven examples from this group are over 10 percent tin, although these are mostly just over this quantity (a single one was as high as 12 percent).⁴⁴ And of those eleven, only three had lead levels above 10 percent. So while this amount of tin and the lead to tin ratio is not completely impossible for an antique bronze, it is very uncommon, especially for such a small statuette.

The trace elements of the statuette can also be compared to known ancient bronzes. Riederer notes that silver is comparatively uncommon, generally 0.04–0.06 percent, and that antimony is very stable across a large number of Roman bronzes, at around 0.06 percent.⁴⁵ In their analysis of bronzes at

the Getty Museum, however, Scott and Podany see more variation in both elements.⁴⁶ Silver concentrations run from 0.009 to 0.08 percent (0.07–0.08 percent for Etruscan bronzes only) and antimony from 0.00 to 1.18 percent (0.01–0.05 percent for Etruscan bronzes). Similarly, arsenic ranges from 0.04 to 1.18 percent overall, and 0.04 to 0.28 percent in Etruscan statues. The Missouri statuette is composed of 0.02–0.025 percent silver and 0.1–0.12 percent antimony and 0.12–0.14 percent arsenic. While iron was not directly attested, it may have composed up to 0.5 percent of the statuette. This is in line with ancient bronzes, which were almost always under 0.5 percent iron.⁴⁷ Overall there is nothing particularly revealing about the trace element composition of the Missouri statuette. It has a slightly lower silver composition than other Etruscan statuary, but not beyond what was common in other ancient bronzes.

Therefore the NAA testing was not able to provide any definitive confirmation of the origin or antiquity of this statuette. The composition, particularly in regards to the level of tin, lead, and copper, is unusual for ancient bronze but not completely anomalous. The percentages for the trace elements are roughly in line with both ancient and pre-industrial modern leaded bronzes. Ultimately, there is nothing about the composition that allows an identification of a particular time or place of manufacture, either ancient or modern. And yet the composition has no direct parallels with other ancient statuettes, at least based on published studies of bronze compositions.

XRF testing, however, proved to be somewhat more useful. Calcium was found in the brown-red encrustation on one of the folds of the garment. Calcium carbonate—a mineral common in chalk, limestone, and marble—has been used in paints since antiquity. This encrustation must be some form of paint. Unfortunately, the presence of paint alone does very little to help establish the age or provenance of this piece. This is for two reasons. First, if the statuette is indeed antique, the paint could have been applied at any point after it was discovered. It is at least hypothetically possible that it is an Etruscan bronze, but coated in modern paint. Exactly why it would have been painted is not immediately obvious. Perhaps the paint was intended to cover up an unattractive patina, or to give the statuette a more authentic look. Second, there is some very limited evidence for the application of paint to bronze in antiquity. While there is no evidence for the painting of small figurines like this one, there are indications, both textual and physical, for the artificial patination of bronze with paint.⁴⁸ For example, a first millennium B.C.E. helmet was painted with a

substance that has been identified as calcium carbonate and quartz.⁴⁹ Yet given the very few examples of ancient paint on bronze art works and that pigments were widely used to make forged objects look antique from the Renaissance to at least the nineteenth century, it seems most likely that the paint on the statuette is not antique.⁵⁰ This leaves two possibilities: the statuette was indeed made in antiquity but painted at some time after its discovery, or it is a modern fake and painted to look antique. Yet given the scientific evidence, in combination with the stylistic problems, and the significant problems with the joint in the arm, it is more probable that the statuette is a forgery.

Discussion and Conclusions

The numerous problems regarding the identity, sex, technique, and composition of the statuette strongly suggest that it is a modern forgery that was cast and treated with an artificial patina and paint before being passed off as an antique. For the style, it seems that the sculptor started with an Etruscan votive statuette but then added features from other classical works for this statuette. Since the Missouri statuette seems to draw inspiration at least in part from the Nemi figures, it was possibly made after the Nemi figures were first discovered. While the story of their discovery is somewhat murky, it seems that the earliest they could have been found was 1887.⁵¹ These priests and priestesses were first put on display in London in 1908, which is a more likely point after which they would have been familiar enough to warrant an imitation. Yet, the stylistic connection between the Nemi statuettes and the Missouri one is not strong enough to assign a definite date.

For the surface treatment, it is nearly impossible to say whether the splotchy patination and encrustation on this statuette was the result of poor workmanship or intentionally produced to give the appearance of age. Beginning in the nineteenth century, a wide variety of chemical processes was available for the development of artificial patinas.⁵² Antimony salts in particular were commonly used in the creation of false patinas in the nineteenth and twentieth centuries, and this statuette has notable amounts of antimony in the surface, possibly indicating this treatment.

The presence of at a minimum 0.24–0.29 percent impurities in the bronze (not counting zinc and iron, which were not measured, but might be present below 1 percent and 0.5 percent respectively) suggests that the statuette was

made before refining processes improved later in the twentieth century. It is impossible to know which component of the alloy introduced impurities into this statuette, which complicates suggesting a date based on the technological advances in refining practices of various metals. Electrolysis, which can produce copper with purities of 99.95 percent, was first developed in Wales in 1869 and became reasonably common in the 1880s.⁵³ Metal produced by this method was largely used for electric wires, or other contexts where purity was essential. Copper with similar purity (ca. 99.25 percent or greater) became more widely available after the 1920s when the process of “fire-refining” was developed.⁵⁴ Because the Missouri statuette might be comparably pure (although we do not know the precise amounts of zinc or iron), this may suggest that it was produced around the 1920s. This fits with the earlier suggestion that it was probably made in the early twentieth century—not long after 1908 and before 1950 or so. Without any further specific evidence, this must remain at best speculative.

Simply identifying this statuette as a forgery (and further as a pastiche) does not, however, devalue it entirely. Rather, it puts it in the middle of a broad discourse on fakes, reproductions, and the nature of the authentic. It transforms what would otherwise perhaps be a rather average Etruscan votive bronze into a launching point for a larger discussion on the methods and nature of forgery of ancient art and the place of art and authenticity in society. This discourse, perhaps, is even more valuable than traditional art-historical practice, simply because it is more critically self-aware.

To begin this discussion, definitions are critical. What sets forgeries apart from other art is the intention of deceit, by either the artist or the seller. The artwork must be represented as authentic, or else it is simply a replica or imitation. Forgery can be done in several ways: *ex novo* (i.e., at the creation of the object), or through repairs, restorations, and transformations. This latter occurs when an authentic piece is altered or augmented beyond a certain (admittedly fuzzy) line. The issue is one of degree of treatment rather than one of treatment at all, as a significant number of works in museums have had at least some conservation work.⁵⁵ One of the more common instances of this practice, at least for ancient statuary, is fitting various authentic fragments together to form a new whole. This type of restoration, as for example putting an ancient head on a different body, was especially common in the eighteenth century.⁵⁶ In this case, while the object remains antique, it is no longer authentic. This type of forgery can overlap with pastiche, discussed below. One

reasonably famous example of this sort of restoration is an Egyptian statuette that represents a man standing with Osiris directly in front of him, which was once in the collection of Sigmund Freud and is now in the Freud museum (acc. number LDFRD 3132). X-rays revealed that several authentic statuette pieces had been cobbled together and joined with modern pins and plaster.⁵⁷

Ex novo forgeries can be sorted into three categories: direct copy, evocation, and pastiche.⁵⁸ Direct copy is straightforward, meaning an object has been copied through mechanical or manual means. Although the practice has declined in recent years, ancient art collections used to license out their artworks to local artisans for reproductions. The National Archaeological Museum of Naples, for example, worked with the famous Chiurazzi foundry to make cast reproductions of numerous classical statues from Pompeii and Herculaneum from the 1870s.⁵⁹ These reproductions were available with a variety of distinct artificial patinations.⁶⁰ A direct copy only becomes a forgery when it is passed off as authentic, at whatever point in its history. But as they are derived from known (and often well-known) pieces, they are easily identified as copies. Evocation, in contrast, refers to non-authentic pieces that do not exactly copy a particular work but, instead, create something new evoking the general style of an artist or era and often employing certain specific elements to evoke authenticity and/or age. One example of this type of forgery may be the still-contested Getty Kouros. This large-scale marble statue of a young man generally looks like an Archaic statue and has the correct proportions, stance, etc., but is strongly suspected to be a forgery.⁶¹ Finally, the third kind of forgery is pastiche, in which the artist takes aspects of several different works and combines them in a new way that is not at once immediately obvious. There can be some overlap in this category with evocation, depending on how faithfully the individual elements were copied.

The Missouri statuette is such a pastiche; it has a grab bag assortment of features that together give a vague impression of antiquity. It is impossible to know whether the artist intended such deceit or was simply making a statuette in an ancient style. It is, therefore, impossible to tell when this piece became a forgery. Nevertheless, at some point it was fraudulently sold as authentic. Since there are no records of the statuette before 1962, that part of its history is lost. There are, however, two facts that suggest that the person who created the piece intended it to be passed off as authentic. First, the patina, both from the treatment of the bronze and the paint laid over it, must have been intended to lend credibility by making the object look antique. Second, pastiche (and

evocation, as well) works by subtly disorientating the viewer into suspending disbelief. By employing a number of elements that are, or on first look appear to be, authentic, an overall picture of validity is built up and authenticity is created. In some part, the use of pastiche—a powerful tool that draws in and disorientates the viewer—is what allowed this statuette to slip into the collections of the Museum of Art and Archaeology. Perhaps other forms of forgery would not have succeeded so well in their deception in the more critical marketplace of the last half-century, which has been increasingly aware of such practices.

Jonathon Keats, in a recent provocative book, argues, “Fakes are arguably the most authentic of artifacts. Certainly, they’re the most candid, once the dissimulation has been detected. To discover what ancient Egyptians or Romans lied about, and what they did not, is to penetrate the inner sanctum of their values and beliefs.”⁶²

While this is not a forgery of the Etruscan era, the act of forgery illuminates the time when and place where the statuette was created, which seems most likely to be in early twentieth-century Europe. First, it shows that there was a market for ancient art, specifically statuettes. This sheds light on the values and ideas of the period. As Briefel notes, “National and local patterns of object acquisition encouraged the forger and the dishonest art dealer, both of whom filled a demand for art-works that could not be satisfied by authentic objects alone. . . . Forgers assessed which objects and artists were currently valued the most and produced art-works that met the desired requirements.”⁶³ For example, there exists what is often called a “cult of the artist” in contemporary society, whereby the most famous artists, like Vermeer or Van Gogh, are valued above all others. This phenomenon is reflected in the prices that the works of well-known artists fetch compared to contemporaries of similar ability. And this has germinated some of the most famous instances of forgery in the last century, which have largely been focused on big-name artists. Alfred Lessing explains this phenomenon, saying, “It is just the preponderance in the art world of nonaesthetic criteria such as fame of the artist and the age or cost of the canvas which is largely responsible for the existence of artistic forgeries in the first place.”⁶⁴

Similarly, the art of Greco-Roman antiquity once held a significant cultural value, which might be called a “cult of the antique.”⁶⁵ This trend had its origins in

the Renaissance, yet flourished in the eighteenth and early nineteenth centuries with the new wealth found in the industrial revolution and the expansion of education—particularly classical education—to a wider base of society. One element of this “cult” was the popularity of the Grand Tour, where wealthy young men from England and America traveled across Europe, generally ending in Italy to take in the art and antiquities there (and often returning with souvenirs made specifically for foreign tourists, notably reproductions of classical statues and miniature models of buildings). While the cult of the antique has waxed and waned over the intervening years, it has never fully disappeared. The Missouri statuette affirms this, being most likely made at the beginning of the twentieth century in Europe and sold there or in the United States. Its manufacture and sale shows that money could still be made from an average and un-provenanced Etruscan votive statuette and, therefore, that such items had value for that time and place. Interestingly, Etruscan art has long been seen as fertile ground for forgeries. Artifacts from Etruscan civilization were extremely popular in the eighteenth and nineteenth centuries, and they are generally both highly stylized and notably eclectic, making it easy to create and pass off imitations as authentic.⁶⁶ Of course, the statuette was sold to the museum as “Roman,” but it was linked to known examples that were thought to be either Etruscan or Roman (the Nemi figures, whose dating was at the time unclear).

Yet the cultural significance of fakes goes beyond the cultural fascination with ancient art in the eighteenth and nineteenth centuries. The existence of forgery also reflects the wealth of the society in which it was purchased. Prosperity breeds forgeries. Briefel makes this point clearly, noting that, for the eighteenth and nineteenth centuries,

Forgeries were considered accurate indicators of cultures whose artistic heritage or superior resources made them worthy of being deceived. *Not* falling prey to the forger could have far more unsettling implications than being duped—it might designate a nation that was too destitute to be defrauded. The existence of fakes was material proof of cultural abundance, a confirmation of an extensive demand for luxury goods. . . . National wealth could be measured through the presence of forgeries.⁶⁷

While the provenance of this statuette is largely undocumented, a man living in Manhattan, a thriving metropolis and hub of culture, purchased it sometime before 1962, probably in the midst of the postwar economic boom. Applying Briefel's analysis to this era, forgeries like this statuette were a direct and unavoidable consequence of a particular period of prosperity in American history. Moreover, Umberto Eco postulates that fakes are a result of a particularly American desire to have an authentic experience: "The frantic desire for the Almost Real arises only as a neurotic reaction to the vacuum of memories; the Absolute Fake is offspring of the unhappy awareness of a present without depth."⁶⁸ The *horror vacui* arising from the absence of any extensive past, coupled with new wealth, pushes a society into the realm of half-truths and fakes.

Finally, the general relegation of discovered forgeries to basement storage is also significant for what it says about contemporary values. This sort of banishment happens regularly, as, for example, to an Etruscan terracotta sarcophagus that was on display in the British Museum from 1871 to 1935. Serious concerns were raised on several occasions about its authenticity, and it has not been publicly displayed since, except for when it was pulled out of storage in 1990 for the exhibition *Fake? The Art of Deception*.⁶⁹ Yet forgery—not the practice of creating and passing off antiques, but the concept and framework that allow it to exist—is a strictly modern concept. As Lessing defines it, "forgery is a concept that can be made meaningful only by reference to the concept of originality, and hence only to art viewed as a *creative*, not reproductive or technical, activity."⁷⁰ Authenticity thus requires originality. Meyer connects this to "the cult of the new, arising out of nineteenth-century notions of personal expression."⁷¹ It is impossible to forge without the societal framework of authenticity and originality; there was no forgery, therefore (in this conception), for example, in the Middle Ages or even in the Renaissance. Forgery is a problem particular to our own era.

There is a case, of course, to be made for honesty and full disclosure in the art and museum world, which the very nature of a forgery contravenes. In this way, a forgery is deception and perhaps morally or ethically wrong. But in strictly art historical terms, scholars and the lay public both largely value authenticity in art over any aesthetic or other (e.g., historical) criteria. This is notable, since aesthetics are integral in evaluating art; theoretically, a forgery could be just as or even more aesthetically valuable than an original.⁷² Meyer takes this further,

creating a paradox whereby “the great forgers have not been mere copyists . . . though their vision is not original, their works of art are, in a sense, creations.”⁷³

The discourse on authenticity, both as a philosophical concept and an art historical concept, is considerably too deep to do anything but skim its surface in the present discussion. But it will be sufficient to note that authenticity, as much as the “cult of the artist,” runs deep in our understanding of art.⁷⁴ As Lessing provocatively questions, “In a museum that did not label its paintings, how many of us would feel uneasy lest we condemn one of the greats or praise an unknown?”⁷⁵ Walter Benjamin calls authenticity “a most sensitive nucleus” but notes that,

The authenticity of a thing is the essence of all that is transmissible from its beginning, ranging from its substantive duration to its testimony to the history which it has experienced. Since the historical testimony rests on the authenticity, the former, too, is jeopardized by reproduction when substantive duration ceases to matter. And what is really jeopardized when the historical testimony is affected is the authority of the object.⁷⁶

In his view, the authority of an object is what is primarily challenged by a reproduction, and authenticity is almost an extraneous concept, a falsity that we only notice once it comes up against the question of whether copies of objects still have worth. The same notion can be applied to an object discovered to be a forgery; in the same way that a copy does nothing to change the object itself (only its authority), revealing this statuette as forgery changes nothing about its intrinsic qualities.

Fundamentally, then, authenticity is a double-edged sword. This votive statuette was created as a result of a market—where demand outstripped supply—for original, authentic antiques. Now, since it has been revealed as a fake, the same desire for genuineness means it will never be displayed although no aspect of it has changed. In some sense, this reveals something critical (and some may say problematic) in Western art-historical discourse, which is firmly rooted around the authority of the past. So while this statuette has perhaps lost its art-historical value, it has gained a whole second life in how it was a springboard for exploring these important issues. In that sense, this otherwise

small and mediocre votive statuette, which was not likely to be on regular display in the museum, acquires an impressive significance.

NOTES

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1. Carol Mattusch, "Metalworking and Tools," in John Peter Oleson, ed., *The Oxford Handbook of Engineering and Technology in the Classical World* (New York, 2008) p. 422.
2. Carol Mattusch, *Classical Bronzes: The Art and Craft of Greek and Roman Statuary* (Ithaca and London, 1996) p. 4.
3. Mattusch, "Metalworking," p. 422; Alain Hus, *Les bronzes étrusques (Collection Latomus 139, Brussels, 1975)* p. 66.
4. Renate Thomas, *Griechische Bronzestatuetten* (Darmstadt, 1992) pp. 77–79.
5. Hus, *Bronzes*, p. 117.
6. *Ibid.*
7. Marianne Caroline Galestin, *Etruscan and Italic Bronze Statuettes* (Warfhuizen, 1987) p. 132.
8. Winifred Lamb, *Greek and Roman Bronzes* (London, 1929).
9. For a more thorough overview of this transition, see *Reader in Archaeological Theory: Post-processual and Cognitive Approaches*, David Whitley, ed. (London, New York, 1998).
10. David G. Mitten and Suzannah F. Doeringer, eds., *Master Bronzes from the Classical World*, Fogg Art Museum (Mainz on Rhine, 1967).
11. *Art and Technology: A Symposium on Classical Bronzes*, Suzannah F. Doeringer, David G. Mitten, and Arthur R. Steinberg, eds. (Cambridge, Mass., 1970).
12. Outlined concisely in Arthur Beale, "Scientific Approaches to the Question of Authenticity," in *Small Bronze Sculpture from the Ancient World*, J. Paul Getty Museum (Malibu, 1990) pp. 197–208. Studies of this kind can also be noted in recent publications of various congresses on bronzes such as *I bronzi antichi: Produzione e tecnologia, Atti del XV Congresso internazionale sui bronzi antichi organizzato dall'Università di Udine*, Alessandra Giumla-Mair, ed. (*Sede di Gorizia, Grado-Aquileia, 22–26 maggio 2001*, Montagnac, 2002).

13. On the former, see Paul T. Craddock, *Scientific Investigation of Copies, Fakes and Forgeries* (Oxford, 2009); on the latter, Pieter Meyers, "The Use of Scientific Techniques in Provenance Studies of Ancient Bronzes," in *Small Bronze Sculpture*, pp. 237–252.
14. Especially, Sybille Haynes, *Etruscan Bronzes* (London, 1985); E. Formigli and Mauro Cristofani, *I bronzi degli etruschi* (Novara, 1985); and Galestin, *Etruscan and Italic*.
15. For example, Anna Maria Carruba, *La Lupa Capitolina: Un bronzo medievale* (Rome, 2006); *La Minerva di Arezzo*, Mario Cygielman, ed. (Florence, 2008); *The Chimaera of Arezzo*, Mario Iozzo, ed. (Florence, 2009).
16. Acc. no. 62.66.3. H. 12.5 cm; W (head) 1.9 cm; W. (shoulders) 3.6 cm. Mounted on a modern base. Weight (without the base) 272.5 g.
17. James Robinson and Richard Smith, *The Nag Hammadi Library in English* (San Francisco, 1988) p. 25.
18. The earliest research on these statuettes is summarized in Sybille Haynes, "The Bronze Priests and Priestesses from Nemi," *Mitteilungen des Deutschen archäologischen Instituts, Römische Abteilung* 67 (1960) pp. 34–35.
19. Brian F. Cook, "Two Etruscan Bronze Statuettes," *Metropolitan Museum Journal* 1 (1968) p. 168, n. 6.
20. For a thumbnail sketch of Etruscan history, see Haynes, *Etruscan Bronzes*, pp. 17–39.
21. All comparisons with the Nemi figurines come from the catalogue established in Haynes, "Bronze Priests."
22. Otto Kurz, *Fakes: A Handbook for Collectors and Students* (New Haven, 1948) p. 181.
23. George Ortiz, "Connoisseurship and Antiquity," in *Small Bronze Sculpture*, p. 262.
24. Haynes, "Bronze Priests," p. 42.
25. Christopher Hallet, *The Roman Nude: Heroic Portrait Statuary 200 B.C.–A.D. 300*, (Oxford, 2005) p. 20. The second example, the funerary stele with a man in military garb (Fig. 9), is not precisely a portrait statue and instead likely featured generic or only slightly personalized features. Still, it demonstrates a key way that men were represented in Greek sculpture.
26. Liza Cleland, Glenys Davies, and Lloyd Llewellyn-Jones, *Greek and Roman Dress from A to Z* (London and New York, 2007) p. 137.
27. Larissa Bonfante, *Etruscan Dress* (Baltimore, 1975) p. 48.
28. Cleland, Davies, and Llewellyn-Jones, *Greek and Roman Dress*, p. 190.
29. The statues in the section entitled *le divinita* in Cristofani, *I bronzi*, provide a good survey of the iconographic standards for Etruscan divinities.
30. Mattusch, "Metal Working," p. 427.
31. David Brown, "Bronze and Pewter," in Donald Strong and David Brown, eds., *Roman Crafts* (London, 1976) p. 27.
32. Heather Lechtman and Arthur Steinberg, "Bronze Joining: A Study in Ancient Technology," in Doeringer, Mitten, and Steinberg, *Art and Technology*, p. 6.
33. *Ibid.*, p. 7.
34. Craddock, *Scientific Investigation of Copies*, pp. 349–352.
35. Rutherford J. Gettins, "Patina: Noble and Vile," in Doeringer, Mitten, and Steinberg, *Art and Technology*, pp. 61–62.
36. Brass was first used in the classical world in coinage (except for a few outstanding Etruscan statues), only becoming somewhat more widespread in other applications, including some statuary, in the first and second centuries c.e. Generally speaking, zinc

replaced tin, meaning that any alloy with a high tin content had very little zinc and vice versa. For further information, see Paul T. Craddock, "The Composition of the Copper Alloys Used by the Greek, Etruscan and Roman Civilizations: 3. The Origins and Early Use of Brass," *Journal of Archaeological Science* 5 (1978) pp. 1–16.

37. Craddock, *Scientific Investigation of Copies*, p. 142.
38. David A. Scott and Jerry Podany, "Ancient Copper Alloys: Some Metallurgical and Technological Studies of Greek and Roman Bronzes," in *Small Bronze Sculpture*, pp. 33–34.
39. Earle R. Caley, "Chemical Composition of Greek and Roman Statuary Bronzes," in Doeringer, Mitten, and Steinberg, *Art and Technology*, p. 41.
40. Scott and Podany, "Ancient Copper Alloys," p. 56.
41. Paul T. Craddock, "The Metallurgy and Composition of Etruscan Bronze," *Studi etruschi* 52 (1986) p. 229.
42. Caley, "Chemical Composition," p. 43.
43. Scott and Podany, "Ancient Copper Alloys," p. 43.
44. Craddock, "Metallurgy," p. 229.
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46. Scott and Podany, "Ancient Copper Alloys," p. 43.
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