

# CULT STATUE OF A GODDESS

Summary of Proceedings  
from a Workshop Held at  
The Getty Villa, May 9, 2007

On July 31, 2007, the Italian Ministry of Culture and the Getty Trust reached an agreement to return forty objects from the Museum's antiquities collection to Italy. Among these is the *Cult Statue of a Goddess*. This agreement was formally signed in Rome on September 25, 2007. Under the terms of the agreement, the statue will remain on view at the Getty Villa until the end of 2010.

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Summary of Proceedings  
from a Workshop

Held at

The Getty Villa

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Mark Greenberg, *Editor in Chief*

Benedicte Gilman, *Editor*  
Diane Franco, *Typography*

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## Schedule of Proceedings

### Wednesday, May 9, 2007

- 9:30 View *Cult Statue of a Goddess* in Gallery 104, Getty Villa
- 10:00 Return to conference room for welcome remarks
- Introduction: Michael Brand
- Session I** Moderator: David Bomford
- Presentation of topic overviews from the participants:
- Clemente Marconi: Acrolithic Sculpture in South Italy and Sicily
- Malcolm Bell: Overview of the Archaeology of South Italy and Sicily, and the Excavations at Morgantina
- Rosario Alaimo: Overview of Limestone Analysis from the Ancient Quarries of Sicily
- John Twilley: Overview of Soil Analysis from Samples Taken from the *Cult Statue*
- Pamela Chester: Overview of Palynology Analysis from Samples Taken from the *Cult Statue*
- Discussion among participants
- 12:30pm Lunch for participants
- 2:00 Gallery 104 for second viewing of the *Cult Statue*
- 2:30 Return to conference room for the start of Session II
- Session II** Moderator: David Bomford
- Discussion among participants and guests

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## Introduction

*Michael Brand*

Good morning and welcome to the Aphrodite Workshop. I have been director of the J. Paul Getty Museum since December 2005. One of my top priorities over the past eighteen months has been to resolve claims made by the governments of Greece and Italy on a number of antiquities in our collection. Today's unique event has been organized to help resolve the origins of what is arguably the most art-historically important of this group of claimed objects: an acrolithic image often called "Aphrodite" but more safely referred to as the *Cult Statue of a Goddess* (accession number 88.AA.76). I sincerely thank you all for agreeing to participate in this scientific workshop. Our aim is to examine all existing evidence from a number of disciplines in a collegial spirit of open-minded dialogue.

We have asked art historian Professor Clemente Marconi to discuss the relationship of the *Cult Statue* to other acrolithic works from the Mediterranean basin. Archaeologist Professor Malcolm Bell will talk about the current state of knowledge regarding the archaeology of Sicily and southern Italy, at least partly in order to see if there is any new evidence to support a claim that the statue comes from Morgantina in Sicily. Palynologist Dr. Pam Chester has been invited to examine pollen remains contained in the soil residue removed from the statue after it arrived at the Getty. And, finally, the scientist John Twilley and the geologist Professor Rosario Alaimo are being asked, respectively, to examine the traces of soil removed from the statue, and to re-evaluate an analysis commissioned in 1997 by the Italian Ministry of Culture that posited a possible Sicilian origin for the limestone of the *Cult Statue*.

The information provided and the research undertaken by this group will help us better to determine the *Cult Statue's* origins as part of the Getty Museum's final stages of research before determining the statue's permanent resting place.

I would also like to welcome the observers at today's event:

The Sicilian Regional Ministry of Culture and Environmental Heritage is represented by three colleagues: Dr. Gaetano Gullo, Professor Antonio Vitale, and Dr. Flavia Zisa. Regrettably, the Italian Ministry of Culture did not respond to two formal invitations to be represented at this event.

The Archaeological Institute of America is represented by Professor Jenifer Neils from the Department of Art History and Classics at Case Western Reserve University in Cleveland.

Finally, it is a great pleasure to acknowledge my colleagues from the Getty Museum and our sister institutions at the Getty.

I would now like to start our proceedings by briefly surveying in as neutral a manner as possible what we know so far about this extraordinary work of art.

Firstly, what are the accepted facts, those based on what might be termed "scholarly evidence"?

1. The *Cult Statue* is an acrolithic work composed of both Parian marble and limestone from a different source (which, as I mentioned earlier, one study has tied to a particular region in Sicily).
2. It dates from between 425 and 400 B.C.
3. It depicts a female deity, possibly Aphrodite, Demeter, or Hera.
4. Stylistically, it relates most closely to works of art from Sicily and southern Italy.





Secondly, what do we know of its more recent history, in other words its provenance based on what we might term “forensic evidence”?

When the Getty Museum was offered the *Cult Statue* for purchase, the dealer provided a provenance, which was later supplemented by the previous owner. The Italian government authorities, however, believe the sculpture to have been recently excavated at the ancient site of Morgantina in Sicily. These allegations, based on “confidential sources” that have not been shared with the Getty, form the central premise of the Italian claim on this sculpture.

The ownership history provided to the Getty Museum can be summarized as follows:

The *Cult Statue* was first offered to the Getty Museum by the London dealer Robin Symes in 1986 and was eventually purchased by the Museum in 1988. It had never been published or exhibited before that date. The only information Symes provided to the Getty with respect to its provenance was that he had purchased it from a “supermarket magnate” and collector in Chiasso, Switzerland.

In 1996, a Swiss man by the name of Renzo Canavesi contacted the Getty and claimed to be the former owner of the statue, and this was subsequently confirmed by Mr. Symes. Enclosed with Mr. Canavesi’s letter were some copies of photographs showing the statue in a fragmentary state. During the Getty’s investigations last year with the assistance of the Los Angeles law firm Munger Tolles Olson (MTO), we had independent investigators interview Mr. Canavesi. During this interview he said his father was a watchmaker who had worked in Paris. In 1939 as the war was beginning he left Paris and returned to Switzerland with the disassembled statue. Canavesi’s father allegedly gave him the sculpture in 1960, and from 1962 to 1986 Canavesi stored it in boxes in the basement of one of his businesses (unknown to anyone else in his family). He sold the statue to Symes in 1986. This and other information has raised questions in our minds regarding the statue’s history.

Now, the Italian allegations:

In July 1988, Italian authorities notified the Getty Museum that an investigation was being launched into its acquisition of the *Cult Statue* earlier that same month.

In 1978, the Cultural Superintendent of the Sicilian Region had reported the discovery of illicit excavations in several archaeological zones (Gambero and San Francesco Bisconti) in what was ancient Morgantina, near the modern town of Aidone. In 1988, Dr. Fiorentini, the Cultural Superintendent of the region, reported that rumors were circulating in 1979 that a large stone statue had been excavated near Aidone.

An October 1988 carabinieri report indicated that a “confidential source” had told them about the illegal excavation in 1978 of the *Cult Statue*, a group of acroliths (that is, some marble hands, feet, and heads), and the so-called “Morgantina silver” that had subsequently been acquired by the Metropolitan Museum of Art in New York. More precisely, another carabinieri report says that several directors of local museums, a local superintendent, and several police officers had met and claimed to have determined the exact locations from which the head of the *Cult Statue*, the acroliths, and the silver had been removed in 1978: an illicit dig in the area of San Francesco Bisconti, at Morgantina. This report is said also to include a photograph of the place where the head was allegedly excavated, but no copy of this image has been provided to the Getty. The report says that no information was obtained as to where the body of the goddess was located prior to the excavation. We do not know the identity of the “confidential source” who reported the illicit excavations, nor the basis for the conclusions of the local museum directors and carabinieri that the find spot of the head of the *Cult Statue* had been identified.



In 1993, six Italians were charged in connection with the alleged illegal excavations at Morgantina: two were charged with the illicit excavation and removal of the *Cult Statue*, while four were charged with the illegal excavation of the other acroliths and the silver. Criminal proceedings against all six were eventually dismissed for lack of proof. (However, the acroliths have been definitively determined to be from Morgantina, and the Metropolitan Museum recently agreed to return the silver hoard to Italy.) In 2001, Mr. Canavesi was tried in absentia in a brief hearing on charges of receiving the *Cult Statue*, which was alleged to be stolen property. His conviction was later overturned on statute-of-limitations grounds.

The *Cult Statue* is one of the objects that are part of the ongoing criminal trial in Rome of the Getty Museum's former antiquities curator Dr. Marion True.

Finally, I would like to brief you on the current state of our negotiations with the Italian Ministry of Culture.

In January 2006, I led a delegation, including Getty staff and lawyers from Munger Tolles Olson, to Rome to meet then Minister of Culture, the Honorable Rocco Buttiglione, and to begin negotiations with the Italian Ministry of Culture concerning a list of fifty-two works of art they claimed should be transferred to Italy. I returned to Rome in June 2006, when our team met with government officials to review evidence provided to the Getty by the Ministry of Culture. During that visit I also had my first meeting with the new Minister of Culture, the Honorable Francesco Rutelli.

In October 2006, Getty staff and MTO lawyers reached an agreement whereby the Getty would return to Italy twenty-six objects, Italy would drop claims for six objects, and negotiations would continue with respect to the remaining pieces, including the *Cult Statue* and the so-called *Getty Bronze*. The Ministry also agreed to consider our offer of co-ownership of the statue during a period of joint study and investigation regarding the origins of the statue and, if necessary, submission to neutral, binding arbitration. This offer was subsequently rejected.

Unfortunately, when I returned to Rome in November 2006, our talks broke down when Minister Rutelli confirmed a revised Italian position whereby no agreement could be reached without the transfer of the *Getty Bronze*. In an attempt to forestall such an impasse, I offered to transfer full title of the *Cult Statue* to the Italian state immediately and suggested we spend the next year undertaking joint research on the object. That offer likewise was rejected. In the wake of this, the Getty Museum decided, nevertheless, to go forward with the research into the origins of the statue, which we believe is an essential part of our due diligence in response to the claim by the Italian Ministry of Culture.

As participants in this workshop, your art-historical, archaeological, and scientific expertise is an essential part of this process. Only when this process is complete, would I feel secure in recommending the final deaccessioning of the *Cult Statue* from the collection of the Getty Museum. We have imposed a one-year deadline on ourselves to finalize the research conclusions.

It is our intention to publish the results of this workshop in order to make them as broadly available as possible. To that end, the results will be posted on our website. If any of the participants wish to publish their material in an additional venue, we are happy to discuss this with them.

It is now my pleasure to introduce the moderator of today's workshop, the Getty Museum's new Associate Director for Collections, David Bomford. David was Senior Conservator and Curator at the National Gallery, London, for many years, and he is a former editor of the international journal *Studies in Conservation*. Even though most of his professional work has involved art from a later period, he brings a long technical and art-historical experience to today's proceedings.



## Acrolithic and Pseudo-acrolithic Sculpture in Archaic and Classical Greece and the Provenance of the Getty Goddess

*Clemente Marconi*

First, two notes on terminology. In the literature on Greek sculpture, statues made with the combination of stone for the limbs and wood for the body are referred to as both “acroliths” and “acrolithic statues,” based on the Greek word *akrolithos*, meaning “with extremities of stone.” “Acrolithic statue,” however, is preferable to “acrolith,” for it is more in touch with ancient literary sources, which tend to use “acrolithic” as an adjective in combination with the word for “statue,” *agalma* (literary sources are systematically discussed by Häger-Weigel 1997, 3–11). In Greek sculpture, in addition to the combination of stone and wood, the combination of white marble and limestone is also found. In the literature on Greek sculpture, both “acrolithic” and “pseudo-acrolithic” can be used to define this second combination of materials. Of the two definitions, the second is preferable, for statues made of white marble and limestone, like the Getty goddess, are not really “acrolithic,” in the sense of being “with extremities of stone.” A distinction between the two combinations made at the linguistic level (for which, cf., e.g., Mustilli 1958) is more appropriate, for the methods for producing sculptures with a combination of white marble and limestone were different from those for producing sculptures made with a combination of wood and stone. Also different must have been the appearance of sculptures combining these different materials. It is important to avoid confusion between acrolithic statues and pseudo-acrolithic statues, and for that reason I will discuss them separately.

Two studies have been published in recent years on the subject of acrolithic statues: the revised version of a doctoral dissertation by Elisabeth Häger-Weigel (University of Bonn 1997) and a long essay by Giorgos Despinis (2004).

In regards to the function of acrolithic statues, the literary sources are consistent in using the term “acrolithic statue” in reference to statues of gods located in sanctuaries and standing inside temples. For this reason Häger-Weigel suggests that (1) all acrolithic statues were cult-statues and (2) they were all deliberately archaistic in style in order to look older and more similar to the cult images of the gods of the Archaic period. These two suggestions are open to question in light of the material evidence. One may mention the Apollo from the temple of the god at Cirò (Giustozzi 2005) as an example (figs. 1–2).





#### FIGURES 1–2

Head and feet of an acrolithic statue of Apollo from the Temple of Apollo at Cirò Marina (Crotone), 440–430 B.C. Reggio Calabria, Museo Nazionale della Magna Grecia, inv. nos. 6499, 6505, and 6506. Head: 41.3 cm high; right and left feet: each 30.5 cm long. Reproduced by permission of the Ministero per i Beni e le Attività Culturali n. 74 del 20/11/2007—Soprintendenza per i Beni Archeologici della Calabria.

It is unlikely that this acrolithic sculpture was meant as the cult image of the temple, for the temple dates to the beginning of the sixth century, and the statue only dates to 440–430 B.C. The statue was more likely commissioned as a modern complement to an older cult image of the god, according to a practice well documented for the Classical period. As such, the statue does not show any features that would make it look earlier in style (a bronze wig of Early Classical style, associated in the past with the head of this statue, is not pertinent).

In regards to the origin and diffusion of acrolithic statues, the earliest extant pieces are those from San Francesco Bisconti in Morgantina (530–520 B.C.), which are likely to represent Demeter and Kore (Marconi 2005). The statues date to only a few decades after the introduction of life-size chryselephantine statuary in mainland Greece (Lapatin 2001, 57–60), a temporal connection that reinforces the idea that acrolithic statues were meant to replicate, in cheaper materials, the structure and appearance of chryselephantine statues (cf. Lapatin’s definition of acrolithic statues as “pseudo-chryselephantine”: Lapatin 2001, 61). For the period between the end of the sixth and the middle of the fifth century, the largest number of acrolithic statues come from South Italy and Sicily (4: Häger-Weigel 1997, cat. nos. 2–5); acrolithic statues are also documented in Greece (2–3: Häger-Weigel 1997, cat. nos. 12–13, plus maybe a marble arm from Aegina, Athens NM 4506) and in Libya, at Cyrene (1–2: Häger-Weigel 1997, cat. no. 10, plus maybe no. 11). For the second half of the fifth century and the early fourth century, almost all known acrolithic statues are from South Italy (3–5: Häger-Weigel 1997, cat. nos. 1, 7–8, plus maybe

nos. 6 and 9). Only one, apparently, comes from Greece (Häger-Weigel 1997, cat. no. 14), while none is from Libya.

The diffusion of pseudo-acrolithic sculpture—the technique used for the Getty goddess—offers an entirely different picture. In fact, for the Classical period, this second technique is safely documented only in Sicily, on the metopes of the Temple of Hera (E) at Selinous (460–450 B.C., figs. 3–5) (Marconi 1994).



**FIGURE 3**

Limestone metope from the Temple of Hera at Selinous, 460–450 B.C. The head, arms, and feet of Hera are of Parian marble. Museo Archeologico Regionale “Antonio Salinas” di Palermo, inv. 3921 B. Reproduced by permission of the Assessorato dei BB. CC. AA., Regione Siciliana.



**FIGURES 4–5**

Female head of Parian marble from one of the east metopes of the Temple of Hera at Selinous, 460–450 B.C. Museo Archeologico Regionale “Antonio Salinas” di Palermo, inv. 3926. Reproduced by permission of the Assessorato dei BB. CC. AA., Regione Siciliana.

These metopes were carved in the local limestone of Menfi, except for the exposed parts of the female bodies (heads, hands, arms, and feet), which were carved in marble imported from Paros. The same technique is documented in Sicily, during the Hellenistic period, for a female statue from Morgantina (225–200 B.C.) (Bonacasa and Joly 1985, 297), which combined hard limestone for the body with marble for the head, arms, and feet, which are now missing (fig. 6).



**FIGURE 6**

Limestone body of a female pseudo-acrolithic statue from Morgantina, 225–200 B.C. The missing head, arms, and feet were of marble. Aidone, Museo Archeologico Regionale, inv. 56-1749. Reproduced by permission of the Soprintendenza per i Beni Archeologici, Regione Siciliana.

To the same period dates the enthroned Zeus from Solunto (150–100 B.C.) (Vlizos 1999, 32–34), which combines soft limestone for the body with white marble for the face (fig. 7).

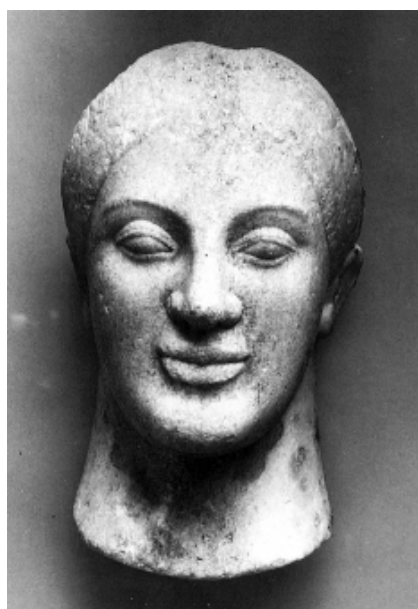


**FIGURE 7**

Limestone statue of Zeus from Solunto, 150–100 B.C. The face is of marble. Museo Archeologico Regionale "Antonio Salinas" di Palermo, inv. 5574. Reproduced by permission of the Assessorato dei BB. CC. AA., Regione Siciliana.

It has sometimes been suggested that the pseudo-acrolithic technique was used for the pediments of the Temple of Olympian Zeus at Akragas (ca. 430 B.C.) (cf., e.g., De Waele 1982). However, there is no real evidence to support this view.

In the literature, it has been suggested that the pseudo-acrolithic technique was used in the case of marble sculptures of the Archaic and Classical periods from other regions. This is the case with three heads from Paestum (510–480 B.C., figs. 8–10) (Rolley 1995).



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**FIGURES 8–10**

Three marble heads from Paestum, originally belonging to acrolithic or pseudo-acrolithic sculptures. 8. Female head, 500 B.C. Marble, h. 17 cm. Paestum, Museo Archeologico Nazionale, inv. 133150. 9. Female head, beginning of fifth century B.C. Marble, h. 15.5 cm. Paestum, Museo Archeologico Nazionale, inv. 133151 (formerly inv. 4851). 10. Female head, beginning of fifth century B.C. Marble, h. 12.5 cm. Paestum, Museo Archeologico Nazionale, inv. 133159. Published by kind permission of the Soprintendenza Archeologica di Salerno, Avellino e Benevento—Museo Archeologico Nazionale di Paestum.

It remains unclear whether the three heads belonged to the same monument, and also whether they belonged to sculptures in the round or to reliefs. Based on the comparison with the metopes from the Temple of Hera at Selinous, however, this possibility seems excluded for at least two of them. As for the technique, there is no real evidence from Paestum that would support the attribution of these marble heads to pseudo-acrolithic sculptures. Another case is represented by two marble fragments (a section of a face and a fragment of hair) in the Archaeological Collection of Johns Hopkins University (410–380 B.C.), which have been attributed to pseudo-acrolithic metopes from a temple in Taranto (Pollini 1988). That the two fragments did in fact belong to acrolithic or pseudo-acrolithic sculptures is however problematic (*contra*, see Häger-Weigel 1997, 44 note 124). Finally, one may mention a marble head from Cyrene (470–460 B.C.), tentatively attributed by Langlotz to a relief (Langlotz 1975, 205 on figs. 47.3–4). Häger-Weigel has convincingly argued that this head belonged instead to an acrolithic statue (Häger-Weigel 1997, 21–22).

In conclusion, the use of the pseudo-acrolithic technique for the Getty goddess strongly argues for a Sicilian provenance, for Sicily is the only region for which the combination of limestone and white marble in sculpture is documented during the Classical period. One might expect that the same combination of materials would be used in other regions lacking white marble, such as South Italy and Libya (the combination of limestone and white marble would not make sense in regions rich in white



marble such as mainland Greece, the Cyclades, or Asia Minor). However, there is no evidence for the use of the pseudo-acrolithic technique in these regions.

I would like to conclude with some comments on the style, subject, and provenance of the Getty goddess. In my view, both the limestone and marble parts of the statue date to the years 420–410 B.C. In style, the statue is very close to sculpture produced in mainland Greece: to the Nemesis of Rhamnous by Agorakritos (430–420 B.C.) in the posture, and to the Nike of Paionios (420 B.C.), the Aphrodite of the Agora (420 B.C. See below, Bell fig. 1), and the reliefs of the balustrade of the Temple of Athena Nike (420–400 B.C.) in the rendering of the drapery. The sculptor of the Getty goddess was thus well aware of the stylistic developments in Athens during the generation after Pheidias. This is not enough, however, to conclude that an Athenian sculptor was responsible for carving the Getty goddess (Giuliano 1993), for the influence of High Classical Athenian art is particularly significant in Sicily during the last quarter of the fifth century (cf. Rizza and De Miro 1985, 233–40) (fig. 11).



**FIGURE 11**

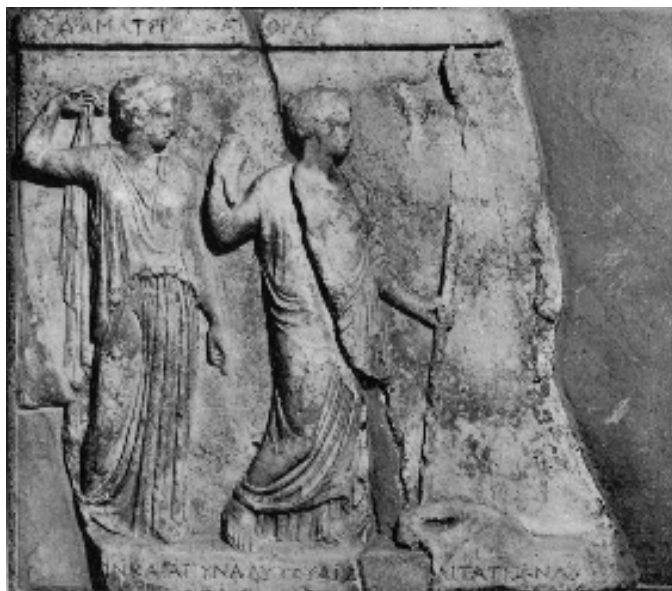
Head of Athena on a tetradrachm of Syracuse signed by Eukleidas, ca. 410 B.C. Silver, diameter 26 mm, weight 17.28 gram. Museo Archeologico Regionale "Paolo Orsi" di Siracusa, Gabinetto di Numismatica, inv. 69103. Reproduced by permission of the Assessorato dei BB. CC. AA., Regione Siciliana.

As for the subject, the physique and the diaphanous clothing would suggest the traditional identification of the Getty goddess with Aphrodite (e.g., Rolley 1994–99, 2: 193–94). The goddess, however, lacks any indication of the décolletage that is so characteristic of statues of Aphrodite produced in the last quarter of the fifth century (see esp. Delivorrias 1991). Demeter (Giuliano 1993), however, is not a good alternative, for in this period she is represented in sculpture not wearing a chiton and himation but rather a peplos. The combination of chiton and himation speaks instead in favor of the identification of the Getty goddess with Persephone (Portale 2005). The great Eleusinian relief (430 B.C., fig. 12) and a

relief from Catania showing Demeter and Kore (420–410 B.C., fig. 13) offer good parallels for the representation of this goddess in regards to posture, physique, and clothing.

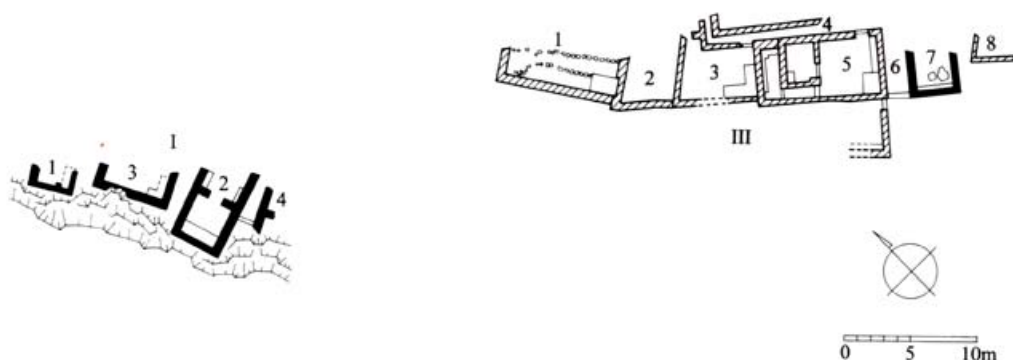


**FIGURE 12** (above left)  
Great Eleusinian relief, 430 B.C. Athens, National Archaeological Museum, inv. 126. Photo: Erich Lessing/Art Resource, NY.



**FIGURE 13** (above right)  
Relief with Demeter and Kore, from Catania, 420–410 B.C.  
On deposit in the Museo Civico Castello Ursino di Catania.  
From Peschlow-Bindokat 1972, fig. 35.

If this identification were correct, along with the phiale that was most likely held in her outstretched right hand, one should restore a torch on the left side of the Getty statue. As for the provenance: San Francesco Bisconti in Morgantina, indicated as the find spot of the statue by Italian investigators, is a perfectly plausible location. San Francesco Bisconti was the site of a major, monumental sanctuary of Demeter of the Archaic and Classical periods. The sanctuary was articulated in a series of terraces housing a series of buildings also used for the offering and display of images, including large-size statues of terracotta and stone—the acrolithic statues of Demeter and Persephone that I have already mentioned (fig. 14; Hinz 1998, 124–27).



**FIGURE 14**

Plan of the sanctuary of Demeter at San Francesco Bisconti, Morgantina, Sicily. Drawing by S. Franz, 1998. From Hinz 1998, fig. 25, p. 126.

The sanctuary has been only partially excavated by archaeologists, and one hopes that a systematic exploration will be carried out in the not-too-distant future. In theory, of course, other sanctuaries in central Sicily cannot be ruled out as the place of provenance: one need only think of the systematic looting of major archaeological sites in this area, including Montagna di Marzo. An original provenance for the Getty goddess from a temple in one of the Greek colonies on the coast, by contrast, seems to me very unlikely.

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## Observations on the *Cult Statue*

Malcolm Bell, III

There is general agreement that the great limestone and marble statue at Malibu was carved in the later fifth century B.C. and that the subject is a goddess.\* There is, however, no unanimity about either the specific function of the work or its subject, and, of course, the precise provenance also remains to be established. As for the function, I believe that the large scale and unusual pieced construction of the sculpture (let me say here that I would prefer to use the term *acrolith* with reference to works with stone extremities and bodies of perishable wood or cloth; Giustozzi 2001) indicate that it must certainly have served as a cult statue, that is, as an overlife-size image standing within a temple, in Greek belief representing—or, better, embodying—the very person of the deity. Both the application of paint to the goddess's drapery and the pieced construction, which originally encompassed not only the marble head and extremities but also, presumably, gilt bronze hair, make it unlikely that the work was ever exposed to the elements in a sanctuary, as has been suggested (Giuliano 1993). That it stood protected in a temple is far more probable. And if, as seems likely, the work was indeed found in Sicily, there is no dearth of contemporary Sicilian temples, each one of which called for a cult statue. Relatively new buildings of the mid- to late fifth century B.C. are known at such sites as Selinous (at least 2 temples), Akragas (5), Gela (1), Kamarina (1), and Segesta (1). With the exception of the last, all of these cities were captured and sacked by the Carthaginians between 409 and 405 B.C., and we can be sure that their temples were looted. If the *Cult Statue* now in Malibu once stood in such a temple, it is likely to have been a victim of intentional violence: an almost new work that could have been found in damaged condition by returning Greeks and subsequently buried.

The *Cult Statue* in Malibu was created by a gifted and ambitious artist familiar with new developments in the carving of drapery that can be dated to the last quarter of the fifth century B.C. The point of departure for this style was the completion in 432 B.C. of the Parthenon, which had served as a laboratory for change in sculpture. Indeed, the sculptor of the *Cult Statue* belongs squarely in this essentially Athenian tradition of ornate drapery. The richness of the goddess's elaborate costume, the contrast of light and shadow, the wonderful variety of folds, the several textures of cloth, and especially the bravura display of wind-blown drapery over the generous forms of her body: all these are features demonstrating the artist's mastery of the new style. As has been observed, the closest parallels are works such as the parapet of the Temple of Nike and the statue of Aphrodite from the Athenian Agora (fig. 1; Portale 2005), but we can also cite in contemporary vase-painting the highly ornate costumes of women drawn by the Meidias Painter (fig. 2), an Attic artist who must have looked closely at contemporary sculptures such as this (Burn 1987).

\*I am grateful Michael Brand and Karol Wight for their invitation to participate in the colloquium on the *Cult Statue*, which offered both productive exchanges of information and a welcome opportunity to study the sculpture at close quarters. I believe that in its decision to restore the *Cult Statue* to Italy the Getty Museum has chosen the proper course, one that will lead to a new and fuller understanding of this remarkable work.



**FIGURE 1**

Statue of Aphrodite from the Athenian Agora, about 420 B.C.  
American School of Classical Studies at Athens: Agora  
Excavations, inv. S 1882.



**FIGURE 2**

Tondo of a cup by the Meidias Painter. Los Angeles, J. Paul Getty Museum 82.AE.38.

Athenian influence in Sicily can be documented throughout the fifth century B.C. Knowledge of Athenian architecture is apparent in buildings at Selinous, Segesta, and Akragas (Mertens 1984, Miles 1998); and in sculpture we can cite such earlier works as the *pais*, or boy-athlete, from Grammichele (Bell 2005); the charioteer from Motya (Canciani 1992, Bell 1995); the metopes of Temple E at Selinous (see Marconi fig. 3 above; Marconi 1994); and several sculptures at Akragas, including a late fifth-century female head (fig. 3) in marble that has been associated with the style of the sculptor Agorakritos, who worked mainly in Athens (De Miro 1966). In a forthcoming work I am proposing that the Akragantine head does not come from a freestanding figure but rather belongs to one of the relief figures of the west pediment of the Temple of Zeus at Akragas—that is, to a grand composition depicting the Ilioupersis, or Sack of Troy, designed and carved by sculptors either from Athens or under strong Attic influence. Like the *Cult Statue*, the female figures of the Akragantine pediment had pieced marble heads and limbs. The sculptors of the pediment were working in the new style during the decade immediately preceding the Carthaginian conquest of 406 B.C., and they provide a cultural and artistic context for the contemporary *Cult Statue*.



**FIGURE 3**

Female head from Akragas, late fifth century B.C. Marble.  
Photo courtesy of Clemente Marconi.

One characteristic of the rich style of the later fifth century is elaborate curly hair that creates the effect of a swelling, puffed-out mass around the face. Such hair is seen in female figures in sculpture (Agorakritos), terracotta figurines (Boeotia, Syracuse, Gela, and fig. 4, from Kamarina), and vase-painting (the Meidias Painter), but also on contemporary Syracusan coins (fig. 5; Kimon, Euainetos). We may wonder if the lost metal hair of the *Cult Statue* was not of this sort. It would have given greater volume to a head that without hair may now seem too small for the generous proportions of the body.





**FIGURE 4**

Head of a goddess (Persephone) from Kamarina, end of the fifth century B.C. Terracotta, h. 23 cm. Syracuse, Museo Archeologico Regionale "Paolo Orsi," inv. 29138. Photo: Soprintendenza ai beni culturali e artistici, Siracusa.



**FIGURE 5**

Syracusan tetradrachm by Kimon with head of Arethusa, about 412–400 B.C. From C. M. Kraay and M. Hirmer, *Greek Coins* (London, 1966), pl. 44, above. Reproduced by permission of Hirmer Verlag, Munich.

Identification of the subject of the *Cult Statue* is essential to our understanding of the work's historical and artistic significance. The best evidence on this question would surely have been provided by the find spot, and only when we know more about the precise source will we be able to arrive at a fully convincing identification. I am thinking here not so much of the general provenance in one of the ancient Sicilian cities as of the specific sanctuary and temple where the goddess once stood, for which she was commissioned, and in or near which she presumably was found in the 1980s.

Even without such knowledge there are some clues regarding the subject that can be mentioned. Several unrestored fragments as well as a broken edge running along the shoulders show that the goddess was depicted with her himation, or cloak, pulled up over her head (fig. 6), a motif associated with women's marriage and maturity. The himation worn as a veil would, I believe, eliminate Aphrodite as a possible subject, for that goddess is not normally represented as a matron. Demeter and Persephone are both often depicted with veils of this type, both were widely worshipped in Sicily, and so it is not surprising that their names have been associated with the *Cult Statue* (Giuliano 1993, Portale 2005).



**FIGURE 6**

Broken edge of himation at the left shoulder of the *Cult Statue*.  
Los Angeles, J. Paul Getty Museum 88.AA.76.

A more likely candidate, however, may be the goddess Hera, whose worship is documented in Temple E at Selinous as well as elsewhere in Sicily (Parisi Presicce 1985, Marconi 1994). Hera was the spouse of Zeus and was usually imagined by artists in bridal dress. Like the famous representation of Hera standing before Zeus in the metope from Temple E at Selinous, the *Cult Statue* in Malibu wears an elaborate tripartite costume, consisting in this instance of a linen chiton (visible only at the shoulders where it is buttoned, and just above the feet), a woolen peplos (the overfold covers the breasts and torso, the lower folds visible over the left lower leg and the right foot), and the remarkable himation, or cloak, of very light material, which swirls around the legs and lower abdomen and is held in place by the lowered left arm. The himation rises over the right shoulder and, as previously noted, was pulled up over the head. It also covers almost the entire back of the figure, where it sways rhythmically in elongated vertical folds. In my view, this is a bridal costume, and thus it would be suitable for the goddess Hera, whose marriage to Zeus was celebrated in her sanctuaries.

The wind-blown effect may be a further argument favoring identification of the statue as Hera. Wind-blown drapery would hardly be appropriate for every goddess, and one cannot think, for instance, of narrative circumstances calling for such drapery for Demeter or Persephone. Not only is the effect of the wind apparent in the light fabric of the himation over the legs, but it has tossed up the heavier woolen overfold of the peplos in an extraordinary and unparalleled way (fig. 7). This can be seen both in the hanging flap of the overfold above the left thigh, which casually overlaps the bunched folds of the himation; and, more remarkably, over the right side of the abdomen where the other corner of the overfold has flipped up to reveal the fabric beneath. The sculptor has evidently imagined his subject as exposed to a stiff breeze, the momentary effects of which are seen in himation and peplos. This wind-blown drapery calls for narrative explanation. I suggest that the sculptor was thinking of the epiphany of Hera before Zeus on the airy slopes of Mount Ida (*Iliad* 14.293ff.), when the goddess aims to seduce her spouse, and so, while he sleeps, allow the Greeks to capture Troy; the idea may be that the updraft helps achieve her purpose by revealing her body through all the cloth. Of course she accomplishes only her first objective. This is Hera's great moment in mythological narrative, when, in the context of her role as divine spouse, she reveals both her power and its limits. Hera arrives at Mount Ida armed with a magic belt (κεστός ἱμάς) of leather or fabric given her by Aphrodite (*Iliad* 14.214, 219). I suggest that the traces of ancient fabric that are preserved on the marble surface of the right arm of the *Cult Statue* (fig. 8) can be explained as impressions of Aphrodite's gift, which Hera extends toward Zeus in order to accomplish her purpose. Such a talisman would also have served as a sign of Hera's cultic role as an exemplar of marriage for her human worshippers.



**FIGURE 7**

Detail of flap of overfold falling over the bunched folds of the himation of the *Cult Statue*. Los Angeles, J. Paul Getty Museum 88.AA.76.



**FIGURE 8**

Imprint of fabric on the surface of the attached right arm of the *Cult Statue*. Los Angeles, J. Paul Getty Museum 88.AA.76.

I have sketched a set of possible circumstances regarding the function, date, and subject of the statue, and I have emphasized the importance of ascertaining its precise provenance. The statue has long been attributed by the press and by the Italian authorities to the site of Morgantina, where archaeologists from the U.S. have been excavating since 1955, and where since 1980 I have served as director or co-director. Although I am unaware of any evidence that might either point to an actual find spot for the *Cult Statue* at Morgantina or indicate if, when, or by whom the sculpture was found there, I have learned in archaeology that one must expect the unexpected. Whether or not it was found at Morgantina, I believe that great works of art like this one should never be deprived of their identity and history by the workings of the illegal antiquities market. It therefore remains of the first importance that we identify where the *Cult Statue* stood in antiquity in order that we may begin the recovery of its historical, cultural, and artistic context. Although we may never learn who carved it, we may hope some day at least to know who in antiquity commissioned it, and who once stood in awe before it.

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# Petrographic and Micropalaeontological Data in Support of a Sicilian Origin for the Statue of Aphrodite

Rosario Alaimo,<sup>1,2</sup> Renato Giarrusso,<sup>1</sup> Giuseppe Montana,<sup>2</sup> and Patrick Quinn<sup>3</sup>

## Introduction

This study aims to investigate the possible Sicilian origin of the enigmatic statue of Aphrodite housed at the J. Paul Getty Museum, Malibu. Outcrops of carbonate rocks comparable to the raw materials used in the production of the *Cult Statue* are found in several parts of Sicily. The largest occurrence of such strata is in the Hyblean Plateau in the southeast corner of the island. It is known that these rocks were used as raw material for sculptures produced during the Classical and Hellenistic periods of Sicily. In order to test the hypothesis that the *Cult Statue* likewise originated from this source, we have studied it using thin section petrography and scanning electron microscopy (SEM) and dated it geologically with nannofossil biostratigraphy. We compare the results of this analysis with that of geological field samples collected from the Hyblean Plateau, as well as an unidentified female Hellenistic statute found at Morgantina in central Sicily.

## Geological Samples

The geology of the Hyblean Plateau is characterized by a succession of Upper Cretaceous and Cenozoic sedimentary rocks. The Cenozoic strata can be subdivided into an Eastern Domain, deposited in shallow water, and a deep-water Western Domain represented by the Ragusa Formation (Rigo and Barbieri 1959). Thick calcarenite limestone beds suitable for building and sculpture are common within the Ragusa Formation, particularly in the Irminio Member, where they are separated by thin marls (Di Grande and Grasso 1977, Pedley 1981).

Three geological field samples were collected from different stratigraphic levels within the Irminio Member of the Ragusa Formation (fig. 1). Sample 1 was taken from one of the thick calcarenite beds at the base of the Irminio Member, while samples 2 and 3 were collected from the middle and upper levels, where thinner calcarenites alternate with marls (Table 1).

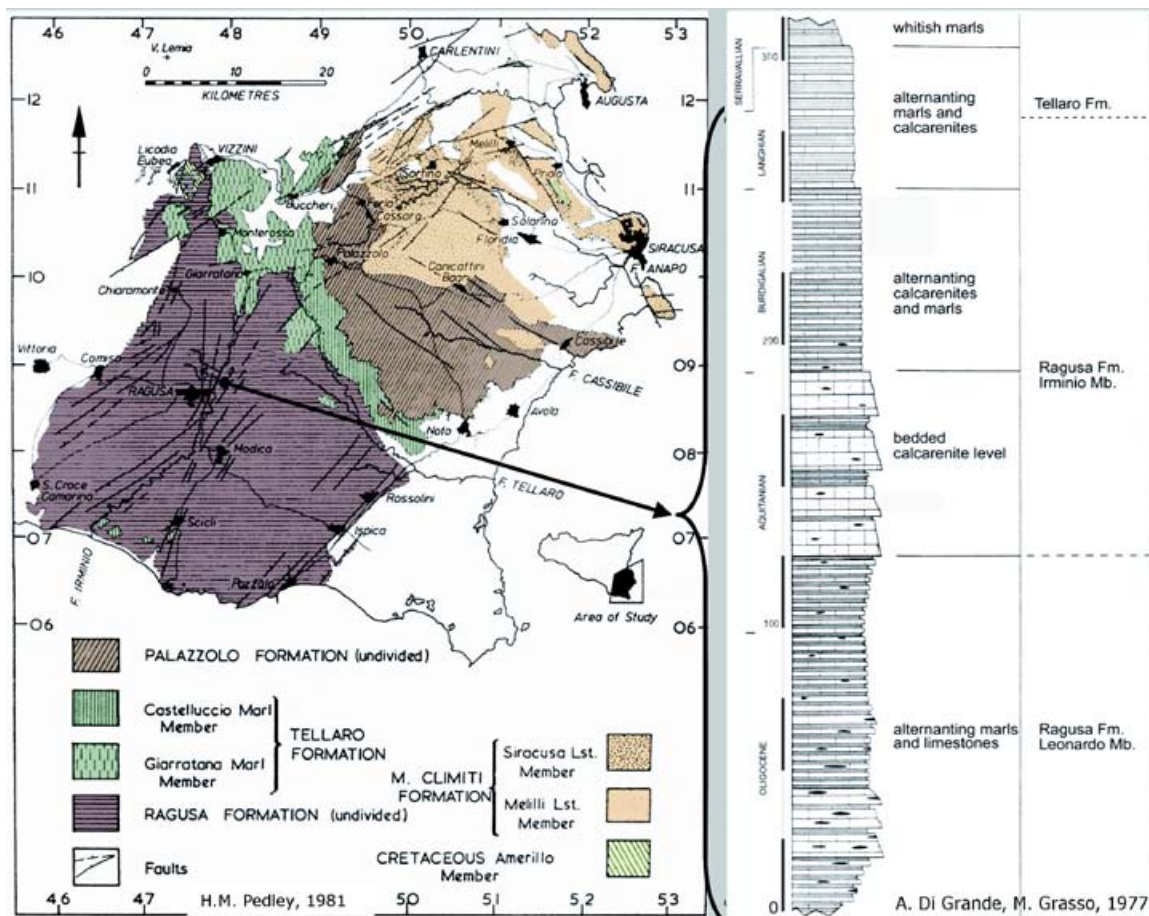
<sup>1</sup> CEPA (Centro Protezione Ambientale e Analisi dei Materiali), Palermo, Italy

<sup>2</sup> Dipartimento di Chimica e Fisica della Terra (CFAT), Università di Palermo, Italy

<sup>3</sup> Department of Archaeology, University of Sheffield, United Kingdom







**FIGURE 1**

Geology of the Hyblean Plateau of southeastern Sicily (after Pedley 1981) and stratigraphy of the Ragusa Formation with geological samples analyzed in this study (after Di Grande and Grasso 1977). *Left side:* Reprinted from *Sedimentary Geology* 28, H. Martyn Pedley, "Sedimentology and Palaeoenvironment of the Southeast Sicilian Tertiary Platform Carbonates," pp. 273–91 (April 1981), with permission from Elsevier Limited: <http://www.sciencedirect.com/science/journal/Sedimentarygeology>. *Right side:* From A. Di Grande and M. Grasso 1977.

RAGUSA FORMATION								
SERIES	STAGES	AGE (My)	ZONE	SAMPLE 1 IRMINIO	SAMPLE 2 MONTEROSSO	SAMPLE 3 BALATA DI MODICA	APHRODITE STATUE (J.P. Getty)	MUSE STATUE (AIDONE)
MIDDLE MIOCENE	SERRAVALLIAN	14	NN5					
	LANGHIAN	15.5						
LOWER MIOCENE		BURDIGALIAN	16	NN4				
	18							
	18.5		NN3					
	19							
	19.5	NN2						
	20.5							
	21	NN1						
	22.5							
	AQUITANIAN	23	NP25					
UPPER OLIGOCENE	CATTIAN	26						

**TABLE 1**  
Relative abundance of minerals inclusions, planktic and benthic foraminifera, and other bioclasts in thin section of archaeological and geological samples in this study.

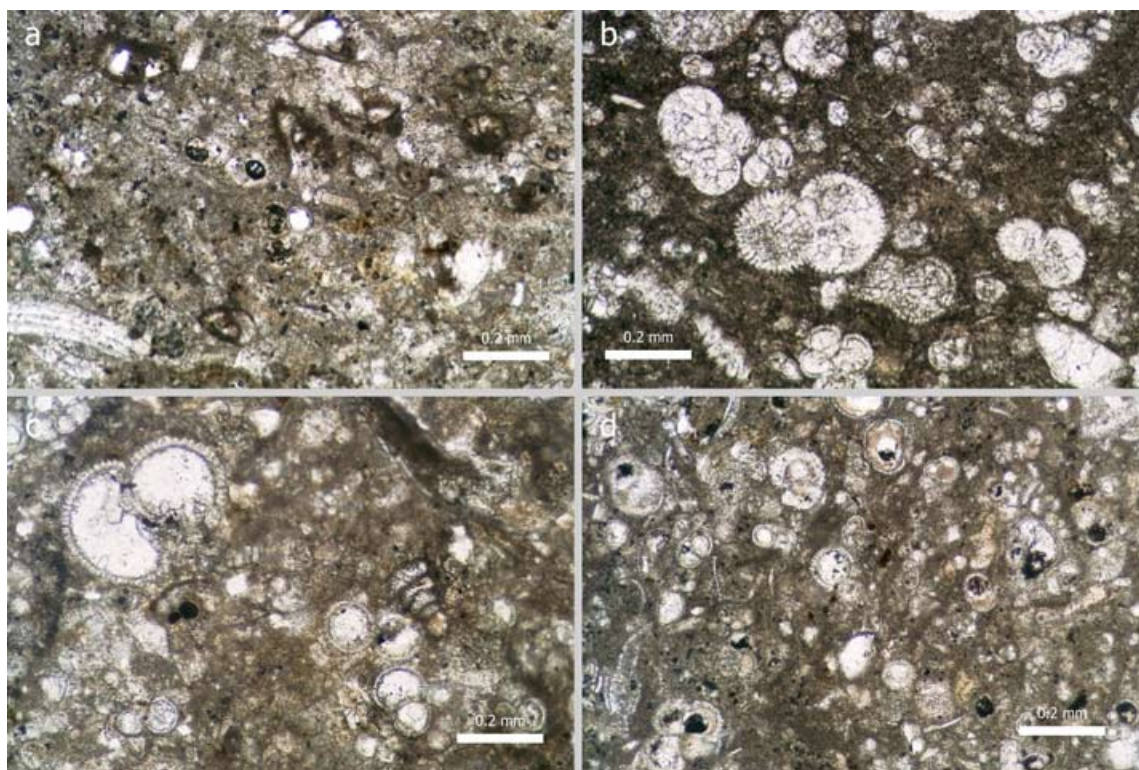
**Analysis**

A small subsample of the limestone *Cult Statue* was taken for detailed analysis. For comparison we also sampled an unidentified female statue that was found in Morgantina in central Sicily and is now housed at the Aidone Museum. These two archaeological samples and the three geological field samples were studied in detail for their textural features and nannofossil content.

**Results**

All five samples can be classified as “wackestone” limestone according to the scheme of Dunham (1962). They are rich in micritic calcite and contain about 30% allochems, including foraminifera (microfossils) and echinoid fragments (fig. 2). Based on the relative abundance of these different particles, the unidentified female statue from Morgantina and geological samples 2 and 3 were deposited in a deep-water pelagic environment. By contrast, the limestone of the *Cult Statue* and geological sample 1 were probably formed in much shallower water as indicated by the lower proportion of planktonic foraminifera and the higher abundance of bioclasts such as echinoids (Table 2).





**FIGURE 2**

Thin-section micrographs of archaeological samples and their probable geological counterparts: *a* Geological sample 1; *b* Geological sample 2; *c* Statue of Aphrodite; *d* unidentified female statue from Morgantina. Photos by author.

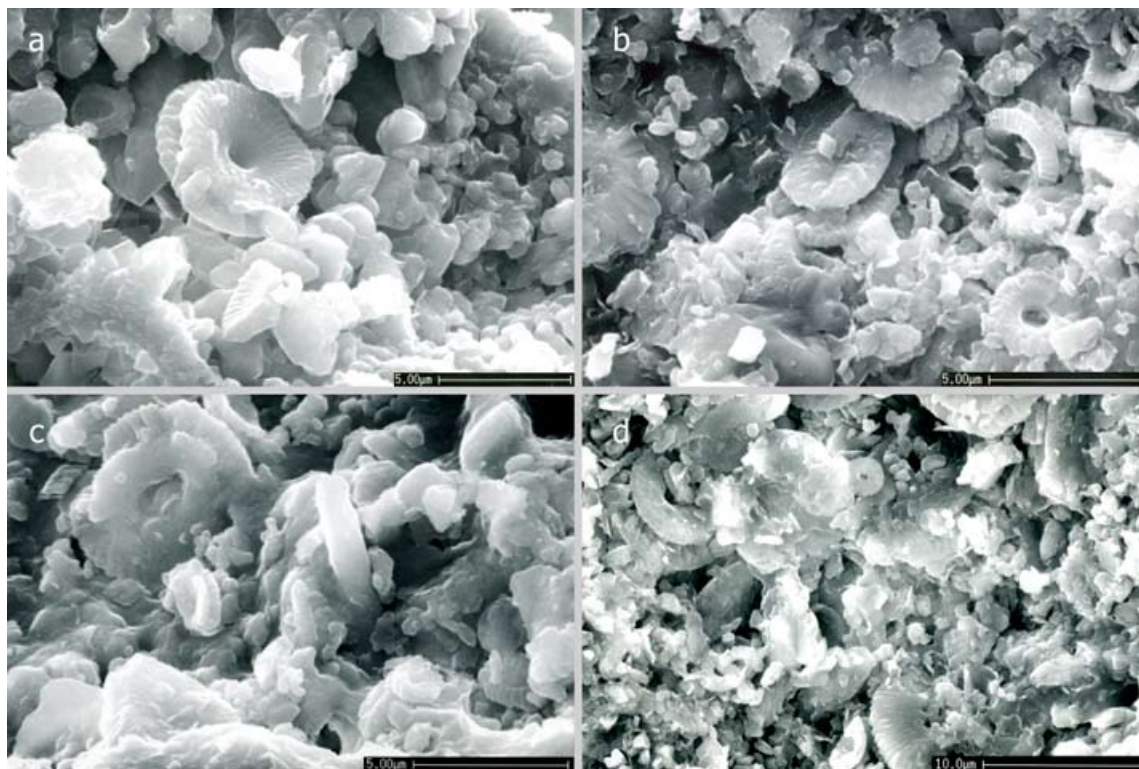
SAMPLE	PLANKTONIC FORAMINIFERS	BENTHONIC FORAMINIFERS	BIOCLASTS	MICRITE	QUARTZ	GLAUCONITE
MONTEROSSO	23%	2%	2%	72%	<1%	<1%
BALATA DI MODICA	21%	2%	8%	68%	<1%	<1%
MUSE STATUE	28%	2%	2%	67%	<1%	<1%
APHRODITE STATUE	15%	2%	10%	72%	<1%	<1%
IRMINIO	6%	2%	23%	68%	<1%	<1%

**TABLE 2**

Biostratigraphic assignment of archaeological and geological samples based upon nannofossil assemblages.

In the SEM, all five samples were found to contain abundant nannofossils (fig. 3). Our analysis of these nannofossils confirmed the stratigraphic position between the three limestone beds sampled

and suggested possible relationships between these and the two archaeological specimens. Based upon its nannofossil assemblage, the limestone of the statue from Morgantina could be dated to the late Burdigalian or early Langhian stages of the latest Early Miocene–earliest Middle Miocene (about 16–18 million years before present), as could samples 2 and 3 from the middle and upper Irminio Member. The limestone of the *Cult Statue*, on the other hand, was found to be considerably older, dating from the early Aquitanian stage of the Early Miocene (about 23–24 million years before present). Geological sample 1 from the base of the Irminio Member also dated to the early Aquitanian, suggesting that it is chronologically equivalent to the *Cult Statue*.



**FIGURE 3**

Scanning electron micrographs of archaeological samples and their probable geological counterparts: *a* Geological sample 1; *b* Geological sample 2; *c* Statue of Aphrodite; *d* unidentified female statue from Morgantina. Note the presence of nannofossils in all samples. Photos by author.

### Discussion

Our analyses of the *Cult Statue* and of comparative geological samples of limestone from southeastern Sicily have suggested a possible match for the raw materials used in the production of the statue. In thin section the *Cult Statue* was found to be texturally similar to geological sample 1 collected from a massive calcarenite limestone bed within the base of the Irmino Member of the Early Miocene Ragusa Formation (see fig. 2). Biostratigraphic analysis based on nannofossil content confirmed that the stones were geologically contemporaneous.

Geological samples 2 and 3, collected from the middle and upper levels of the Irminio Member, while also of wackestone limestone composition, were found to be texturally different from the *Cult Statue*. These two samples contained higher percentages of planktonic foraminifera and less bioclasts, suggesting that they were deposited in deeper water in a more pelagic environment than the raw materials used for the production of the *Cult Statue*. Analysis of the nannofossils within these samples indicates that they were formed at a considerably later date than the stone of the statue and geological sample 1.

Geological samples 2 and 3 were found to be a good match for the unidentified female statue found at Morgantina. This archaeological sample is composed of a pelagic wackestone limestone of comparable age to that of the upper levels of the Irminio Member of the Ragusa Formation.

### Conclusions

The results of our study strongly suggest that the limestone used to produce the *Cult Statue* may have been procured from the Early Miocene Irminio Member of the Ragusa Formation in the Hyblean Plateau of southeastern Sicily. The close geological match between those rocks and this important statue has significant implications for our current knowledge of its archaeological provenance.

Our analysis of the unidentified female statue from Morgantina in central Sicily indicates that this object was probably made of stone from a similar but younger limestone bed within the same geological formation. The various Miocene calcarenite limestone beds of the Irminio Member therefore appear to have been an important source of raw material during the Classical and Hellenistic periods of Sicily.

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## Soil Residues Survey for the Getty Acrolithic *Cult Statue of a Goddess*

John Twilley

### Summary

The full text of this study is available upon request to the  
Department of Antiquities Conservation, J. Paul Getty Museum.

A survey of the soil residues associated with the acrolithic *Cult Statue of a Goddess* was undertaken for the purpose of characterizing these soils and identifying likely key discriminating factors that would serve for comparison with a proposed find site when material for such a comparison is made available. In the absence of comparative material, the most useful discriminators cannot be known in advance. Therefore, the focus of this effort was to determine the makeup of the soil associated with the sculpture and to identify those constituents that would be unique and thus most likely to be of interpretive value in making direct comparisons to any purported find site. It must be recognized from the outset that no determination of similarity of the soil on the *Cult Statue* to any find site can be made in the absence of soil from that site for comparison. Without comparative material, a determination of the *difference between* soil residues on the *Cult Statue* and the soil of a purported find site is only possible in those instances where the major mineralogical components of the site are known from prior study to be fundamentally different from those associated with the statue. For example, if a site were to contain abundant volcanic, lateritic, or podzol constituents, heavy mineral sands, or metamorphic rock fragments, such a site could now be excluded a priori. However, the converse is not true—without detailed study of site material, no scientific judgment as to similarity is possible.

The soils associated with the *Cult Statue* have been found to consist primarily of detrital grains of calcium carbonate, calcium carbonate bioclasts, quartz, and potassium feldspar, with perthite and perhaps a few examples of myrmekite found among the feldspars. The coarser fractions are typically subrounded to subangular sands. Feldspars in all states of preservation are represented, but the majority of the sand-size fractions are not so far deteriorated as to be “skeletonized” by dissolution. In silt-sized fractions, the proportion of micas and secondary clays increases, and the morphology of quartz and feldspars becomes more angular, suggesting that the smaller fractions have been liberated through more recent mechanical weathering, with less subsequent rounding through transport.

Consolidation of grains by bridging calcium carbonate is common for all but the coarsest sands, leading to the retention of high levels of clay-size minerals in agglomerates isolated along with coarser fractions. Rock fragments are not abundant, and when they occur, they typically contain a small number of co-joined quartz, or quartz and feldspar grains. Overgrowth formations retained on quartz grains that could be indicative of a source in the form of sandstone weathering were not found. A few examples of fragments containing both silicates and bioclasts (in the form of shell fragments and foraminifera) joined by micritic calcite were found, suggesting that an extremely immature, mixed calcareous sandstone could be a contributor to the sediments. A few examples of pseudomorphic replacement of framboidal pyrite by



iron oxide are present. Calcium carbonate is present in many different forms in the sediments. It occurs as bioclastic material, as small examples of microsparite cement bound to bioclasts, as micritic calcite, as fibrous calcite (perhaps in pseudomorphic replacement), and as cleavage fragments of larger single-crystal calcite whose origin cannot be determined.

Coccoliths are common in the finest fractions, and the clay fraction contains degraded mica that complicates the differentiation of more mature clay species. Evidence from infrared spectroscopy and polarized light microscopy at 1,000x shows that fine quartz and halloysite are relatively common in the finest material. They persist even in those fractions that remain suspended through centrifuging and that could be collected only by acidification and agglomeration followed by centrifuging.

Iron is relatively scarce in the sediments, with most remaining bound to secondary clays and degraded micas even after acid treatment. (Acid extracts freed of suspended matter were very pale.) Alkaline extracts, however, were more strongly colored at the conclusion of centrifuging, and their humic matter was evident in infrared spectra of noncentrifugable matter.

Soils with the above general composition can be expected to be very widespread in the Mediterranean Basin as a consequence of the geological history of the region, necessitating the study of minor species and localized phenomena as a means of making further distinctions. For that reason, the direct comparison of soil from any putative find site is absolutely essential to any scientific determination of a geographical origin; without it, no sound determination on the subject can be made.

A number of things are notable for their absence from the *Cult Statue's* soil samples. For example, there are no zoned feldspars such as would be indicative of a volcanic source. The proportion of heavy minerals is very low. Indicators of hydrothermal alteration, such as chert formation, are absent. Rock fragments, in general, are not abundant. Metamorphic minerals, even low-grade ones, are few. There are few primary iron minerals in any condition, most iron being present in the form of hydrated oxides staining other grains. Siliceous phytoliths—inorganic cellular fragments common in grasses and some leaf structures—were rarely encountered and never found in complete pieces. Surprisingly for a soil containing so much marine matter, there were few examples of fossil bone.

In spite of the relative simplicity of the soil, potential avenues for fine differentiation between this and superficially similar examples do exist. These include population studies of grain size, density, and mineralogy, as well as study of the internal traits of individual mineral species. There are, for example, numerous quartz inclusions in the form of both trace minerals and voids whose contents could be analyzed by laser ablation mass spectrometry methods or Raman spectroscopy. There are also a few idiosyncratic species, such as lamellar structures comprised of both barite and witherite, that might be useful keys for comparisons.

In the absence of comparative material, only one avenue appears to remain open for independent progress. That avenue would involve micropalaeontology study of the micro- and nanno-fossil constituents (chiefly foraminifera and coccoliths), for these appear to be well preserved in the soil and seem unlikely all to have arisen merely through “shedding” of particles by the statue limestone. Such study has the potential to put temporal geological bounds on the sediments from which the statue was excavated, though not directly to identify geographic boundaries.

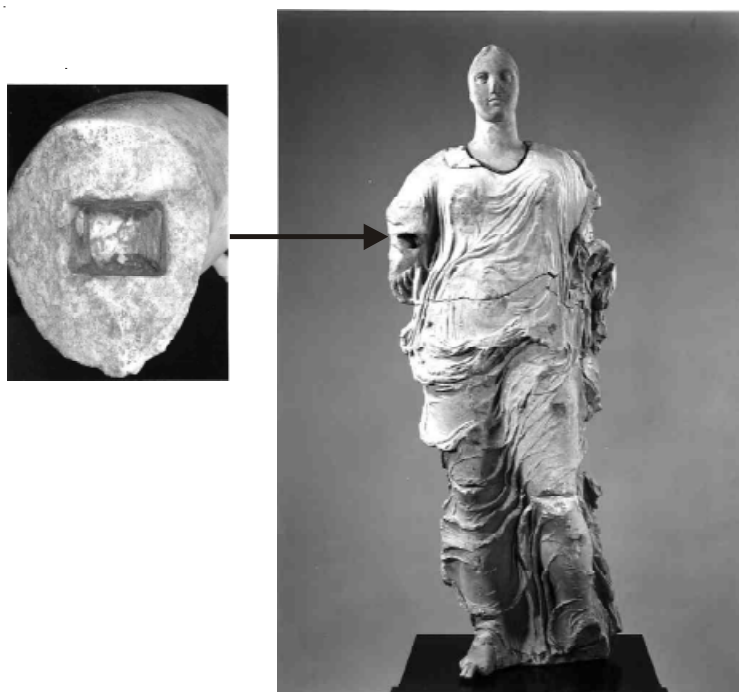


## Preliminary Pollen Analysis of a Soil Associated with the *Cult Statue of a Goddess*

*Pamela I. Chester*

### Introduction

Pollen and spore (palynomorph) analyses of soil incorporated into attachment holes and adhering to the surface of a statue have the potential to provide information on its geographic origin. Because palynomorphs are often not well preserved in soil, a preliminary study was undertaken. The analyzed soil removed from the true right-arm socket of the acrolithic statue during cleaning at the time of acquisition (fig. 1) was the largest single sample available. The soil had been removed mechanically with small amounts of deionized water and subsequently stored in a glass vial. The cemented soil nodules provided material potentially uncontaminated with modern palynomorphs.



**FIGURES 1A-B**

In ancient times, a large pin (most probably of wood) was inserted into the arm socket of the *Cult Statue* to connect the marble arm to the limestone torso.

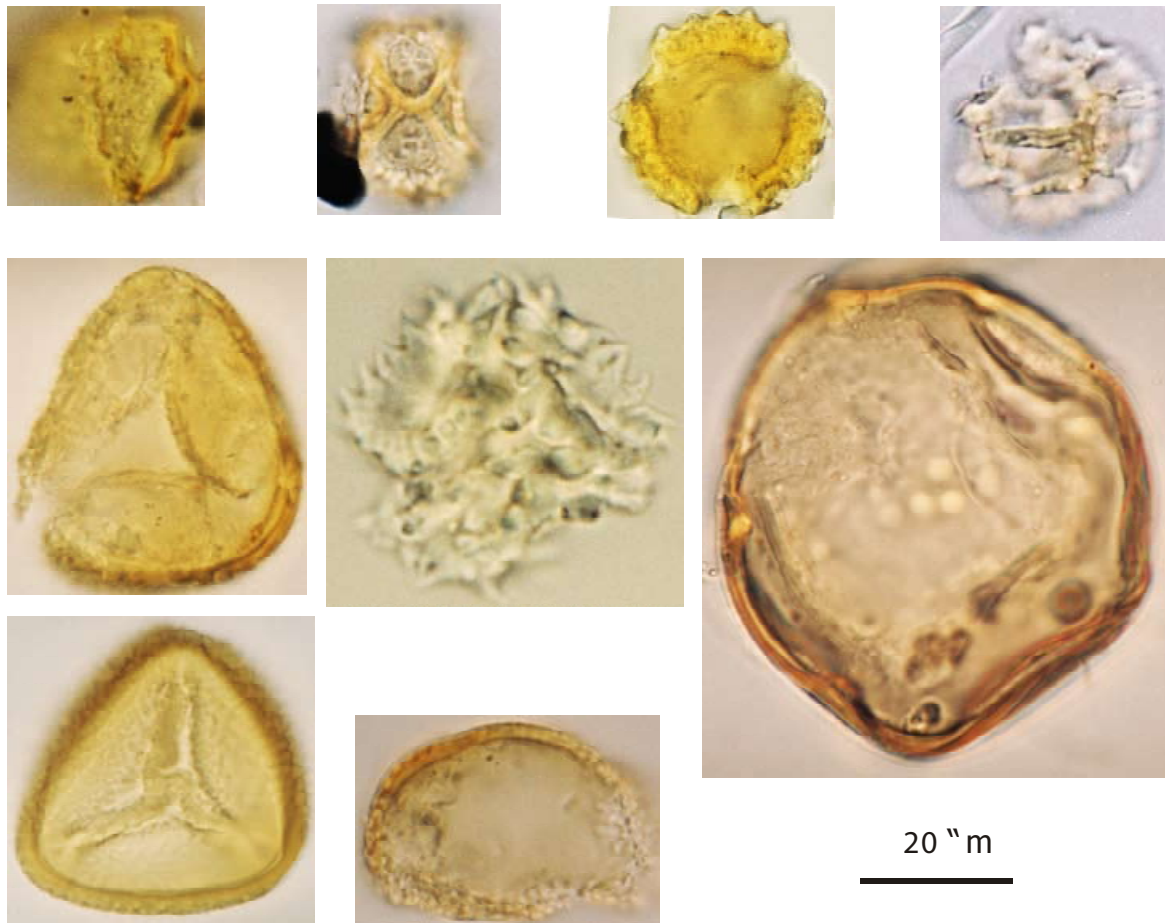
## Method

Ten grams of soil were prepared for analysis. Particular care was taken to prevent contamination and produce a high-quality concentrate. The laboratory has a palynomorph-free atmosphere controlled by positive air pressure, and the filtered air is checked regularly. Only analytical-grade chemicals and new centrifuge tubes, rinsed in distilled water, were used for this study. Preparation procedures were kept to a minimum to avoid loss of palynomorphs. After cleaning the surface of each nodule, standard preparation techniques were applied: carbonate removal with 10% HCl; dispersal in Calgon solution; gravity separation, then removal of heavy minerals with s.g. >2.0; and sieving to recover particles 6–260  $\mu\text{m}$  diameter. The palynomorph-rich concentrate was mounted on microscope slides in glycerine jelly under 22 mm<sup>2</sup> cover slips.

Palynomorphs were examined under transmitted light and incident-light fluorescence microscopy. All grains under the cover slip were counted by traversing contiguous transects. Identifications were made under immersion oil using 40x or 100x objectives. Pollen types follow Chester and Raine (2001), except that fenestrate pollen, with the exception of *Lactuca* type, were combined into a single *Taraxacum* type, and wild grasses were combined into a single type, Gramineae. Oak pollen types were renamed as: *Quercus* deciduous, *Quercus* semi-evergreen, and *Quercus* evergreen. “Indeterminate” grains were those so badly damaged that they were beyond recognition. Some “unknown” palynomorphs were well preserved and might be identified in the future.

## Results

Palynomorph concentration was very low, about 100 grains/gram. A total of 150 palynomorphs and 24 types were identified (figs. 2–3). No contaminant grains were observed. Fluorescence indicated that modern contamination was absent. The appearance of grains under fluorescence and transmitted light indicated taphonomic coherence as well as broad contemporaneity. Mechanical degradation, rather than oxidation, caused the high proportion of indeterminate grains (39.3%).



**FIGURE 2**

Selected palynomorphs identified in the sample. Top left to bottom right: *Quercus* semi-evergreen, *Epipactis* type, *Achillea* type, *Lactuca* type, *Pteridium aquilinum*, *Taraxacum* type, *Juglans regia*, *Secale cereale*, unknown monolete pollen, unknown trilete spore.



**Coniferous & deciduous canopy trees**

*Abies* (3)

*Betula* (1)

*Quercus* deciduous (5)

*Quercus* semi-evergreen (1)

**Woodland understory shrubs**

*Juniperus* (1)

**Woodland herbs**

*Epipactis* type (2)

**Evergreen woodland trees**

*Quercus* evergreen (2)

**Plants of open rocky habitats**

*Erica* (1)

**Herbs of open places**

*Achillea* type (4)

*Centaurea cyanus* type (1)

Gramineae (7)

*Lactuca* type (3)

*Plantago lanceolata* type (1)

*Pteridium aquilinum* (6)

*Rumex* type (2)

*Solanum nigrum* type (1)

*Solidago* type (4)

*Taraxacum* type (9)

**Cultivars**

*Hordeum* type (3)

*Juglans regia* (14)

**Damp environments**

*Schoenus nigricans* (2)

*Scirpus* (3)

**Unknown**

Pollen (1)

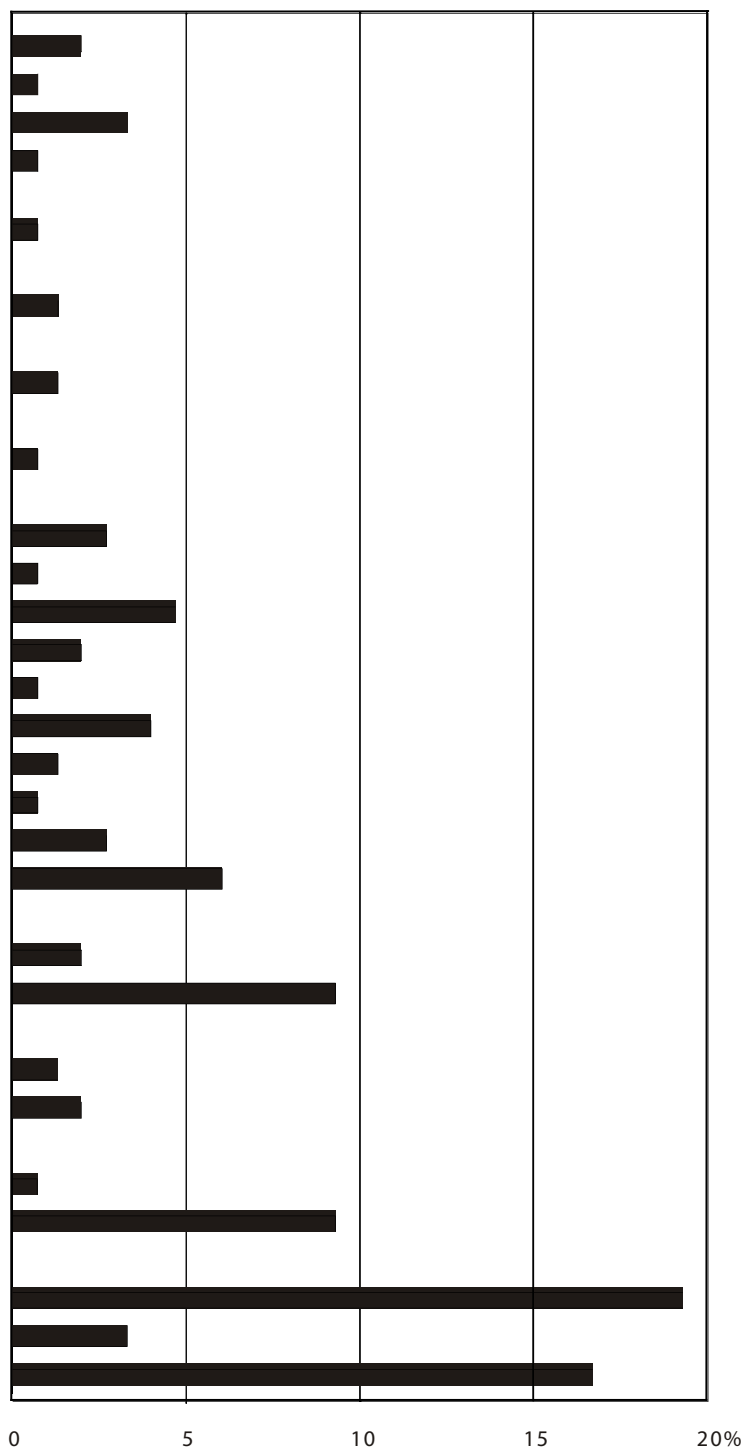
Trilete spores (14)

**Indeterminate**

Pollen (29)

Monolet spores (5)

Trilete spores (25)



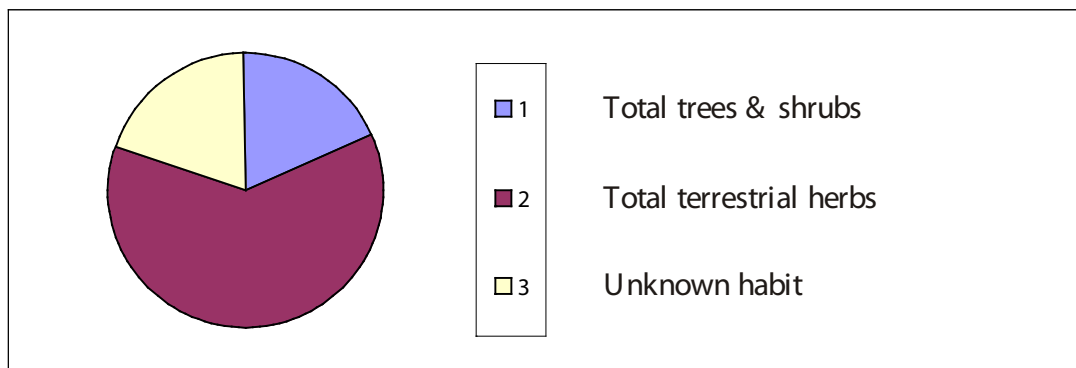
**FIGURE 3**

Histogram of relative percentages of pollen taxa. All pollen types counted are listed (counts in brackets following taxon names). Pollen sum = all palynomorphs counted (including indeterminates). Taxa are grouped according to habitats.



Identification of source vegetation that corresponds to the identified palynomorph assemblage can be inferred by considering current geographical distribution of vegetation. However, pollen types may comprise species with contrasting ecological requirements. In total, only 13 grains (8.7%) representing mid- to high-altitude woodlands were identified. With the exception of the orchid pollen *Epipactis* type, all grains could derive from a long-distance source, as they are wind dispersed. The orchids are ecologically heterogeneous, growing in woods and scrub, and also among maritime sand dunes. Evergreen woods are represented only by two grains of *Quercus* evergreen, which can grow from sea level to mid-altitudes. Pollen of this type can be transported long distances. “Plants of open rocky habitats” are represented by one pollen grain of *Erica*, which is ecologically heterogeneous; species grow on dry rocky hillsides, in dry woods, evergreen scrub, and by streams (Tutin et al. 1964–80). Several pollen types in the “herbs of open places” group belong to the Compositae family: *Achillea* type, *Centaurea cyanus* type, *Lactuca* type, *Solidago* type, *Taraxacum* type. Many species comprise these pollen types. They grow in open landscapes, often taking advantage of open spaces where trees have been cleared for agriculture, at a range of elevations from sea level to mountains. The species comprising *Plantago lanceolata* type, *Pteridium aquilinum* (bracken), *Rumex* type, and *Solanum nigrum* type also grow at a range of elevations. Gramineae (wild grasses) are ubiquitous. The very high relative percentage (25.5%) of “herbs of open places” indicates a very open landscape in the vicinity. The cultivar species represented by *Hordeum* type (which includes cultivated barley and wheat, plus some wild grasses) and *Juglans regia* (walnut) can be cultivated at a wide range of altitudes. Species represented by the pollen taxa *Schoenus nigricans* and *Scirpus* can also grow at a range of altitudes.

The ratio of arboreal pollen to nonarboreal pollen is 1 : 3 (fig. 4), although the high percentage of unknown palynomorphs (20%) makes this rather approximate. Noncultivated and cultivated trees and shrubs each represent 9.3%, with *Juglans regia* the only cultivated tree represented. Noncultivated herbs represent 59%, and cultivated herbs 2%. The dominance of *Juglans regia*, and its association with an assemblage that is dominated by herbs that are usually associated with cultivation, represents a landscape of intensive agriculture.



**FIGURE 4**  
Summary diagram of main plant forms.

The analyzed soil probably originates from an agricultural soil. Agricultural soils are typically palynomorph-poor, containing a few grains from the crop/crops being cultivated and weeds growing nearby. The dominance of *Juglans regia* pollen suggests that this tree was being intensively cultivated in the vicinity. The abundance of cereal pollen suggests that they were also being cultivated close by,

as cultivated wheat and barley is self-pollinating, producing little pollen and releasing little into the atmosphere.

### Discussion

A pollen study undertaken in Lake Pergusa, Sicily (Sadori and Narcisi 2001), only about 25 km northwest of the archaeological site of Morgantina, records the vegetation history of a much wider geographic area than the soil analyzed for this study, but it likewise shows intensive cultivation of *Juglans regia* and cereals. *J. regia* first appears at about 2600 B.P. From 2400 B.P. to the present the concentration of arboreal pollen and the number of arboreal taxa decline, and nonarboreal pollen increases. A concomitant increase in *Rumex* suggests that pastoralism also occurred.

Although similar land use during the Classical period can be inferred from the two studies, this does not restrict the origin of the soil removed from the statue to the location of Morgantina, for similar palynomorph assemblages may be obtained from other localities. All identified pollen types include species that have at least a Mediterranean-wide, and usually a European-wide, geographic distribution (Tutin et al. 1964–80). Furthermore, the land-use scenario indicated by the two pollen data sets—that of cultivation of *Juglans regia* and cereals combined with pastoralism—is not unique to this location. For example, this type of land use has been inferred, from palynomorph analyses, in northwestern Greece between 480 and 80 B.C. at an elevation of 1750 m (Chester 1998).

### Conclusion

Production and dispersal patterns of palynomorphs of the Mediterranean region during the Classical period are indicated by previous pollen studies undertaken in this region. Many studies, from a variety of environments and altitudes, have been undertaken, but they are from lakes or bogs with large surface areas that capture mostly wind-dispersed pollen from a wide geographic region. Soil samples generally contain proportionately more local herbaceous pollen than samples from bogs or lakes. To identify possible source vegetation, comparisons need to be made between the soil analyzed here and soil from possible sites of origin, from known localities and of known age.

Soil removed from the arm socket provided sufficient data on which to make reliable inferences about the environment of the site of burial of the *Cult Statue*. Detritus attached immediately to the surface of the statue may contain palynomorphs from the place of manufacture of the statue, for example, soil attached to the swabs used to clean the interior of the attachment holes and the silicon rubber molds made of the cleaned holes. However, those samples are smaller and probably will not provide sufficient palynomorphs on which to make reliable inferences.

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## List of Participants

### Invited Presenters:

Professor Clemente Marconi  
James R. McCredie Professor of Greek Art and Archaeology  
Institute of Fine Arts, New York University

Professor Malcolm Bell, III  
Professor of Art History  
University of Virginia  
Co-director, U.S. excavations at Morgantina, Sicily

Professor Rosario Alaimo  
Professor of Geochemistry  
University of Palermo

Mr. John Twilley  
Art Conservation Scientist  
New York

Dr. Pamela I. Chester  
Archaeological Palynologist  
New Zealand

### Invited Guests:

Dr. Flavia Zisa  
Professor of Museum Studies and Archaeology  
Università di Catania and Università “Kore” di Enna  
Consultant to the office of the Assessore of the Sicilian Ministry of Culture  
and Environmental Heritage

Professor Antonio Francesco Vitale  
Professor of Legislation at the Università di Catania  
Consultant to the office of the Assessore of the Sicilian Ministry of Culture  
and Environment Heritage



Mr. Gaetano Gullo  
Director  
Central Library of Sicily  
Palermo

Professor Jenifer Neils  
Ruth Coulter Heede Professor of Art History and Classics  
Case Western Reserve University  
Vice President of the Archaeological Institute of America

**Participating Getty Staff:**

Dr. Michael Brand  
Director, J. Paul Getty Museum

Dr. David Bomford  
Senior Restorer of Paintings, The National Gallery, London

Dr. Karol Wight  
Senior Curator of Antiquities, J. Paul Getty Museum

Mr. Jerry Podany  
Head of Antiquities Conservation, J. Paul Getty Museum

Dr. Giacomo Chiari  
Chief Scientist, Getty Conservation Institute

Dr. Claire Lyons  
Collections Curator for the History of Archaeology and Ancient Art,  
Getty Research Institute

**Invited Staff Observers:**

Dr. James Wood  
President and Chief Executive, Getty Trust

Mr. Ron Hartwig  
Vice President, Communications, Getty Trust

Dr. Deborah Marrow  
Director, Getty Foundation



Dr. Tom Crow  
Director, Getty Research Institute

Mr. Tim Whalen  
Director, Getty Conservation Institute

Ms. Jeanne-Marie Teutonico  
Associate Director, Programs, Getty Conservation Institute

Ms. Julie Jaskol  
Assistant Director, Media Relations, Communications, Getty Trust

Dr. Janet Grossman  
Associate Curator of Antiquities, J. Paul Getty Museum

Dr. Kenneth Lapatin  
Associate Curator of Antiquities, J. Paul Getty Museum

Dr. Mary Louise Hart  
Assistant Curator of Antiquities, J. Paul Getty Museum

Dr. Jens Daehner  
Assistant Curator of Antiquities, J. Paul Getty Museum

Ms. Marie Svoboda  
Associate Conservator of Antiquities, J. Paul Getty Museum

Mr. Jeffrey Maish  
Associate Conservator of Antiquities, J. Paul Getty Museum

Mr. Eduardo Sanchez  
Associate Conservator of Antiquities, J. Paul Getty Museum

Ms. Meagan Miller  
Project Specialist, J. Paul Getty Museum

