



The Herculaneum Boat: Preliminary Notes on Hull Details

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famed Pergamo" in 1625. Petty spoke of having acquired but "meane things, not worth his charge, only as testimonies of his travails" from Pergamon,²⁰ and while it is possible that the "new" Lambeth fragments were among them, we shall probably never know for certain.

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THE LUDOVISI HEAD ONCE AGAIN

In 1979, as my contribution to the volume of studies in honor of Peter H. von Blanckenhagen, I advanced the hypothesis that the Ludovisi Head, at times identified as an Erinyes or a Medusa, was instead a dead Giant from the Gigantomachy frieze of the Pergamon Altar. Size, general iconography and presence in Italy could be reconciled with such a theory; final proof, however, could be provided only by additional evidence. I concluded my article, therefore, with the wish that samples could be obtained from both the head in Rome and the Pergamon frieze, to test the composition of the marbles.¹

Through the kindness of many persons,² I was recently able to obtain small specimens from the Ludovisi Head in Rome and from a fragment of the Pergamon Altar, the so-called Fawley Court Giant at present on display in the Ashmolean Museum at Oxford, England. The samples were sent to the Center for Archaeological Sciences of the University of Georgia at Athens, Georgia, and Dr. Norman Herz has kindly provided the following comments.

Both samples were analyzed for their stable isotope ratios of $^{18}\text{O}/^{16}\text{O}$ and $^{13}\text{C}/^{12}\text{C}$. The results were normalized against the PDB standard and showed:

	$\delta^{18}\text{O}$	$\delta^{13}\text{C}$
BR-1 (Museo Naz. Rome)	-0.93	+3.99
BR-2 (Ashmolean)	-0.65	+2.82

Dr. Herz's conclusion from the isotopic analysis is that the two pieces are from different originals. Weathering will often change the oxygen isotopic ratio by one or two per mil., but almost never the carbon ratio. The differences in isotopic ratios between the samples are too large to be explained in any other way than their having different sources.

²⁰ Haynes 1975 (supra n. 1) 6.

¹ B.S. Ridgway, "The Ludovisi Head," in G. Kopcke and M.B. Moore eds., *Studies in Classical Art and Archaeology. A Tribute to Peter Heinrich von Blanckenhagen* (Locust Valley 1979) 153-61. The latest reference to the head is by B. Palma in A. Giuliano ed., *Museo Nazionale Romano. Le Sculture I.5, I marmi Ludovisi* (Rome 1983) 127-30, no. 56 (inv. 8650). The head is there considered a Roman (Antonine) copy from a bronze original of the 2nd c. B.C., perhaps part of the Pergamene victory monument against the Gauls.

² I am deeply indebted to the Rev. Gerard Domanski, M.I.C., Provincial Superior of the Congregation of Marian Fathers, who

Since no doubt exists that the Fawley Court Giant once belonged to the Pergamon Altar, the theory that the Ludovisi Head may originally have been part of the same monument must be rejected. Chemical analysis has also shown that the sample from the Pergamon Altar has a high magnesium content which classifies it as dolomitic. Its isotopic signature would link it with marbles from Marmara or Denizli in Turkey. The second sample (from the Ludovisi Head) offers less conclusive information, but its isotopic signature is not incompatible with a provenience from Carrara.³ It is clear that the problems presented by the Ludovisi Head have yet to be solved and deserve more thorough treatment.

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THE HERCULANEUM BOAT: PRELIMINARY NOTES ON HULL DETAILS

During the summer of 1982, staff archaeologists uncovered the bottom of an overturned Roman boat while excavating an area of the ancient beach at Herculaneum. At the invitation of Dr. Giuseppina Cerulli Irelli, of the Soprintendenza Archeologica di Pompei, I recorded the exposed portion of the hull and began preliminary work on its reconstruction under a grant from the National Geographic Society (see *National Geographic* 165.5 [May 1984] figs. on 602-603, 606).

The boat apparently was a victim of the eruption of Mt. Vesuvius in A.D. 79 and originally was covered by 23 m. of volcanic overburden. Most of the material surrounding the boat was pyroclastic flow, which carbonized nearly the entire structure of the hull. The vessel was located only 5 m. from the seaward wall of the sub-urban *thermae* and close to a series of boat chambers

gave permission for the sample to be taken from the Fawley Court Giant, to Mrs. Gwyn Miles, who actually took it, and to Michael Vickers, of the Ashmolean Museum, Oxford, who obtained all the necessary permissions and mailed me the specimen. I am equally grateful to Dottoressa Rita Sanzi Di Mino, of the Museo Nazionale Romano, and to Dr. Baldassare Conticello, who were instrumental in obtaining the marble sample from the Ludovisi head.

³ For N. Herz's work to determine the provenience of ancient marbles, see G.V. Foster and N.R. Herz, "Identification of Marble Provenience by Pattern Recognition of Xeroradiographs," *AJA* 89 (1985) 331; also N. Herz, "Isotopic Analysis of Marbles," in G. Rapp, Jr. and J.A. Gifford eds., *Archaeological Geology* (New Haven and London 1985) 331-51.

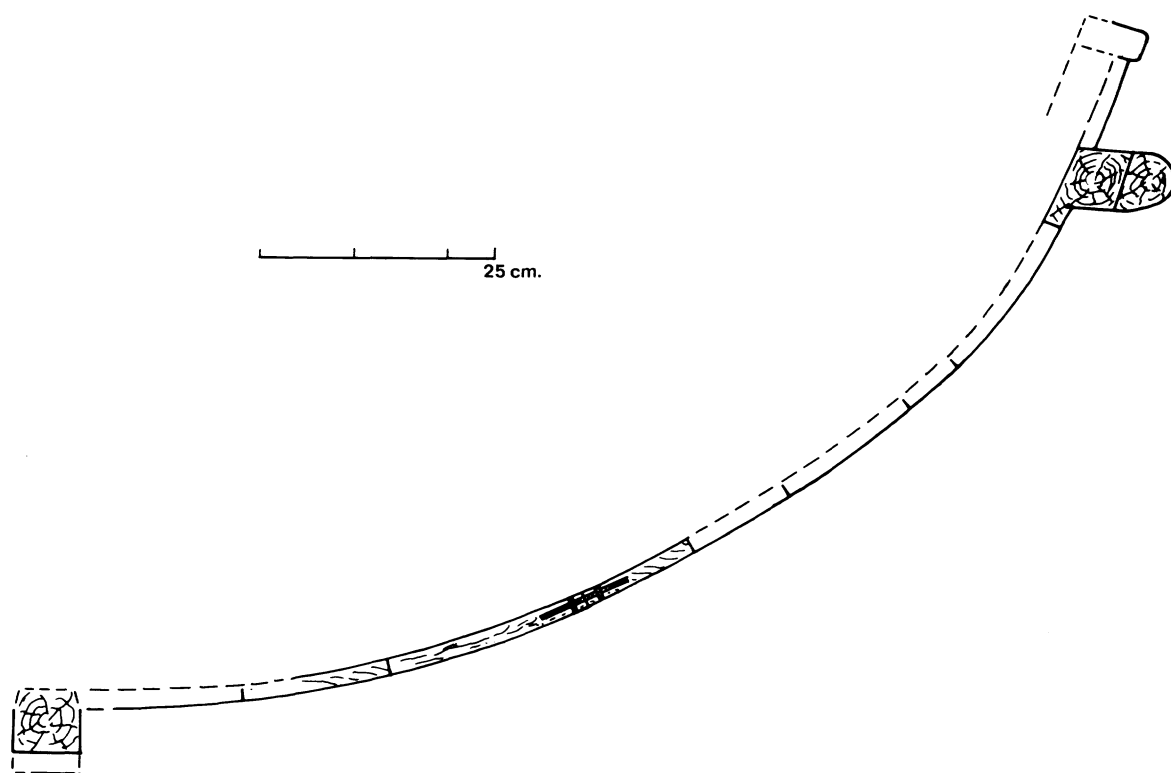
which lined Herculaneum's shore. By the end of 1983, two-thirds of the length of the hull had been exposed from its keel to its wales. Test excavations indicated that this portion survived from keel to gunwale, while the unexcavated section appears to have suffered collapse and may be in a fragmentary state. Most wooden members are charred so thoroughly that they cannot be handled without some means of support. Initial conservation of the hull has begun. After excavation is completed, complex lifting methods will be required to remove the hull members from the site.

Physical characteristics of ship and boat construction are difficult to determine when only a portion of the outside of the hull is visible. Although structural arrangements seem to indicate that it is the stern end of the hull which has been exposed, this statement cannot be proved until the interior of the hull becomes visible. To date I have found no parallel documentation in archaeological reports, or in contemporary iconographic or literary examples, to describe the boat at Herculaneum. It is long, shallow, and lightly built. The exposed architecture shows that it must have been a graceful craft. The keel and one end post have been exposed over a length of 7.6 m.; projection of its curved, unexcavated end suggests that the overall length was about 9 m. Although the sides are now flared outward, preliminary lines drawings indicate a beam of approximately 2.4 m. and a midship

depth of about 85 cm. The exposed end of the hull flares upward at least 50 cm. above the midship line (ill. 1).

The keel is sided (thick) 7.2 cm. and molded (deep) 6 cm. No scarfs have been found, but a stem or sternpost widens gracefully to 14 cm. where it enters the fill. Planking ends are rabbeted into this post, but the garboards are chamfered against the upper sides of the keel. There are 7 bottom planks on the starboard side of the hull and 8 on the port side. Only 4 of them reach the post rabbet on each side. In addition, each side has a two-piece wale, a single side plank, and a gunwale or sheer cap. Planking is 1.7 to 2 cm. thick and wales are 10 to 12 cm. thick. The hull was constructed in the classical shell-first fashion with plank edges joined by pegged mortise-and-tenon joints. Joint spacing was inconsistent, although measurements taken between the centers of about 200 tenon pegs resulted in an average spacing of 13 cm. The few mortises I could examine averaged 5.1 cm. in depth, 5.2 cm. in width, and 0.5 cm. in thickness. Their tenons had smaller dimensions, although their edges were burned off and dimensions were not reliable. The pegs that locked the tenons were tapered and were driven from the inside of the hull. Outside peg diameters ranged from 0.6 to 1.0 cm.

Frames were fastened to planks by an irregular pattern of bronze nails and treenails. Nails had head diameters of 1.7 cm.; treenails averaged 1.5 cm. in diameter.



Ill. 1. Herculaneum boat, half-section near amidships. (Drawing author)

On a typical 16 cm. wide plank near amidships there were 2 treenails and 2 nails per frame. One detached frame fragment had cross-sectional dimensions of 5 by 4.5 cm. Examination of rows of fastenings along the exposed surfaces of the outer hull revealed that frames were spaced on average centers of about 24 cm., although spacing varied between 12 and 30 cm. Two sets of double frames were situated near amidships, perhaps in the area of a mast step. Fastening patterns indicated that only half the frames crossed the keel; probably this arrangement is that of the alternating floor and half-frame recorded for most of the larger vessels in the classical period.

A through-beam, 5.4 cm. wide and 7.5 cm. high, projects 43.5 cm. beyond each side of the hull about a meter forward of the post. It has rounded ends and penetrates the side planks directly above the wales.

The statements made above and the dimensions reflect limited access to exterior surfaces exclusively; they may not represent construction standards. Only after the entire hull becomes accessible can such features as joint and frame spacing be defined for the structure as a whole.

The Herculaneum boat is unique in that its upper structure has survived in reasonably good condition, a situation not usually found in underwater wrecks. Its structural form—light, graceful, yet large for a boat—makes it a potentially exciting wreck. If even part of the inner hull is as well preserved as the exposed area of its outer surface, many of the nagging questions surrounding small and medium-sized Roman boat construction may be answered.

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THE CHRONOLOGY OF THE PUNISHMENT AND RECONSTRUCTION OF SICILY BY OCTAVIAN/AUGUSTUS

Shelley C. Stone III recently published in this journal a thorough and detailed examination of the evidence for the history of Sicily between 44 and 20 B.C.¹ He summarizes recent archaeological discoveries at several Sicilian sites which suggest that many cities were burned and largely deserted in the third quarter of the first century B.C., while some were resettled after an interval, in the last quarter of the century. He argues that the rather patchy literary testimonia provide grounds for connecting this destruction with the punishments meted out by Octavian's legates after the battle of Naulochos, and the new settlements with the "Augustan reconstruction" of Sicily by means of Roman colonies. Stone proposes the

following chronology for the events of these years: from 36 to 32 B.C. Octavian's legates punished those Sicilian communities which had helped Sextus Pompey against Octavian; from 32 (when Sicily joined with Italy and the other western provinces in swearing allegiance to Octavian before the final showdown with Antony) until some years after Actium Sicily remained in the forlorn state to which those punishments had brought it, while Octavian was preoccupied with other matters; finally, in the late 20s Augustus took action to restore some of the Sicilian cities by creating Roman *coloniae* at five of them (viz., Thermai Himeraii, Tyndaris, Tauromenion, Katane and Syracuse).

Admittedly, this reconstruction, which concentrates the destructive phase of Octavian's interest in Sicily in the years between the battles of Naulochos and Actium, and the constructive phase approximately 10 years later, is a tidy one, which appears to accord with the archaeological record at some sites. The literary testimonia, however, do not necessarily support such a neat division of this period of Sicilian history into clearly separable destructive and constructive phases. The descriptions of Sicily provided by Strabo (6.2.2–7, C 267–73) and the Elder Pliny (*HN* 3.8.88–91) carry no precise chronological implications: Strabo's appears to have been written between 20 and 10 B.C., while Pliny's is usually said to depend on Agrippa's *Commentaries*, which were published shortly after his death in 12 B.C.² Thus both describe the result of the Augustan settlement. Strabo does, it is true, mention some developments as relatively recent, but he gives no precise dates for either the destructive or the constructive actions which he mentions. The only statements that carry more definite chronological implications seem to be: 1) reports in Dio (49.12.4–5) and Appian (*BC* 5.1.29 and 5.13.31) of some punitive measures taken by Octavian immediately after Naulochos in 36; 2) Dio's notice (54.7.1) that during his visit to Sicily in 21/20 Augustus founded Roman colonies at Syracuse and some other places; and 3) the report in Diodoros (16.7.1) that Tauromenion received a colony of Romans after "Caesar" (i.e., Octavian) had ousted its previous inhabitants. The information given by these passages is meager. Dio and Appian in referring to the aftermath of Naulochos give no details of any particular punishment meted out to a named city; Dio's report of Augustus' visit to Sicily in 21/20 names only Syracuse as the recipient of a new Roman colony; and Diodoros does not date the events at Tauromenion. Doubtless for this reason Stone felt justified in treating Diodoros' statement as a report of two separate events: the ousting of the Tauromenians he assigns to ca. 36 B.C., as part of the general punitive action attributed by Dio and Appian to this period, while he places the refoundation of Tauromenion as a Roman colony ca. 21, in the context of Augustus' Sicilian visit, which Dio says was the occasion for

¹ Shelley C. Stone III, "Sextus Pompey, Octavian and Sicily," *AJA* 87 (1983) 11–22 (cited hereafter as Stone).

² Stone 19 n. 65.