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ARTICLES

REVIEWS

Beyond the Grave: Biographies from Early Greece

SUSAN LANGDON

Abstract

Object biography is an analytical technique that traces the changing social meanings an object accumulates during its lifetime. This study of two Late Geometric pots from Argos and Thebes employs biographical methods to address the role played by material goods in contemporary social rituals. The decoration and burial context of both vessels attest discrete stages in the construction of the social identity of the deceased. A giant pyxis from Argos can be connected with the social maturation of the woman buried within it. A figured pithos from Thebes represents what may be an important festival of Apollo and can similarly be connected with the interred child. The biographical data of these objects and their ultimate owners necessitate reconstructing the social setting of goods within complex communities, including the often-marginalized young and aging adult segments of the population. By focusing on the intersections of biographies in the grave, these narratives emphasize the centrality of objects in shaping identity and social order in early Greece.*

Familiarity breeds neglect. There is a tendency for well-known objects of high aesthetic merit to lose their archaeological and cultural contexts when placed in the broad narrative of Greek art history. The so-called Polyphemus amphora from Eleusis, for example, occupies a coveted spot in most major textbooks used in Western art survey courses, yet rarely has it been noted to have served as a child's coffin (fig. 1).[1] This fact is but incidental to the vessel's role in the larger art historical drama of the expression of human experience, which ironically displaces the individual personality that lived and died with the object. The social focus of research on this vessel during the past two decades has demonstrated how retrieving its archaeological context offers new pathways for understanding the pot and its Protoattic style. Indeed, the vessel has become a veritable poster child for the need to address social questions of early Greek pottery.[2] Nevertheless, popular perceptions of this and similarly significant works, shaped without archaeological context, enjoy wide currency, while more recent studies remain in the realm of experts on early Greece. These are pedestrian observations, to be sure, but they raise the important question of the place of exceptional objects within the sphere of material culture, as part of both the contexts in which they are found and the spectrum of social meanings acquired between manufacture and final deposition.

INTO THE INDIVIDUAL: OBJECT BIOGRAPHY

One effective way to recover these social contexts is through the construction of object biography. Introduced by Igor Kopytoff, object biography seeks to narrate the accrual of social meanings over the lifespan of an artifact.[3] The approach is attractive for its narrative structure and postprocessual emphasis on the active nature of material culture. While carrying the same liabilities as human biography—a tendency to privilege the elite or atypical and to disconnect its subject from the greater historical context—in application, object biographies effectively intersect with and elucidate larger social narratives, such as colonial encounters or gender constructions. The relation of the individual object to the broader functional or "career" pattern inherent within its typology is very much at issue. The purchase of a Renoir painting by a museum or by a private collector is a typical career path for the object type. Its demise in an incinerator, Kopytoff suggests, would be as tragic a biography for the paint-

* This study was begun during the 1999–2000 fellowship year at the National Humanities Center, whose unstinting hospitality and support I gratefully acknowledge. I want to thank especially Carla Antonaccio, Tracey Cullen, Susan Einbinder, Sarah Morris, Carol Muller, John Papadopoulos, Paul Rehak, Tim Taylor, John Younger, and James Whitley for discussing or corresponding with me about these and related objects. My thanks also to my anonymous reviewers, whose insightful comments encouraged me to expand my earlier essay into its final form.

[1] Mylonas 1957; Morris 1984, 11–12, 43–6.

[2] Morris 1984 (use as a tomb); Osborne 1988; Morris 1993, 1998; Whitley 1994. So far no consensual view of this vase or of Protoattic iconography has emerged from these recent treatments. I will follow suit in adding to the sketchy proposals when I return to the pot below.

[3] Kopytoff 1986. For more recent uses of this approach, see the issue of *WorldArch* devoted to the topic: *The Cultural Biography of Objects*, *WorldArch* 31 (2) (1999); Weiner 1992. For other studies of the life cycles of early Greek pots, see Crielaard 1999, 65–7; Shanks 1999.

Fig. 1. The Polyphemus amphora from Eleusis. (Courtesy of the DAI Athens, Eleusis 544)

ing as murder for a person. For objects as for individuals, the specific biography is predicated on awareness of both the biographical possibilities within the society and that society's perception of an ideal life. The potential of the approach is tantalizing. Because the way a society constructs persons and the way it constructs things are fundamentally similar, in Kopytoff's view, "What one glimpses through the biographies of both people and things in these [smaller-scale] societies is, above all, the social system and the collective understandings on which it rests."[4]

When applied within carefully defined parameters, object biography can offer a useful approach to archaeological material. Time is emphasized as an essential dynamic of materiality for both human and artifact lives. Not only are objects and their users transformed by the passage of time, but objects (especially in oral cultures) supply the necessary framework to measure and mark the rotations, durations, and events by which a culture organizes its social and physical world. Object biography prioritizes the inextricable link between things and people by focusing on the meanings constructed around objects.[5] The contextually rich reading produced by such an approach provides occasion to consider those transcendent aesthetic qualities that can become lost in processual archaeologies, but whose recognition belongs to any study of social investment in objects. Finally, isolating and tracking the career of a single object can not only "make salient what might otherwise remain obscure," as Kopytoff notes,[6] but also reveal contradictions in prevailing theories pertaining to types of objects and their use patterns within a culture. It can, for instance, reveal a contradiction that arises from the absence of significant information. An archaeologist might refer to this disjuncture between material record and ancient reality as "positivist fallacy"; a biographer as the "geranium mistake."[7]

This paper employs object biography to explore some missing information concerning the integral role played by certain decorated works of early Greek art as objects used in social rituals. I focus on two painted vases from the Early Iron Age, specifically the second half of the eighth century B.C. One of these vases figures prominently in scholarship of the Geometric period because of its exceptional artistic and aesthetic qualities and the singular absence of close parallels. The other vessel, no less striking, has gone almost unremarked in recent studies. These pots represent the artistic output of two distinct communities, Argos and Thebes, but share several essential features that point to broader cultural patterns. Both vessels were deliberately interred in graves as containers for the bodies of the deceased. Both were distinguished by high aesthetic quality and innovative treatment. The passage of time and shifting meanings will not always result in an object's physical modification.[8] Yet in an archaeological context, shifts in meaning may be detected more readily when an object demonstrates movement in time or space through some visual sign of dislocation: a style far from home, a

[4] Kopytoff 1986, 66, 89.

[5] Rainbird 1999, 214.

[6] Kopytoff 1986, 67.

[7] Positivist fallacy: Snodgrass 1980, 126. Geranium mistake: An old man in a rest home believed that geraniums ate bread at night because the crumbs he sprinkled on them in the evening were always gone in the morning. There was "a piece of information, about birds, that he did not seem to have" (Glendinning 1988, 53).

[8] Gosden and Marshall 1999, 170.

break mended or left unrepaired. In this light, both objects reveal something of at least two phases of their existence—before and at the time of their burial—when their social meanings were transformed. The grave is a behavioral context in which ideas, beliefs, and emotions guide the disposition of material. Our first view of the objects' lives is at the point of their last social appearance. Their use for burials provides the crucial human link, through the vital statistics of the deceased, that makes them ideal subjects for a biographical approach.

Interpretations of Early Iron Age grave goods often bypass the issue of whether funerary offering was the occasion for which an object was made or acquired. The archaeological record presents a fairly uniform picture: the majority of Geometric decorated pots, especially figural examples, have come from graves. While some scholars have doubted that this was their sole intended function, there has been a general tendency to refer to such pots as "grave amphoras" or "burial pithoi." Yet the known circulation of Geometric pottery in gift exchange, trade, and travel suggests greater complexity of its production and use.[9] Recent work has examined early Greek pottery within strategies of self-identification, necessarily based upon funerary context and demographics.[10] Objects that stand out as distinctly higher in quality or apparent value than those of surrounding graves are usually taken as signs of high rank or of some special role of the deceased, predicated on the reasonable idea that certain objects or assemblages are socially exclusive. James Whitley has directly addressed these issues for Geometric pottery from Attic graves. His statistical analysis considers not only total grave content but also shape, decoration, and size of vessel in correlation with grave type. His findings demonstrate a close relationship between vessel production and funerary use in the ninth century that breaks down in the later eighth while stylistic change accelerates, revealing an apparent paradox: the stylistic and iconographic enrichment of Attic LG II pottery that was viewed only briefly at a funeral and immediately buried.[11] While Whitley is surely right to tie stylistic change to social developments, burial is the only social ritual he considers. When the presumed connection between art and burial breaks down, and pottery is no longer viewed as a primarily funerary accoutrement, he must conclude that style has been "divorced from particular social needs" and reflects a confusion paralleling the social disorder generated by the processes of state formation.[12]

Social hierarchy is only part of the story. The assumption that fine painted pottery was mainly intended for ostentatious funerary use shortchanges both the artists and the role of material culture in a society. Pottery painters, as Anthony Snodgrass and others have shown, were the leading artists of their day, influencing as often as borrowing from other crafts.[13] Painted decoration offered the potential for complex expression found in no other medium and a larger social role than is usually assumed. The specific changes in iconography provide a valuable clue to understanding the changing roles of Geometric pottery and imagery. The new motifs in Attic LG II, including athletic contests, a variety of dances, acrobats, cult scenes, hunting, and riders, almost entirely depict non-funerary social situations.[14] These suggest that status may have been one important concern in eighth-century society, but other factors also shaped its material components. In many traditional societies potters are uniquely integral to the ceremonies and routines of social reproduction. When it is time to marry or to bury, to pacify a toddler or placate a god, one goes to the potter. The author of the Byzantine *Geoponika* (85.20) describes the potter as the most necessary craftsman in the countryside. We should expect no less in Early Iron Age Greece, which was demonstrably attuned to the potentials of ceramic form and stylistic nuance. Where, for example, are the origins of such ritual types of pottery as *lebetes gamikoi* and wedding *loutrophoroi* to be found if not among the amphoras and kraters of Attic Late Geometric?[15]

Biography as Metaphor and Method

The challenge, then, is getting the right pots back out of the grave—that is, discerning which vessels might have been employed in other con-

[9] I.e., not solely funerary, see Courbin 1966, 472; Papadopoulos 1993; Boardman 1998, 264; on the pottery's role in gift exchange, see Coldstream 1983; cf. Papadopoulos 1998, 116; on circulation, see Crielaard 1999, esp. 59–62.

[10] Whitley 1991, 1994; Morgan and Whitelaw 1991; Morris 1993; Osborne 1988, 1998; Shanks 1999.

[11] Whitley 1991, esp. 162–80.

[12] Whitley 1991, 179–80.

[13] Snodgrass 1998, 44–9; Vickers and Gill 1994, 110–12; Boardman 1998, 267; Crielaard 1999, 51–2.

[14] Rombos 1988, 35–7. Whitley (1991, 196) did not factor in iconographic changes for reasons that are cogent but surmountable; ignoring the iconography unnecessarily foregoes a valuable source of information.

[15] Ginouvès 1962, 276–82; Oakley and Sinos 1993, 6–7.

texts prior to burial and what those contexts were. Biography, it should be acknowledged, is as much metaphor as method, and while it offers a theoretical relationship of people and things in mutual transformation, its application must be appropriate to the culture under study. The concept takes on a very literal meaning in Pacific ethnographies, for example, where objects are seen as extensions of or even as "detached parts of people circulating through the social body."[16] The idea that one's standing is enhanced through valuable possessions because of who else has owned them may be a particularly Melanesian concept, but Homer offers glimpses of such deeply personalized objects that had accumulated a significant history, a chain of givers, owners, and stories. So, for example, the boar's tusk helmet given to Odysseus by Meriones, the silver krater given to Telemachus by Menelaos, and Agamemnon's scepter are all described by their illustrious biographies (*Il.* 2, 100–108; *Od.* 4, 615–619; *Il.* 10, 260–270). At the very least such Homeric prestige goods suggest that theorizing the central, active nature of objects in early Greek social relations is sound. Homeric works of art are never isolated wonders but function in life situations. In Nikolaus Himmelmann's astute observation, "The aristocratic character of property and its social meaning in the Homeric world are among the essential underlying principles of Greek art."[17] Somewhere between the property of the elite and the ceramic essentials of daily life lies the province of Geometric vessels used in important, cyclical occasions—the ceremonies of marriage and maturation, the feasts and festivals that define a community.

Recognizing the complex and active role objects play in culture is a familiar theoretical stance in postprocessual approaches to archaeological material.[18] Equally clear is the need for interpretive constraints.[19] The application of biographical methods to artifacts as to humans involves a certain amount of reconstruction, but does not license the interpreter's unrestrained subjectivity. The conventional (pre-postmodern) wisdom sees the biographer as "an artist under oath," who has a duty to both fact and reconstruction.[20] The juridical tone of the phrase is appropriate for archaeological application as well. The approach must be grounded in standard archaeological procedure: understanding an individual object depends on established parameters of the typical in size, material, form, decoration, function, symbolism, use contexts, and depositional patterns. The following case studies are not used simply as springboards for alternative narratives. Rather, they were specifically chosen because conventional interpretation leads to unresolved contradictions: a tomb that is both "rich" and "poor," pots considered solely funerary that attest previous use. Similarly, interpretive possibilities are grounded in a network of evidence drawn from numerous sources, including iconography, texts, and later parallels. The ultimate goal of this study is to generate, through empirically rich contexts reconstructed by biographical data, a framework within which a broader analysis of the social role of Geometric pottery can be undertaken.

To this end the following strategies are employed. Since any anomalous object or context may simply represent random occurrence, the comparison of two (more are indicated later) case studies having significant points of correspondence can support a larger pattern not previously revealed by the conventional evidentiary approaches. In these cases, large vessels of innovative decoration, unparalleled in their cemetery contexts, contain bodies and reveal evidence of prior use. This study focuses on exceptional objects for two reasons. First, from their outward signs of scale, fine craftsmanship, innovation, and labor-intensive production one can presume some notion of value and significance above that of standardized, common pottery. Such vessels exhibit what Henry Glassie calls a rich "display of purpose" through the embodiment of value.[21] Second, the exclusivity of the burial context can be challenged more readily through exceptional objects than through the standard ceramic fare of typical assemblages. The problem is straightforward: do atypical grave goods constitute idiosyncratic objects placed in unexceptional funerary contexts or idiosyncratic biographies—that is, standard objects used in an unusual way? These biographical case studies address the issues of type and stylistic parallel from this viewpoint. The presence of an atypical or anomalous object (as defined by type, size, imagery, quality) in a grave may be explained not because it marked a special status for the deceased within the community, but because it had a prior role in the life cycle rituals that created the

[16] Gosden and Marshall 1999, 173.
[17] Himmelmann 1998, 49.
[18] Shanks and Tilley 1987; Hodder 1989, 1991; Robb 1999; Sørensen 2000, 94–5.
[19] Thomas 1995; Trigger 1998, 27–30.
[20] Glendinning 1988, 53.
[21] Glassie 1999, 18.

social persona of the deceased, and its deposition in the grave resulted from this association.

This study makes two assumptions in reconstructing social rituals: that basic rites existed in early Greece, and that material objects were used in their performance. These premises allow us to break open familiar patterns formed by purely functional typologies. The presence of social rites can hardly be doubted.[22] Transitional life cycle events such as birth, death, age-group initiations, betrothal, and marriage constitute the machinery of cultural reproduction, the pulse of the social organism.[23] The prominence of objects in such rites of passage, whether as ritual equipment, products, or gifts, is ubiquitous in the ethnographic literature.[24] Mary Douglas succinctly argued their efficacy:

> Without some conventional ways of selecting and fixing agreed meanings, the minimum consensual basis of society is missing. . . . [R]ituals serve to contain the drift of meanings. Rituals are conventions that set up visible public definitions. . . . Some are purely verbal rituals, vocalized, unrecorded, but they fade on the air and hardly help to limit the interpretive scope. More effective rituals use material things, and the more costly the ritual trappings, the stronger we can assume the intention to fix the meanings to be.[25]

The recognition of such material in the archaeological record, especially for a primarily oral society, is a problematic but essential challenge. The centrality of gift exchange within the social and economic world of early Greece suggests that life cycle rituals not only created new social personae but were significant occasions to establish or reaffirm relationships among the members of family, kin groups, and community. As a result, ritual events would entail the exchange of gifts, goods, and services among the participants.[26] Extended across a lifetime, these bonds structured the lives involved and may have become equally a matter of economic as of social consequence. Passage rites and similar social events might leave little archaeological trace, but pottery likely figured among the objects and imagery that equipped rituals (in which consumption, purification, and offering are typical ritual features) or served as gifts or markers of achievement. Pottery lacks the intrinsic value of artifacts, usually metal, whose precious materials made them suitable for gift exchange.[27] Yet distinguished by size or aesthetic treatment, common pots might acquire high prestige and value proportionate to the labor and skill they represent. The striking and flexible modes of ceramic decoration are in fact ideally suited to actions and exchanges surrounding rites of social passage.

The interpretation of Geometric iconography is a richly contested subject. Past study has tended to polarize debate in terms of epic/mythic and contemporary "real-life" representations. Few researchers have taken very strong stands at either end of the spectrum, and most identify certain images as mythological and locate the rest in eighth-century realities.[28] The source of the debate arises not from the ambiguous imagery but from the modern notion of such a dichotomy. Taking a cue from the success of Geometric style and its developments through a period of evident social upheaval, we can assume that the basic content of Geometric figural work is structured by contemporary social concerns. The imagery is often, but not always, overtly veiled in heroic guise. Real social types and actions filtered through myth and ritual helped the eighth-century Greeks to order and comprehend their world, using images not so differently from their Classical descendants.[29] The Geometric qualities of ambiguity and generality, which can leave images of warriors dueling or a man claiming a woman open to multiple identifications, allowed the ancient viewer to participate in the social configuration and behaviors grounded, through heroizing elements, in mythic authority.[30] As approaches to decoration varied among different local painting traditions, however, our interpretations must take into consideration local concerns and conventions. A logical extension of the idea that pottery could play a significant role in ritual because of its flexible and descriptive decoration is that such objects were created as totalities, their decoration not ran-

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[22] The existence and nature of rites of passage in classical Greece, after rather extensive support in past decades (Brelich 1969; Vidal-Naquet 1981; Dowden 1989; Calame 1997), remain controversial. Difficulties stem partly from an uncritical application of van Gennep's formula (1960) to a wide scope of myths, institutions, and literary works with little textual support or social analysis (Calame 1999).

[23] van Gennep 1960.

[24] E.g., van Gennep 1960; Mauss 1990; Strathern 1988; Weiner 1992.

[25] Douglas and Isherwood 1996, esp. 43–7.

[26] Cyphers Guillén 1993, 281; Morris 1986, 1989; van Wees 1992, 104. See Garland 1990, 95 on the social value of gifts in postnatal rituals.

[27] Finley 1980, 120–3; Appadurai 1986, 19–21, 38; Mauss 1990; Morris 1986, 1989; Kurke 1999, esp. 10 and n. 21.

[28] See Fittschen 1969; Rombos 1988, 19–33; Ahlberg-Cornell 1992 for extensive bibliographies. Snodgrass (1998) dismantles the maximal epic view.

[29] For similar approaches, see Bérard et al. 1989; Beard 1991.

[30] Langdon 1998, 269–70.

Fig. 2. Late Geometric pyxis C.209 from Argos tomb 23. (Photo by Emile Séraf, © EFA)

dom but keyed to shape and function in the broadest sense. Vessel and image worked together to define social identity, cohesion, and transformation.

The two objects examined here began their lives as gifts or ritual equipment within the system of material symbols that mediated gender, age, and status in the community, and became associated with specific families or individuals. The task at hand is to demonstrate that these unusual pots—a giant Argive pyxis and a decorated Theban pithos—were created for rituals among the living. For the pyxis, the well-documented Argive burial customs and the vessel's own formal qualities support the argument. The iconography of the Theban pithos offers surprising evidence for contemporary ritual activity despite the relative obscurity of local burial contexts. The terminus of both objects in a grave signals a clear decision to remove them from the world of the living and forego alternative use as gift, heirloom, or votive offering. In the one case, over a long lifespan a vessel may have become so intimately associated with its owner as to render future exchange undesirable. In the second, for a child the pot might have served to signify the life stage last attained, or to bring an incomplete social state to posthumous closure. Such interpretations emphasize how objects might have articulated identity and social order in early Greece.

THE GREAT ARGOS PYXIS

Argos tomb 23 was excavated in 1953 in the Bakaloiannis plot in the southwest sector of the modern city. The burial (hereafter T.23) consisted of a large globular pyxis (C.209, fig. 2) with tripod loop feet; it was found lying on its side with its mouth oriented to the west and closed by a krater.[31] Interred within the pyxis were long bones judged by osteological analysis to be those of a woman about 35 years old.[32] Excavation revealed that the side of the vessel had been sliced by Roman terracing, but the interior was sufficiently preserved to assure that it held no grave goods.[33] The pyxis stands 1 m high and is decorated with a veritable compendium of the Argive painters' repertoire during the Late Geometric I phase, ca. 750–730 B.C. Motifs and composition here reach fuller development than in some examples of LG I pottery, and its date might thus be narrowed to about 740/735 B.C.[34] The dense textile-like scheme of metopes and continuous bands depicts a tripartite world in which water, land, and air are evoked through animal imagery (three different bird types that resemble hefty Great Bustards, long-necked storks, and sinuous marshbirds; various types of fish; snakes) and the human realm (tethered horses; a pair of wrestling men, unique in Argive painting, tucked beneath each handle, fig. 3). Some viewers might also find the scheme of sky, earth, and sea continued in the sunwheels, quatrefoils, and stacked zigzags of the linear motifs.[35] The ambitious scope of design is matched by painstaking execution. The pyxis mouth was stoppered by a large krater (C.210) that was, when whole, equally impressive within its own class of vessel (figs. 4–5).[36] The krater, now missing its foot and lower body, originally would have stood 0.5 m high; its paired stirrup handles and broad body were covered in a web of figural and geometric de-

[31] Courbin 1954, 178–80, pl. 6G; 1974, 34–5.

[32] J.L. Angel cited in Courbin 1974, 34; cf. Charles 1958.

[33] Courbin 1954, 178–80; Foley 1988, 37.

[34] Argos C. 209, H. 1.04 m. Courbin 1966, 177 for dates, pl. 100–104; 1974, 34, pl. 28; Coldstream 1968, 126, 330, pl. 26; 1977, 141, 143, fig. 45a.

[35] For the significance of Argive motifs, Courbin 1966, 473–95; 1992; Boardman 1983; Langdon 1989.

[36] C.210, pres. H. 0.39 m. Courbin 1966, 177, pl. 41; 1974, 34–5, pl. 28; Coldstream 1968, 139–40.

signs. Taken together with the pyxis, the Argive figural tradition is fully represented: in four panels a man leads a horse, in two more a man stands between horses, and four panels carry lines of five or six dancing women, possibly the earliest in Argive painting.[37] A continuous frieze of reclining deer, a rare motif in Argive Geometric runs under the rim.

While the aesthetic merits of this spectacular pyxis have been celebrated in the scholarship of early Argos and of Geometric art (being called, e.g.,"the zenith of the local style at its grandest and best" and "the apex of Argive Geometric"[38]), its discovery in a burial greatly increases its interest by introducing two biographical clues. The first has to do with the specific type of burial in a ceramic container. The vessel shape is derived from small covered pyxides. Yet when enlarged to meter-high scale, the pot is more akin in construction, shape, and function to a pithos, and T.23 is thus customarily classed with pithos burials.[39] A second biographical clue is its chronological complexity. The burial is given a terminus post quem of about 715 B.C. (LG IIb), not by the pyxis but by the krater, which was made some 25 years later than the pyxis.[40]

It should be noted that T.23 was a single-use burial, not reused in LG IIb. Plentiful evidence for both accidental and intentional reopening of tombs in Argos supports a general respect accorded the earlier deceased: their bones tend to have been reinterred and sometimes given new offerings or other placatory treatment.[41] The lack of offerings or other skeletal material in T.23 as compared with the few documented successive pithos burials, such as Argos T.190, argues against prior funerary use. In fact, successive interments rarely occur in pithoi and characterize less than 10% of ceramic container burials in the entire plain.[42] The burial can be considered a primary interment with vessels of differing ages.

A brief survey of the burial patterns of Late Geometric Argos provides context for T.23.[43] In addition to smaller ceramic containers, cist and pit graves constitute the other common tomb forms. Within Argos certain customs, such as grave groupings, the non-segregation of child burials, tombs with multiple occupants, and the dispersal of these groups throughout the central habitation area, support kinship as the fundamental structuring factor in the community's burial practices. Certain developments in the second half of the eighth century are shared with the other communities of the plain: an increasingly westerly orientation of tombs and the rising predominance of pithos burials at all sites, which catches on in Argos only shortly before 700 B.C. But specific to Argos alone is the appearance after 750 B.C. of bigger and richer cist graves with numerous gifts and often successive interments. Burial types at Argos show a limited degree of segregation, with cists clustered in the central area of the modern city, and pithos and pot burials more frequent in the north, west, and southwest areas.[44]

Fig. 3. Wrestlers, detail of pyxis C.209. (Photo by Emile Séraf, © EFA)

[37] Coldstream 1968, 141. Courbin disagrees, dating the Panoply grave that contained krater C.229 with dancers to LG IIa (1957; 1966, 177).

[38] Coldstream 1968, 127; Foley 1988, 56.

[39] For shape, see Courbin 1966, 246; Coldstream 1968, 126. As a pithos burial, see Courbin 1974, table p. 5; Hägg 1974, 140.

[40] For absolute date of krater C.210 within LG IIb, see Courbin 1966, 177.

[41] Courbin 1974, 143–7.

[42] Hägg 1974, 148–9.

[43] On Argive burial customs, see Courbin 1974, 1977; Hägg 1974, 1983, 1998; Bommelaer 1977; Morris 1987, 183–5; Foley 1988, 1998; Whitley 1991; Morgan and Whitelaw 1991; Touchais and Divari-Valakou 1998. Asine is an exception to many of the patterns, Hägg 1998.

[44] On the center of ancient Argos, Hägg 1974, 33, 39; but see Courbin 1977, 327–8. For segregation of tomb types, see Foley 1998, 138–9.

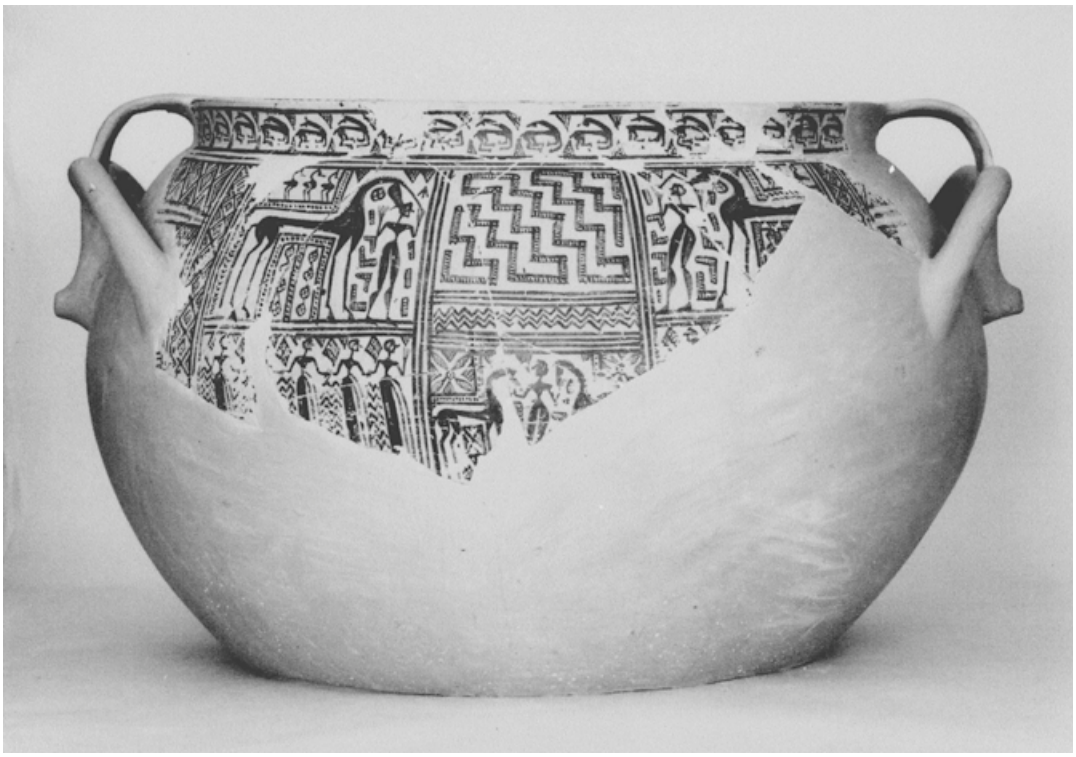

Fig. 4. Late Geometric II krater C.210 from Argos tomb 23. (Photo by Emile Séraf, © EFA)

Nevertheless, the intermingling of tomb types is a significant feature of Argos and their segregation should not be exaggerated. Tomb 23 lay in the vicinity of some notably wealthy neighbors—several cist graves including T.106 and the Panoply tomb—in the southwest part of the modern city.

Pyxis C.209 signals several anomalies in T.23 as compared to other Argos graves. It is unparalleled as a LG I monumental decorated (i.e., non-pithos) ceramic tomb, which along with other evidence discussed below suggests that it was not originally made for funerary use.[45] The pyxis was interred in LG IIb, at a time when the rich cist graves attest new interest in demarcating groups through competitive burial display.[46] Contemporary pithos burials with few or no gifts appear as outliers to this elite set, yet in this case two of the finest products of the Argive pottery tradition form a tomb that has more in common with the poorer burials.

Decisions that governed the stratified burial typology in Argos are far from clear. Two factors not fully understood are gender and ethnicity, although the questions have been raised. The suggestion that pithos burials reflect ethnic affiliation has been convincingly dismissed by Jonathan Hall, who finds irregularities in all the perceived patterns and emphasizes that persons of different ethnic affiliation rarely share burial space.[47] More attractive is the idea of a gender-specific association of pithoi and women, but here as well difficulties arise. Whitley has observed that at Argos the LG II richly endowed cist tombs became principally associated with males marked as warriors. Restricting the use of ceramic-container burials primarily to women and children effectively excluded these groups from the pageantry of high status burial.[48] This pattern may relate more strictly to class or kinship than to gender, for two men and a woman were interred successively in pithos T.190, while at least two women shared cist tombs with men who predeceased them (T.14, 173).[49] In other words, family trumps gen-

[45] The other two known large Argive vessels with loop feet found in graves, both amphoras, are later in date, and at least one is significantly smaller than the pyxis. Nauplion Archaeological Museum 10006, H. 68 cm; Coldstream 1968, pl. 28D; Charitonides 1966, 127 from Argos, found near the OTE. Courbin 1966, 246 and pl. 105 cites other fragments of large decorated loop feet, none identifiable as LG I.

[46] See supra n. 37 for the close contemporaneity of T.23 and T.45 (the "Panoply Grave"); Hägg 1983, 1998; Foley 1988, 37.

[47] Foley 1988, 38; 1998; Hall 1997, 122–8.

[48] Whitley 1991, 190; similarly, Hägg 1974, 136.

[49] Courbin 1974, table p. 5 uses osteological evidence, which is occasionally updated in the text with newer studies by J.L. Angel and R.-P. Charles.

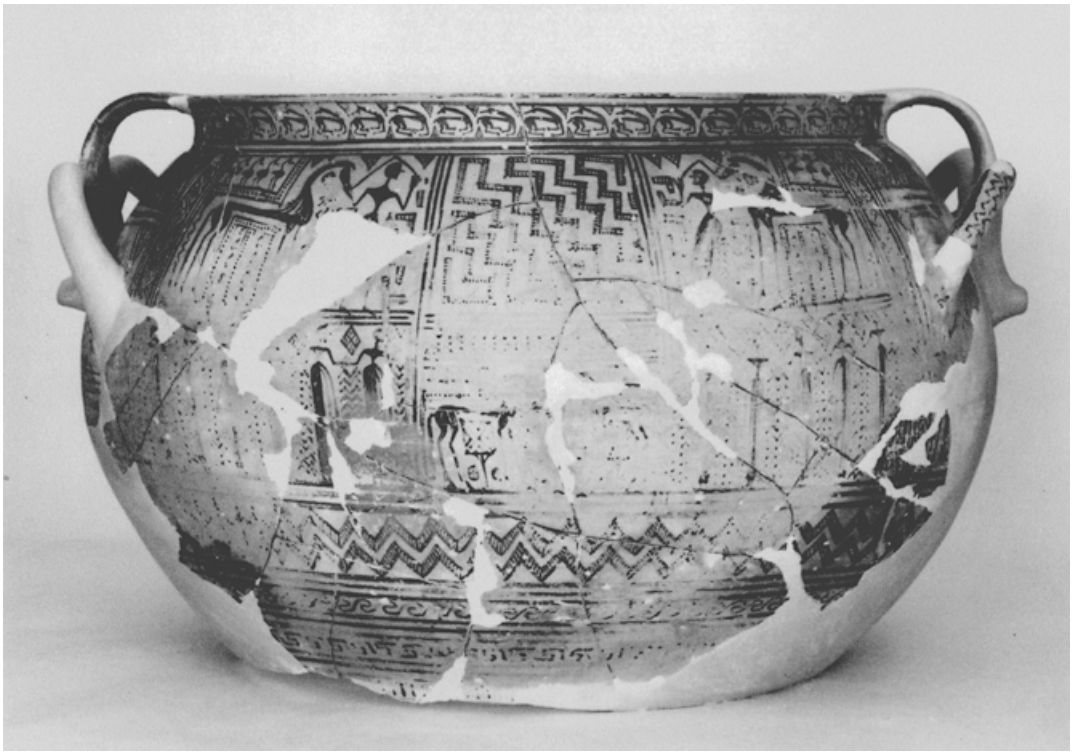

Fig. 5. Late Geometric krater C.210, other side. (Photo by Emile Séraf, © EFA)

der, but visibility is attached to the male for whom the cist was made.

Tomb 23 hardly qualifies as an "invisible" pithos burial, with its pyxis standing in direct contrast to those undecorated specimens. Nevertheless, linking the choice of ceramic burial with the gender of the deceased raises the anomaly of the krater. In Geometric Athens, as in Homeric epic, kraters define the realm of men. Their exclusive sympotic associations allow kraters, whether of metal or ceramic, to circulate within the social bonds of gift exchange.[50] The same associations designated kraters as the visual markers of deceased elite males in the Kriezi Street and Dipylon cemeteries.[51] Outside Athens the pattern is less clear. In Boeotia, for example, a notably wealthy grave of an adult woman at Lake Paralimni included a magnificent Boeotian krater along with Attic horse pyxides, seals, bronze figurines, many vases, gold and bronze jewelry, and two infants.[52]

In the Argive plain, kraters have a particular presence as a favored shape that is also the main bearer of imagery. Krater C.210 is especially rich with its orientalizing deer and unusual combination of horseleaders and female dancers. Both motifs appear regularly on kraters and drinking cups. In the aristocratic horseleader the religious, social, and economic interests of the Argolid are personified; in dance the community acts in concert. Together they express collective identity and cohesion through social types that in their generic form mediate the protection and well-being of the land. Behind every horseleader shimmers the image of Poseidon, in the maiden dance the protecting Danaiads.[53] In juxtaposition, however, they suggest more than in isolation. The contrast between the maiden cohort in their number and replication and the individuality of the horse-master has implications for the construction of gender in Argive society.[54] Bridled horses and belted maidens set within the domain of the horseleading icons of husbandry: juxtaposed on ceremonial kraters they possess a force of cultural, even divine, authority, a vision of gendered, hierarchical social order.

[50] Luke 1994. On kraters in gift exchange, see Coldstream 1983; on gift exchange in Early Iron Age Greece, see Morris 1986, 1989.

[51] Boardman 1988; Whitley 1996, 221–3.

[52] Spyropoulos 1971, 7; Demakopoulo and Konsola 1981, 57.

[53] Boardman 1983; Langdon 1989, 1998.

[54] Like the collectivities of mythic heroines (e.g., the Danaiads), the Argive dancers, changeable in number but identical in features, imply subordination; see Calame (1997, 30) for mythic collectivities. By contrast, the horseleader is occasionally duplicated for purposes of symmetry, but remains singular within his frame.

Kraters are not generally associated with female burials in Argos. Examples have been found in numerous male cist burials of LG IIa and IIb date, and others served as containers for four (unsexable) infants in LG IIc.[55] Besides T.23, the only other osteologically sexed female burial linked with a LG krater occurs in a cist where the presence of an earlier male inhumation complicates the picture: the krater may have been offered to the earlier deceased whose remains were disturbed.[56] A krater is not a standard lid for pithoi, which are more often closed by stones and sherds. In Argos T.316 a krater with a broken-out base topped a pithos burial and seems to have protruded above ground to mark the grave and perhaps to receive *spondai*.[57] Jean-François Bommelaer found support for such ritual in a possible funerary libation depicted on a Subgeometric krater, and he noted the great number of funerary kraters with intentionally broken bases.[58] It is not clear whether the bottom of C.210 was purposely removed or was lost during Roman terracing. Still, the evidence for ritual alteration of kraters suggests that their social and symbolic associations figured in their role in tomb construction. The combination of a female-associated ceramic vessel burial with the male-associated krater C.210 complicates the gender identification of T.23. In fact, the pyxis shape itself signals female identity. Paul Courbin has noted that in Argive Geometric graves pyxides are generally associated with women rather than with men.[59]

That the pyxis was not originally intended for funerary use is best supported by the fact that it was made some 25 years prior to the earliest possible date for the grave. While the lack of parallels in Argive graves was noted above, the deeply rooted contention that it is a funerary vessel is worth refuting on other grounds as well. These include the suggestion that it was a grave marker later recycled as a coffin. The intentional reuse of tombs implies a marking system, as attested by slabs and the krater of T.316, but there is no direct evidence for monumental vessels used this way.[60] The very form of the pyxis argues against this. The stability of tripod feet on an earthen surface accounts for neither the loop form of these feet nor their completely decorated surfaces.[61] They are relatively fragile as supports, but could be threaded with a rope and so maneuvered, tipped, and transported.[62] Courbin believes that very few Argive vessels were made exclusively for burial, and most of those found in graves can be assumed to have had a prior use. Certainly the occurrence of lead joins on some burial pithoi attests earlier, presumably domestic, use.[63]

If not made for the grave, then for what was the pyxis used for the 20 or 25 years between manufacture and burial? Here the questions of style and its social role in the Argolid become crucial factors. Catherine Morgan and Todd Whitelaw have demonstrated that the region was marked in the later eighth century by intensifying social differentiation negotiated through increased material display. Newly elaborate decoration and elitist iconographic motifs in pottery played an active role in this phenomenon throughout the plain.[64] The overtly competitive imagery of paired wrestlers (among the first Argive human representations) puts the pyxis in the vanguard of this effort. Its visual power and recognizable style would have advertised a family's high rank in the social strata of Argos, as distinct from other communities. Accordingly, a much greater variety of figural motifs appears in sanctuaries than in graves: in the ground, the effect is mute; in the house or sanctuary, it is powerfully deployed. The relatively few published sherds from the Argive Heraion attest themes unrepresented in Argos graves: warrior frieze, Siamese twins, boxing match (cf. the C.209 wrestlers), chariots, sea battle, lion hunt, kithara-player. Indeed, Robin Hägg has observed that the deposition of fine decorated pot-

[55] Kraters in male cist burials: T.6/2, 175, 45, the Theodoropoulos plot; infant burials: T.38, 43, 131, 195; indeterminate cist: T.1, Courbin 1974; Deilaki 1973, 99. The use of kraters for infants, a practice that apparently begins in LG IIc, is a separate topic.

[56] Courbin 1974, 71–2, T.173.

[57] Bommelaer and Grandjean 1972, 165; Hägg 1974, 146, 147 table 34 on lid types for ceramic graves.

[58] Bommelaer 1972, 245; Hägg 1992b. Boardman (1988, 176) finds the alteration of a krater for such a ritual unnecessary. The question arises whether Bommelaer correctly identified intentional perforations, but accidental breakage that left the entire upper krater wall and rim intact would probably be rare.

[59] Courbin 1974, 127; cf. Strömberg 1993, 102 for a similar pattern in Athens.

[60] C.209 as funerary, Bommelaer 1977, 331–2; as possible marker, Hägg 1992b, 173, n. 11 without addressing how it came to be used as a coffin. For evidence of markers, Hägg 1974, 154–6; Courbin 1974, 140; 1977, 329.

[61] In fact most vessels with tripod loop feet are small and quite varied, ranging from open bowls to pithoi, jars, and amphorae; Buchholz 1983.

[62] Courbin 1966, 263. This explanation is not necessary for small vessels with loop feet of more formal tradition than functional use.

[63] Courbin 1966, 472 n. 6; 1974, 150. For lead joins, see Hägg 1974, 146; for an example from Bertzeletos plot, Argos, see Charitonides 1952, 416 n. 1.

[64] Morgan and Whitelaw 1991.

tery in shrines and sanctuaries was instituted as a new feature of cult practice starting about 750, and suggests that the high quality drinking vessels, kraters, and monumental vases might have played the same role of status display as tripods, for example, at Olympia and Delphi. Monumental decorated vases are known from sanctuary deposits on the Larissa and the Aspis, where among the poorly published material are reported finely decorated sherds 15 mm thick.[65] Pyxis C.209 was never dedicated in a sanctuary and so suggests domestic use.

Pithoi were standard domestic furniture for storing bulk items like oil, grain, wine, or water, and even this giant pyxis with its delicate loops could be stabilized for storage.[66] On the other hand, the intrinsic value suggested by its labor-intensive painted decoration belies such prosaic usage and recalls its origin in the globular pyxis form. With their much smaller scale, elegant patterns, and rims made to accommodate lids, pyxides were intended to contain dry goods, often of an inherently valuable nature: jewelry and other small objects, perhaps precious substances such as dried herbs and powders. Their sumptuary links made them the perfect gift boxes.[67] The giant pyxis was decorated and shaped like these small fine containers, but with a tremendous advantage in capacity and ostentatious display. It is best suited for the storage of items of more bulk than weight whose significance was commensurate with their presentation in such a container. Fine ceramics not used on a daily basis, for example, might have been nested in the pyxis.[68]

Pursuing a line of reasoning that connects the standard uses of the pyxis more closely with the occupant of the tomb adds elements of family history and lifespan to the biography. If the krater C.210 was relatively new when buried ca. 715, the deceased must have been born around 750.[69] The pyxis would have been made when she was in her very early teens—that is, when she reached puberty.[70] This biographical parallelism, with the pot and the woman perhaps sharing much of their respective lifespans, raises questions about when and how the woman's family obtained this valuable vessel. The creation of the pyxis around the time of her coming of age raises the possibility that it was acquired by her family to hold something that she would bring to her marriage. The textile-like appearance of the pyxis surface has often been noted. It might suggest that the pyxis held the worked wool or even the very textiles the deceased and her mother had been weaving since her childhood, and that she was expected to bring to her new home. The production of cloth would have dominated her married life as well. Weaving as familiar metaphor for marriage was objectified in the vestments given as a gift from the bride to the groom and in her *pherne*, to be understood as a trousseau rather than a dowry.[71] Not only the creation of fine textiles but also their safe storage for display and distribution as guest gifts were among the important responsibilities of aristocratic women.[72] Although Homeric women usually retrieved these garments from wooden chests, a stupendous lidded storage vessel decorated like the very textiles it contained is not difficult to imagine. A ceramic container would have offered more effective security from rodent and insect pests than basketry. Indeed, an image on a small Archaic Corinthian aryballos depicts women at looms, and shelving beside them that appears to hold lidded jars—containing perhaps wool thread?[73] Homer's audience was familiar with the idea of weaving as women's proper activity parallel to war (or discussion) as men's work; Penelope's virtues are encapsulated in the single image of her weaving.[74] As a striking domestic centerpiece, the giant pyxis would

[65] Hägg 1992a, esp. 11, 21. For pottery from the Argive Heraeum, see Waldstein 1905, 112, pls. LVI, LVII; from the Aspis and Larissa, see Roes 1953, pls. XXIV, XXV, XXIX.

[66] On standard uses of pithoi, see Devos et al. 1999. For stabilization, the pithoi built into benches in the houses at Zagora, e.g., Cambitoglou et al. 1988, 80, H 19.

[67] The most famous example is Pandora's gift from Zeus, which Hesiod calls a pithos (*Op.* 94). Homer cites Zeus's two pithoi containing gifts (*Il.* 24, 527). On pyxides and other containers associated with women, Lissarrague 1995.

[68] As a possible parallel, pithoi filled with pottery in the Ulu Burun shipwreck; Bass (1986, 279) compares pithos KW 251 to a modern "china barrel."

[69] A terminus post quem is no guarantee of date, but in the absence of stratigraphical context to the contrary, the date can be provisionally accepted.

[70] On age of puberty and marriage, see Dean-Jones 1994, 47–8; Foxhall 1998, 125; Ingalls 1998, 21 n. 31. Dean-Jones notes that while first menarche was not ritually marked in classical times, social puberty was recognized at age 14.

[71] Redfield 1982, 194–5, 199 n. 15; Scheid and Svenbro 1996, 53–82. On *pherne* as trousseau rather than dowry, see Vernant 1988, 67. Solon's interest in limiting, as part of his sumptuary reforms, a bride's pherne to three changes of clothing and small household items bespeaks the lavish parades of weavings and other goods that had become customary (Plutarch, *Solon* 20, 4).

[72] Jenkins 1985, 109–12.

[73] Barber 1994, 241 fig. 10:2. Some of the pithoi at Pessinus were found to contain remnants of textile production, although the excavators question whether this was their original use (Devos et al. 1999, 97).

[74] *Il.* 6, 490–492; *Od.* 1, 356–359.

have interwoven statements of ideal feminine industry and familial prosperity that integrated the owner's identity as daughter, wife, and woman of a particular status in Argos.[75]

The marshbirds, watery zigzags, and bridled horses of C.209 exemplify the conventional reading of Argive iconography as elaborating the world of the horse-rearing, "thirsty" Argive plain. Into this world the vigorous little wrestlers tucked beneath the handles (fig. 3) introduce a combative note nearly missed in the bustle of pattern and panel. It slips without difficulty into a generalized aristocratic vision of competitive excellence in keeping with the ostentatious status-making object on which it appears. It is equally possible, however, to see a more relevant interpretation for a young woman's pyxis. The contest of physical prowess was also part of the discourse of betrothal and marriage much attested in early Greek poetic and historical consciousness. Penelope's suitors or Kleisthenes' construction of a wrestling floor for his daughter Agariste's suitors offer parallels. In Argos one might recall the story of the much sought-after daughters of King Adrastus, who awarded them in marriage to Tydeus and Polyneikes when he came upon them wrestling in the palace, thus fulfilling a prophecy. This event, which initiates the Theban cycle, belongs to an aetiological type of bride-contest tale.[76] The symbolism of the bride contest is another expression of a family's social power and identity. The point here is not that one can always invent a plausible interpretation, but that shifting the focus to a social interpretation of Geometric imagery sets up a new model to be tested across the corpus of material.

These conclusions can be drawn: that the grave is a single unit, that the pyxis was not made originally for funerary use, and that it had previously functioned in a domestic space where it marked the elite status of the family. The pyxis form conjures up a world of female activity that may relate to textile production as well as domestic prosperity, thus doubly signifying family status and feminine industry (and virtue), possibly linked in its owner's life course with the achievement of a stage of social maturity. The intersection of lives—the woman's and the pot's—remains central. Having come to her at a critical juncture in her young life, perhaps at the time of puberty or betrothal, this exceptional vessel played a significant role in the creation and maintenance of her new social persona and was inextricably associated with her.

It remains to understand the presence of the krater. At 35 years of age, the deceased would have been one of the middle-aged women in the community.[77] Although she was still within the childbearing years, she was also of the age at which a woman's social relationships began to shift through such events as widowhood and the arrival of a third generation.[78] The latter aspect is particularly relevant. Greek thought constructed ideas of life experience and social identity around the concept of generations, factored by both time of life and ancestry.[79] Standardized as early as Homer and Hesiod, generational identities rested on cohort solidarities and belief in universal age-linked behavioral characteristics against which individual experience was measured. The experiences of a middle-aged woman would have been defined in part by her relationships, especially to the younger generations. The typical Greek marriage pattern by which a young woman was married soon after puberty to a significantly older husband—the ages of ca. 14 and 30 are the classical norm, perhaps ca. 18 and 30 in the eighth century—led to different experiences of male and female aging. Men, for one thing, had a statistically smaller chance of participating in the upbringing of the third generation in their family. If the couple's first child was a daughter, her mother could become a grandmother in her early to mid-30s, when her father would be approaching 50. Should they have only sons, the age disparity with their first grandchild would be much greater.[80] Al-

[75] On weaving as a wife's ideal and proper industry, see Redfield 1982, 194–5; Jenkins 1985, 109–12; Barber 1994, 273–7; Reeder 1995, 200–2.

[76] Robertson 1991; Gantz 1993, 509–10. On the significance of the Proitid genealogy (to which Adrastos belongs) in Argive ideology, see Hall 1997, 89–107. Courbin (1966, 492–3) entertains a mythological interpretation of the C.209 wrestlers as Epeios and Euryalos of ll. 23, 687–688 only to discard it for lack of identifying detail in the figures; Odysseus and Ajax wrestle a few lines later with a similar description, *ll.* 712–713. For Kleisthenes of Sikyon and his daughter's suitors, Hdt. 6, 126–130.

[77] Charles (1963, 74–6) sets the life expectancy for women in the Early Iron Age Argolid, as in the Mycenaean period, at around 40. Angel (1971, 66–7, 70 table 2) yields similar findings in his small sample of Geometric period skeletal material from Lerna. Cf. Morris 1992 and Chamberlain 1997 on the inherent problems in paleodemographic studies.

[78] Dean-Jones (1994, 105–8) notes that even with a relatively early average age of death at 36–37 for Classical Greek women, menopause would still have occurred at approximately 45–50.

[79] Nash 1978. See also Finley 1981, Falkner 1989, Garland 1990. Following classical authors, modern scholarship on Greek generations and their characteristics has dealt exclusively with men's experience.

[80] Golden (1990, 136) offers these odds: "about 65% of the mothers of firstborn daughters and about one-half of their fathers could expect to see at least one grandchild by them. . . . About 40% of mothers and 22% of fathers could

though Argive customs are unknown, the advice of Hesiod with respect to age at marriage supports this pattern as an ideal in some parts of Greece already by the late eighth century.[81] Whatever her own reproductive status, a 35-year-old woman was old enough to have grandchildren and therefore had crossed a new generational threshold.

This generational structure can be archaeologically investigated through the anthropological concept of "social age," the cultural construction of age that entails behavioral norms and gender expectations apart from, but also utilizing, physiological realities.[82] Its material correlates may take symbolic or ideational as well as practical form. There is evidence that in Argos certain middle-aged women were accorded a recognition of status at burial that corresponded with a "social age" distinct from that of younger women producing families. The dispersal patterns of Late Geometric kraters and other status symbols presented by the sexed Argos graves are striking. Cist tombs, kraters, obeloi, and horseleader symbolism are elements that have been loosely linked with male identity and/or warrior burials—*loosely* because all have occurred with females as well.[83] Yet a closer look reveals that these female exceptions are all around 35–45 years of age. The sample of osteologically sexed Argos graves is admittedly small: 46 burials in Argos ranging in date from EG to LG IIc have been osteologically aged and/or sexed, and usually both for the 31 adult burials (13 female, 18 male). Of the 13 adult female burials, seven fall into the 30–45 range (none is older). Four of these graves (T.14/3, 106/2, 173/2, and our T.23), all LG, stand apart from the rest: the women are in cist tombs (except for pyxis tomb 23), three have kraters, two have pottery with horseleader motifs, and one has an obelos.[84] None of these items is documented with a woman under ca. 35 or in a non-cist female grave (other than T.23).

The question arises whether kraters, obeloi, and horses when attached to older women still carry "male" associations, a subjective and contemporary but still useful concept. In the cist these three Argive middle-aged women "look" like men. In many cultures advanced age brings a person into a phase of gender ambiguity, when elderly women may acceptably pursue activities traditionally designated as "male." In fact, cross-cultural studies of societies from simple to more complex have shown that women generally experience increased freedom and authority with the onset of middle age. This time of life when one has (or one's cohorts have) adult offspring tends to bring with it reduced behavior restrictions, new powers of authority over kinfolk, and increased status beyond the immediate household.[85] In Classical Greece this increase of freedom was partly based on a biological perception. In Aristotelian science, the cessation of menstruation "dries out" and assimilates a woman's body to that of a man. In cultural terms, an older woman by virtue of her nonreproductive body might enjoy "greater authority and freedom because her behavior posed less of a threat to the integrity of the *oikos*."[86] The applicability of Aristotelian views to Early Iron Age society may be questionable (and the menopause explanation is probably not applicable to the occupant of T.23), but there is a more positive way to perceive the vital role played by older women in early Greece. Lin Foxhall argues that because of a woman's relatively early marriage and maturity and her intimate association with family rites and history (as opposed to public, long-term, male-controlled history), her authority over kin and household could increase until she "held sway over three generations of family."[87] The influence of this older generation as repository of wisdom and knowledge would be especially viable in a preliterate society with no alternative written sources.[88] With kinship as a structuring principle in Argos burials, it appears that women of a certain age, perhaps finished with their own childbearing and possibly heading households and kin groups, overseeing the history and rituals of two or three generations, achieved a

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expect to see a son's child . . . fewer than six in ten men who became grandfathers at 65 would still be alive when their grandchild reached five years of age."

[81] *Op.* 695–699. See commentary by West 1978, 327–8.

[82] Sofaer Derevenski 1997b. For other archaeological studies that address age as a factor of gender and social construction, see Whitley 1996; Gilchrist 1999, 105–8; Sofaer Derevenski 1997a, 2000.

[83] Similarly, see Whitley 1996 on the adult male symbolic system, and the lack of one for women, in Early Iron Age Greece.

[84] Statistics from Courbin 1974 with modifications from Charles 1963: cist burial 14/3, 30- to 35-year-old female, with part of an obelos and numerous vessels; cist burial 106/2, 40-year-old female with reused EG krater and LG skyphos with horseleaders; cist burial 173/2, 40-year-old female with krater.

[85] Brown 1982, with commentaries.

[86] Dean-Jones 1994, 108.

[87] Foxhall 1998; Gilchrist 1999, 88. This generational concept is stated by Nestor, who claims to be "now ruling over a third generation" (*Il.* 1, 250–252; *Od.* 3, 245).

[88] Nestor, the prototypical "voice of experience," draws his advice and wisdom directly from his memories of his youth, e.g., *Il.* 1, 259–274; but see Finley's qualification, 1981, 164. Garland compares the differing respect accorded the elderly in "largely illiterate" Sparta with that of literate, progressive Athens from this angle (1990, ch. 6, esp. 286).

new level of social identity. This status was represented by material associated with the world of power and knowledge more usually appropriated by men.[89] Comparison with male graves at Argos may uphold this assessment. Men in their 20s to early 40s have the full range of status markers, but the three LG graves of men aged ca. 45–55, although cist interments, are poorly equipped. One has a single cup, one a pair of handmade pots. A third, while sharing a cist with a contemporary 30-year-old male who has a wealth of goods, has nothing.[90] This pattern recalls a generational scheme less familiar in Homer than in Hesiod, where an older man is defined by physical debility and the cessation of military involvement in the community, with a corresponding decline in status.[91]

In practical terms it is not difficult to understand how a middle-aged woman's social stature might increase as she entered this new generational bracket. The specific definition of this Argive female social group, however, is not revealed by the archaeological material. Class is certainly implicated, but grandparent status, the temporary or permanent absence of a male head of household, particular religious or ritual office, or certain lineage connections may all be factors. The archaeological pattern has interesting implications for comparison with contemporary Athens. Whitley has noted that unlike other regions of Greece, Athens has richly furnished female graves throughout Geometric, and he postulates that middle-aged women might in particular have received special burial treatment.[92] Consideration of the specific use of symbolic elements, however, may be a more effective way to discern female (or male) status than analysis based on the richness of graves. The Argive female graves examined above are not particularly wealthy, but granting women at a certain life stage access to the male symbolic system may signal increased social status. This approach can usefully be extended to Athens, where certain male-linked items or combinations of items, such as kantharoi and oinochoai, may be found to correlate with graves of older females.[93] The occupant of T.23 and the middle-aged women in the Argos cist-tombs reveal that in Argos as in Athens women may have participated in the competitive display of status-making objects and imagery. What the present interpretation of T.23 offers is a way to interpret a change in female gender that is not directly linked with reproduction, through the acquisition, at least at death, of the marks of status among a group of women that brackets both childbearing and post-childbearing women. Carrying the badges of two stages of femininity, the chronological complexity of T.23 in this way reflects the biographical texture of a full female life.

A PITHOS FROM THEBES

Construction workers in the Pyri suburb of Thebes in 1966 unearthed a pithos of 720–700 B.C. containing the bones of a child. Over 0.5 m tall, the cylindrical vessel was covered with painted geometric ornamentation and some striking figural imagery (fig. 6).[94] Two (unpublished) vessels found nearby, a lekanis and a kalathiskos, are thought to belong to the burial. In contrast with Argos T.23, it is difficult to contextualize this burial within a larger Theban, or even Boeotian, funerary pattern. This is particularly true of Pyri, which is best known for the extensive looting and dispersal of its material to European museums in the late 19th century. The present pithos burial is thought to come from the same cemetery as so much of the Boeotian pottery provenanced only as "near Thebes" and acquired by museums in the 1880s and 1890s.[95] In 1985 Sarantis Symeonoglou noted three sites of Geometric graves in Thebes, all north of the Kadmeia, to which can be added the site of Agia Eleousa in Pyri, discovered in 1975 to contain over 40 burials ranging from LG to the fourth century B.C.[96] Pithos burial was common for adults as well as children and seems to have been the rule in Late Geometric

[89] Perhaps with access to rituals as well. Recent studies of iron spits in LG warrior graves at Argos connect them with a ritual meal; see Strøm 1992.

[90] Courbin 1974, T.171, 68–70; T.173/1, 71–2; T.190/3, 87–93.

[91] Falkner 1989, 49–52, 57–60.

[92] Whitley 1996, using CLUSTAN analyses from his 1991 study. There are some problems, however, in that the "Rich Athenian Lady" was analyzed by Angell as 24–40 years of age, and no age has been published for the cremated remains of Kerameikos G41 with which Whitley compares her (1996, 221, 227). His observations hold for female graves, but he does not distinguish older from younger women by definition or analysis.

[93] For example, kantharoi are closely linked with men, but appear in two female burials: the RAL tomb (possibly middle-aged) and the intriguing VDAk 1 which has other strongly male-associated items, Strömberg 1993, 71, Cat. 12, 125.

[94] Excavation report: Touloupa 1966, 197–8, pl. 202 a–b; Michaud 1970, 1034, 1035 fig. 313. Pithos: Thebes Museum BE 469, H. with handle 0.665 m. Ruckert 1976, 91 Cat. Pi 1, pl. 16:3–4; Demakopoulou and Konsola 1981, 57, pl. 28; Boardman 1998, figs. 105:1–105:2. The bones, which Coldstream called an infant (1977, 201), are identified by Demakopoulou and Konsola as a small child (1981, 57).

[95] Boehlau 1888, 325; Ruckert 1976, 10, 12, and n. 14.

[96] Symeonoglou 1985, 84–6, 262, 265, sites 71, 74, 87. At Agia Eleousa (Andreiomenou 1976, 119–20) more than 40% of these tombs were infant/child inhumations in pots dating mostly to the seventh to sixth centuries B.C.

Fig. 6. Pithos from a child's tomb, Pyri, Thebes. (Courtesy of the DAI Athens, 73/2444)

Thebes.[97] Inhumation was standard practice in Boeotia, although the pit graves at Rhitsona and tumuli at Paralimni show that specific grave types varied. The Agia Eleousa excavations show that at least by the seventh century infants and children were sometimes clustered together in a cemetery, but as an isolated find the Pyri pithos cannot be associated with a larger grouping of child burials.

In this case, the container rather than the grave provides a basis for biographical analysis. It is unique as a Late Geometric figure-painted pithos, with iconography that is equally unparalleled.[98] On either side of the vessel, a panel near the top depicts a gathering. On the front side a man holds a lyre and faces a line of six long-skirted females, behind the last of which winds a vertical, dotted serpentine line (fig. 7). Between the man and the women, filling the space below the lyre, stand two small figures, a male and a shorter female, turned toward each other. The small male figure reaches up to the hand of the first woman in line. On the back panel a solitary woman on the right faces a line of eight women much like that on the front (fig. 8). All have reserved eyes and short spiky hair and wear long robes. Where the torsos are better preserved, short vertical strokes on either side of their chests seem to represent the dress rather than breasts. This treatment, however, is not unlike the short angled strokes, some quite thin, that mark breasts on the belted but otherwise nude female dancers on a pyxis in Vienna.[99] Clearly the small figures represent children and not space-cramped adults, as some have suggested. The girl is no small imitation of the larger females, but in contrast to them is depicted without hair or breasts. While the slightly larger youth is distinguished from the man only by size, his pairing with the younger female suggests that both are children.

The few discussions of this vessel either interpret the overall scene as a dance or view the (incomplete) line behind the women as a snake, a representation of *Totenkult*.[100] The women's regular spacing, identical posture, and attention to the musician are familiar from the lines of female dancers in Boeotian Geometric painting. Unlike those examples, the women on the pithos do not hold hands, and the stately congregation of men, women, and children found here are unparalleled in dance scenes from Boeotia and other regions. Prothesis scenes, by contrast, sometimes include children. Indeed, the only preserved Boeotian prothesis, on a hydria in the Louvre, involves a number of children differentiated from the adults by their appearance and gestures (fig. 9).[101] In light of this funerary parallel, the chthonic snake motif, and the terminal use of the pithos for burial, an obvious conclusion is that it was created specifically to contain a child's remains. Imagery suggesting a funeral ceremony within a household of women mourn-

[97] Spyropoulos 1971; Coldstream 1977; Symeonoglou 1985, 94.

[98] The only other published Boeotian example of this form is the slightly later Subgeometric pithos in Brussels, Ruckert 1976, pl. 16:2, 5 Pi 2. Its figurative friezes are heavily influenced by Protocorinthian and Protoattic work, and stand outside the local Geometric tradition of the Pyri pithos.

[99] Vienna, Kunsthistorisches Musem IV 3458, Ruckert 1976, FP8, pl. 21, 6.

[100] For interpretation of the scene as dance, see Fittschen 1969, 22 A 10a; Demakopoulou and Konsola 1981, 57. As *Totenkult*, see Ruckert 1976, 50. Outside of Athens the chthonic snake symbol need not carry only funerary implications. Most snakes on Argive pottery, for example, have come from sanctuaries (Courbin 1966, 484–5).

[101] Hydria Louvre A 575 (CA 639), *CVA* 17, pl. 4, 4–5, pl. 5, 1–4, p. 12 fig. 3; Ruckert 1976, 91 Hy5, pl. 15, 5; Ahlberg 1971, 216–8, fig. 52a, b.

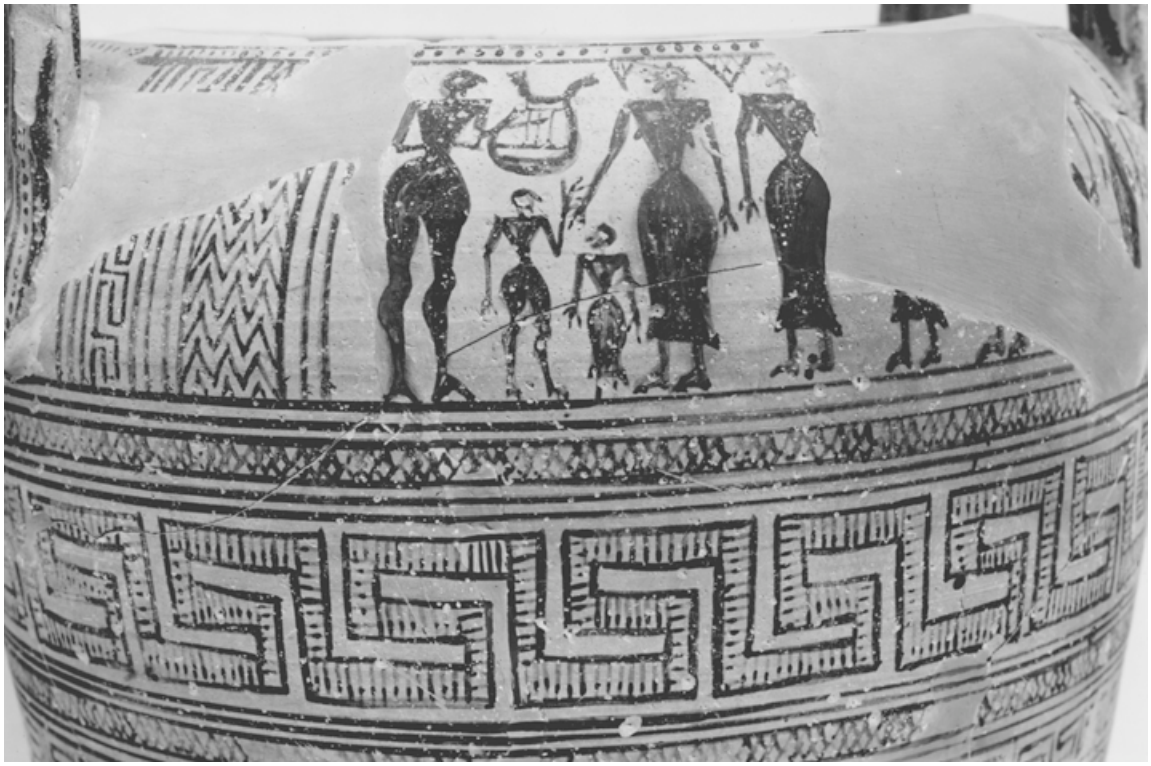

Fig. 7. Pithos from Thebes, detail. (Courtesy of the DAI Athens, 73/2447)

ers and including both a boy and a girl renders the vessel suitable for a child of either sex.

The Pyri pithos also shows signs of ancient breakage and repair on the lower body, and this opens the door to a richer object biography with earlier and later stages of the vessel's life. Detaching it from a purely funerary function invites a new interpretation of its imagery. The lack of parallel among Boeotian dance scenes has been noted, but it is significant that no two Boeotian Geometric dance images correspond in figures' dress, posture, props, sex, or number. Men dance with swords, led by a lyre player; women dance in skirts or nude, with branches or with hands clasped, with a musician-leader or without.[102] These might all seem to be random scenes unlinked to specific events, until taking into account the influence of other pottery styles, which are sometimes evident among these scenes. A trio of skirted, belted, branch-wielding women on the neck panel of a Theban belly-handled amphora might have come straight from Argos, except for their presence on a pot of this shape.[103] A kantharos with nude women dancing with garlands and a wreath to the accompaniment of a lyre looks more Boeotian except for their probably Attic-inspired juxtaposition with boxers on the reverse side.[104] Borrowed motifs need not lack local meaning but likely were adopted because they resembled Boeotian dances. These standard formulations throw into higher relief the local inventions, including the Pyri pithos. In local imagery particular features seem intended to identify rituals, such as the unusual gesture of the women who raise clasped hands around the skirt of a bell-idol, or the oddly belted but otherwise nude females who circle the body of a flat pyxis.[105] Perhaps most indicative that these scenes represent specific types of events is the fact that they vary according to their pottery context. Each different Boeotian dance appears on a different kind of vessel—belly-handled amphora, kantharos, flat pyxis, lidded krater, bell-idol, and pithos—whose functions and personal connections would likewise have differed.

Within the boundaries of Boeotian tradition, the Pyri pithos scene may be seen as a non-funerary group performance. The image is undoubtedly

[102] E.g., Wegner 1968, 75 cat. 61, pl. IIIb; Ruckert 1976, pls. 6:2, 21:6, 26:3, 29:4.

[103] Ruckert 1976, pl. 6, BA3.

[104] Ruckert 1976, pl. 26, Ka 6. Compare with the Copenhagen kantharos NM 727, Ahlberg-Cornell 1988, 56, fig. 1a–b.

[105] Ruckert 1976, pl. 29, Te 4; pl. 21, FP 8. For another specific dance, cf. the Crane Dance oinochoe (Coldstream 1991, 54–5).

Fig. 8. Pithos from Thebes, detail of reverse side. (Courtesy of the DAI Athens, 73/2448)

ceremonial, with the combination of male musician and throng of females suggesting a public gathering. The focal point is not the musician but the youth, who stands before the musician yet does not look at him, as if he were performing to the man's lyre accompaniment. In this case the presence of the girl requires explanation. This particular configuration of ages and genders in ceremonial performance strikingly anticipates the Theban Daphnephoria described in a partheneion fragment by Pindar, a report in Pausanias, and Proclus's *Chrestomathia*.[106] The Classical festival can be reconstructed as follows. Every eight years at the festival in honor of Apollo Ismenios, a chorus of girls carried laurel through Thebes and across the River Strophia to the nearby sanctuaries of Apollo Ismenios and Galaxios. A boy of noble family who was *amphithales* led the procession; he was made priest of Apollo for a set period of time (Pausanias says a year) and bore the title *daphnephoros*. A close adult male relative of the boy carried the κωπώ, a log wound with laurel, flowers, cloth, and small objects. The young daphnephoros served as choregos, a role he shared with a young girl (πρώτα), and the two headed a maiden chorus that sang praises, first of the daphnephoros and πρώτα, then of Apollo, while walking in procession rather than dancing. Early scholarship on the festival, particularly by Martin Nilsson and Lewis Richard Farnell, focused on parallels for the log-carrying procession, the kopophoria. Akin to the Plataean Daidala and other early Boeotian log festivals, it was derived from a northern European type of annual maypole celebration. The view synthesized by Ludwig Ziehen is generally accepted now: the classical festival conflated at some unknown date two earlier, separate processions, the kopophoria and the daphnephoria proper.[107] The origins of these two distinct rites and the order of their introduction at Thebes remain controversial. Apparent contradictions and vagueness in the ancient sources suggest that their integration was never complete. Proclus, glossing Pindar, describes the festival originally as a laurel-bearing celebration of Apollo, but he does not address how the log became part of the ceremony.[108]

[106] Pindar *Fr.* 94b, Pausanias 9.10.4, Proclus, *Chrestom.* in Phot. *Bibl.* 321 a 35–b 32; sources discussed in Ziehen 1934; Schachter 1981, 83–5; Calame 1997, 59–63.

[107] Ziehen 1934 summarizes the earlier scholarship.

[108] Severyns 1938, 51–3.

Fig. 9. Hydria from Thebes, Louvre A 575 (CA 639). (After *CVA* 17, 12 fig. 3, with permission)

Albert Schachter has usefully shifted the focus to their specific relation to Thebes. He plausibly connects the kopophoria with the Kopais, through both etymology and the setting of its aition, as reported by Proclus. Two warring neighboring groups were told by an oracle to settle their disputes by gathering laurel from the slopes of Helikon and the River Melas (the margins of the Kopais) for a joint festival of Apollo.[109] Together the story and the adorned log procession, according to Schachter, point to the kopophoria as a "non- or pre-Apolline" rite originating elsewhere and only later imported into Thebes. He considers the Daphnephoria proper, the Apolline ceremony, to have been introduced to Thebes under Delphic influence.

Although the textual sources are late, differ widely in time, and cannot be fully reconciled in all details, one consistently represented feature of the festival is its generational aspect, and this provides the most important point of correlation with the Pyri image. The age and gender roles of the Daphnephoria participants are clearly represented. The boy's gesture to the first woman signifies his role as choregos. The musician may be his father or the adult male relative, although specific relationships are difficult to extract from the sources.[110] According to the sources, at least one and possibly two adult men assisted the boy choregos (carrying the κωπώ, conducting the chorus, playing the lyre), while the woman who prepared the πρώτα is also specifically named. Among these adult male and female assistants and the required living parents of the daphnephoros, many identifications are possible for the man and first woman in the pithos scene. Some scholars have assumed the main adult participants in the procession were in fact the parents of the daphnephoros. The chorus in the image is composed of maidens of apparently similar age. Their disparity in size and treatment from the smaller female is notable—usually a female choregos is a contemporary of, if not slightly more mature than, the chorus—and the differences here effectively and meaningfully separate her from the procession she leads.

The pithos does not, of course, illustrate a Pindaric daphnephorikon, for it clearly lacks both laurel branch and decorated log. Such variance may reflect an early version of the Apolline festival alone, without the kopophoria and without depicting the laurel. Indeed, the sources variously describe the laurel as attached to the log, worn on the head, or carried, although Schachter believes that in the Daphnephoria "no one involved actually carries or wears laurel," at least until the two rites were later conflated.[111] More important than justifying an ab-

[109] Schachter 1981, 79, 85.

[110] Calame 1997, 60–2 n. 156.

[111] Schachter 1981, 84–5 and n. 6. The chronological relation of the rites is controversial; Nilsson believed the kopophoria to be the later element (1960, 171–2).

sence is understanding the artist's emphasis of the lyre. The instrument is rendered with remarkable detail compared with the rather casual treatment of the human figures around it. A survey of lyres in Geometric art shows that the number of strings (here, three) was not meaningful, and the most common form, a round-bottomed instrument with parallel arms of equal length, could vary widely.[112] By the late eighth century, the chelys and the kithara appear in art, and from this point the phorminx (the round-bottomed form) becomes more distinct. The Pyri version includes not only the S-curve of the arms but the lower horizontal line representing the string-fastener, or more likely the top of the sound box. Most lyres in Geometric art occur in the context of a dance or a procession. The few examples that appear alone may take on a symbolic connection with Apollo or Artemis, as in the small bronze votive lyres from the Amyklaion, Mavriki, and Tegea, or the pyxis fragment from the Amyklaion.[113] A strong association of Apollo with the phorminx is already established in Homer and develops further in the seventh century, perhaps enough to see the fine phorminx of the Pyri scene as evocative of the god and his worship.[114] As visual representation of the hymns, the lyre effectively expresses the choral nature of the festival, while its processional program is evoked by a chorus that does not hold hands, that is, it does not dance in the usual circular manner. In view of the chronological distance between the literary sources describing this evolved ritual and its prehistory captured on the pithos, exact points of comparison with the texts are less important than the similar structures of a youth, accompanied by a man, and a girl who together lead a procession of girls singing paeans and supplicating hymns to Apollo.[115]

The visual correspondence linking image and ritual provides only half the argument for connecting this pithos with the Daphnephoria. The other half comes from the social meaning and function of the festival itself. The associations of the Daphnephoria with springtime renewal together with Delphic elements of segregation, supplication, and purification signal a rite of initiation for the young people involved.[116] Claude Calame has examined the festival's initiatory aspect from the point of view of the maidens, noting that their hymns of supplication are part of a general initiatory pattern of propitiation and expiation found in other cults of Apollo and Artemis. The group leaves the civilized space of the city and crosses the Strophia to go to the River Ismenos (the "snake" in the painted scene?) and thus remains in a liminal space (and state) until their return as maidens prepared for their next transformation, into marriage.[117] Focusing on the daphnephoros, Ken Dowden suggests that the concept of a boy-priest, that is, a priest too young to perform the usual priestly duties, is an adaptation of an age-group ritual.[118] Stressing the kourotrophic role of Apollo in this cult, François de Polignac observes that the rule of the amphithalic status of the boy leading the procession ensures "vertical integration," the accession of the young participants to the status of adult members of the community. He sees close connections between the Daphnephoria and the Delphic festival of the Stepterion. At this daphnephoric event, adolescent boys led by an amphithales progressed through trials that mimed Apollo's struggle against Python and his subsequent wanderings, purification, and return.[119] Might the so-called snake on the pithos even represent Python?

Archaeological evidence and historical arguments support an origin for the Theban Daphnephoria in the late eighth century. Excavations at the Ismenion in 1910 revealed traces of a Late Geometric temple of wood and mudbrick on stone foundations erected on a terrace. Both the terrace and the destruction layer of the building contained large amounts of Late Geometric and Protocorinthian pottery. A second temple was constructed on the site shortly after the destruction of ca. 700 B.C.[120]

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[112] Wegner 1968, 2–18; Maas and Snyder 1989, 9–14, esp. 11 on number of strings. Two other lyres in Boeotian Geometric art: kantharos Dresden 1699, Maas and Snyder 1989, fig. 11 and krater in Basel, Wegner 1968, pl. IIIb.

[113] For a votive lyre from Amyklai, see Maas and Snyder 1989, 9, fig. 3D where it is called Mycenaean; Demakopoulou (1982, 73–8) has redated it to Geometric. For Mavriki and Tegea lyres, see Voyatzis 1990, 201–2, pls. 143, 144, and for a pyxis fragment, see Maas and Snyder 1989, fig. 12. A LG seal from the sanctuary of Apollo Maleatas at Epidauros depicting a man with a lyre may begin the long association of Apollo and the lyre at the site, as attested by classical bronze figurines; Lambrinoudakis 1977, pl. 122b–c; 1978, pl. 98c; 1982, 51 fig. 2.

[114] Maas and Snyder 1989, 26–7. There are no real grounds for interpreting the man as Apollo or the nine women on the reverse as the Muses. Geometric art represents very few gods, and the ordinary appearance of these figures suggests no particular effort to introduce new iconography.

[115] For songs of supplication as described by Proclus, see Calame 1997, 103 n. 42.

[116] Brelich 1969, 413–20; de Polignac 1995, 63–4; Calame 1997, 101–4.

[117] Calame 1997, 103–4, 127.

[118] Dowden 1989, 131.

[119] de Polignac 1995, 64 n. 78; Calame 1997, 101–3.

[120] Keramopoullos 1917, 66–79; Symeonoglou 1985, 236–9; Mazarakis Ainian 1997, 242, 312.

Apollo Pythios is securely attested at Thebes in the first quarter of the seventh century by an inscribed bronze lebes rim fragment.[121] The institution or elaboration of a daphnephoric Apollo cult at this time makes historical sense in view of the concurrent rise to prominence of Delphi. In the last quarter of the eighth century the Delphic oracle was established, and the number of nonregional votives (including Boeotian) swelled dramatically as emergent poleis, led by Corinth, adapted the sanctuary to serve their interests.[122] By associating itself with Pythian Apollo, the Theban cult would have gained status and perhaps even attracted traffic from outside the region. Perhaps a measure of competition was also involved: the Ismenion oracle seems to have been established at this time. A late eighth-century date for the founding of a suburban Apollo sanctuary at Thebes is best understood in the context of polis development. According to the patterns observed across Late Geometric Greece, an extra-urban sanctuary served the dual functions of defining the territory of the city and providing a regional focus and meeting place for the smaller towns.[123] The Daphnephoria would have integrated the Theban community and reinforced its social structures through its initiatory aspect even as it expressed religious and territorial sovereignty through its Delphic association.

Participation in the Daphnephoria seems to have been an event of real social importance. Pindar's daphnephorikon pays homage to the house of Aioladas, his son Pagondas, and numerous relatives. Pindar supposedly composed a hymn, now lost, for his own son on the occasion of his being daphnephoros. Such hymns permanently commemorated these offices.[124] Both Pausanias and Proclus note that at some point the dedication of a tripod by the graduating daphnephoros became customary. Pausanias (9.10.4) reports seeing a tripod at the Ismenion sanctuary dedicated by Amphitryon in honor of Herakles for the latter having officiated as daphnephoros at the festival. Antonios Keramopoullos has suggested that the laurel wreath worn by a warrior on a grave stele excavated in Thebes signifies that he had been daphnephoros.[125] The boy and girl chosen for the leading roles in such an important festival were accorded a particular social identity that would follow them through life, augmenting their aristocratic standing in the community, which was a prerequisite for such roles.

The hazards of analyzing Early Iron Age imagery through historical texts are well known. In this case the approach is justified because the image conveys a social (not epic) event that is supported by both the vessel's biographical elements and the structural correspondence with the texts. First, the burial of the pithos with a child and the evidence of use, damage, and repair suggest a specific connection between the pot with its imagery and the deceased. Second, the iconographic features selected for emphasis correspond with a child-related festival whose function was to create a social identity through age-group initiation, which was fixed and commemorated by event and object. The men and women these children are to become are modeled in the adult companions.

In the same way that T.23 evoked the layered identities of a mid-life woman in Argos, so the Pyri burial offers evidence of the social role of children in early Boeotia. Children are known archaeologically in Geometric Greece only through their graves. Their proximity to adult burials, and consequently their visibility, varies considerably throughout the period, and a short-lived integration of child graves among adult burials at the end of the eighth century in Athens has been linked to a rising egalitarian ethos.[126] A cultural constant throughout Greece is their symbolic distinction from adults in material goods and funerary ritual. Whitley has defined in Athens, for example, a symbolic system structured on the dichotomy of adult male and child, such that men are marked by weapons and the abstraction of the body through cremation, children by greater concretization through models and the intact, inhumed body.[127] Similarly, recent archaeological discussions of children associate them with women and nature, from which their social maturation gradually separates and redefines them.[128] Geometric child burials usually are not clearly gendered male or female, suggesting that gender was

[121] Jeffery 1990, 91, 94 no. 2, 402, pl. 7, 2. She has also suggested that the bronze "Mantiklos Apollo" statuette comes from the Ismenion (1990, 90–1).

[122] Morgan 1990; Schachter sees a pattern of developing poleis in search of an urban religious focus choosing Apollo Pythios as patron god of gatherings and divination (1992, 37–9).

[123] Schachter 1992, 29; de Polignac 1995, esp. 79–80 on the Ismenion.

[124] Pindar *Fr.* 94c; Ziehen (1934, 1549) pointed out that Pindar would himself have carried the κωπώ, an attractive glimpse of the poet as father and local festival-goer.

[125] Grave stele, Schachter 1981, 85 n. 5.

[126] Snodgrass 1983; Morris 1987, 1992, 1998, esp. 25; Whitley 1991, 1994.

[127] Whitley 1996.

[128] Moore and Scott 1997; Gilchrist 1999, 88–94.

not strongly ascribed at birth but only achieved at certain life stages. The Pyri burial seemingly offers a glimpse into such a process. The kalathiskos form suggests that the deceased was a girl. The strong association of women with kalathoi, wool baskets, and ceramic models begins early in the Geometric period. In Athens from Protogeometric through Late Geometric ceramic kalathoi belong exclusively to female graves. Alternatively, Geometric model kalathoi could be offered to female deities such as Demeter and Kore at Corinth and Hera at Perachora. Through their connection with weaving, kalathoi later serve iconographically to indicate women's spaces and activities. The kalathiskos in the Pyri grave might have marked an emerging female identity.[129]

The imagery of the Pyri pithos suggests that children can be important social actors in their own right, beyond these achievements of gender and social status. The Boeotian hydria in Paris offers a ritual parallel (fig. 9). Here the funerary rites of the deceased woman involve as many as 18 people, nearly half of which are children. Five small figures beneath the bier and two or three in the dance above are gendered by dress and marked as children by their short hair and behavior. The hands-to-head mourning gesture is restricted to adult men and women. By contrast, the children touch the bier: four boys grasp its legs and the girl reaches to the side(?) of the couch. If the specific action is somewhat obscure, it is interesting that both the restrictions placed on mourning gestures and the children touching the bier occur also in Attic prothesis scenes.[130] The six figures dancing in the upper range include boys performing acrobatic moves, a dance form also paralleled in Attica.[131] The Paris hydria and the Daphnephoria scene demonstrate that in Boeotia children were very much a part of the ritual life of the community. Distinguished from adults in appearance and roles, they participated in public social rituals through their own independent and specifically prescribed actions, thus fulfilling roles that an adult could not. In the Daphnephoria the worship of Apollo through complementary adult and child roles helped define the specific identity of Thebes as a religious and social entity.

The generational concept may once again offer a way to understand archaeological material associated with children. It has been shown that Hesiod's myth of the five races employs a conceptualization of life stages as constructed and valued in Boeotian society, at least through the poet's representation.[132] At its heart is the ideal of (masculine) maturity (both Golden and Heroic), the only age credited with inherent moral and physical excellence, against which the other ages, especially childhood (Silver) and old age (Iron), are defined through deficiencies and weaknesses. In the world of Hesiod's peasant oikos, the child can only be seen as an unproductive drain on resources. The negativities of "useless immaturity" expressed by the poet may reflect in some measure a cultural predisposition to devalue childhood.[133] The evidence of ritual participation seen in Boeotian Geometric vases offers some adjustment to this largely negative picture. Nevertheless, the poetic construct might provide a useful way to understand the material "completion" of a child's life stage through grave goods as a way of according her a higher social value. To record her (immanent, unrealized) maturity was a greater boon than to recognize her actual status.

The importance of children in the configuration and corporate identity of early Thebes is underscored by the elaborate decoration of the pithos on behalf of a child. How the bucket-like vessel was originally used is unknown. The inturned rim and broad shoulder limit its use to containing dry substances, which could be tightly secured with a green stick run through its handles over the now missing lid. Perhaps it held objects used in the ritual, foodstuffs for an offering or meal, or the laurel itself. The burial of the child with a kalathiskos and within a pithos bearing a commemorative image marked both a stage of life and a stage of gender—a social persona attained, or perhaps not attained but ascribed at death.

CONCLUSION: BEYOND THE INDIVIDUAL

For all its logical coherence, the biographical method is no more than a heuristic device. The multiple threads of these objects' lives reveal the limitations of exclusively funerary interpretations and open the way to explore their prior social roles. The process involves some judicious reconstruction that must be tested in a broader-based analysis

[129] An association perhaps from birth: Hesychius noted that the birth of a girl was announced by hanging wool at the doorway of her home (Golden 1990, 23). For ceramic kalathoi and iconography, see Strömberg 1993, 49, 50, 85–6; Lissarrague 1995, 95–6.

[130] Ahlberg 1971, 99–100.

[131] Ahlberg-Cornell 1988, 63–7.

[132] Falkner 1989, with earlier bibliography on this interpretation.

[133] Falkner 1989, 60; similarly, Finley (1981, 159–60) notes the need for speedy maturation in a peasant society. Ingalls (1998, 31–2) sensibly cautions against trying to reconcile conflicting ancient views of children.

of evidence. Osteological evidence, for example, carries some ambiguity.[134] A larger database of more precisely aged and sexed remains from Theban and Argive burials might undermine the proposed connections between the deceased and their pottery (for instance, if young women were found buried with kraters). Further iconographic study will be crucial to linking these objects with social rites and identities. An investigation of material evidence for Early Iron Age social rituals must ultimately be framed within the entire system of material and social practices as revealed by the distribution of artifacts in all types of context.[135]

The biographical method nevertheless produces several significant results, all with broader implications for the study of early Greece and classical material culture in general. First, it reveals evidence of social rituals and object use that might otherwise remain undetected. Questions about who gave these objects and what reciprocation was won are not specifically addressed, but viewing life cycle rituals as economic events offers a broader understanding of the dynamics behind the creation and distribution of fine ceramics and metalwork. The approach thus adds another social dimension to the political and economic aspects more often emphasized in models of guest gifts and exchange.[136] The Argos pyxis further provides glimpses of women's roles in the social apparatus of hospitality and reciprocity. The presence of a large, rich, female-associated pyxis in a domestic space presents a striking counterpoint to the walls hung with weapons and shields more normally associated with the aesthetics of the early Greek household.[137]

Second, the biographical method challenges traditional interpretations of grave goods, especially those regarding anomalous objects in funerary assemblages. The point is not that the Greeks were concerned with representing the individual at death, but that these objects were interred with the deceased because of a prior association that broadly defined a social persona. Biography addresses the interconnectedness of behavioral contexts that articulate an individual's life and help create the funeral assemblage. The T.23 krater may or may not have belonged to the deceased during her life but apparently constituted a social view of her at death. Moreover, the model of non-funerary social ritual offers an important theoretical approach for understanding other exceptional objects and images. The well-known Lefkandi centaur, for example, was broken in two parts and buried with a child and an adult; it can be linked with boys' initiation rites.[138] Our starting point, the Protoattic Polyphemus amphora from Eleusis, can be similarly considered (fig. 1). Like the Argos pyxis and the Pyri pithos, it goes beyond the merely distinctive to constitute a statement of extraordinary iconographic and stylistic complexity amid the dullness of the surrounding pots and gifts in the cemetery.[139] Whitley has noted significant patterns in the use of Protoattic pottery style for "liminal occasions," particularly elite burials. Consideration of ritual linkages to Protoattic imagery might add a new dimension to this reconstruction. The belly of the Eleusis amphora carries a graphic depiction of Perseus slaying Medusa, a myth that Michael Jameson has connected with dramatized adolescent rites of passage.[140] The vessel was ultimately transformed from a previous use or intention into a coffin for a child 10–12 years of age.[141]

Finally, this method forces us to reconstruct the social setting of goods within complex communities that integrate all ages and gendered identities. Two biographies have become four—two pots, two persons—and perhaps here the parallel with conventional literary biography ends. The current interest in archaeological object biography may in part result from recent theoretical concerns with individual intentionality that perceive objects as extensions of a person's agency.[142] Whatever the virtues of that approach, the ultimate goal here is not to construct communities through individuals, but to uncover normative practices in cumulative, routine negotiations of gender and age through objects. The focus on constructed meanings reveals that the symbolic associations of pyxis, krater, and kalathos with gender, social behavior, and boundaries were actively deployed and deepened by their funerary use. The close examination of burials

[134] For problems, Morris 1992, 72–90. Hodder (1997) sees all earlier analyses as culturally biased.

[135] Snodgrass 1980; Whitley 1994, 54–7; Morris 1998, 6–7.

[136] Finley 1980; van Wees 1992; Donlan 1998.

[137] van Wees 1998, esp. 363; Ahlberg 1971, figs. 46, 49 for weapons hanging in house.

[138] Lebessi 1996.

[139] Morris 1984, 12; Morris 1993, 31.

[140] Jameson 1990; similarly, Marinatos 2000, 59–65. Jameson does not mention the Polyphemus amphora in his study of the Perseus cult at Mycenae, but I extend his conclusions here.

[141] On its alteration, Morris 1984, 12. Mylonas (1957) identified the deceased as a boy, although such young bones are probably not sexable, but they are clearly not infant remains, as has been stated (Whitley 1994, 64).

[142] Hodder 1991; Meskell 1996; cf. Barrett 1987; Sørensen 2000, 47–51.

makes it possible to challenge what has been described as the "still prevalent and reactionary notion that rich female and child burials reflect nothing more than male wealth and prestige."[143] Biography exposes the need to address the construction of social identity as a lifelong process shaped by ritual and material signs. Social reconstructions that attempt to link this material with static binary categories of male and female, without concern for age differences, can mask as much as they reveal.[144] An analysis of social age and generational identities offers a useful theoretical perspective. For the Greeks, generational structure provided a basic social stability through its categorical and predictive qualities.[145] For the researcher, this structure may signal significant changes through time and space that reflect the impact of cultural, political, and economic developments.

The use of object biography also raises questions. For example, if social rituals were important, why is the associated material not more readily apparent in graves, sanctuaries, and habitations, and why did these institutions not give rise to specific classes of artifact? Several possible answers emerge from associating these items with other significant objects in early Greek culture—fine metalwork and heirlooms—that served the living better than the dead. They link generations, create social bonds, and are made transcendent by their past associations while conferring identity and distinction on successive owners. For this reason it is unlikely that the best of Late Geometric artistry was made for graves. Exclusively funerary pottery (e.g., amphorae with plastic snakes) was still being made in the late eighth century, but by then the deposition of fine pottery in graves had become more random, tied to individual attachments, emotions, and other archaeological imponderables. The typical treatment of ritual-related artifacts may have been to keep them above ground as family heirlooms and exchange goods until offered as votives or accidentally destroyed. Habitations are still the most problematic context for Early Iron Age Greece, and continuous settlement of major sites has obliterated much of their early remains. The finest Geometric art in fact is found in sanctuaries, the other terminal context, where the opportunity for reciprocity with the gods may have been the most fitting destination for precious goods and heirlooms.[146]

These case studies highlight another dimension of the well-documented shift in offering patterns and funerary ritual that occurred around 750 B.C. and accelerated after 725 in most major communities. The general decline in grave goods and concurrent increase in sanctuary dedications are connected processes, as Ian Morris has argued, in a "reordering of the whole ritual system."[147] "Goods are neutral," Mary Douglas contends, "their uses are social; they can be used as fences or bridges."[148] One way to characterize the changes in material culture from the ninth to the later eighth centuries is a shift from the exclusionary, fence-raising role of the monumental grave markers to the more broadly distributed, more inclusive materials of LG II—the bridge-building objects and images that help to articulate and consolidate a community. Among the diverse strategies for creating a social system were a new value and visibility attached to the rituals that guide individuals through ordered sequences into adulthood and marriage to ensure stability in changing communities. Decorated pottery may have served as an especially valuable tool for, in Douglas's words, "selecting and fixing meanings."

Finally, one should distinguish between special possessions and more mundane objects used in rites of passage. The latter may in fact be very much in evidence if one approaches the material with this question in mind. The unusual objects discussed here provide ready access to questions of social meaning and function, but not only the exceptional can be considered in this light. Since neither pyxis C.209 nor the Pyri pithos is unique in all respects, one might be able to generalize the results. Should all large tripod vessels or Boeotian pithoi be linked with social rites, and need they be severed as a class from funerary productions? The answer must be no in both cases. An important contribution of the biographical approach is to challenge convenient but rather abstract categories of type and function. Contexts create meaning but are never exclusive. Meanings attached in an object's prior life still resonate at the graveside. A culture works with a finite material corpus to accommodate all social circumstances. References to social rituals remain, permeating the pots, figurines, and tripods of early Greek communities.

[143] Chamberlain 1997, 250.

[144] This is a drawback of Strömberg's 1993 study, which assumes unchanging constructions of gender.

[145] Nash 1978, 11.

[146] Morris 1986; Langdon 1987; Parker 1998; Bremer 1998.

[147] Morris 1992, 26; 1989; 1998; Snodgrass 1980.

[148] Douglas and Isherwood 1996, xv.

The most important application of a biographical approach to archaeological material must be to uncover the details and linkages with which to frame broader analytic questions. The meanings of the objects examined here, like the larger material culture to which they belong, are contextually constituted. Rich in embodied values, such material mediates the basic components of social identity—gender, social age, ethnicity, status. For Early Iron Age Greece the task begun here is to reconstruct the missing context of transformative social rituals by recovering the meanings in objects. A broader approach must engage the interplay of iconography and shape, type and function, later parallels, textual evidence, and deposition patterns: the wider and more complex the network of interconnections, the more evidence to uphold the hypothesis. Equally important is the indirect verification provided by other approaches, for example, the systemic and processual studies that indicate movement away from the primacy of the funeral as focal symbolic activity in the later eighth century, and hence the greater need to seek an understanding of Geometric pottery developments in other contexts.[149] These considerations can open up other classes of Geometric Greek material to more socially embedded interpretations.

The principal objects discussed here—giant pyxis and commemorative pithos—should be understood not as unique items preserved by archaeological accident, but as survivors of object types whose more customary biographies were lived above ground in the realms of ritual and heirloom. Their role in an individual's final rite of passage transformed their social meanings once again. Each of these objects is unlikely to have spanned more than a person's lifetime, but their inalienable association with the deceased attests a process of mutual biography that illuminates the role objects played in early Greek society.

DEPARTMENT OF ART HISTORY
AND ARCHAEOLOGY
109 PICKARD HALL
UNIVERSITY OF MISSOURI-COLUMBIA
COLUMBIA, MISSOURI 65211
LANGDONS@MISSOURI.EDU

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[149] Snodgrass 1980; Whitley 1991; Morris 1987, 1998.

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Deepwater Archaeology of the Black Sea: The 2000 Season at Sinop, Turkey

ROBERT D. BALLARD, FREDRIK T. HIEBERT, DWIGHT F. COLEMAN, CHERYL WARD, JENNIFER S. SMITH, KATHRYN WILLIS, BRENDAN FOLEY, KATHERINE CROFF, CANDACE MAJOR, AND FRANCESCO TORRE

Abstract

In 2000, a major expedition for deepwater archaeology was conducted by the Institute for Exploration in the Black Sea along the northwestern coast of Turkey from the Bosporus to the Turkish seaport of Sinop. A complementary land-based expedition will be reported upon elsewhere. The 2000 underwater expedition had three research objectives: to search for evidence of human habitation prior to major flooding of the Black Sea that researchers predicted occurred some 7,500 years ago; to investigate a deepwater shipping route; and to search for ancient wooden ships in the sea's anoxic bottom waters. Research methods included the use of a phased-array side-scan sonar, a towed imaging sled, and a small remotely operated vehicle (ROV) to collect deep-sea survey data. Three shipwrecks and a probable site reflecting human habitation prior to the proposed flooding event were located at depths around 100 m. One additional shipwreck was found within the anoxic layer at a depth of 324 m. The ship found within the anoxic layer was intact, in a high state of preservation, and dated to the Byzantine period of 450 A.D.*

THE ARCHAEOLOGY AND OCEANOGRAPHY OF THE BLACK SEA BASIN

The archaeology of the Black Sea basin reflects a mix of European, Anatolian, and Eurasian steppe cultures. The Black Sea coast was occupied during the Middle and Upper Paleolithic when it must have served as a conduit of interaction between Eastern Europe and the Caucasus.[1] The coastal plain of the Black Sea would have been significantly broader at that time since its water level was approximately 150 m below recent levels.[2] Recent research has suggested that the Black Sea was abruptly filled by waters from the Mediterranean when the Bosporus was cut by rising world sea levels.[3] At this time, the

*We wish to express our gratitude to the Turkish Ministry of Culture and the Turkish General Directorate for Monuments and Museums for permission to carry out this research. Special thanks are due to the Director General of Antiquities, Dr. Alpay Pasinli, for his continued cooperation and support of our long-term archaeological research along the Turkish Black Sea coast. We are also grateful for the valuable assistance provided by Dr. Harun Ozdas of the Turkish Ministry of Culture, who participated in the expedition as the official representative of the Turkish government, and Dr. Nemik Cagatay of Istanbul Technical University, who also participated in the expedition. The authors also wish to thank Fuat Dereli and other researchers from the Sinop Museum for their support and assistance in this project.

The authors wish to thank the captain and crew of the *Northern Horizon* for the excellent support they provided for the expedition and the technical teams from the Institute for Exploration and the Woods Hole Oceanographic Institution that operated the vehicle systems used on the expedition. We also wish to thank the engineering team, in particular, chief engineer James Newman, who developed and operated the *Argus* and *Little Hercules* vehicle systems and Catherine Offinger, who was in charge of operations.

We wish to thank the major sponsors of the expedition, including the Office of Naval Research, the National Oceanic and Atmospheric Administration, the National Geographic Society and their Exploration Council, and the J.M. Kaplan Fund.

National Geographic Society's Committee on Research and Exploration and the Samuel S. Freeman Charitable Trust of New York provided support to Hiebert for the analysis of archaeological data. Dr. Naomi F. Miller of the Museum Applied Science Center (MASCA) of the University of Pennsylvania carried out the botanical analysis of the organic samples and wood identification; Professor William Woods of Southern Illinois University conducted the preliminary analysis of the chemistry of the sediment samples from the bottom of the Black Sea; Dr. Terry B. Ball and Nicole Anderson of Brigham Young University conducted preliminary phytolith analysis of the sediment samples. Professor Richard Steffy of the Institute for Nautical Archaeology provided assistance with preliminary interpretation of Shipwreck D; Dr. Katherine Singley of Conservation Anthropologica provided assistance with wood conservation; Dr. John Broadwater of the National Oceanic and Atmospheric Administration provided assistance with the mapping of Site 82; Dr. Katherine Moore of the University of Pennsylvania provided assistance with the analysis of the expedition's data; Profs. Henry Wright and William Farrand of the University of Michigan and Prof. Mehmet Ozdogan of Istanbul University reviewed the video data from Site 82; and Prof. Cemal Pulak and the late Erkut Arcak of the Institute for Nautical Archaeology reviewed the video data from the shipwreck targets.

We would also like to thank the University of Pennsylvania Museum of Archaeology and Anthropology for a subvention for the color illustrations in this article.

[1] Otte 1998; Bibikov et al. 1994.

[2] Kuprin et al. 1974.

[3] Ryan et al. 1997.

Black Sea became saline for the first time. The speed of this flooding is difficult to determine, but the ecology of the region would have shifted dramatically with the contraction of the coastal plain and the shift from freshwater to saline ecology.[4] After a break in occupation of undetermined length, agricultural village sites appear along the southern and western littoral as early as the sixth or fifth millennium B.C.[5] Ceramic and metal parallels from the Bulgarian and Turkish coasts indicate coastal interaction, possibly through seafaring, during the fourth millennium B.C.[6] Following this period, the Bronze Age was a period of intense occupation, chiefly agricultural villages, pastoral nomadic encampments, and megalithic burials along various parts of the Black Sea littoral.[7] Archaeological survey along the central Turkish coast suggests early Bronze Age coastal settlement similar to the settlement pattern and land use choices of later classical ports and colonies.[8] The distribution of Bronze Age (third and second millennium B.C.) artifacts in regions surrounding the Black Sea basin is suggestive of an active trade network.[9] Rubinson has noted the close stylistic similarity of a bronze cauldron from Shaft Grave 4 at Mycenae with a cauldron from Kurgan XV at Trialeti, Georgia, which may reflect direct contact.[10] From other sites in Georgia of the second quarter of the second millennium come bronze rapiers of Aegean type as well as ceramics with close parallels in the Aegean world, which further indicate direct long distance trade.[11]

The Black Sea became a major crossroads of the ancient world with the advent of Greek colonization in the period 800–700 B.C.[12] Seafaring economies participated in trade from the central southern Black Sea coast to the Crimea, taking advantage of strong winds and currents. This north–south commerce is documented by finds of significant quantities of amphorae and tiles manufactured at Sinop, Turkey at settlements along the north central coast of the Black Sea.[13]

The Aims of the Black Sea Project

Underwater Research

A joint program of land-based research (through the University of Pennsylvania's Black Sea Trade Project) and underwater research (through the Institute for Exploration) has been investigating ancient seafaring and settlement along the Black Sea coast at Sinop since 1996 (fig. 1). Sinop is the best natural harbor along the Turkish Black Sea coast, and its fertile and gentle coastal plain has evidence of occupation from prior to the flooding to modern times.[14] The 2000 underwater season reported here was the first systematic survey in waters deeper than 85 m; this deepwater research complements the previous systematic shallow water survey near the Sinop peninsula[15] and the ongoing land survey of the hinterland behind the port of Sinop.[16]

The Black Sea has significant potential for archaeological and oceanographic research as a result of its history of fluctuating sea level over the last several thousand years and its non-oxygenated (anoxic) water below 200 m. An ancient coastline, which appears to have been abruptly flooded, is preserved in many places with a minimum of sedimentation at 150 m below the present-day surface. The abrupt flooding of this landscape appears to have caused the lowest layer of water to be deprived of oxygen, allowing a high degree of organic preservation in deep water, of particular importance in the study of shipwrecks.

For more than 25 years, marine biologists working in the oxygenated waters of open oceans have documented that wooden objects falling to the bottom of the deep sea are quickly consumed by wood-boring organisms.[17] The vulnerability of ancient wooden ships to the attack of wood-boring organisms in the deep sea has most recently been documented by a series of expeditions conducted by the Institute for Exploration. In the first case, five shipwrecks of the Roman period were located in approximately 1,000 m of water along the deepwater trade route connecting ancient Carthage with the Roman seaport of Ostia.[18] In all five wrecks, the exposed wooden portions of these ships had been removed by the activity of wood-borers, although highly preserved wooden timbers of the ship were found a short distance beneath the surface of the bottom sediments.

In the second case,[19] two Phoenician ships were located in 400 m along the deepwater trade route connecting the ancient seaport of Ashkelon to the

[4] Beug 1967.
[5] Alkim et al. 1988; Thissen 1991.
[6] Price 1993.
[7] Draganov 1995; Markovin 1997; Zbenovich 1973.
[8] Hiebert et al. 1997; Doonan et al. forthcoming.
[9] Lazarov 1984; Nikolova 1995.
[10] Rubinson 1991, 284.
[11] Abramischwili and Abramischwili 1995, 190.
[12] Tsetskhladze 1996.
[13] Maksimova 1956; Zolotarov 1979.
[14] Hiebert 2001.
[15] Mindell et al. 1998.
[16] Doonan et al. forthcoming.
[17] Turner 1973.
[18] Ballard, McCann, et al. 2000.
[19] Ballard et al. forthcoming.

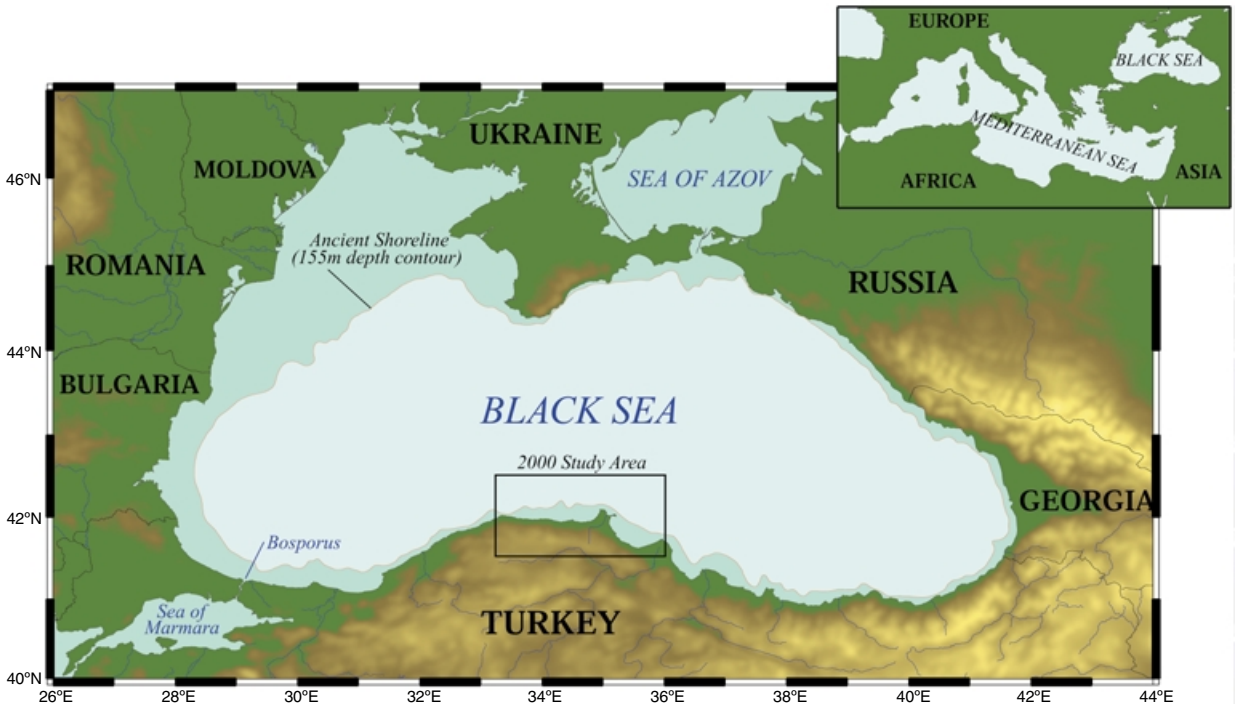

Fig. 1. Index map of the Black Sea showing the ancient shoreline (155 m depth contour) and study area for the 2000 expedition

Egyptian Nile. Unlike the Roman ships, which were largely buried in the deep-sea mud, the two ships off Ashkelon had been scoured by bottom currents to a depth of 2 m below the seabed, exposing a larger percentage of the ships' hulls. As in the former case, wood-boring mollusks had removed all of the exposed wood from these two ships.

Willard Bascom first suggested, however, that the unique anoxic bottom water conditions of the Black Sea should result in the preservation of ancient wooden ships in a fashion unlike any other deep-water region.[20] This prediction could not be tested with the technology available at that time, but since 1996, a deepwater archaeological expedition has been developed by the Institute for Exploration to search for ancient shipwrecks in the anoxic bottom waters of the Black Sea. The primary goal was to determine if the state of preservation of wrecks in the deep waters of the Black Sea differed from that of ships in oxygenated waters, as Bascom had suggested.

Recently, marine geologists William Ryan and Walter Pitman challenged the conventional sequence of events leading to the conversion of the Black Sea in the Holocene from a lacustrine environment prior to postglacial melting to its present marine conditions. Earlier authors argued that this conversion was a gradual event beginning around 9000 B.P.,[21] while Ryan and Pitman contended it was sudden and took place later, around 7150 B.P.[22]

Ryan et al. based their 1997 findings upon a survey conducted in 1993, during which a high frequency sub-bottom profiling system was used to survey two areas on the Black Sea's northern continental shelf, to the east and west of the Crimea peninsula. These surveys were then followed by a systematic coring effort along the profile lines.

Their seismic survey revealed an erosional angular unconformity throughout the survey areas everywhere above the present 150 m contour of the sea's shelf. Draping the erosional surface is a thin uniform layer of sediments that lack any internal structure or evidence of transgressive features that might be associated with a slow rise in sea level.

Cores taken during the survey penetrated the uniform layer as well as the underlying erosional surface. The upper draping layer proved to be sapropel mud, further suggesting a sudden transition from a well-oxygenated environment to one now lying in a macerating and putrefying anaerobic environment. Mollusks extracted from the cores at the base of the uniform draping layer and rest-

[20] Bascom 1976.

[21] Ross et al. 1970; Degens and Ross 1972; Deuser 1972; Ross and Degens 1974.

[22] Ryan et al. 1997; Ryan and Pitman 1998.

ing on the unconformity had identical radiocarbon ages of 7150 ± 100 years B.P.

Ryan et al. went on to conclude that the flooding of the Black Sea at 7150 B.P. was virtually instantaneous, resulting in the submergence of 150,000 km^2 of previously exposed land that now makes up the Black Sea's continental shelf. They also asserted that this sudden flooding "may possibly have accelerated the dispersal of early Neolithic foragers and farmers into the interior of Europe at that time."[23]

In the summer of 1999, the Institute for Exploration carried out a survey of the continental shelf off the north central Turkish seaport of Sinop to determine if such a flood had occurred there and at what time.[24] Using a side-scan sonar, small remotely operated vehicles, and a series of dredge lowerings, an ancient exposed high energy shoreline at a depth of 155 m was located, inspected, and sampled. Analysis of mollusks collected from this ancient beach revealed a sudden flooding of the Black Sea in this area around 7,500 B.P. changing it from a lacustrine to marine environment. This ancient surface remained in contact with the bottom waters of the Black Sea for a long period of time before being draped by a thin layer of sapropel mud characteristic of today's anaerobic conditions.

Based upon the results of this 1999 study, the operational plans of the 2000 expedition were modified to include an effort to search landward of the 155 m contour for evidence of human habitation prior to this flooding event.

RESEARCH METHODS

Three major mapping systems were utilized during the 2000 survey. These included the *DSL-120* side-scan sonar system, the *Argus* imaging vehicle, and the *Little Hercules* remotely operated vehicle (ROV) system.

The *DSL-120* is a phased-array 120 kHz side-scan sonar (fig. 2) developed by the Woods Hole Oceanographic Institution and capable of working in over 6,000 m of water.[25] Owing to the small targets (i.e., less than 10 m on a side) being sought, the effective total swath width of the sonar was 600 m from one side to the other while the sonar was being towed at an average altitude of 40–50 m. Tuning the sonar to detect these small targets, however, resulted in the inability to measure the phase of the returning signal and therefore the loss of topographic information within the acoustic swath of the returning signal.

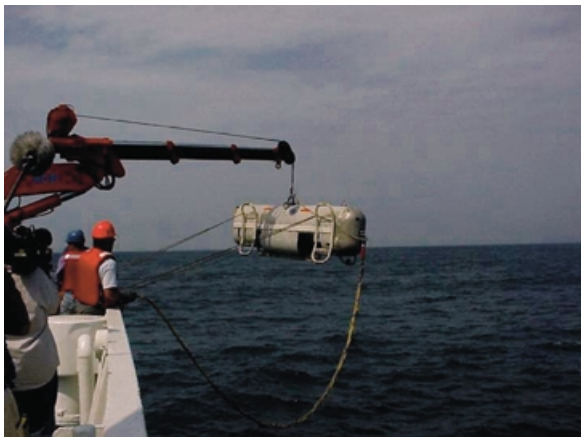

Fig. 2. *DSL-120* side-scan sonar

The *Argus* imaging vehicle, developed by the Institute for Exploration (fig. 3), is towed at the end of 0.68-in. fiber-optic cable.[26] It has an operating depth of 3,000 m and carries multiple cameras (a low-light level video camera, three color video cameras, and a 35 mm still camera) mounted on a trainable platform. At the back end of the vehicle are two 400 watt and one 1,200 watt lights that illuminate the ocean floor. It also carries a 675 kHz obstacle avoidance sector scanning sonar, an electronic still camera (ESC), magnetic compass, altimeter, and depth sensor. Thrusters are mounted on either end of the 4-m long stainless steel frame perpendicular to the long axis of the vehicle capable of spinning the vehicle on its vertical axis while being towed. The *Argus* vehicle system can be deployed alone or used in conjunction with the *Little Hercules* ROV.

The *Little Hercules* remotely operated vehicle (fig. 4) was developed by the Institute for Exploration and also is capable of working to 3,000 m. It has four thrusters, a 330 kHz obstacle avoidance sector scanning sonar, altimeter, magnetic compass, depth sensor, two 400 watt HMI lights, and either can carry a 1-chip color video camera and 35 mm still camera or a 3-chip color video camera. *Little Hercules* operates from the end of a 30 m long neutrally buoyant tether that is connected to the *Argus* vehicle.[27] Although the vehicle does not have a manipulator system, it was outfitted at various times on the expedition with a scoop bag or coring device to recover objects and wood samples from the seafloor.

[23] Ryan et al. 1997, 119.
[24] Ballard, Coleman, et al. 2000.
[25] Bowen et al. 1993.
[26] Coleman et al. 2000.
[27] Coleman et al. 2000.

Fig. 3. *Argus* optical sled

The support ship for the expedition was the British trawler, *Northern Horizon*, a 75 m long vessel, which served as the expedition base permitting survey to be conducted 24 hours a day, seven days a week. Of particular importance, the ship was outfitted with a bow thruster and dynamic positioning system, which allowed us to maintain a precise longitude and latitude position above the search areas in deep water.

THE 2000 SURVEY: METHODOLOGY

Survey using all three vehicle systems in 2000 was conducted in three separate areas (fig. 5). Research in deep water began by surveying the geography of the underwater region to the east of the Sinop peninsula. The central area, in deeper waters, was investigated specifically for the purpose of identifying ancient shipwrecks in anoxic water. The westernmost area, with its gently sloping submerged topography, was surveyed for evidence of both human habitation prior to flooding 7,500 years ago and ancient shipwrecks in oxygenated water. The results pertaining to human habitation and ancient wooden ships are summarized here.

We initially identified the ancient Black Sea shoreline off of the Turkish coast in the eastern search area in the 1999 season. Because of stream piracy farther inshore in today's Turkish landscape, no major rivers flow into this area. Thus, while we were able to pinpoint the location of the submerged coastline, the probability of finding a human modified landscape landward of the shoreline to the east of the Sinop peninsula was low. In contrast, the western coast of the peninsula, where there are clear indications of pre-flood occupation,[28] appeared to be a particularly good region to begin systematic survey for evidence of occupation along the submerged coast.

The 2000 study therefore concentrated on the area just west of Sinop, where more than 400 km^2 of underwater terrain lies between the 155 and 90 m contours (fig. 6). This region lies between the shoreline of the ancient freshwater lake and the near shore area where archaeological survey evidence indicated there would have been abundant opportunities to hunt and gather in lacustrine, riverine, and upland regions. That said, the submerged landscape in the western search area was poorly defined based upon previous bathymetric data. To compensate for this, during the 2000 expedition, we generated local bathymetry by combining data from two sonar systems. This was made possible by combining the vehicle's *DSL-120* sidescan sonar altitude data with its depth to determine total depth beneath the tow fish. This data, combined with a series of separate lines using the ship's echo sounder, was used to construct a bathymetric map of the study area (fig. 7). An area approximately 50 km along the coast was mapped. A steep coastal cliff unfavorable to human habitation characterizes approximately 50% of this area. The remaining 50% is divided into three distinct areas divided by submerged river valleys and bluffs—east, central, and west. The topography of the study area is characterized by a series of gentle valleys and ridges cutting across the area. An ancient stream channel, which emptied into the ancient lake to the northeast, flowed into the southwest portion of the study area. A north–south cross section through the region reveals relatively flat relief around 100 m water depth, which then plunges steeply and continuously to deeper water (fig. 8).

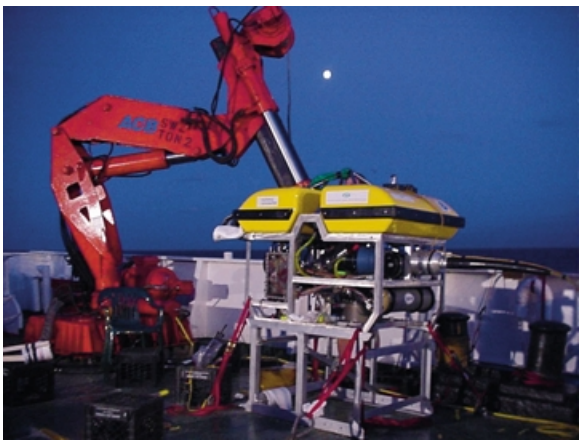

Fig. 4. *Little Hercules* remotely operated vehicle

[28] Hiebert 2001.

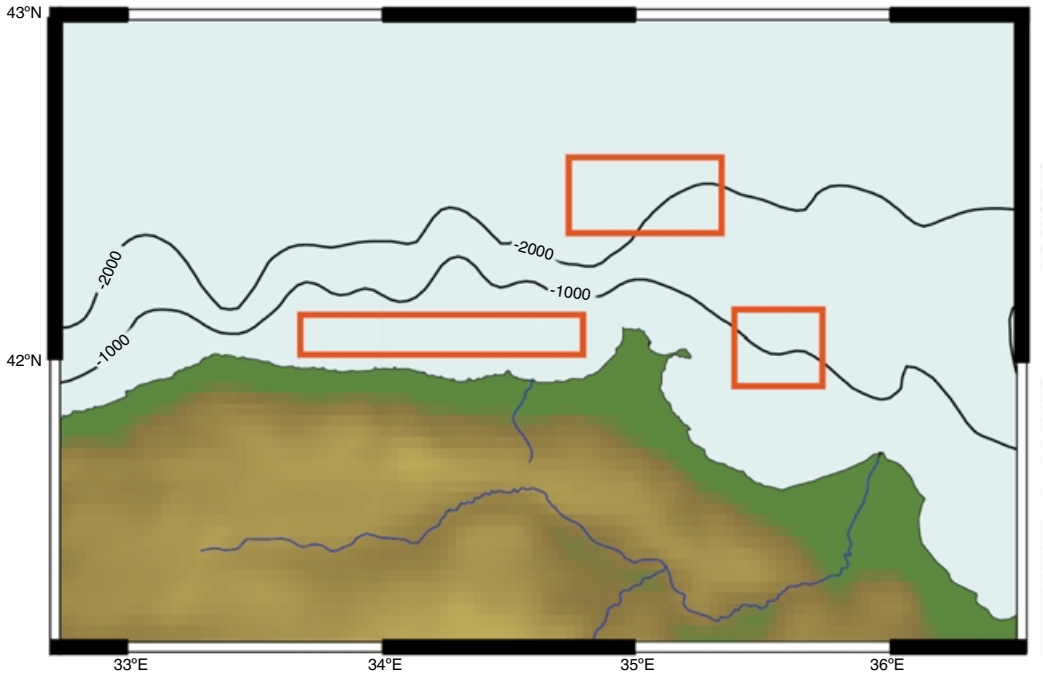

Fig. 5. Locator map for three primary study areas (within red boxes) off of the Turkish coast

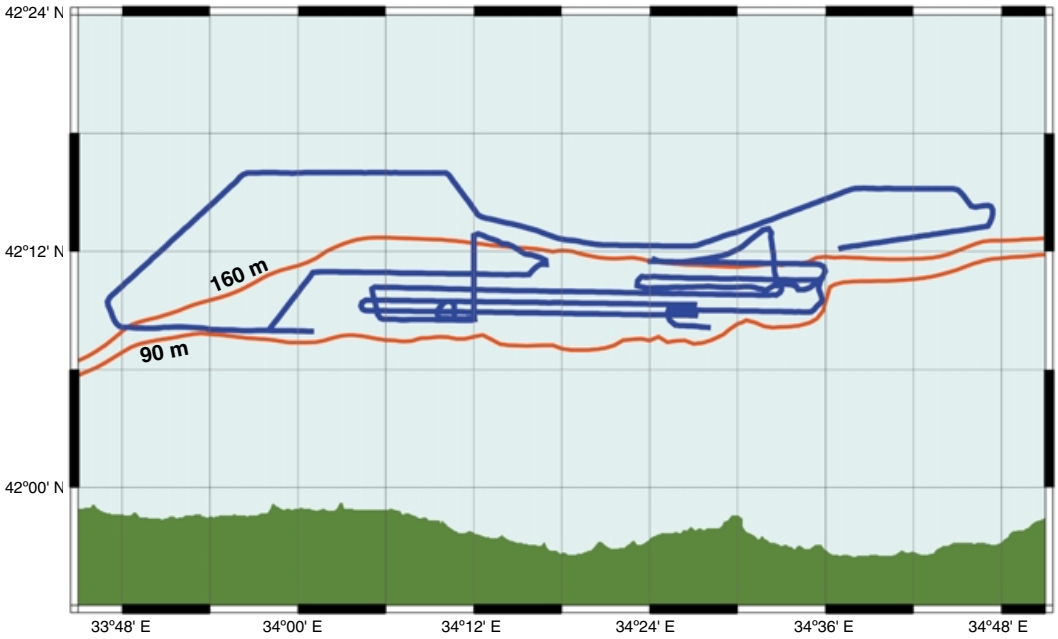

Fig. 6. Western search box. DSL-120 side-scan sonar track lines in blue, contour lines in red.

More than 200 sonar targets (bottom surface anomalies identified by sonar) were detected during the survey of this area. Of these, 52 targets were visually checked with video and ESC mounted on *Argus* and *Little Hercules*. Most sonar targets were evident rock outcrops, but three targets were identified as shipwreck targets and two potential submerged terrestrial sites were inspected by the ROV. Of the possible submerged sites, the 71st target proved to be uninterpretable based upon video and remote photographic inspection from the *Argus* and *Little Hercules* vehicles. The other potential submerged site, Site 82 (the 82nd target identified), however, appeared uniquely rectangular in its sonar image (fig. 9) and was examined as thoroughly as possible within the limits of our technology and research permits.

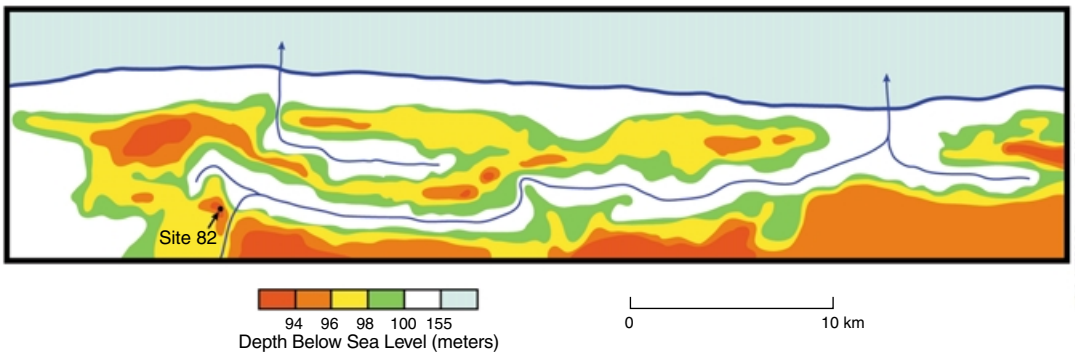

Fig. 7. Bathymetric map of study region west of Sinop

Site 82

This site is comprised of an array of more than 30 stone blocks located on a gently sloping, otherwise featureless bottom (figs. 10–11) approximately 1 km from the beach line identified in the 1999 survey.[29] The stone appears to be similar to the thinly bedded limestone visible in outcrops both along the modern coast ridges and underwater in this region,[30] but the blocks in Site 82, in contrast to observed outcrops in other targets, do not appear to be geologically in situ. The irregularly shaped blocks are generally smaller than 1 m^2, approximately 10 cm thick, and protrude from the Black Sea floor in diverse orientations, some at least 45° from the horizontal sediments. (fig. 12). The topographic relief and individual stones suggest a rectangle, forming a 5 × 15 m arrangement (fig. 13). The site's northern boundary is marked by stone blocks and pieces of wood, including a 1 m long log with one end cut and the other notched (fig. 14). A circular feature 85 cm in diameter located along the east side appears to be either a ceramic vessel or stone cyst. To the southeast, a 4.5 × 4.5 m rectangular feature with raised outline edges is visible in faint relief.

Site 82's stone size, orientation, small finds, and overall layout led us to hypothesize that it might be a submerged structure built prior to the infilling of

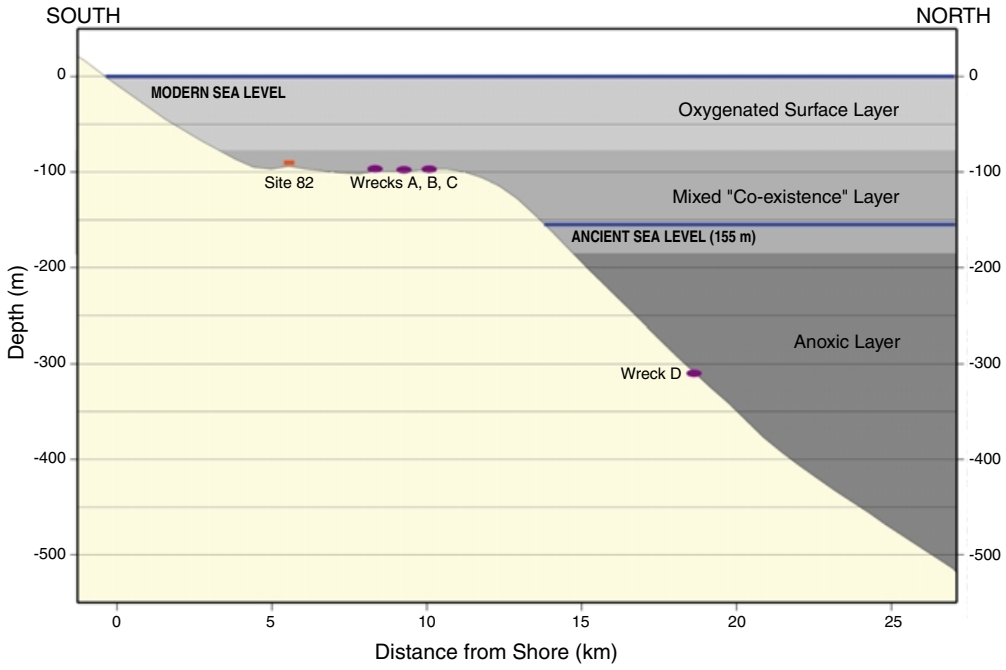

Fig. 8. Cross-sectional profile through study area showing anoxic layering and depths of archaeological finds

[29] Ballard, Coleman, et al. 2000.

[30] Ketin 1962.

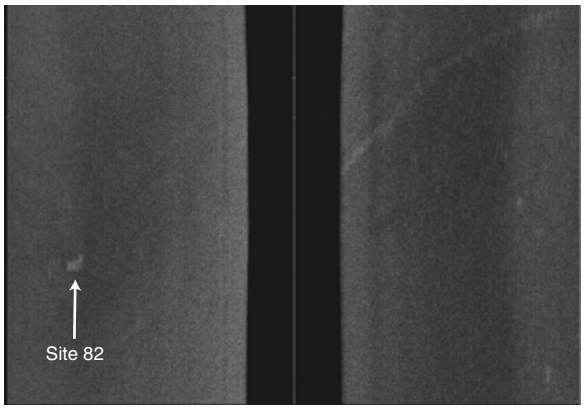

Fig. 9. Side-scan sonar image of Site 82. West is up.

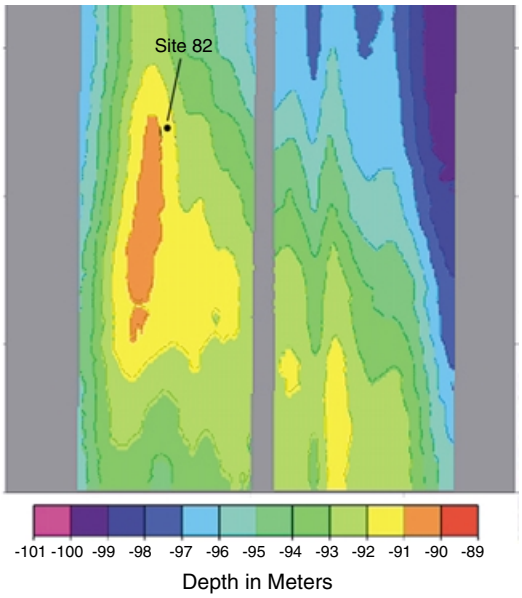

Fig. 10. Topographic map of Site 82 and surrounding area. West is up.

the Black Sea (prior to 7,500 years ago). Analogous habitation remains from pre-7,500 B.P. contexts are found along the present coast of the Black Sea and in the Sinop region.[31] Such architecture typically has wood or wattle and daub superstructure and occasionally has stone foundations.[32] In the Sinop region, typical ancient settlements consist of isolated house structures scattered along low bluffs near the sea.[33] Blade and flake tools from a locally available flint were found eroding from a scarp at Ince Burun along the northern corner of the Sinop peninsula.[34] These finds were found more than 180 m above the submerged coast, approximately 30 km from Site 82. The tools, generally Mesolithic/Neolithic in form, directly document occupation prior to the infilling that flooded Site 82.

As on all other targets in this region, driftwood and other debris appear clustered on the surface of the site, where the irregular surface collects materials drifting over the bottom of the seabed. We recovered several clearly worked objects from the surface within the boundaries of the site. These objects, which initially appeared to be stone, were carved and drilled from oak (*Quercus*). Four worked wooden objects were found along the south edge of the site (fig. 15). Three drilled objects, 22 cm in length, were found in close proximity to each other. Fiber remains in one of the drilled holes suggests that they were originally connected together with rope. A further worked but less shaped piece of wood was recovered nearby. A chisel-shaped wooden object, 14 cm long, was also recovered from from the surface of the site. None of this wood appeared to have been modified by wood-boring mollusks or other marine organisms. A fragment of modern milled lumber was recovered at the site as a control sample. Radiocarbon analysis of these wooden objects, all with modern dates including the control sample, confirms that these objects were surface materials recently deposited on the site (table 1).

Matrix Sample Analyses. Matrix samples from three locations were fine sieved and analyzed. Control bottom mud samples came from dive 34, 5 km from Site 82, and from a 1999 bottom sample, recovered east of Sinop in 140 m depth just above the ancient beach line. These samples contained only shell and marine organism debris. Two samples were taken of the top 5–7 cm of deposit from within Site 82 (dive 23: 3 dl and dive 29: 1.5 dl). Both samples contained small fragments of burnt wood (charcoal fragments of oak and conifer) and several seeds, but no ceramics, stone debitage, or diagnostic artifacts. One possible bone fragment was also reported. A low density of charcoal and bone is typical of terrestrial occupation debris, so the presence of these organic remains is consistent with the hypothesis that the deposits originated in a now submerged terrestrial site.

Chemical analyses of the mud matrix from the deposit taken from the stone blocks of Site 82 were conducted; samples comprised two 32 ml soil plugs from the upper 5 cm of deposit and a similar control sample from the Black Sea bottom mud (dive

[31] Ozdogan et al. 1997.
[32] Ozdogan and Basgelen 1999.
[33] Doonan et al. 1998.
[34] Hiebert 2001.

Table 1. Radiocarbon Analysis of Samples Collected from the Surface of Site 82

Object	Dive Number	Material	Radiocarbon Number	Raw Date	Calibrated Date
Shaped wood "chisel"	21	Wood (oak)	Beta 147526	240±40 B.P.	A.D. 1920–1950
Shaped stick	23	Wood (oak)	Beta 147527	240±40 B.P.	A.D. 1920–1950
Perforated stick	26	Wood (oak)	Beta 147528	210±40 B.P.	A.D. 1840–1950
Modern driftwood	27	Wood (conifer)	Beta 147529	250±40 B.P.	A.D. 1770–1950
Drilled wood	29a	Wood (no positive ID)	Beta 147530	120±40 B.P.	A.D. 1950–1950
Drilled wood	29b	Wood (no positive ID)	Beta 147531	210±40 B.P.	A.D. 1840–1950

34). Both wet chemical analyses and near infrared spectroscopy were conducted, providing a preliminary assessment of the Site 82 matrix as compared to typical, randomly located Black Sea bottom mud. Preliminary results from the two Site 82 samples indicate elevated phosphorus and magnesium compared to the off-site samples, consistent with the interpretation of the site as a potential habitation site. One of the two samples from Site 82 (dive 29) had concentrations of zinc and copper, which are typically associated with excrement and urine. Further, in comparison to the control samples, Site 82 samples have lower sulfur, sodium, and nitrogen, observations with unclear significance at this time.

Analyses of sediments and chemical compositions from Site 82 samples show considerable differences to seafloor samples from dives off of the site. The results are consistent with the hypothesis that this location is a submerged habitation site but do not confirm it. The results of the radiocarbon dating indicate that the wooden artifacts recovered from the surface of the site represent a modern accumulation with no direct association to the site. These analyses, though inconclusive, suggest that further research using robots and submersibles to investigate landscapes unseen since the moment that they were flooded could be fruitful. Further sampling of Site 82 is clearly necessary to confirm its archaeological nature. Additionally, further collection of baseline data concerning the nature and chemistry of the Black Sea floor is essential in order to clarify the relationship between the submerged former landscape and the marine environment.

Ancient Shipwrecks above the Anoxic Layer

The discovery of the first ancient shipwreck on the 2000 expedition occurred while searching for evidence of human habitation above the anoxic layer in water depths between 90 and 155 m. During this search, wood material was found to be pervasive throughout the area. Entire trees, stumps, branches, and twigs were seen in large number, particularly wedged beneath rock outcrops along the banks of the now submerged stream system.

Their large-scale occurrence was not expected, since the water in this depth zone is well oxygenated, characterized by schools of pelagic fish. On clos-

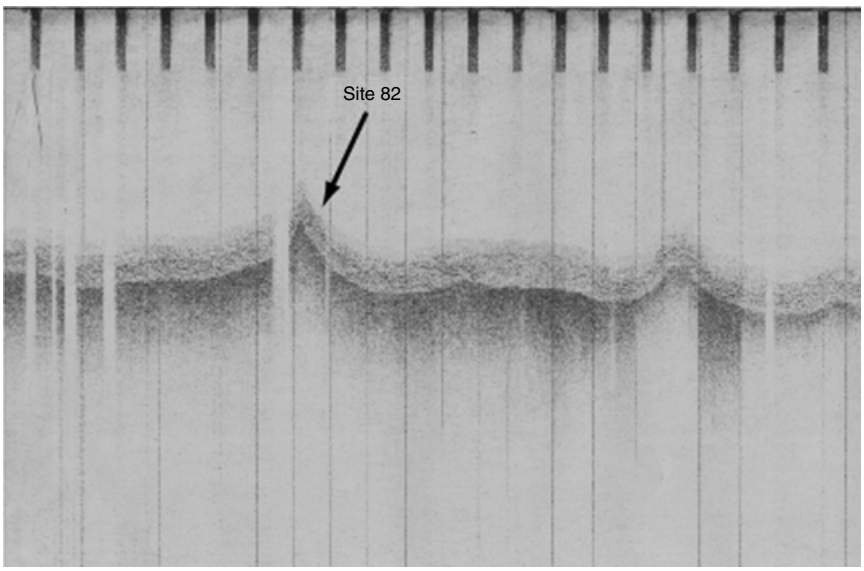

Fig. 11. Bathymetric profile over Site 82

Fig. 12. Site 82 as viewed from Argus, with *Little Hercules* ROV hovering

er inspection, however, it was apparent that the benthic community was quite limited, characterized by small sponges instead of the rich benthic community typical of shallow depths.

Local fishermen reported that when trawling with nets at this depth, they frequently caught pelagic fish such as bonito. On other occasions, however, no fish were recovered and their nets had been stained black and smelled of hydrogen sulfide suggesting periodic mixing of the anoxic water below 155 m with oxygenated water above.

Given the layered nature of the Black Sea waters, the occurrence of internal waves is quite possible, which could aid in the vertical mixing. Such a possible mixing mechanism was further supported by the occurrence of extensive areas of sand waves at the anoxic boundary, which was typically found at a depth of 170 m.

The periodic introduction of anoxic water into shallower depths through internal waves or other mixing mechanisms would result in the death of benthic organisms such as wood-boring mollusks. Pelagic fish such as bonito could escape such mixing by moving into shallower oxygenated water. For that reason, wood would have a higher probability of surviving for longer periods of time than previously thought. A wood sample collected from the bottom surface of the Black Sea above 170 m, had a ^{14}C age of over 3,000 years, further suggesting that wood-boring organisms are absent at these intermediary depths.[35]

Archaeological data from land surveys on the Sinop peninsula document maritime connections between the Sinop peninsula and the Bosporus from as early as the Chalcolithic period (4,500 B.C.) and continuing through the Ottoman period (17th century A.D.). The most intensive trading activity appears to have occurred during the Roman and Byzantine periods (second century A.D.–seventh century A.D.).[36] With the understanding that bottom net fishing obliterated the archaeological record to a depth of 85 m off the Turkish coast, we conducted systematic survey along this trade route, searching between 85 and 150 m, over a 50 km stretch west of Sinop. Three shipwrecks were located with side-scan sonar and verified visually with *Little Hercules*. The shipwrecks were found in approximately 100 m of water, and appear to be undisturbed by any bottom net fishing, trawling scars, or diving activity. All of the shipwrecks appear to have foundered in the open sea and sunk with the cargo in discrete piles. Although no sampling was conducted on these sites, all three appear to date to the late Roman/Byzantine period of vibrant trade between the Sinop peninsula and the west, and all appear to have been carrying amphorae of a distinctive form made only in Sinop.

Shipwreck A consists of two discrete dense clusters of ceramic vessels located on a flat featureless bottom (figs. 16–17). The larger cluster is approximately 23 m in length and 10 m wide, oriented approximately north–south. A second cluster is 4 × 4 m. The visible artifacts in both clusters are distinctive carrot-shaped amphorae. Dating to the late Roman period (second through fourth centuries A.D.),[37] they are known from kiln sites at Sinop from the Demerci valley.[38] The lack of scouring around the debris indicates that the bottom is firm. The nearly 2 m tall site profile suggests that the ship descended right-side up and splayed open upon impact with the bottom, rather than settling into a soft mud bottom. Several large (5–7 m) timbers are aligned along the side of the clusters and may be planking from the vessel. As on Site 82, however, modern seabed debris is concentrated on the topographic anomaly that the site represents. This debris includes small wood branches (20–40 cm) and debris such as a cloth sack visible in the center of the larger cluster.

Shipwreck B is a single cluster of amphorae, also located on a flat featureless bottom. The lack of scouring around the shipwreck suggests that the bottom is firm. Shipwreck B is oriented north–north-

[35] Ballard, Coleman, et al. 2000.
[36] Hiebert et al. 1997.
[37] Kassab-Tezgör and Tatlican 1998.
[38] Kassab-Tezgör and Tatlican 1997.

Fig. 13. Site 82 plan, based on a mosaic of 52 ESC images corrected for parallax distortion. Preliminary topographic relief based on stereoscopic pairing of ESC photos.

Fig. 14. Electronic still camera image of northern boundary of site

east and is larger than Shipwreck A: 15 m wide and at least 25 m in length—its total length is unclear based on our initial recording of the site. Carrot shaped amphorae from Sinop are visible covering the entire site representing at least the upper layer of cargo from the ship. One large oval transport vessel suggests that this shipwreck dates later than Shipwreck A—perhaps to the Byzantine period (fifth–seventh centuries A.D.).[39] A possible bilge pipe, which may be associated with the vessel, is visible several meters away from the amphorae pile to the south. Scattered among the amphorae are two types of large wooden planks: long planks (5–8 m), mostly parallel to the length of the amphorae pile, and shorter planks (1–3 m), both parallel to and perpendicular to the amphorae pile. While most of the planks appear to be lying on the surface, several are clearly embedded within the matrix of amphorae (fig. 18), allowing us to suggest that they are hull planks from the ship itself.

Shipwreck C was located on side-scan sonar and checked visually via video by *Little Hercules*. The site appears to be similar to Shipwreck A: an amphorae pile approximately 5 m across consisting of primarily carrot shaped amphorae. No further investigation was made and no photo mapping was carried out. The work on Shipwreck C confirms that the protocol of side-scan sonar and target checking with a ROV can efficiently conduct systematic survey in underwater environments where the pattern of shipwrecks has not been disturbed by subsequent human activity. The discovery and identification of Shipwreck C also demonstrates that the technology and methodology utilized here can be used in the development of large-scale systematic survey and site identification. This information is critical to the goal of evaluating the quality and density of archaeological remains along a trade route, and to provide a baseline for underwater archaeological resource management and protection.

Ancient Shipwrecks within the Anoxic Layer

Separate searches for ancient wooden ships were carried out in the anoxic layer at three separate locations: just seaward of Site 82 to a depth of 600 m, east of Sinop to a depth of 450 m, and north of Sinop to a depth of 2200 m.

One of the original objectives of the 2000 study was to determine if an ancient deepwater trade route once existed between Sinop and the Crimea.[40] Unfortunately, that proved difficult. The ocean floor just north of Sinop plunges rapidly from 100 m to over 1,000 m. Based on the side-scan sonar record and subsequent visual inspection by the ROV, this region consists of massive slumps and landslides producing complex bottom morphologies. As a result, searching for ancient shipwrecks within this terrain using both the acoustic and visual imaging vehicles proved extremely difficult, time consuming, and unproductive.

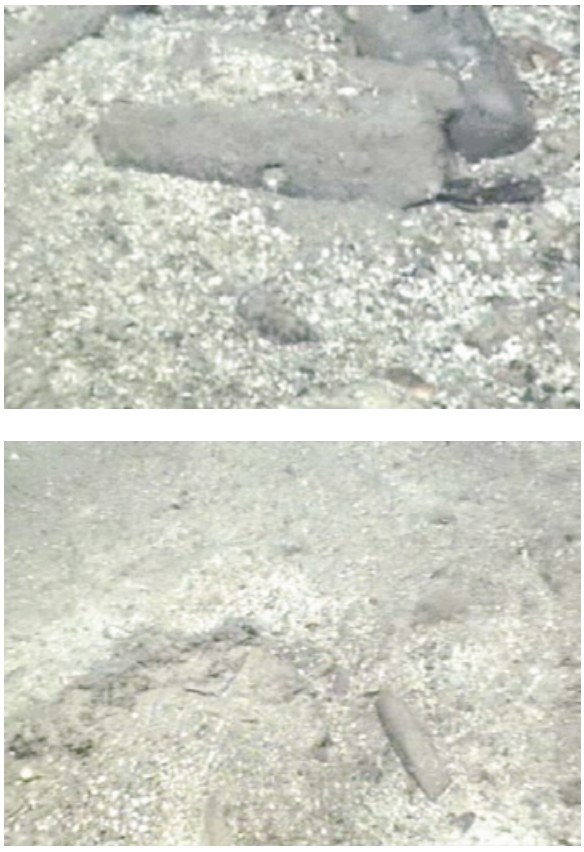

Fig. 15. In situ wooden debris on Site 82 from dives 29 (top) and 21 (bottom)

[39] Bass and van Doorninck 1982.

[40] Hiebert et al. 1997.

Fig. 16. Video camera image of Shipwreck A

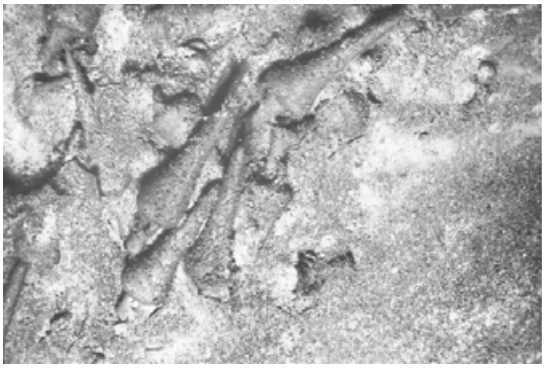

Fig. 17. Electronic still camera image of Shipwreck A

The focus of the search then shifted to the region east of Sinop. Here there was a broad and somewhat more level terrain within the anoxic layer. It was also relatively close to shore and along what might have been a coastal trade route connecting Sinop to the regions farther east. Several targets were detected on sonar but no ancient shipwrecks were found in this area and further searching was abandoned.

Near the end of the expedition, a final search effort was conducted north of Site 82 between the region of sand waves, which ends at a depth of 200 m, and the beginning of landslides and slumping at a depth of 600 m. Within this narrow depth range a few promising targets were detected, one of which proved to be a sunken wooden ship when investigated visually by *Little Hercules*.

The shipwreck was located in an area where the seafloor has little topography and lies at a depth of approximately 320 m. The bottom sediments are soft and not compacted in comparison with the bottom near Site 82 and Shipwrecks A, B, and C. The wooden structure of the shipwreck appears covered in silt up to its deck, with drifting of sediments across the ship structure, unlike the bottom characteristic of shallower depths where bottom geology and topographic features were visible.

Shipwreck D is comprised of a very well preserved wooden vessel sitting virtually upright in the bottom silts. The outline of the hull is defined by 18 frame ends (fig. 19); the mast of the ship rises, at a slight angle, approximately 11 m above the hull, and the mast step is visible at its base (fig. 20). The hull seems to be nearly as long as the mast is tall (11–12 m) and approximately one third as wide (3.5–4 m). A number of timbers (particularly the bulwark/uppermost planking strakes) are missing or have been displaced. The wood surfaces appear clean cut and even display wood grain. Several wood knots are visible near the top of the mast. A short length of cordage coils around the mast near its top (fig. 21). There is no metal visible on the site or vessel.

Many of the 18 frame ends have a hole through their molded face (wider face). One has what appears to be a wooden cleat remaining in this position. Two frame ends flank the mast and may indicate the mast partners. One frame end is situated in association with a beam approximately twice its thickness. Both the end of the beam and the frame end are mortised or notched.

The cant of the mast toward one end suggests the direction of the bow, but it may be that the mast slipped with the impact of the shipwreck. The mast originally was lashed to a bracing timber that also

Fig. 18. Video camera image (left) and electronic still camera image (right) of Shipwreck B

Fig. 19. Video images along the deck of Shipwreck D: right, frame ends, rudder support and stern post (viewed towards the stern); left, upright stanchions (viewed accross the boat, port to starboard).

has treenails passing through it. Two pairs of upright stanchions, located immediately aft of the mast, probably had cross-pieces that connected them. There are notches facing outboard (away from each other) on the pair of stanchions closest to the mast and the second pair of stanchions is topped by square tongues, presumably fashioned to fit into mortises on a cross-piece, now missing. This arrangement may have been intended to support yards when lowered or it is possible that it was once lightly roofed as a shelter.

Beyond the stanchions are what appear to be a rudder support and the sternpost, which rises up out of the sediment in line with the mast. A large spar with a round tenon at one end lies on the surface nearby. Several spars (long, tapering timbers that were part of the rigging) are visible on the shipwreck. These probably are yards for a sail. If the cant of the mast is not the result of impact, it may indicate that this was a lateen-rigged hull. The mast's height also suggests a lateen-rigged hull.

The only visible fastenings are wooden treenails in the bracing timber and treenail ends protruding from the faces of five of the frame ends. No other fastenings, such as mortise-and-tenon joints, nails, sewing, bolts, or pegs are visible, so we cannot pinpoint the techniques used to build the hull.

An unglazed ceramic jug with a small neck and handle appears in situ on the shipwreck near the mast step. The jug is not typologically diagnostic, as such pots are found on sites in the Mediterranean and the Black Sea from antiquity through recent times.

A wood sample for radiocarbon dating was collected from the rudder support using a coring device measuring approximately 1.5 cm in diameter and 10 cm in length. The rudder support was chosen for sampling because it was a large timber with visible exterior surface, ensuring that the sample would date approximately to the felling of the tree. The wood was identified as fir (*Abies* sp.), which is traditionally used in boat building in the Black Sea region. A sample submitted for AMS ^{14}C resulted in a date of 1610 ± 40 (Beta-147532) calibrated to 410–520 A.D. The results of the AMS dating suggest that this vessel was generally contemporary with the two Byzantine wrecks at Yassi Ada and the Boz Burun shipwreck located off the Turkish Mediterranean coast.[41] It is important to note that these vessels, found in Mediterranean waters, are not nearly as

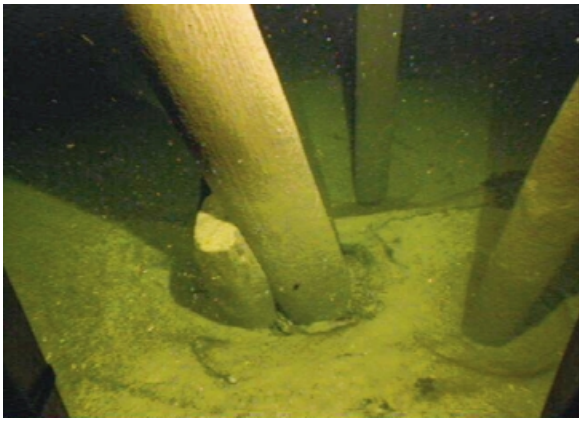

Fig. 20. Video camera image of mast step of Shipwreck D

[41] van Doorninck 1997.

well preserved as this Black Sea vessel. The state of preservation of Shipwreck D—the first vessel to be found in the anaerobic waters of the Black Sea—suggests that other equally well-preserved vessels await discovery.

CONCLUSIONS

The 2000 season was a successful test of our deepwater survey and research techniques and resulted in the investigation of a possible habitation site on the submerged shoreline of the Black Sea and the identification of several shipwrecks more than 25 km from the coast. Our oceanographic propositions about deepwater research in the Black Sea have been confirmed: we have shown that the anoxic bottom waters of the Black Sea create an environment highly favorable to the preservation of organic materials. In addition, we found that vertical mixing introduces anoxic water into shallower depths, resulting in a further zone of good preservation of organic remains. We found intact organic material, in particular, ship's wood, in depths up to 90 m. This survey identified a zone between 85 m and 150 m of intact ancient landscape relatively unclouded by sedimentation and undisturbed by fishing or trawling. We also established that bottom net fishing is a major force disturbing underwater remains in this region and have shown the clear difference in preservation between areas where bottom net fishing is common and regions that are too deep for nets. Results from the expedition thus proved that it is possible to systematically survey and map a submerged landscape in underwater depths that are beyond safe diving depths.

The archaeological description of Site 82, a potential pre-flood coastal habitation site, resulted from our first efforts to survey the submerged landscape along the Black Sea coast. These underwater remains were documented by video and ESC rather than directly observed, thus the available data are not strictly comparable with remains on land. However, the appearance of the site and the composition of its sediments bear similarities to structures known from northern Turkey of the Neolithic period. The location of this site can be understood with reference to its local pre-flood geography based upon the construction of detailed bathymetry, and the upland sites known from linked archaeological survey.[42] This proposed forager settlement pattern is quite different from the later, agricultural villages known from the Sinop region. The possibility that this site represents a flooded settlement of a little known, early period of Turkish prehistory is extremely exciting, but the significance of these finds can only be determined in association with discoveries from the land survey and excavation program.

Fig. 21. Video camera image of top of the mast, Shipwreck D

The identification of shipwreck remains in this initial survey provides more than just a baseline methodology for the systematic survey of trade routes. From the study regions to the west and north of Sinop, more than 25 km from the coast, we found evidence of ships carrying amphorae of a very homogeneous type, typical of production at Sinop during the Roman and Byzantine periods. By combining land and underwater data in a single research design, we will be in the position to confirm the archaeological and historical evidence for vibrant Roman and Byzantine production and maritime trade from Sinop to the Bosporus and the other ports of the Black Sea.[43]

The best preserved of the wrecks, Shipwreck "D," is dated to the late Byzantine period on the basis of radiocarbon dating, rather than by distinctive artifacts or ship design. The boat's size, construction and building materials (based upon the wood identification) suggest local, Black Sea, manufacture. Further investigation of the boat's well preserved wooden structures and its cargo will shed light on the traditions of Black Sea technology and commerce in relationship to Mediterranean, Eurasian, and Near Eastern regions. Recent stratigraphic investigations at Sinop's natural harbor indicate that the Byzantine port was built upon Roman, Greek, and even Bronze Age remains.[44] Provided these

[42] Doonan et al. 1998; Hiebert 2001.

[43] Maksimova 1956; Bryer and Winfield 1985.

[44] Hiebert et al. forthcoming.

data, further underwater survey in the zone below 85 m has the potential to locate earlier ships that were lost during equally active periods of maritime commerce.

Robert D. Ballard
Dwight F. Coleman
institute for exploration
55 coogan boulevard
mystic, connecticut 06355
dcoleman@ife.org

Fredrik T. Hiebert
Jennifer S. Smith
university of pennsylvania museum of archaeology and anthropology
33rd and spruce streets
philadelphia, pennsylvania 19104
hiebert@sas.upenn.edu
jshadel@sas.upenn.edu

Cheryl Ward
Kathryn Willis
institute of nautical archaeology
college station, texas 77843
cward@anthro.fsu.edu
knewthomas@yahoo.com

Brendan Foley
Katherine Croff
massachusetts institute of technology
cambridge, massachusetts 02139
bfoley@mit.edu

Candace Major
lamont-doherty earth observatory of columbia university
palisades, new york 10964
major@ldeo.columbia.edu

Francesco Torre
university of bologna
bologna, italy
ignazia@tin.it

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A Tale of Two Monuments: Domitian, Trajan, and Some Praetorians at Puteoli (*AE* 1973, 137)

HARRIET I. FLOWER

Abstract

This article offers a complete and interdisciplinary reevaluation of a large marble block, originally from Puteoli and now in the University of Pennsylvania Museum in Philadelphia. One side of the stone has a unique, completely erased inscription of Domitian from A.D. 95/96, while the other has a relief of three Roman soldiers of the Praetorian Guard, the personal bodyguard of the Roman emperors. The Philadelphia relief joins another relief from Puteoli, now in Berlin, to form the corner of an imposing public monument. Three moments in the history of the stone are analyzed in detail in their historical, epigraphical, and art historical contexts. The marble was originally inscribed with an exceptionally fulsome text honoring Domitian for the inauguration, in A.D. 95, of the new *Via Domitiana* linking Puteoli to Sinuessa. After Domitian's murder the text was erased in situ and the erasure was then displayed for a short time. Finally, the stone was turned and reused, probably in an arch marking the start of the renovated road to Naples, which was started by Nerva and eventually opened by Trajan in A.D. 102. The iconography of the Praetorians, as they appeared on Trajan's Arch, and the political role of the Guard at the end of the first century A.D. is elucidated, as is the continuing struggle over Domitian's memory in the years immediately after his death and the character of the fierce sanctions (*damnatio memoriae*) imposed on him by his successors.*

miles gravissime tulit statimque Divum appellare conatus est, paratus et ulcisci, nisi duces defuissent
Suetonius *Domitianus* 23.1

In 1909 the University of Pennsylvania Museum in Philadelphia acquired a newly excavated block of marble from Puteoli (modern Pozzuoli).[1] The piece was bought for its fine relief of three Roman soldiers that seemed to date from the turn of the second century A.D. (fig. 1). Since then the relief has served as a central display piece in the Roman sculpture gallery of the museum. After some years it was discovered that on the other side the stone also has a monumental erased inscription of Domitian in what remains of a decorative frame (fig. 2).[2] It seems that the grayish white marble was imported from Greece and was used at various times in two different imperial monuments erected in the wealthy harbor city of Puteoli on the Bay of Naples.[3] Although it has been known for over 90 years, the Puteoli stone has received little scholarly attention in its own right.[4] In the discussion that follows a complete reevaluation of this piece will be offered, with a view to recovering the meaning and context of its various appearances as part of the urban landscape. This reexamination will use analysis of the erased text and of the relief sculpture to recreate the visual and symbolic effect of two quite separate yet essentially similar monuments, one for Domitian and one for Trajan. The mutilation and subsequent destruction of Domitian's monument can be closely associated with the creation of Trajan's image as *optimus princeps*.

The Puteoli relief is not an isolated object; it can be exactly matched with another relief of a Roman soldier, discovered in Puteoli in 1801 and now in Berlin (figs. 3–4).[5] In 1919, the two parts were iden-

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[1] MS 4916, purchased by G.B. Gordon in 1908.

[2] The inscription was first noted in print by Hall (1913), who imagined that both the text and the relief were part of the same monument.

[3] The marble seems to be Parian II. Trajan's arch at Beneventum is also of Parian marble, while his arch at Ancona is of Pentelic marble from Mount Hymettos. Domitian tended to favor Pentelic, as for the arch of Titus in Rome.

[4] Discussion can be found in Gabrici 1909; Sieveking 1919; Cagiano de Azevedo 1939; Kähler 1951; Matthews 1966; Ostrow 1977, 31; Vermeule 1981; de Maria 1988; Kleiner 1992, 229–30; Zevi 1993; and Kinney 1997.

[5] Sk 887 in the Pergamonmuseum in Berlin was acquired by Bunsen in 1830. See Knittlmayer and Heilmeyer 1998, no. 127 with color plate.

American Journal of Archaeology 105 (2001) 625–48

Fig. 1. Relief of Praetorian Guardsmen from Puteoli, University of Pennsylvania Museum, Philadelphia (MS 4916, neg. no. S4-142867)

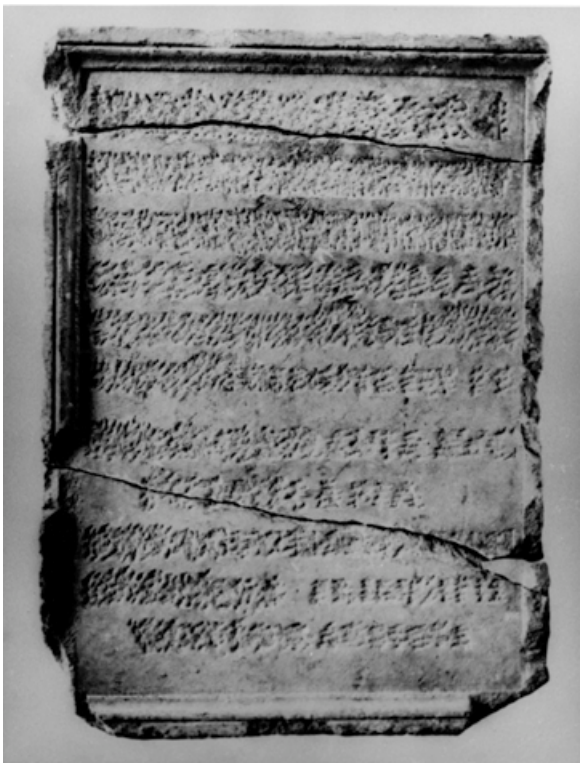

Fig. 2. Erased inscription of Domitian on the reverse of figure 1, University of Pennsylvania Museum, Philadelphia (MS 4916, neg. no. NC35.3325)

tified as belonging to the same monument, and they were actually rejoined as plaster casts in 1938, as part of the *Mostra Augustea della Romanità*, which aimed to recreate many Roman monuments (fig. 5).[6] An exact match was attested at the time. As a result, we know that what survives is the corner of what must have been a fairly large public monument in Puteoli. This corner was emphasized in a special way by the figures of individual Roman soldiers portrayed frontally in high relief and standing in deep niches. To the left of the corner a part of the frieze remains, with two further soldiers walking toward the left. The style of the carving has much in common with similar historical reliefs of late Flavian and early Trajanic date.

Sieveking, who first noticed that the two reliefs belonged together, imagined that they had been part of a base for a large statue, perhaps equestrian, of the emperor Trajan;[7] however, the corner seems too large for such a reconstruction to make sense. A consensus has emerged among modern scholars writing since the late 1930s that the Puteoli fragments belonged to an honorific arch, either as part of the attic (at the top of the arch) or in the socle area (at the foot).[8] A further connection with the imperial themes to be found on such arches is provided by the identification of the soldiers as members of the Praetorian Guard, the personal bodyguard of the Roman emperors.

Praetorians are not usually highlighted in Roman public art, and their presence in stone at Puteoli in the early second century A.D. is therefore of significant interest. Yet they appear in palimpsest, as the "other" side of a piece of marble that originally had a very different honorific purpose, as is demonstrated by the monumental erased inscription. The inscription provides a striking example of the effects of postmortem sanctions, commonly referred to by the modern term *damnatio memoriae*.[9]

[6] Sieveking (1919) identified the two pieces as having been part of the same monument. Since the 1938 exhibition, the plaster cast has been kept in the Museo della Civiltà Romana in Rome (MCR 871, sala XVIII, 57). For detailed discussion of the join, see Sieveking 1919, 6; Kähler 1951, 433.

[7] Sieveking 1919, 7.

[8] Cagiano de Azevedo 1939, 55–6; Magi 1945, 162–3; Kähler 1951, 433; de Maria 1988, 125–6 with no. 41 at 256–7. It is also possible that they belonged to some other type of monument, such as a monumental altar like the Ara Pacis, or another kind of enclosure.

[9] The standard treatment of *damnatio memoriae* in the imperial period is still Vittinghoff 1936, although he himself demonstrated that this Latin term was not used in antiquity.

Fig. 3. Relief of a Roman soldier from Puteoli, Pergamonmuseum, Berlin (Sk 887, neg. no. Sk 6395), Antikensammlung, Staatliche Museen zu Berlin – Preußischer Kulturbesitz

Fig. 4. Side of figure 3 showing arm and shield of soldier on Puteoli relief in Philadelphia, Pergamonmuseum, Berlin (Sk 887, neg. no. Sk 6396), Antikensammlung, Staatliche Museen zu Berlin – Preußischer Kulturbesitz

In this case, the person honored and dishonored is the emperor Domitian; immediately after his murder in A.D. 96 the senate imposed widespread official sanctions on his memory.[10] It is very rare for an inscription to be completely erased, especially in a case where the text was effectively removed by turning the stone and reusing it in a new architectural setting. Erasure usually targeted the name, or just part of the name, of the disgraced person.[11] In cases of reused stones there is often no erasure at all since the inscribed text was made to disappear completely from view.[12]

The Puteoli stones clearly have a complex history that was closely related to the fate of several emperors and to the role of their Praetorian Guardsmen. The difficulty of deciphering the text has meant that it has not been the object of much discussion. Yet, what we have here is direct evidence for three moments in the history of the stone that is now in Philadelphia. First it was used as the base for a statue of Domitian and inscribed by the local community of Puteoli with a text honoring him. The inscription shows that this took place in A.D. 95/96 (between 14 September 95 and 13 September 96 in Domitian's 15th tribunician year). Domitian was assassinated on 18 September A.D. 96, and shortly thereafter the whole text was removed from

[10] For Domitian's damnatio memoriae, see Pliny *Pan.* 52; Suet. *Dom.* 23; Dio Cass. 68.1 with the detailed treatment in Paillier and Sablayrolles 1994.

[11] For Domitian's case, see Martin 1987, esp. 198–9. Of his 155 inscriptions with erasures, 90 have only *Domitianus* erased and 40 more have both *Domitianus* and *Germanicus* removed. There are 25 examples where the whole of Domitian's titulature was erased.

[12] A good example was found at Olympia in the 1995 excavations of the clubhouse of the athletes' guild (*AE* 1995, 1406). Two identical dedicatory inscriptions of Domitian from A.D. 84 were turned and reused in the same architectural setting. Cf. *AE* 1995, 1082.

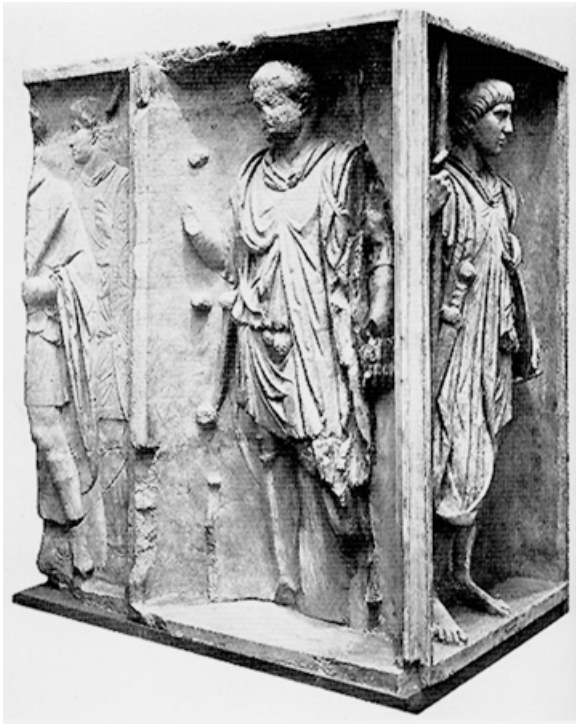

Fig. 5. Cast of Philadelphia and Berlin reliefs joined together, Museo della Civiltà Romana, Rome (MCR 871). (After Cagiano de Azevedo 1939)

the stone. The angle and shape of the chisel marks confirm that this was done when the stone was still standing upright, presumably in its original position.[13] Consequently, it seems clear that the erasure was itself the subject of public display, presumably because the recent text was so embarrassing in the new political climate after Domitian's death. Subsequently, the erasure was removed from view and the stone was turned and reused in a public monument, probably an arch connected with Trajan.[14] Both Domitian's achievements and his disgrace were removed to make way for honors paid to the new ruler and for a representation of some soldiers of his retinue, who were surely depicted as accompanying the emperor himself. The present analysis will offer a discussion of each of these three distinct stages of the stone's use, specific episodes that seem to fall within a short and identifiable time span. The full significance of the Puteoli piece can only emerge when its whole history is taken into account.

AN INSCRIPTION FOR DOMITIAN AT PUTEOLI

The monumental inscription that honored Domitian at Puteoli was so thoroughly removed that its very existence was not noticed either by the original Italian excavators of the stone or by the museum staff in Philadelphia, who at first displayed the stone clamped to the wall so that the erasure was not visible.[15] Even after the erasure's discovery it was initially dismissed as unreadable, although it was suspected, on the basis of the early Trajanic style of the reliefs, that Domitian was the emperor named in the text.[16] Efforts at decipherment were made in 1939 and again in 1966,[17] but no reading was securely established. Beginning in 1997, I used a variety of strategies to try to establish a definitive and verifiable reading. Most of the text can be read with time and patience by using a raking light from the left, since the chisel marks of the erasure were made by a right-handed person. Only the letters themselves have been erased, so that the word breaks are mostly clear and apices remain to indicate the position of some of the vowels. The text is most easily read at night when the light source can be completely controlled. For difficult areas squeezes were made of individual sections and read with a raking light.[18] Small squeezes are especially helpful when working with such a large stone, as they enable one to shine a light onto the text or erasure at angles that are impossible to achieve in the gallery itself. The photographs and squeezes were also scanned for digital enhancement.[19]

I have been able to confirm the following text, which is very close to the reading made by Kenneth Matthews in 1966 (*AE* 1973, 137):[20]

[13] Kähler 1951, 431.

[14] The Anaglypha Traiani/Hadriani provide another example of early second-century reliefs that are constructed of stones of various sizes (Pentelic marble) that have apparently been reused. See Boatwright 1987, 184.

[15] The history of the stone in its setting in Philadelphia is conveniently discussed by Matthews (1966).

[16] See Sieveking 1919, 6.

[17] Cagiano de Azevedo 1939 (from the cast in Rome) and Matthews 1966 (from the stone in Philadelphia) = *AE* 1941, 73 = *AE* 1973, 137 (note the unusual editorializing in *AE* 1973 which led to a correct but unconfirmed reading of the stone). Other scholars who tried to work from squeezes did not make much progress. See Kähler (1951), whose photograph of the erased inscription is reproduced upside down.

[18] Individual squeezes were made of the numerals in order to confirm the date (tribunician power XV, imperator XXII, consul XVII) and of the last line in individual sections.

[19] I used Adobe Photoshop 5.0 for digital enhancement.

[20] Imp(eratori) Caesari | divi Vespasiani f(ilii) | Domitiano Aug(usto) | German(ico) pont(ifici) max(imo) | trib(unicia) potest(ate) XV, imp(eratori) XXII | co(n)s(uli) XVII, cens(ori) perpet(uo), p(atri) p(atriae) | Colonia Flavia Aug(usta) | Puteolana | indulgentia maximi | divinique principis | urbi eius admota.

Fig. 6. Detail of line 8 of the erased inscription of Domitian in Philadelphia. (Photo by the author)

IMP CAESARI
DIVI VESPÁSIÁNI F
DOMITIÁNÓ AUG
GERMÁN PONT MAX
TRIB POTEST XV IMP XXII
CÓS XVII CÉNS PERPET P P
COLÓNIA FLÁVIA AUG
PUTEÓLÁNA
INDULGENTIA MAXIMI
DIVINÍQUE PRINCIPIS
VRBI EIUS ADMÓTA

To Imperator Caesar Domitian Augustus Germanicus, son of the deified Vespasian, high priest, in the fifteenth year of his tribunician power, imperator for the twenty-second time, consul for the seventeenth time, perpetual censor, father of the country, the Flavian Augustan Colony of Puteoli [dedicates this] having been moved closer to his city by the indulgence of the very great and divine leader.

The inscription is spread over 11 lines and the letter sizes vary from about 11 cm at the top to about 7 cm at the bottom. The name of the local community (*Puteolana*) appears in slightly larger letters than the surrounding text and is placed on a line of its own (fig. 6). The field of writing is surrounded by a border, only a small part of which has been cut down in the reuse. The present size of the stone is 162 × 114.5 × 28 cm. The letters were very fine and deeply cut so that each character had its own profile. As a result it was difficult to obliterate them completely, and their original shapes are revealed by very thin white lines that remain beneath the erasure. Considerable effort was expended to remove all the letters, although the last two in the top line on the right (RI) are still easily legible (fig. 7). It seems that these were simply too awkward to reach. The bottom line is by far the hardest to read. The chisel marks are almost horizontal as the person doing the erasing had to work close to the ground. The appearance of the completely erased monumental text is striking today and must have been all the more so when seen in its original context. The statue may have been left standing above the erasure or it may have been removed or mutilated in some way to enhance the visual and symbolic effect of the erasure.[21]

The citizens of Puteoli not only removed Domitian but also effaced the name of their own com-

[21] See Cic. *Verr.* 2.2.158–68. In 70 B.C. after the disgrace and voluntary exile of C. Verres, the corrupt governor of Sicily, his statues throughout Sicily were removed but the bases were left standing as a mark of shame. It seems that the base of the monumental equestrian statue of Domitian in the Roman forum (*equus Domitiani*) was probably left standing in 96 and perhaps reused after some years for a statue of Trajan. In that case a civic image of Trajan seems to have replaced a military one. See esp. Hammond 1953. Contra Richardson (1992 *ad loc.*), who argues that the base was destroyed in 96. See also Giuliani in *LTUR ad loc.*

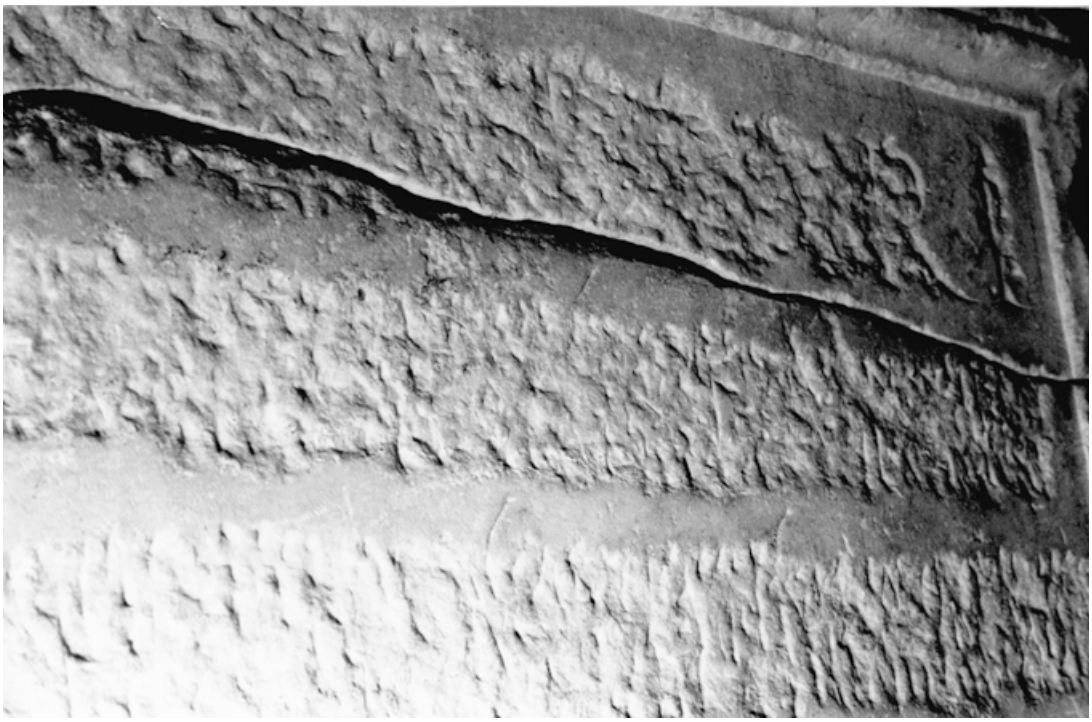

Fig. 7. Detail showing top right corner of erased inscription of Domitian in Philadelphia. (Photo by the author)

munity at the same time, together with the whole record of their relationship of mutual obligation and respect for the previous emperor. This violent public reaction to Domitian's disgrace provides more than a simple reflection of events in Rome itself, where Domitian's statues were toppled and his memory was openly and officially attacked by senators.[22] In Puteoli, the text itself had become a political liability, and the best way to deal with it seemed to be to resort to the unusual decision of a complete and public erasure of all of the words. This choice is all the more striking given that other inscriptions in Puteoli contain erasures with only part of the disgraced person's name removed.[23] As far as we can tell, local practice did not provide precedent for such severity. In all, about 400 texts have survived that mention Domitian. Of these slightly over 40% contain some erasure, usually targeting his name.[24] In most cases only part of the name is removed, especially *Domitianus* and *Germanicus*. I know of no other surviving example of a Domitianic text that has been completely erased. The mutilation of the Puteoli inscription is a remarkable historical phenomenon that attests to complex feelings of fear and to correspondingly elaborate mechanisms of self-defense.

The wording of the text reveals some of the reasons for its removal, which we may imagine happened soon after Domitian's death. The opening six lines (over half the text) are taken up with Domitian's name and his standard titles, which are reproduced in full.[25] His name appears in the dative case since this is an inscription (and statue) dedicated to him. Below his name is the name of the local community (two lines), which is in the nominative as the donor of the statue and of its base. No verb of giving is used since the gift itself and its dedication are made self-explanatory by the context, as is common in many Latin public inscriptions. There is a comment on the reason for the gift, however, and for the qualities and actions of the emperor Domitian that are being recorded here for posterity. In this section, in the last three lines of the inscription, the language departs in striking ways from the standard formulae of honor-

[22] Pliny *Pan.* 52; Suet. *Dom.* 23.1; Dio Cass. 68.1.

[23] The most notable example is *CIL* 10.1574, which records games given in A.D. 56 by the *Augustales* in honor of Nero, Agrippina, Jupiter Optimus Maximus, and the genius of the colony of Puteoli. Only Nero and Agrippina have been erased and in such a way as to leave a record of the games for an emperor (whose name could now be mistaken for that of Claudius) and an unnamed Augusta. For further discussion, see Flower 2000.

[24] Domitian's inscriptions and their erasures are fully discussed by Martin (1987), who shows that later texts were more likely to be erased. For examples of other texts from the last year or so of Domitian, see *AE* 1982, 84 (= *CIL* 6^2. 40458) and *AE* 1984, 156.

[25] For Domitian's standard titles, see Cagnat 1914, 191–2; Martin 1987.

ific texts.[26] This language reflects the local desire to honor Domitian in a special way when the statue was erected. The exceptional degree of adulation is equally revealed by the decision to erase the whole text. This recently inscribed eulogy had become distinctly inappropriate at this particular moment of political upheaval.

The citizens of Puteoli had warm feelings toward Domitian, based on their long association with the Flavians. The Julio-Claudians had also been closely associated with the Bay of Naples, where Nero and his mother Agrippina were both especially popular.[27] However, during the confusion of the year A.D. 69, after Nero's suicide, Puteoli had been quick to declare for the Flavians and to oppose their local rival Capua, which supported Vitellius.[28] This was a natural move for a harbor town with so many trading connections to the eastern Mediterranean, where Vespasian first staked his claim. Puteoli was also the first place in Italy, after Rhegium, where Titus landed on his return from his conquest of Judaea.[29] Puteoli was amply rewarded by Vespasian, probably early in his reign, with significant new grants of territory at the expense of Capua and with a new name, *Colonia Flavia Augusta Puteolana*, to mark the community's renewed status and political affiliation.[30] This was also the name that the town was to keep until well into the fourth century A.D. Some of Vespasian's veterans may also have been settled here.[31]

The Puteoli text refers to Domitian's indulgence (*indulgentia*), which has caused him to become the benefactor of the local community. This inscription provides one of the very first examples of the use of this concept in a public text; such an expression later became commonplace in inscriptions honoring second-century emperors such as Trajan and Hadrian, particularly in relation to tangible benefactions or grants.[32] Whereas the quality or attribute of indulgentia had been a common expression in Latin literary works for generations, it was originally a feeling or habit that characterized the relationship of a parent, especially a father, with his children.[33] In this thoroughly traditional way, the emperor Tiberius was said by the senate in A.D. 20 to have been a very indulgent (*indulgentissimus*) father to his adopted son Germanicus.[34] The Puteoli inscription, however, exemplifies a very different kind of indulgentia, which is both the mental attitude and the practical inclination of the ruler (*princeps*) toward his subjects. The linguistic and ideological shift involved is the logical result of Roman rulers' presenting of themselves as father figures for the whole community of citizens (*pater patriae*).[35]

There is only scanty evidence for this new, imperial indulgentia in the first century. Titus referred to his own indulgentia in a memorable passage of a letter that he sent to Spain to settle a dispute there in A.D. 79.[36] He used the concept of indulgentia to characterize his own even-handed role as arbiter in a bitter dispute over tax money, when he reprimanded the local community for trying to avoid paying what he thinks they clearly owe. Titus's letter provides the earliest secure evidence of an emperor characterizing himself in this manner. Similarly, in a letter that he sent to settle a boundary dispute between Falerii and Firmum in A.D. 82, Domitian called the divine Augustus "indulgentissimus" in relation to an earlier ruling.[37] Domitian himself evidently saw indulgentia as an appropriate concept to describe the relation of emperors to local communities. The Puteoli text is the first example we have of a community adopting such terminology in their own recognition of the emperor as their benefactor. The public use of this terminology at the very end of Domitian's reign was influential for practices that were to become common under Trajan.[38]

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[26] See Salomies 1994 for an overview.

[27] The Flavians inherited the property of the Julio-Claudians in Campania. See D'Arms 1970, 99–103; Frederiksen 1984, 332. Domitian had villas at Circei and Baiae (Jones 1992, 97).

[28] See Tac. *Hist.* 3.57 and 4.13.3 with D'Arms 1970, 101; 1974a for Puteoli declaring for the Flavians.

[29] Titus landed first at Rhegium and then at Puteoli according to Suet. *Tit.* 5.3.

[30] The first Roman colony at Puteoli was in 194 B.C. (*CIL* 1.698; Livy 32.29.3; 34.45.1). Augustus refounded it in his own name after Puteoli sided with him against Sextus Pompeius (Frontin. *Mens.* 236; App. *BC* 5.71). The harbor works are Augustan (Gialanella 1993, 81; Gianfrotta 1993). Under Nero, perhaps around A.D. 60, we find *Colonia Neronensis Puteolana* but also *Colonia Claudia Augusta Puteoli* (*CIL* 10.5369; Tac. *Ann.* 14.27), then under Vespasian *Colonia Flavia Augusta Puteolana* (*CIL* 6.3884; 10.1641; 10.1650–4 cf. *EphEp* 8, number 364). For a detailed discussion with bibliography, see Cébeillac Gervasoni 1993.

[31] For Vespasian's veterans at Puteoli, see especially Panciera 1977, 204–5.

[32] For *indulgentia* in second-century texts, see Pliny *Ep.* 10.58.8 (Edict of Nerva); *CIL* 11.1147 = *ILS* 6675 (Trajan); *CIL* 6.972 = 14. 95; 8.22391 (Hadrian). *AE* 1948, 91 offers an apparently Augustan example from the Largo Argentina, but the text is very fragmentary. For discussion, see Gaudemet 1967; Frei-Stolba 1969; Cotton 1984; Salomies 1994, 74. A summary is given by Corbier (1994, 422).

[33] Cic. *De or.* 2.168 and *Cael.* 79 with Cotton 1984, 261.

[34] *SCPP* 59 with Eck et al. 1996, 182 and n. 497.

[35] Cotton 1984, 263–6.

[36] Titus's letter of 7 September 79 to Munigua is *AE* 1962, 288. On the occurrence of indulgentia in lines 6–7, the editor of *AE* said: "c'est tout un programme de gouvernement."

[37] *CIL* 9.5420 line 21 (Domitian's letter of A.D. 82 from Falerii).

[38] See esp. Pliny *Ep.* 10.58.8, where it is used by Nerva in an edict confirming favors previously granted by Domitian.

Fig. 8. Map of southern Italy

The emperor whose indulgentia is being celebrated is described by the two adjectives *maximus* (greatest/very great) and *divinus* (divine). Both of these were unusual epithets, and the combination of the two is virtually unparalleled.[39] The language used reveals the unique effort that was made in Puteoli to recognize Domitian in ways that would have appealed to him, while also improving on what was found in standard honorific texts. A sensational effect was desired, but one that would not appear excessive. The benefaction he bestowed on Puteoli is recorded in the last line, which is the hardest to read. In this passage, the people of Puteoli used unusual and metaphorical language to attribute a virtually godlike achievement to Domitian, who had moved their community closer (*admovere*) to Rome. Rome is described as being Domitian's city (*urbi eius*), in a phrase that is especially noteworthy;[40] most Roman inscriptions plainly state the achievement (deed or object) that is being commemorated, which is usually something tangible.

THE VIA DOMITIANA AND THE VIA ANTINIANA AT PUTEOLI

When taken out of context, the phrasing of the inscription is obscure, but given its wording and date it surely must refer to the completion in A.D. 95 of Domitian's new road (*Via Domitiana*) that provided a direct route between Puteoli and Sinuessa, where it connected with the Via Appia leading to Rome (figs. 8–9).[41] The new road, which was a notable feat of engineering skill, made travel between Puteoli and Rome much faster, partly by avoiding the inland detour by way of Capua.[42] It was adorned at various points with honorific monuments that celebrated its construction by Domitian. Consequently, Domitian's statue and inscription at Puteoli were originally part of a whole series of new monuments and texts honoring the emperor. We may imagine that communities along its route vied with each other to find memorable expressions of thanks to mark their place on the road and in the celebrations of its opening, which were probably attended by the emperor himself.

Fig. 9. Map of Bay of Naples area

[39] *CIL* 10.1558 of A.D. 46 from Puteoli calls Claudius *divinus* (Cf. *CIL* 6.2034 in the Acts of the Arval Brethren.) For the general development of these epithets, see Frei-Stolba 1969.

[40] In inscriptions and other texts, Rome is usually simply *urbs*.

[41] For the *Via Domitiana*, see Dio Cass. 67.14.1 and *CIL* 10 p. 58 no. 6 (route: Sinuessa - Safo - Volturnum - Liternum - Cumae - in vinias - Puteoli). *CIL* 5.7812 and *AE* 1964, 239 attest a *curator viae novae faciendae usque Puteolos*, a separate official, apparently of consular rank and later *praefectus aerarii Saturni*, who was in charge of the road's construction. See also D'Arms 1970, 103; 1974b, 113; Ostrow 1977, 36–8; Frederiksen 1984, 18, 336; Cébeillac Gervasoni 1993, 23; Gialanella 1993, 91–5; Laurence 1999, 47, 65, 90–1.

[42] For Roman roads in Italy, see Quilici 1990; Capelli 1991. For distances and speed of travel, see Laurence 1999, 88–91.

Striking confirmation of the fact that the Puteoli inscription should indeed be associated with the road comes from Statius, who wrote a poem describing and celebrating the construction of the road.[43] In his poem he uses a phrase that is reminiscent of the last line of the inscription.

> hic segnis populi vias gravatus
> et campos iter omne detinentes
> longos eximit ambitus novoque
> iniectu solidat gravis harenas,
> gaudens Euboicae domum Sibyllae
> Gauranosque sinus et aestuantis
> septem montibus admovere Baias.
> (*Silvae* 4.3.20–26)

> He (Domitian), wearied by the slow journeys of his people and the plains which delay the whole road, removes the long detour and lays a new and solid path on the heavy sands, rejoicing that he is moving the home of the Euboean Sybil and the hollows of Gaurus and steamy Baiae closer to the seven hills (Rome).

Statius uses the same verb (*admovere*) and the same metaphor of the Bay of Naples being moved nearer to the city of Rome by the construction of the road. In his case he refers to the town of Baiae rather than to Puteoli. It seems evident that this metaphor was indeed current at the time and was perhaps used as part of the inaugural celebrations. Unfortunately, it is impossible to be sure whether Statius's poem inspired the inscription or whether ceremonies at Puteoli gave Statius the idea for his image. Given the rarity of metaphor in Latin inscriptions, one may suspect that Statius or someone else used such an image publicly and that the local population then adopted it for their inscription. Statius's poem, with its fulsome praise of Domitian, would have been just as dated and inappropriate by late A.D. 96 as the inscription clearly was.[44]

Statius's poem is one of the few primary sources to describe the construction of an ancient road, and it provides a wealth of detail both about the road itself in its original surroundings and about the atmosphere of festivity that surrounded its opening.[45] Together, the poem and inscription give a fleeting glimpse of the splendor and adulation that would have typified the public celebration inaugurating the new road.[46] Monuments to be found along the road were an arch of white Ligurian marble to mark its beginning at Sinuessa, the monumental bridge over the river Volturnus with another arch, the Arco Felice at Monte Grillo, and the statue at Puteoli, which was probably near the end of the road where it led into the town.[47] Traces of the foundations of an arch have been discovered where the road would have reached the city walls.[48]

The striking bronze equestrian statue of Domitian at Misenum also seems to date to late in his reign.[49] The face of the statue was subsequently changed to portray the emperor Nerva. The statue was found in the *collegium* (*templum Augusti*) of the *Augustales* and seems originally to have been positioned on one of the two pedestals on either side of the staircase leading to the sanctuary, which was closely associated with the imperial cult under the Flavians. A marble plaque bearing a dedicatory inscription to Domitian was fixed to the left-hand pedestal; this plaque was subsequently turned and reinscribed in honor of Nerva.[50] Only small fragments of the marble plaque bearing the two inscriptions have been recovered. Reversed impressions of the letters remain in the mortar on the face of the left pedestal, however, and these have allowed the reconstruction of Domitian's titulature, dating to late 94 or early 95, in the first six lines of the text. This inscription was, therefore, not erased but turned and immediately reused for Nerva. It seems to show that high honors for Domitian at Misenum, and probably the spectacular bronze horse, are a little earlier than the dedication of the new road.

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[43] See Martial 8.65 and Coleman 1988, 102–35 for commentary.

[44] Coleman 1988, xix–xx has Statius compose *Silv.* 4.3 in Naples in 95. It is assumed that he died in 96 before Domitian did.

[45] See Chevallier 1976, 82–3 and esp. Laurence 1999, 65 on the *Via Domitiana* in Statius. Maiuri 1928, 181–5 confirms Statius on its construction. Coleman 1988, 104–5 associates Statius directly with the opening of the road.

[46] Dio Cass. dates the road to 95 but the inscription must be after 13 September. Coleman 1988, xx has Statius *Silv.* 4.3 written in early summer 95. The inauguration of the road could have been in the spring or in the fall (late September–October). A dating to the spring of A.D. 96 was suggested by Matthews 1966, 36.

[47] See Statius *Silv.* 4.3; Martial 8.65; Dio Cass. 67.14 with Ostrow 1977, 36–8; Frederiksen 1984, 18; Coleman 1988, 127–8; de Maria 1988 no. 105 for the Arco Felice.

[48] See Gialanella 1993, 95 (now called quadrivio dell' Annunziata).

[49] For the equestrian statue of Domitian/Nerva at Misenum, see Adamo-Muscettola 1987, esp. 63–5, who wants to associate the statue closely with the opening of the Via Domitiana, and Bergemann 1990, P31 with full bibliography and illustrations.

[50] Although presently under water, the inscription has been ingeniously reconstructed by Camodeca (2000) as follows: [Imp(eratori) Ca]esari | [divi Vesp]asiani [f(ilio)] | [Domitiano] Aug(usto) | Germ(anico), [po]nt(ifici) max(imo) | tr(ibunicia) pot(estate) XIIII, [i]mp(eratori) X[X]II, | [co(n)]s(uli) [X]V[I or II], c[ens(ori)] perp(etuo), [p(atri) patriae)]. Camodeca has suggested that the pedestal supported the bronze equestrian statue of Domitian/Nerva and that the whole complex of the *Augustales* mirrors the contemporary dedication of the Templum Gentis Flaviae on the Quirinal, also between late 94 and mid 95.

Statius further demonstrates (4.3.7) that at the dedication of Domitian's road a direct comparison was made with Nero's incomplete canal that was to link Puteoli with Rome. It seems that Domitian's road was itself built with a previous disgraced emperor in mind, and Statius's poem describes the *Via Domitiana* as both replacing and memorializing Nero's failed project.[51] A few archaeological traces of the road itself have been found at various points, but no milestones or other inscriptions have survived.[52]

The Puteoli inscription confirms and illustrates how the memory of Domitian as the builder of this new road was thoroughly effaced under the new regime.[53] These texts reveal that Domitian, a renowned builder, was famous near the end of his life for commissioning the construction of the new *Via Domitiana* that had involved costly and time-consuming road construction along the rocky Campanian coastline.[54] The road's importance is equally shown by the efforts both of Nerva and of Trajan to dissociate Domitian's name from the road and to celebrate comparable achievements of their own. Shortly after Domitian's death, Nerva found time in his brief reign to start the construction of a continuation of the *Via Domitiana* that led to Naples.[55] This new road (*Via Antiniana*), whose ancient name we do not know, was inaugurated by Trajan in A.D. 102.[56] In contrast to the *Via Domitiana*, it is well attested by milestones both from the original construction and from repairs under the Severans and under Constantine. Nerva and Trajan took over Domitian's role as road builder, and hence as local benefactor in Campania, by resurfacing the old road to Naples, which seems to have dated back at least as far as the fifth century B.C.[57] It may well have been Domitian's own plan to continue the road in this way himself, and it is not known whether any construction had already been envisaged or started, which Nerva could simply have claimed as his own.

The Puteoli relief in Philadelphia was discovered by chance during the renovation of a private house, in a layer of filling material between two surfaces of the *Via Antiniana,* about 150 m southwest of the large Flavian amphitheater in Puteoli.[58] With it there was another inscription of Antonine date, which honors a local citizen.[59] It is significant that an erased inscription of Domitian celebrating his activities as a road builder in Puteoli should be found in an archaeological context associated with the continuation of that same road by Domitian's successors. Unfortunately, the Berlin relief does not have a secure archaeological context, and no other parts of the same monument have been definitely identified.[60] The findspot near the amphitheater, however, reveals an important clue in reconstructing the monument to which it belonged: a large piece of public architecture (possibly an arch) that was probably connected with Trajan's inauguration of the newly refurbished road between Puteoli and Naples.

An arch would fit well both with the size of the decorated corner that survives and with the established Roman custom of placing an arch at the beginning of a new road. Comparable examples come from the *Via Domitiana* itself at Sinuessa and from Trajan's own extension of the Via Appia to Brundisium, whose start was marked by the splendid surviving arch at Beneventum (A.D. 109).[61] Domitian had been a great builder of arches, especially in the city of Rome, and most of these were demolished, apparently soon after his death.[62] Conse-

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[51] See Laurence 1999, 47, 118–22.

[52] It can hardly be a coincidence that no milestones at all have survived from the *Via Domitiana* (Syme 1930, 56; D'Arms 1970, 103; Ostrow 1977, 38). For the relative frequency of milestones and other texts, see Laurence 1999, 49 fig. 4.5. For the archaeological remains from various places, see Ostrow 1977, 36–7; Gialanella and Sampaolo 1980–1981, 152; and Gialanella 1993, 93–5 with color photographs. New maps can be found in *Puteoli: la carta archeologica* 1993.

[53] For the politics of road building in general, see Laurence 1999, 39–57.

[54] The cost of building the *Via Domitiana* (19 km = just over 30 Roman miles, which would have made the trip from Rome to Puteoli about 126 km) has been estimated by Rogers (1984, 68–9) at around 3 million sesterces.

[55] See Laurence 1999, esp. 47–8 for many road projects begun by Nerva and completed by Trajan.

[56] For the road from Puteoli to Naples, see *It. Ant.* 123.1; *Tab. Peut.* 6.4 with Ostrow 1977, 28–36; Gialanella and Sampaolo 1980–1981, 134–5; Johannowsky 1952; 1993, 101–3.

[57] Ostrow (1977, 35) sees Nerva and Trajan as building what was essentially a new road. Gialanella (1993, 79) interprets their actions as repaving a traditional unpaved road that had been in use for centuries.

[58] For the original discovery, see Gabrici 1909, and also Adamo Muscettola 1993, 131.

[59] T. Caesius T. f. T. n. L. abn. Anthianus (*AE* 1908, 206) had a military and equestrian career (Gabrici 1909).

[60] See Gialanella and Sampaolo 1980–1981, 135 for the evidence about its discovery from the archives in Naples. Adamo Muscettola (1993, 131 and pl. 199) has also attributed the marble head of a Vestal virgin from the Naples museum to the same monument. There is no other evidence to confirm or to disprove this hypothesis.

[61] For the Beneventum arch, see de Maria 1988, 232–5; Kleiner 1992, 224–9 with pls. 188–193; Kuttner 1995, 156–63. For arches at the beginning of roads, see Kleiner 1985, 18–19, 28–9, 32–4, 64.

[62] For Domitian as a builder of arches, see Martial 8.65; Suet. *Dom.* 13.2; Dio Cass. 68.1.1 with Jones 1992, 84 and Darwall-Smith 1996, 238–9.

quently, it made sense for Nerva and Trajan to set up arches of their own, even as they were demolishing his. The Puteoli reliefs were probably part of the decoration of such an arch, perhaps even one of the first to be built under Trajan.

The existence of an arch not far from the findspot of the relief is also confirmed by an inscription, which records a city neighborhood (*vicus*) named *Porta Triumphalis*.[63] A number of the neighborhoods and other features of Puteoli seem to mimic those found in Rome.[64] It is possible that an arch had actually existed here before and that it served as one of the city gates, which means that it may have been a quadrifons arch. In other words, Nerva and Trajan may have refurbished an existing arch when they resurfaced an old road.[65]

A fairly tight chronology can be established for the Puteoli relief in Philadelphia that covers three stages in its public existence. First it was set up as a statue base near the spot where the *Via Domitiana* reached the city limits of Puteoli. This was done in Domitian's 15th tribunician year (between 14 September 95 and 13 September 96), probably in the autumn of 95 to coincide with the opening of the *Via Domitiana*. Soon after Domitian's murder on 18 September A.D. 96 the inscription was erased, but the stone was left standing for a while. Within a short time the stone was taken down and must have made its way to the warehouse of a stonecutter's workshop, presumably in Puteoli, to be reworked.[66] By A.D. 102 it had been incorporated into an arch that marked the start of the newly refurbished road to Naples, which was started by Nerva and finished by Trajan. The arch must have stood somewhere near the Flavian amphitheater and may have been part of the city wall. As a result, we can see that these three uses for the same piece of marble can be dated to within a period of about seven years, a period during which three different emperors were in power at Rome.

THE PUTEOLI RELIEFS FROM TRAJAN'S ARCH

We now come to a consideration of the reliefs that were used to decorate Trajan's Arch at Puteoli. The reliefs were presumably finished by the time the road was opened, by the emperor himself in A.D. 102, and thus they belong to the very early years of Trajan's reign. They may also have been planned or started under Nerva, who is specifically credited with the initiation of the road project.[67] In fact, the carving shows interesting elements of various sculptural styles and is closest overall to the Cancelleria reliefs, which were clearly first made under Domitian but then recarved to portray Nerva.[68]

The four soldiers in the reliefs are represented wearing a standard outfit for soldiers traveling within the Roman empire: the tunic (*tunica*) and cloak (*paenula*) with a standard military belt (*cingulum militare*) and sandals (*caligae*). They do not wear body armor or helmets, although they do carry swords, spears, and a variety of shields, including both the small round ones (*palma*) of the corner soldiers and the large decorated one slung (*scutum*) over the back of the best preserved figure.[69] It is immediately clear that they are neither preparing for nor actually engaging in a battle. Rather they are in a civilian context that is stressed by their lack of helmets, allowing for an individualized treatment of their faces and hair. They can be securely identified as members of the Praetorian Guard, the per-

[63] For the *Porta Triumphalis* at Puteoli, see *CIL* 10.1695 = *ILS* 1224a (A.D. 337–342) with Ostrow 1977, 30, 168–9; Castagnoli 1977, 58 n. 65; Frederiksen 1984, 351; and von Hesberg 1992, 292: "Der Traiansbogen von Puteoli hat hingegen an der Grenze zwischen der frühkaiserzeitlichen Unterstadt und der durch den Bau der Via Domitiana und des 2. großen Amphitheaters belebten Oberstadt aus domitianisch-traianischer Zeit gestanden." There is no other evidence for such a structure outside Rome.

[64] See Camodeca 1977, esp. 71–3 and Cébeillac Gervasoni (1993, 20), who attributes to Augustus the decision to name the neighborhoods of Puteoli after those in Rome.

[65] Other iconographic evidence from glass vases suggests, however, that there were a number of arches to be found in Puteoli by the second century A.D. See Gialanella 1993, 95. According to Blake and Taylor Bishop (1973, 263), Trajan's arch at Puteoli is the earliest example of an arch set up for benefactions rather than for victories. Contra Laurence (1999, 45) who sees arches as connected with beginnings and ends of roads even under Augustus (e.g., the Rimini arch, de Maria 1988, no. 48).

[66] For the role of stonecutters' workshops in the reworking of statues, see Kähler (1951, 432, 436), who thinks in terms of rapid reuse of this stone, and Varner 1993 for a general discussion.

[67] For discussion of the style of the reliefs, see Sieveking 1919 (Trajanic, like the Beneventum arch); Cagiano de Azevedo 1939 (a transition between the Cancelleria reliefs and the Beneventum arch); Kähler 1951, 437–8 (by the same workshop that made the Cancelleria reliefs); Pfanner 1980, 62 (quite unlike the arch of Titus); and Kleiner 1983, 72–3 (comparable to the Philopappos monument).

[68] For the best general discussion, see still Magi (1945, esp. 81–2, 162–3), who recognized affinities with the Puteoli reliefs. For continuity in carving styles and in the careers of artists active under the Flavians and Trajan, see Boatwright 1990/2000.

[69] See Suet. *Ner.* 49 and Herod. 2.13.2; 7.11.2 (cf. 2.2.9; 4.5.1) with Durry (1938, 208–12) who calls this the *petite tenue*. For the equipment of Roman soldiers in general, see Bishop and Coulston 1993; Coulston 1998. For Praetorians, see Rankov 1994, esp. 27–8 with colored reconstruction in plate A. For the *paenula* as a typical outer garment of Roman citizens and soldiers, see Kolb 1973, especially 110–14.

Fig. 10. Detail of Puteoli relief in Philadelphia, showing scorpion on soldier's shield. (Photo by the author)

sonal escorts of the emperor whenever he appeared in public in Rome or elsewhere.

The large decorated shield in low relief has a scorpion in the middle, the characteristic emblem of the Praetorians (fig. 10).[70] Presumably this would have stood out clearly when the reliefs still had their original paint. The Praetorians adopted the scorpion because it was the birth sign of the emperor Tiberius, whom they recognized as a founder figure: during his reign the Praetorians' camp in Rome was established on the Viminal.[71] The scorpion can be seen in various artistic representations of the distinctive military standards they used, as well as on some helmets and shields of individual soldiers.[72] No other Roman legion used the scorpion as its sign.[73] Relatively few artistic representations of the Praetorians can be securely identified, because their armor and dress otherwise did not differ from that of ordinary soldiers.[74] When serving at the palace they often wore a toga, and thus appeared in plain clothes with their swords concealed.[75] Indeed, one might argue that there were good reasons why many emperors did not choose to stress the role of the Praetorians in public representations of themselves. Consequently, the Puteoli reliefs provide significant testimony about the Guard in a datable context at the very beginning of the second century A.D.

The presence of the Praetorians in their traveling clothes (*petite tenue*) and in a relaxed setting suggests that the emperor must also have been portrayed in the section of the relief that is now lost. Moreover, he would presumably be shown in civilian clothes performing some official duty. It is quite possible that the arch represented a scene that reflected Trajan's visit to Puteoli to open the new road. Certainly the message must have been essentially similar to the one contained in the erased text on the back of the stone: the emperor, now Trajan rather than Domitian, was being recognized as a benefactor to society in general and to Puteoli in particular. A comparison can again be made with Trajan's Arch at Beneventum, which celebrates the emperor as a civic rather than as a military leader.[76] The original inscription in honor of Domitian was put up by the local community. It is possible that

[70] For the scorpion as the emblem of the Praetorians, see von Domaszewski 1909/1975, 14–5 and Durry 1938, 205. See Rankov 1994, 26 with pl. I for a reconstruction in color.

[71] For Tiberius and the Praetorians, see Tac. *Ann.* 4.2; Dio Cass. 57.19.6 with Durry 1938, 361–5; Le Bohec 1998, 20–1; Keppie 1998, 187–8. Le Bohec 1998, fig. 4 gives a useful map of all the military camps in Rome. There is also a scorpion on a shield on the *Gemma Augustea* (Kleiner 1992, fig. 47), which may suggest its celebration of Tiberius.

[72] For scorpions in the iconography of Praetorians, see Durry 1938, 213–4. Note esp. the scorpions on the Praetorian standards (pl. 4, *CIL* 14.2523 = *ILS* 2662, the grave relief of M. Pompeius Asper from Tusculum now in the Palazzo Albani in Rome), the Berlin head with a scorpion on the cheekpiece of a guardsman's helmet (Berlin Sk 960, frontispiece), and the scorpions on helmets and shields on the Trajanic reliefs from the Arch of Constantine (Durry 1938, pls. 6–8). Durry was apparently not familiar with the Puteoli relief in Philadelphia. There are also scorpions on two shields on the Barberini mosaic from Palestrina (Rankov 1994, 19), which is now dated to the later second century B.C.

[73] For the emblems used by the various Roman legions, see Le Bohec 1998, 262–3 for a summary chart.

[74] It is possible that their uniforms would have been of a different color, which would have distinguished them. According to Rankov (1994, 21 with pls. H and I), it was shields and shield-blazons that distinguished the Praetorians from the legionaries. For Praetorians in art, see n. 104, infra.

[75] See Tac. *Ann.* 16.27; *Hist.* 1.38; Martial 6.76 with the funeral reliefs of *CIL* 6. 2671, 2488; Durry 1938, 207; Rankov 1994, pl. C. For the rare occasions when armed Praetorians appeared in Rome as escorts for captured enemy leaders, see Tac. *Ann.* 12.36; Suet. *Nero* 13; Dio Cass. 63.4.

[76] A similar interpretation is widely accepted for the Beneventum reliefs, especially the scene of sacrifice in the passageway, which may show Trajan at the inauguration of the road (Kleiner 1992, pl. 191). For Trajan's arch at Beneventum, see Rotili 1972; de Maria 1988, 232–5 no. 5.

the same was true for the arch, although other surviving Trajanic arches (Beneventum, Ancona) were dedicated to the emperor by the senate, in the same way that the Arch of Titus was dedicated to the Deified Titus by the senate and the Roman people. The very fine sculptural style of the figures may suggest that the artists were employed by a workshop in Rome, although it is equally possible that the sculptors were local.[77] It is not clear whether the Roman senate also paid for the arch. Domitian's inscription on the back was as finely carved as any Roman text, and Puteoli was a wealthy community that had erected its own amphitheater in emulation of the Flavian amphitheater in Rome.[78]

It is the fine portrait-like quality of the depiction of the individual soldiers that is especially striking to the modern viewer. The lower relief profile of the soldier in the middle, who is carrying his shield slung over his shoulder, is reminiscent of similar figures in profile from the Cancelleria reliefs and, to a lesser extent, from the Arch of Titus.[79] The soldier facing frontally on the right hand side of the Philadelphia relief also has a hairstyle that is typical of Flavian portrait heads.[80] Despite the damage to his head, the style of the portrait is still clearly visible. It is in strong contrast to the head of the soldier now in Berlin, who has a hairstyle typical of Trajan himself and of a number of sculptures made during his time. We can see that the artists and designers of the arch have deliberately used a variety of contrasting portrait styles to characterize and to highlight the soldiers. Whereas the soldiers on the column of Trajan are nearly all bearded and wearing helmets, so that they are not individualized, the Puteoli reliefs give the appearance of portraits, although we may doubt that they were actually modeled on individual Praetorians. The portrait styles are further complemented by the placing of the corner soldiers in their own separate niches, which set them off for the viewer as individual figures. The effect must have been heightened on the original monument, which would have had a number of corners of this style.

This monument was evidently framed by what seem to be unusual representations of a number of individual Praetorians, portrayed in a civic function rather than in battle, as on the column of Trajan or on the Trajanic friezes from the Arch of Constantine.[81]

Fig. 11. Funerary relief of G. Faltonius Secundus, mid first century A.D., Landesmuseum Mainz. (S176, photo courtesy of Landesmuseum Mainz, Ursula Rudischer)

[77] Roman artists are specifically argued for by Kähler (1951, 438) but are also assumed by others. Yet Puteolean architecture and sculpture regularly reached the standards of Rome, as is demonstrated by the architectural and sculptural reworking of the Capitolium under Augustus.

[78] For dedicatory inscriptions on the attic of arches, see *CIL* 6.945 = *ILS* 265 (Arch of Titus, de Maria 1988, no. 74); *CIL* 9.1558 = *ILS* 296 (Arch of Trajan at Beneventum A.D. 109); *CIL* 9. 5894 = *ILS* 298 (Arch of Trajan at Ancona A.D. 114/115). For Puteoli's large amphitheatre and its date, see *EphEp* 8, no. 364 with Sommella 1978, 52–68; Johannowsky 1993, 101–3. Puteoli's amphitheatre was third in size in Italy after those in Rome and in Capua.

[79] For the low relief figure, see the Arch of Titus triumph panel figs. 3, 4, 9, 10, and 22, as well as the Cancelleria relief A figures behind the emperor and the soldiers on the far right.

[80] A variety of hairstyles can be found both on the Arch of Titus and on the Cancelleria reliefs. A parallel can also be made with an early Trajanic funerary relief in the Villa Medici: see Cagiano de Azevedo 1951, no. 12, fig. 14.21.

[81] It is not easy to find other examples of such Praetorians in public reliefs. Analogous, somewhat later instances appear to be provided by the scene of burning debt records on the Anaglypha Traiani/Hadriani (Kleiner 1992, pl. 217) and the similar Chatsworth relief (Kleiner 1992, pl. 218).

Both the portrait-like style and the special use of niches emphasize these Praetorians in a distinctive way. The single soldiers facing the viewer stand in niches that are much deeper than the relief area to the left.[82] The niches also have chiseled borders to highlight them, whereas the relief area has a flat border, which is typical for many narrative scenes in Roman art. A special effort was made to set the corner soldiers apart. The result is a somewhat awkward transition between the two borders, as the frame of the corner niche sticks out sharply beyond the flatter border to the left. There must have been a reason why the niche was designed in this particular style, despite the fact that it does not easily combine with the narrative section. I have not been able to find a comparable example in surviving Roman art of a niche that joins a flatter relief.

As a result of the particular iconographical features discussed above, it seems appropriate to look for other possible artistic influences on the sculptors. The most immediate comparison is with the gravestones of Roman soldiers that often portrayed their subjects standing frontally in deep niches (fig. 11). Such gravestones can be found in a number of areas where Roman soldiers served, notably in the Rhineland and in Britain, but also in northern Italy, which was a recruiting area for many of these legionaries.[83] It has been a matter of some dispute whether the iconography of the standing soldiers originated in northern Italy or in Germany.[84] Whatever the case may be, this style of grave marker seems to have been first made close to the end of the Republic and can be found throughout the first century A.D., so that it was a common iconographic style in a funerary context, especially for soldiers from Italy, at the time when the Puteoli reliefs were carved.[85] The "standing style" clearly mimics a statue in the round within its own niche and was popular with patrons who could afford an individualized tomb, but who could not pay for a prestigious freestanding statue near their graves.[86]

A detailed comparison between the Puteoli reliefs and funerary reliefs of first-century soldiers can be made in a number of areas, especially in the case of the more monumental tombstones. The niches at the corner of the Puteoli reliefs are typical of the niches used for individual graves.[87] Such niches nearly always contained an individual soldier, the deceased being commemorated, who was standing in a pose very similar to that of the Puteoli Praetorians. Moreover, the dress adopted by these soldiers was frequently exactly the clothing worn by the Puteoli soldiers.[88] This was also the dress style of choice for the tombs of the Praetorians themselves, although most surviving examples date to a later period.[89] The depiction of the military belt was a typical feature, as was the cloak hanging down behind the knees.[90] Even the gesture of slinging a large shield behind one's back while holding the strap with the fingers of the right hand, a feature of the Puteoli relief that was especially noted in the first excavation report, can be paralleled on the grave reliefs from Germany (fig. 12).[91]

Despite these similarities, the Puteoli reliefs are very different in style from the reliefs in Germany. The Puteoli reliefs clearly belong to the realm of public art based on their quality, style, and type of structure they were designed for. No Roman other than the emperor would have been portrayed in the company of a group of Praetorians. Yet the iconography of these reliefs does borrow and adapt, in a rather sophisticated and thoughtful manner, from the vocabulary of images that had been developed in the funerary sphere for individual Roman soldiers. In the resulting design, the single soldiers in their niches surrounded and framed the narrative scenes depicting the emperor engaged in various public functions. Much has been written about

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[82] The big niche for the single soldier is slightly over 16 cm deep. The relief area to the left is only about 5 cm deep at its edge.

[83] For the grave stones of Roman soldiers, see Anderson 1984; Franzoni 1987; Rinaldi Tufi 1988; Selzer et al. 1988. Zanker 1992 gives a general context. For a comparison with the tombs of the emperor's horse guards (*equites singulares Augusti*), see Amelung 1903, no. 392; Speidel 1994a, 1994b.

[84] For the origins of the "stehende Soldaten" style, compare Franzoni (1987), who argues for Northern Italy, with Rinaldi Tufi (1988, 83–5), who argues for the Rhine area. Le Bohec 1998, fig. 2 shows a relief from Cherchel.

[85] The earliest extant example of this style comes from Padua and represents a soldier who fought in the civil wars: the centurion Minutio of *Leg. Mart.* (III?) ca. 44–42 B.C. (Franzoni 1987, 46 no. 26, pl. 13; Keppie 1991).

[86] See Rinaldi Tufi 1988, 83–5.

[87] For the niches used on gravestones, see Rinaldi Tufi 1988, 45–50, with 55–63 on the character of the figures.

[88] See also the late first-century A.D. soldier from Camomile Street in London (Museum of London), Rankov 1994, 27.

[89] For the graves of the Praetorians (mostly third century A.D.), see Durry 1938, 208–9 n. 2 and 212. Particularly notable are *CIL* 6.2602 from Dacia in the Capitoline Museum showing M. Aurelius Lucianus in infantry dress (Durry 1938, pl. 10), and the altar of a centurion in the Vatican (Helbig[4] no. 391 = Amelung 1903, no. 163, pl. 30).

[90] For comparison, see esp. Annaius (*CIL* 13.7507; Rinaldi Tufi 1988, no. 4, pl. 4) and G. Faltonius Secundus (Landesmuseum Mainz, *CIL* 13.6960; Rinaldi Tufi 1988, no. 19, pl. 18; Selzer et al. 1988, no. 63). Cf. also Rinaldi Tufi 1988, nos. 3, 20, 22, 23, 24, 25, 28, 31.

[91] The hand gesture was noted by Gabrici (1909). For comparison, see P. Flavoleius Cordus (Landesmuseum Mainz; *CIL* 13.7255; Rinaldi Tufi 1988, no. 2 pl. 2; Selzer et al. 1988, no. 26).

Fig. 12. Funerary relief of P. Flavoleius Cordus, early first century A.D., Landesmuseum Mainz. (S116, photo courtesy of Landesmuseum Mainz, Ursula Rudischer)

Fig. 13. Sestertius of Nero with Parthian Arch from Capitol, ca. A.D. 66. *RIC* 500. (Photo courtesy of CNG)

Fig. 14. Plaster cast of a sestertius of Domitian showing a triumphal arch in Rome, A.D. 85, *RIC* 261 (Paris, Bibliothèque Nationale 1441). (Photo courtesy of the British Museum)

the way Roman public art influenced private art, especially in the funerary context. The Puteoli reliefs provide an example of a different kind of influence: the iconography of Roman soldiers that is characteristic of the "private" sphere of grave monuments is incorporated into the "public" world of imperial arches.[92] Unfortunately, it is not clear how often such a pattern would have been found in oth-

[92] For the symbolism and significance of the iconography used on military graves, see the especially incisive analysis of Anderson 1984, 29–32. For analogous examples of funerary art influencing state art, see esp. the insightful discussion by D'Ambra (1993) of the closely contemporary Forum Transitorium, summarized at 104–8.

Fig. 15. Plaster cast of a sestertius of Domitian showing a triumphal arch in Rome, A.D. 90/91, *RIC* 391 (Berlin). (Photo courtesy of the British Museum)

er public Roman sculpture, or where or with whom it might have originated.[93]

TRAJAN'S ARCH AT PUTEOLI AND THE PORTA TRIUMPHALIS AT ROME

The character of the niches can, therefore, be used to suggest the artistic effect and the pedigree of the reliefs. It should also give a clue about the placement that can be assigned to the soldiers standing in their corners. Although scholars have been divided over whether the reliefs were in the attic or in the socle zone of an arch, the latter has been the more popular option since the 1950s.[94] Of these alternatives the attic actually seems preferable on the basis of the evidence provided by the reliefs themselves. The corners clearly did protrude in a noticeable way, which would make sense if they were at the top of a monument. Moreover, the transition between the two kinds of frame would have made better sense to a person standing below who was looking up at the arch. When these sculptures appear near ground level, as they would in the socle zone of an arch and as they do in their present setting, the transition between the two parts of the relief seems jarring and is out of keeping with the superior workmanship of the carving. Further, while it is true that the Arch of Nero, as reconstructed from his coinage, seems to have had some decoration in the socle zone, this carving did not extend to the corners (fig. 13).[95] No such decoration appears in the socle zone of the extant arches of Trajan himself. In addition one may note that the Puteoli arch was probably fairly small by Roman standards, although that would not preclude its being highly decorated.

A striking parallel for an arch with standing figures in niches in its attic zone is provided by some bronze sesterii of Domitian.[96] Architectural types are rare on the coinage of Domitian, but his enthusiasm for building arches makes it unsurprising that an arch should appear on his coinage. Domitian took a particular interest in the operation of the mint.[97] These coins presumably portray an arch in Rome. Its form is quadrifons, and there are two *quadrigae* drawn by elephants on top of it. It seems to

Fig. 16. Plaster cast of a sestertius of Domitian showing triumphal arch in Rome, A.D. 95/96, *RIC* 416 (Berlin). (Photo courtesy of the British Museum)

[93] For other possible influences of private funerary art on state art depicting members of the imperial family, see Rose 1997, 26 (Arch of Germanicus) and 44 with pl. 204 (Claudius and Agrippina at Aphrodisias).

[94] Cagiano de Azevedo (1939) was unsure about the monument. Magi (1945, 134–5 n. 1 and 162–3) argues for the attic. Kähler (1951, 434–5) attributed the reliefs to the socle zone and is followed by Rotili 1972, 63–4; de Maria 1988, no. 41; Kleiner 1992, 229–30. For attics of surviving arches, see Grube 1931, esp. 26, 33–4.

[95] For the reconstruction of Nero's arch from coins, see Kleiner 1985, followed by de Maria 1988, 113–5, 283–4 no. 70. At 86–7 Kleiner calls the attribution of the Puteoli reliefs to the socle zone "uncertain."

[96] The coins are *RIC* 261 of A.D. 85 (= *C* 530 = *BM* 303 plate 71.6); *RIC* 391 of A.D. 90/91 (= *C* 672 = *BM* 443); *RIC* 416 of A.D. 95/96 (= *C* 531 = *BM* 476 pl. 81.1).

[97] For Domitian and the mint, see Carradice 1983, 1993; Jones 1992, 75–7. For an overview of Flavian coinage, see Carradice 1998. For architectural images on Domitianic coins, see Darwall-Smith 1996, 102–3, 280–1.

Fig. 17. Plaster cast of the obverse (left) and reverse (right) of a sestertius of Domitian showing a triumphal arch in Rome, A.D. 90/91, *RIC* 391 (Paris, Bibliothèque Nationale 1443). (Photo courtesy of the British Museum)

match the description of such an arch given by Martial, and it has been identified as the famous *Porta Triumphalis* in Rome, which was restored by Domitian after the devastating fire of A.D. 80.[98] Since this is the only arch on Domitian's coins, it is probably a particularly prominent one. It is difficult to recreate a lost monument, especially a large arch, from a Roman coin, but a similar attempt to reconstruct the Arch of Nero, which stood briefly on the Capitol during the 60s A.D., has met with acceptance.[99] There does seem to have been a conscious effort on the part of the mint to ensure that at least some of the principal features were recognizable to people who were familiar with each monument.

Domitian's coins with the arch on them are dated to three different occasions in his reign: A.D. 85, 90/91, and 95/96 (figs. 14–17).[100] The details of the iconography on the coins vary considerably between issues. The obverse types also vary. In this series of coins, produced over some 10 years, the earlier ones offer more details of the arch's decoration than the later ones. In each coin type the attic seems to have niches at the corners that articulate and frame the building, as well as enclosing the relief area in the center of the attic. The earlier two issues show reliefs or statues of individual standing figures in these niches. At the corner the niches appear to meet each other without any intervening architectural features. Consequently, this series of coins does appear to provide a visual example of the use of niches with standing figures at the corners of the attic of an arch. We may imagine that the Puteoli reliefs were designed to be used in the same way and to create a similar overall effect. The comparison carries further res-

[98] For the *Porta Triumphalis* in Rome, see Martial 8.65 with Coarelli 1988, 363–414, esp. 373 and pl. 83; de Maria 1988, no. 75; Darwall-Smith 1996, 103–33; Loreti 1996 with full illustrations of all the iconographic evidence.

[99] See esp. the review by Maggi 1988, who stresses Nero's use of big niches and bold shadows on his arch, which seems to have been influential for later arches despite its destruction.

[100] Carradice (1982) has argued that only the coins of 95/6 are genuine and that the other examples are later forgeries, based on that type, but with more details added to the arch by someone who had seen the Arch of Constantine. Clearly the question of authenticity is crucial for any reconstruction of the arch itself. Arguments are difficult to make because all these coins are very rare, although those of 85 and 90/91 are indeed rarer. Carradice's case is weakened, however, by the fact that the coins he has designated as fakes do not all have the same obverse die (*RIC* 261 has a bust of Domitian; *RIC* 391 has a large SC). Moreover, the issue of 90/91 also exists in a rare incuse example, which is to say a defective coin that has the arch on one side and a reverse of the same image on the other (Giard 1998, no. 325 [fig. 17]). It would be very unusual for such a coin to be a forgery. It would also be unusual to create forgeries based on real coins and to date them to different years. No decisive conclusions can be drawn from the style of the arch, since the vast majority of Roman arches are now lost. In addition, it can be observed that the Arch of Nero, which appears on many coins, is not always portrayed in exactly the same way. For the sake of the argument presented here, it will be assumed that all Domitian's arch coins are genuine.

onance if Domitian's coins do indeed portray the *Porta Triumphalis* in Rome, which may well have served as a model for some features of its cousin and namesake in Puteoli.

Domitian's coins can be used to give a general impression of at least some aspects of Trajan's arch at Puteoli. Trajan's own coins reveal that he built other arches that featured statues in niches.[101] A comparable effect can also be seen in the Forum Transitorium completed by Nerva, which has Minerva in a niche in the attic.[102] What seems to be new here is the decision to place individual Praetorian Guardsmen in the niches. If the niches are accepted as the top corners of an arch that was probably quadrifons in form, then some idea can also be gained of the overall dimensions of the arch in question, which seems to have been comparable to other known arches of a similar date.[103]

THE POLITICAL CONTEXT OF THE PRAETORIANS IN PUTEOLI

At the beginning of Trajan's reign an arch was dedicated in Puteoli that featured a significant number of Praetorian Guardsmen in its decoration. There is no indication that Praetorians were commonly shown in Roman public art during the first century A.D. Claudius may have had some depicted on the arch that celebrated his conquest of Britain. They did appear fairly frequently under Trajan, however, and some examples can also be found in later Roman art.[104]

The depiction of Praetorians in Italy must have carried particular resonance. They had always been the most elite troops of the Roman army, with better terms of service and much higher pay, as well as with the privilege of serving in Rome itself.[105] By this date they were also the most Italian of Rome's soldiers, since Vespasian had changed the recruitment patterns of the Roman legions so that after A.D. 70 it was typical to find provincials serving in the Roman legions, especially on the frontiers, and to find native Italians in the Praetorian Guard and in the other military units stationed in Italy.[106] They represented the unique position of Italy in the empire and the traditional ideal of the native Roman soldier.

Hence it would seem that their appearance in the local communities of Italy would have been especially welcome. The Julio-Claudians had frequented the Bay of Naples as a vacation area and both Titus and Domitian had been active there as builders.[107] Whenever the emperor traveled he would have been accompanied by Praetorians. The Praetorians are specifically attested as having been active at Puteoli itself on two occasions. Under Gaius they were involved with the construction of the bridge of boats he had built to span the Bay of Naples from Baiae to Puteoli,[108] a project that probably involved a large number of troops. Similarly it was the Praetorians who were called upon by Nero to restore order during a period of civil unrest at Puteoli in A.D. 58.[109] Praetorians had surely been present most recently at Puteoli for the opening of the *Via Domitiana*.

Augustus had tended to keep the Praetorians very much in the background while he was estab-

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[101] For coins of Trajan showing the arch in Trajan's forum (de Maria 1988, no. 81, pl. 74.3), see *RIC* 255 and 630 (A.D. 112–117). The arch of Titus also has niches on its front, and it is unclear whether these were ever filled with any sculptures.

[102] See conveniently D'Ambra 1993, pl. 83.

[103] See esp. Koeppel 1980, 19–20 for the reconstruction of a Domitianic arch.

[104] For Praetorians in Roman state art, see Durry 1938, 213–30 and the fully illustrated treatment by Rankov 1994. A list of the most important items includes the Boscoreale cups (Kuttner 1995, 94; 261 n. 1; pls. 5 and 6); Berlin head (Sk 960, Durry 1938, frontispiece); Boston standardbearer (Museum of Fine Arts, Webster 1998, pl. IXb, 59, 336); Cancelleria relief A (Magi 1945, 81–2 prefers to see all the soldiers as legionaries, contra Rankov 1994, 46–8); Louvre fragment of Praetorian fighting Dacian (Strong 1907/1971, pl. 49); Column of Trajan (Settis 1988, pls. 127, 151, 178; Rankov 1994, 24, 26, 49, 56); Trajanic reliefs from the Arch of Constantine (Durry 1938, pls. 5, 6, 7, 8; de Maria 1988, no. 98); Louvre fragment from the Arch of Claudius in Rome (Koeppel 1983; de Maria 1988, no. 69, pl. 61.2; Keppie 1998, pl. 20); base of the Column of Antoninus Pius (Kleiner 1992, 285–8 with pl. 254); panel relief of Marcus Aurelius (Palazzo dei Conservatori; Rome, Rankov 1994, 58); Anaglypha Traiani/Hadriani (Hammond 1953; Boatwright 1987, fig. 41); Chatsworth relief (Boatwright 1987, fig. 43); Arco di Portogallo relief (de Maria 1988, no. 104; Helbig[4] no. 1447, Boatwright 1987, 226–9, 231–4); Praetorian standards on the Arch of the Argentarii (de Maria 1988, no. 90); casualties on the Arch of Constantine (de Maria 1988, no. 98, Rankov 1994, 61).

[105] For terms of service, see Durry 1938, 191, 400; Campbell 1984, 162–4; Le Bohec 1998, 226.

[106] For the recruitment of the Praetorians, see Durry 1938, 239–57; Passerini 1939/1969, 159–69; Le Bohec 1998, 104. For the ethnicity of the Praetorians, see esp. Durry 1938, 377: "les cohortes prétoriennes allaient se distinguer profondément du reste de l'armée et constituer un dernier carré de l'italianité."

[107] For emperors on the Bay of Naples, see Frederiksen 1984, 332. Note esp. Domitian's villas at Circei, near Sperlonga (Mielsch 1987, 70–5, 107–8, 112) and at Baiae (Jones 1992, 97).

[108] Suet. *Calig.* 19 and Dio Cass. 59.17 (A.D. 39) with Kleijwegt 1994.

[109] Tac. *Ann.* 13.48 with Camodeca 1977, 94; Frederiksen 1984, 331. Cf. Speidel 1985–1986 for a Praetorian inscription on an urn from Puteoli (*CIL* 10.1766).

lishing the Principate, but they gained power, especially in the city of Rome, under Tiberius.[110] Tiberius's decision to allow them to build a centralized camp (A.D. 23) was soon followed by his retirement to the island of Capri.[111] Sejanus was the first Praetorian commander to exercise extraordinary power in the capital and to be accused of aiming to control the political future of the empire. Even after Sejanus was executed, the Praetorians continued to wield great political power under the Julio-Claudian emperors who succeeded Tiberius. Gaius was removed by them and Claudius, who had apparently never expected to become emperor, was put on the throne by them. Claudius's coinage provides ample testimony to his generosity toward the Guard.[112] Similarly, Nero was their chosen candidate and he ultimately committed suicide only after they had abandoned him.[113]

The contenders for power in 69/70 each had their own Praetorians; thus a major reorganization was necessary under Vespasian. Titus became the Guard's commander during his father's reign, a move that demonstrated the need felt by the Flavians to keep a firm control over the soldiers and over their commanders' influence. They do not seem to have been able to act independently without a designated leader. There can be little doubt that the Praetorians were fiercely loyal to the Flavians and to Domitian in particular, who had also used them in a number of his wars in Germany and in the Balkans.[114] Their part in his assassination is obscured by distortions in the ancient sources, but there can be little doubt that they must have played a decisive political role after his death.

The surviving ancient sources are unclear about the role of the Praetorians in the plot to murder Domitian. The conspiracy is represented as a palace plot hatched and carried out by disaffected freedmen,[115] but initially there was a smooth and immediate recognition of Nerva, a descendant of the traditional Roman office-holding class and a relation by marriage of the Julio-Claudians, as Domitian's successor.[116] He must have known about the plan and have agreed to be the chosen candidate. Although some senators were clearly involved, the details remain obscure. It is also said that Domitian's wife Domitia Longina was informed.[117] Dio Cassius has the Praetorian commander agree and indeed it would seem foolish on anyone's part to plan a coup without approaching the commander of the Guard.[118] However, even the unsatisfactory sources that we do have reveal that the Praetorians, and probably many other soldiers also, were horrified by Domitian's murder. They wanted to avenge and to deify him.[119]

The continued unrest of the Praetorians in particular appears as a crucial factor both in Nerva's struggle to maintain his own position and in his unanticipated decision in October A.D. 97 to adopt Trajan as successor and effectively as co-ruler.[120] In this sense the initial coup against Domitian had failed because the Praetorians did not support it. Indeed the Praetorian commander whom Nerva had himself appointed, Casperius Aelianus, turned on him and forced him to execute the Praetorians who were implicated in Domitian's murder. Casperius's role is complex and somewhat unclear, since he had commanded the Guard under Domitian but had apparently been removed and replaced before 96.[121] His reappointment should have been

[110] For the history of the Praetorians in the imperial period, see Durry 1938, 361–96; Campbell 1984, 109–20; Le Bohec 1998, 20–1. Individual commanders are discussed by Passerini 1939/1969, 207–356. Stöver 1994 adds little to what was said before.

[111] For the camp of the Praetorians on the Viminal, see Rankov 1994, 6–7.

[112] For Praetorians and the (gold) coins of Claudius, see *RIC* 22–29, 38–43.

[113] See also *RIC* 61–72 for sestertii showing Nero addressing the Praetorians.

[114] For Domitian and the Praetorians, see *CIL* 6.2725; 5.3356; 3.14214 with Durry 1938, 377–8; Jones 1992, 59–61, 68, 138, 144, 153, 193–4.

[115] For the conspiracy of A.D. 96, see *Fast. Ost.* for 18 Sept. 96; Suet. *Dom.* 14–17; Dio Cass. 67.14.4–18 with Syme 1983, 135–7; Southern 1997, 118.

[116] For Nerva, see *PIR* 1227; Garzetti 1950; 1974, 296–307; Syme 1958, 1–18; Cizek 1983, 100–21; Bennett 1997, 34–41.

[117] See Jones 1992, 37.

[118] At the time of Domitian's death the prefects were Norbanus and T. Petronius Secundus (Dio Cass. 67.15.2; Eutrop. 8.1.1) and perhaps also Parthenius (Suet. *Dom.* 16; Dio Cass. 67.15.1; Aur. Victor 11.11).

[119] Suet. *Dom.* 23.1: occisum eum populos indifferenter, miles gravissime tulit statimque Divum appellare conatus est, paratus et ulcisci, nisi duces defuissent; quod quidem paulo post fecit expostulatis ad poenam pertinacissime caedis auctoribus. For the coins of Nerva that seem to relate to the unrest of the Praetorians (*concordia exerc.*), see *RIC* 2, 3, 5, 14, 26, 27 (*aurei*) and *RIC* 50, 53–55, 69, 70, 79, 80, 81, 95–97 (*sestertii*). On the coinage of Nerva, see Brennan 1990/2000.

[120] For the adoption of Trajan in October 97, see Dio Cass. 68.3.3–4.1. Syme (1958, 35; 1983, 137–42) sees events in terms of a conspiracy against Nerva. Cf. also Bennett 1997, 42–52 and esp. Griffin in *CAH*[2] 11, 94–6.

[121] For Casperius Aelianus, see Dio Cass. 68.3.3 with Passerini 1939/1969, 290–5; Cizek 1983, 110–9; and Griffin *CAH*[2] 11, 68. Philostr. *VA* 7.16.138 has Casperius praetorian prefect in 93.

a shrewd move to placate the Guard and to ensure continuity and seasoned command by a man who had presumably had a falling out with Domitian. Instead, Nerva found himself at the mercy of the Guard and was even required by them to give a public speech of thanks to celebrate the avenging of Domitian and their role in it. The senate, who had voted stringent sanctions against Domitian's memory soon after his death, did not apparently come to Nerva's aid. As a result, the memory of Domitian and the loyal feelings of the Praetorians toward him must have loomed large around the time of the first anniversary of Domitian's death.

It was soon after this anniversary that Nerva decided to adopt Trajan and to give him virtually equal powers. Trajan had no intention of tolerating the independence and influence of Casperius Aelianus and his soldiers, whose decisive political will had to be either accommodated or eliminated. One of his first acts as emperor, even before he returned to Rome, was to summon the Praetorian commanders and their most loyal followers among the Guardsmen to his headquarters at Mogontiacum (Mainz) in Germany, where he rapidly executed them without any judicial process.[122]

As a result of Trajan's summary actions, the Praetorians were once again, for the third time in four years, subject to a change of command. It has even been questioned whether their role was now modified and whether they continued to accompany the emperor in all his public duties.[123] The Puteoli relief provides an explanation of the role and status of the Praetorians after their struggle on behalf of Domitian's memory in A.D. 96–98. Far from being publicly disgraced, their function as the loyal attendants of the new emperor was celebrated in the early years of his reign. Such a depiction would make no sense if they had only recently been relegated to other duties and if Trajan had traveled to Puteoli and to other towns in Italy without them. Rather their renewed public prominence should be connected to Trajan's appeasement of them after two recent purges.

The Praetorians in Puteoli do not appear in a vacuum. Rather their presence is highly significant and it draws on and asserts their historical/ideal function. They are portrayed as the premier Roman/Italian soldiers in an iconographic language that consciously draws on the particular self-representation of the individual Roman soldier.[124] This dynamic interplay between public and private art forms in an overtly imperial context is used to produce a striking representation of the ideal qualities of these seemingly individualized men and of their faithful fulfillment of their traditional duties in the emperor's entourage. Their role confirms his legitimacy and excellence, while he allows and encourages them to be represented as the ideal supporters he would like them to be. Their representation in this way so early in his reign supports the modern view that Trajan's principate was indeed a golden age for the Praetorian Guard.[125] As the stone in Philadelphia demonstrates for the modern viewer, however, the renewed emphasis on the special role and status of the Praetorians was inscribed on the reverse of Domitian's disgrace (and of the deep loyalty he inspired even in the last years of his life).

THE CHARACTER OF THE SANCTIONS AGAINST DOMITIAN'S MEMORY

The evidence and arguments presented above have focused on the ways in which the public image of Trajan as *optimus princeps* was built on a complex, subtle, and sustained attack on the memory of Domitian, whom Nerva himself had failed to replace as sole ruler.[126] Immediately after his death, Domitian's honorific inscriptions and portraits were

[122] For Trajan's purge of the Praetorians, see Pliny *Pan.* 5; Dio Cass. 68.5.4 with Syme 1958, 18: "'Concordia exercitum' had been advertised by Nerva. It was achieved by Trajan." Speidel 1994b, 43: "The praetorian mutineers must have been a specific group, so specific that the emperor could claim, without arousing suspicion, he needed them in Germany—clearly they were the *speculatores*." See also Griffin (*CAH*^{2} 11, 85, 91), who sees a possible connection between praetorian unrest and the imperial pretensions of C. Calpurnius Crassus Frugi Licinianus (Dio Cass. 68.3.2; *Epit. de Caes.* 12.6).

[123] Speidel (1994b, 43) argues that A.D. 98 was the time when the German horse guards (*equites singulares Augusti*) became the personal escorts of the emperor ("Having killed a number of praetorians, Trajan could not trust soldiers of that unit with his life."). The earliest positive evidence for this development comes from A.D. 135 toward the end of the reign of Hadrian. Note also that the Praetorians on the Anaglypha Traiani/Hadriani and the Chatsworth relief probably date to the early years of Hadrian, soon after Hadrian's debt relief program of 118 (*HA Hadr.* 7.6; *CIL* 6.967 = *ILS* 309). Contra Torelli (1982, 89–118), who dates them to the reign of Trajan and would, therefore, put them within about five years of the Puteoli reliefs.

[124] See Feugère 1993, 38 for the symbolism and meaning constructed by the iconography of the tombs.

[125] See Durry 1938, 378–9. See also Aur. Victor 13.9 for Trajan's famous remark to his new praetorian prefect S. Attius Suburanus as he was giving him a sword: Tibi istum ad munimentum mei committo, si recte agam, sin aliter, in me magis.

[126] See Waters 1969; Paillier and Sablayrolles 1994; Sablayrolles 1994 in the all-Domitian issue of *Pallas* for 1994. For tensions in Trajan's image, which stem partly from the denigration of Domitian, see Griffin *CAH*^{2} 11, 98–111, 106–8.

removed or mutilated. This shaming was only the first step in replacing Domitian and the Flavians with a new dynasty. Simple denigration was not sufficient in the case of a mature ruler who had been in power for 15 years. Domitian's legacy was consistently attacked in the areas in which his achievements were most obvious and presumably most memorable.[127] He was a great builder, and the *Via Domitiana* with its associated monuments was one of the last major projects he completed. Hence his successors needed to compete with his practice of building roads and erecting decorated arches, and to remove his name from these completed projects. Domitian was a recognized benefactor at Puteoli and in many other Campanian towns, and his successors also needed to appear to be playing a similar public role. Likewise, Domitian had been enthusiastically supported by the Praetorians, many of whom had laid down their lives in his military campaigns.[128] It was essential that their public support for the new regime be demonstrated, especially after it had been in doubt for almost 18 months after Domitian died. Consequently, the need was felt for a new iconography that would draw on a variety of recognizable images and concepts, but that would also exalt the achievements of the new ruler in both civil and military contexts.

CONCLUSION

Three distinct moments can be identified in the history of the Puteoli relief, all of considerable significance for Roman politics of memory. The marble had been imported from Greece to this harbor town, presumably for the express purpose of being incorporated in a public monument. First it was used as a base for an honorific statue of Domitian that was erected to celebrate the inauguration of the *Via Domitiana* in A.D. 95. At that time the stone carried a panegyric offered by the local community to their benefactor, the emperor. Because of the eulogistic character of the inscription, the people of Puteoli decided on the unusual move of erasing the whole inscription and leaving the illegible text in public for a while, rather than simply removing a part of his name or trying to adapt this expensive monument to the new political circumstances in Rome. In the process they were removing even their own name, which connected them so closely with the Flavians, as well as the record of their beneficiary relationship with Domitian himself. They appeared ready to rewrite history. Their readiness to change was demonstrated for all to see.

In the long term, after the fears and passions of the moment had subsided, it was not expedient to continue to display Domitian's disgrace. The erasure in itself served as a type of memorial and its topographical context still connected it closely with the new road.[129] It would not have been difficult for locals to recall whose name had been erased here and why. Consequently, the stone was removed for reuse and its testimony to Domitian's disgrace disappeared with it. Nevertheless, it seems highly symbolic that this same stone should soon be adapted for an arch in honor of Trajan as a road builder and that it should feature reliefs of the Praetorian Guard, who had demonstrated the most vocal and open loyalty to Domitian after his death. The Praetorians on the Puteoli relief are portrayed as the ideal protectors of the new regime precisely because they had been slow to accept the changes brought about by Domitian's death. In this case, we have direct evidence for the inscription of their new role as a palimpsest of the high honors paid to Domitian. They emerge clearly as a political and cultural phenomenon of the new age, and their importance is stressed by the particular iconography that had been developed for them.

At the same time, the Puteoli piece confirms other evidence we have that the sanctions against Domitian's memory were more severe than those against Nero or against Gaius, whose memory was never officially condemned. Domitian's inscriptions were erased more often, with those from the end of his reign being most subject to mutilation. Erasures of recent texts provide especially powerful testimony to the strong feelings associated with his murder, whether they were feelings of rejoicing, fear and uncertainty, or desire for political profit. Sanctions against memory in themselves can be used to draw a variety of conclusions. They demonstrate the achievements of the victim that were thought worthy of public advertisement and consequently of attack. Yet, they give us most information about the mentality of those imposing the sanc-

[127] For Domitian as a builder in Rome (second only to Augustus), see Kolb 1995, 375–7 and Darwall-Smith 1996. See also Laurence 1999, 47: "Like the other building projects of Domitian in Rome, the *Via Domitiana* was constructed as an act of renewal, a replacement of Nero's plans for a canal in the region (a project dicredited after his death . . .) and a popular act that was hoped to consolidate Domitian's position as *princeps*."

[128] See Jones 1992, 138–9, 141–3.

[129] For erasure and omission as a monument in itself, see Hedrick 2000, esp. 85–8.

tions and about their hopes, fears, and aspirations. The Puteoli reliefs provide us with a striking example of reuse that was not random. Rather, for locals who lived through these years, the stone testified to a dynamic interplay between text, erasure, and recarving within the civic space of the community. Many citizens present when Trajan inaugurated his new road in A.D. 102 would surely also have witnessed Domitian in a very similar role seven years earlier. Their experiences would have been similar to that of the stone itself.[130] It was no easy task to make the memory of Domitian and of his actions disappear.[131] Traces would have been left of him and of the attempt to suppress memories of him.

In the case of the Puteoli stone, a set of reliefs and a text that may at first sight appear to have little or nothing to do with each other except for providing a simple chronology prove to have a complex and subtle interrelationship. This same approach to erased inscriptions can be used to place more of them within their respective urban contexts. Similarly, Praetorians and their iconography can and should be closely connected with their historical circumstances, with the aspirations of each emperor, and with the audiences for each relief. The Praetorians from Puteoli contrast especially with those on campaign on the arch celebrating Claudius's conquest of Britain and with those on the column of Trajan, but they prefigure the appearance of the Praetorians helping to burn debt records on the Chatsworth relief and on the Anaglypha Traiani/Hadriani.

Meanwhile, it is essential to keep in mind that the meanings ascribed to each of the stone's public incarnations would have varied greatly according to the point of view of the individual viewer.[132] This would have been especially the case for those who lived in Puteoli at the turn of the second century. However, the many different people who passed by Trajan's Arch on the road to and from Naples over the following generations would also have drawn their own individual conclusions.

DEPARTMENT OF CLASSICS
FRANKLIN AND MARSHALL COLLEGE
LANCASTER, PENNSYLVANIA 17604-3003
H_FLOWER@ACAD.FANDM.EDU

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[130] Moreover, they might also remember Nero's scheme to connect Puteoli to Rome by canal, an undertaking that was discredited after his death (Suet. *Ner.* 31.3; Tac. *Ann.* 15.42.2).

[131] The memory of Domitian lived on in a variety of ways, e.g., *CIL* 6.2725 (= *ILS* 2034) from the *Via Nomentana* in Rome is the epitaph of C. Vedennius Moderatus, a soldier of the *Legio XVI Gallica* of Vitellius, who had been made a Praetorian by Vespasian (cf. Tac. *Hist.* 2.94; 4.46). Although he must have lived at least into the early years of Trajan's reign, he openly celebrates his military decoration received from Domitian. Cf. *CIL* 6^2.40458 (= *AE* 1982, 84) for an unerased Domitianic text of A.D. 95 from the Via Appia near Rome. *CIL* 10.1631 (= *ILS* 6322) of A.D. 93/4 is a dedication to Domitian by the *reg. vici Vestoriani et Calpurniani* of Puteoli, which was not erased (cf. *CIL* 10.1632 for a fragmentary dedication from Puteoli to Domitian and his whole family). *CIL* 15.548a–549d are brickstamps of Domitia Longina of A.D. 123, on which she is still calling herself the wife of Domitian 25 years after his death. For the difficulty of reaching a satisfactory assessment of Domitian after his disgrace, see Saller 1990/2000 and Griffin *CAH*^{2} 11, 55–6.

[132] See the complex and insightful discussion of monuments and memory in Fowler 2000.

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High on the Hog: Linking Zooarchaeological, Literary, and Artistic Data for Pig Breeds in Roman Italy

MICHAEL MACKINNON

Abstract

Three principal sources of data provide information about animals in antiquity. References to animals in the ancient texts furnish written accounts and descriptions. Depictions of them from ancient art yield visual images, while the analysis of their bones recovered from archaeological sites supplies further data about the actual animals themselves. Integration of these three sources of data is essential to form a complete understanding of the role of animals in antiquity and to recognize the strengths and shortcomings associated with each source. Pigs were important animals to the ancient Romans in Italy. Linking the zooarchaeological, literary, and artistic data about them shows the presence of at least two different breeds—a large, fat, short-legged variety and a small, bristled, long-legged variety. Zooarchaeological data confirm that the smaller breed figured more prominently as a source of meat in the Roman diet. The texts suggest that this breed was kept in herds and pannaged in forests for its food. The larger breed seems to have been raised in a different manner, being stall fed, and in much reduced numbers compared to its smaller equivalent. Moreover, because of its grand size and the message of social and economic prosperity with which this quality is associated, this larger breed predominates among artistic depictions of pigs in Roman visual culture.*

If asked to pick one animal that best relates to the Roman diet, the pig would be a logical choice. The Romans certainly ate pigs, and the link between the two is strong. Pork was generally considered the choicest of all the domestic meats consumed during Roman times, and it was ingested in a multitude of forms, from sausages to steaks, by rich and poor alike. No other animal had so many Latin names (e.g., *sus*, *porcus*, *porco*, *aper*) or was the ingredient in so many ancient recipes as outlined in the culinary manual of Apicius. Pigs can be used to help separate the Roman diet from a Semitic one, in which pork was forbidden, and scholars have even argued that its consumption can be a characteristic feature of Romanization, with more pork signifying "Roman," and less denoting "native" cultures, depending on the region and time period in question.[1] Clearly, pigs and Romans were connected. The ancient agronomist Varro (*Rust.* 2.4.3) may have best summed up the importance of these animals to the Romans when he wrote "who of our people runs a farm without keeping pigs."

While it may be easy to recognize the importance of pigs to the Romans, generating the details surrounding their contribution to the Roman diet and economy is a bigger challenge. Three principal sources provide the data required—references to pigs in the ancient texts, depictions of them in Roman visual culture or art, and the analysis of their bones recovered from archaeological sites. Ideally, any comprehensive study of Roman pigs needs to incorporate all three sets of information. In any attempt to expand on the contribution of pigs to Roman society, however, many of us might be caught mixing a bit of modern and ancient fact and fiction in drafting our account. Some might be guilty of picturing a large pinkish-white pig, familiar to us today, being slaughtered and roasted on a spit as hungry Romans looked on with anticipation and bated breath. Sensational accounts in the ancient texts, coupled with selective analysis of the pictorial and zooarchaeological evidence, may have us believe this, but a deeper and more integrated study of these three sources of pig data bestows a much more complex and multidimensional picture. There is great value in a linked text-art-bone analysis, but to achieve this result one must examine these sources in light of their individual strengths, weakness, and biases. This paper illustrates a process of integrating literary, visual, and zooarchaeological data using the example of pigs in Roman Italy.

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[1] King 1984, 1991, 1999.

Fig. 1. Location of Roman sites in Italy with zooarchaeological materials. See table 1 for map legend.

PIGS IN THE ZOOARCHAEOLOGICAL RECORD

Animal bones yield data about a variety of topics—species and elements represented; age, sex, and size differences; pathological conditions; butchery and burial circumstances; among others—which in turn aid in our reconstructions of animal roles in antiquity, be this as herded flock, plow animal, sacrificial victim, pet, provider of meat, milk, hide, and so forth. Despite the long history of classical archaeology in Italy, efforts to recover and analyze animal bones have only been in place for the last few decades. At present, fewer than 100 sites there furnish zooarchaeological data (fig. 1, table 1), but combined these sites extend over the whole country, cover the entire Roman period, and represent materials from both urban and rural contexts. Consequently, they are of value in determining the role of animals in the diet and economy of Italy over space and time.

Table 1. Type, Period, and References for Places Illustrated in Figure 1

Place	Site	Site Type[a]	Period[b]	References
1	Altino	U1: urban settlement	Late antique	Riedel 1985b
2	Anagni	Sp: ritual/votive deposit	VIc–Vb	Ruffo 1996
3	Aquileia	Sp: cattle horn core deposit	Imperial	Riedel 1979a
	Aquileia, forum	U1: urban settlement	2–5	Riedel 1994
4	Bolsena	U1: urban settlement	III–I	Tagliacozzo 1995
5	Campochiaro	Sp: sanctuary	4–5	Barker and Clark 1995
6	Cantone	Sp: necropolis	I–1	Sorrentino 1989
7	Capaccio	Sp: bothroi	Hellenistic	Zancani Montuoro and Zanotti-Bianco 1937
8	Capua, Carillo	U1: urban settlement	2–3, 5–6	King 1987b
9	Castelrotto	U2: settlement	V–IV	Riedel 1985a
10	Classe	Sp: dog burials	Late antique	Farello 1995
11	Colognola	U2: settlement	IV–II	Riedel 1984a
12	Cosa	U1: port settlement	1–2	Hesse and Wapnish 1987
13	Cozzo Presepe	U2: rural fortification	IV–III	Watson 1977
14	Gravetta	Sp: sanctuary	IV–III	Sublimi Saponetti 1991
15	Gravina	R: Hellenistic and Roman villa	VII–1	Watson 1992; MacKinnon 1994
16	Hipponion-Vibo Valentia	Sp: animal burials	II	Albarella 1989
17	Imola, Villa Clelia	U2: suburban complex, church	5–6	Farello 1990b
18	Innichen	U2: settlement	2–5	Riedel 1983
19	Invillino-Ibligo	U2: settlement	1–7	Storck and von den Driesch 1987
20	Kaulonia	U1: Iron Age and Hellenistic city	VI–III	Columeau 1989
21	Le Colonne	R: rural villa	I–2	King 1985, n.d.1
22	Locri	Sp: settlement, and bothroi	VII–II	D'Errico and Moigne 1985; Lissi et al. 1958
23	Lomello	R: rural villa	4?	King 1987a
24	Lugnano	R/Sp: rural villa/infant cemetery	1–3, 5	MacKinnon 1998
25	Luni	U1: urban settlement	3a, 4–8	Barker 1977b
26	Matrice	R: rural villa	1–3, 4–5	Barker and Clark 1995
27	Metaponto territory	U2: settlement and sanctuary	VIII–1	Cabaniss 1983
28	Modena	U1: urban settlement	Ic–1	De Grossi Mazzorin 1988
29	Monte Barro	R: rural villa	4–7	Baker 1991
30	Monte Gelato	R: rural complex (vicus/villa?)	1–5	King 1997
31	Monte Irsi	R: rural fortification	IV–I	Barker 1977a
32	Montereale	Sp: ritual deposit	IIc–Ia	Petrucci and Vitri 1995
33	Naniglio	Sp: well deposit	Hellenistic	Albarella n.d.
34	Naples, Carminiello	U1: urban settlement	I–6	King 1994
	Naples, Girolamini	U1: urban settlement	4c	Albarella and Frezza n.d.1
	Naples, Santa Maria la Nova	U1: urban settlement	6	King n.d.2
	Naples, Santa Patrizia	U1: urban settlement	4	Albarella and Frezza n.d.1
	Naples, Santa Sofia	U1: urban settlement	1a	King n.d.5
	Naples, Via San Paolo	U1: urban settlement	5–6	Albarella and Frezza n.d.2
35	Narce	R: rural complex	IV–II	Barker 1976
36	Oppido Lucano	R: rural villa	I–6	Bökönyi 1994
37	Ostia, bath	U1: urban settlement	1–5	IPU 1968, 1973, 1977
	Ostia, castrum	U1: urban settlement	III–5	King 1985, n.d.4
38	Otranto	U1: Iron Age city	VI	Bigini 1983
	Otranto	U1: Roman and Medieval city	1c–15	Cartlege et al. 1992
39	Palazzo Dugentesco	U2: settlement	1–3	D'Errico et at 1984
40	Pistoia	U1: urban settlement	1–7	Giorgetti and Campodoni 1985
41	Pompeii 94 and 95	U1: urban settlement	Republican	Richardson 1994, 1995; Richardson et al. 1997
	Pompeii, Casa di Ganimede	U1: urban settlement	VI	Kokabi 1982
	Pompeii, forum	U1: urban settlement	VI–1	King 1985, 1994, n.d.3

Table 1 *(Continued)*

Place	Site	Site Type[a]	Period[b]	References
	Pompeii, gardens	U1: urban settlement	1c	Jashemski 1973, 1979, 1993
42	Populonia	U1: urban settlement	III	De Grossi Mazzorin 1985
43	Pozzuolo del Friuli	U2: settlement	I–1	Riedel 1983–1984
44	Quintili	R: suburban rural	1–2	De Grossi Mazzorin 1987
45	Roccagloriosa	U2/Sp: Lucanian settlement and sanctuary	IV–III	Bökönyi 1990, 1993a, 1993b
46	Rome, Aqua Marcia	U1: urban settlement	I–3	De Grossi Mazzorin 1996
	Rome, Caput Africae	U1: urban settlement	1–3	Tagliacozzo 1993
	Rome, Forum Transitorium	U1/Sp: urban deposit, ritual?	1	De Grossi Mazzorin 1989
	Rome, Meta Sudans	U1: urban settlement	5–6	De Grossi Mazzorin 1995
	Rome, San Omobono	U1/Sp: urban temple, ritual deposit	VI–V	Tagliacozzo 1989
	Rome, Schola Praeconum	U1: urban settlement	5	Barker 1982
47	Saepinum	U1: urban settlement	2–3	Barker and Clark 1995
48	San Biagio	R: Roman rural villa	3c–4a	Scali 1983
49	San Costanzo	Sp: sanctuary, church	3–4	Albarella 1992
50	San Giacomo	R: rural villa	5a	Albarella 1993
51	San Giovanni	R: Roman rural villa	1–6	Assad 1986; MacKinnon 2001
52	San Giovenale	R/Sp: rural villa and sanctuary	III–I	Sorrentino 1981a, 1981b
53	San Potito-Ovindoli	R: rural villa	Imperial	Bökönyi 1986
54	Santorso, Vicenza	U2: settlement	V–II	Cassoli and Tagliacozzo 1991
55	Settefinestre	R: rural villa	Ic–4	King 1985
56	Spina	U1: Greek-Etruscan city	VI–IV	Riedel 1978
57	Stufels, Hotel Dominik	U2: settlement	1–5	Riedel 1979b, 1984b
	Stufels, Senoner	U2: settlement	2–4a	Riedel 1979b, 1984b
58	Tarquinia	U1: urban settlement	VI–II	Bedini 1997
59	Torcello	U2: settlement	1–4	Riedel 1979c
60	Udine	U2: settlement	4c–6c	Riedel 1990, 1993
61	Vaste, Fondo San Antonio	R/Sp: Hellenistic and Roman cistern fill	IIIb–II	Albarella 1995
62	Via Gabina site 10	R: suburban grain storehouse	Late antique	Clark n.d.
	Via Gabina site 11	R: suburban villa	III–3	Clark n.d.
63	Volano	Sp: agriculture/craft production deposit	3c–5a	Riedel and Scarpa 1988

[a] Site type: R = rural; U1 = urban1 (i.e., city); U2 = urban2 (i.e., settlement); Sp = special.

[b] Time periods are given in Roman numerals for centuries B.C. and in Arabic numerals for centuries A.D. The letters "a," "b," and "c" refer to "early," "middle," and "late," respectively.

To facilitate comparative analyses for this study, sites are grouped according to temporal period, geographic region, and site type categories. Three temporal periods are broadly defined: 1, republic (ca. 500 B.C.–ca. 50 B.C.); 2, imperial (ca. 50 B.C.–ca. A.D. 300); and 3, late antique (ca. A.D. 300–ca. A.D. 500).[2] Three geographic regions are denoted: southern, central, and northern Italy,[3] while four

[2] My choice of temporal periods here requires some explanation. Italian history has often been divided into a number of chronological phases be these based on sociopolitical factors (e.g., Iron Age, Etruscan period, Hellenistic period, republican and imperial times, Late Antique period) or on artistic styles (e.g., archaic, classical, hellenistic). The greatest problem in using any of these systems, be they artistically or culturally derived, is that many of them cannot be extrapolated over the whole of Italy. Moreover, these set classification schemes do not always conform in terms of dates, which further compounds the problem of correlation. Since a complete chronological harmony among all regions of Italy is a difficult, if not impossible task, I have chosen to use three broad time brackets as listed above rather than rely, too heavily, on established sociopolitical, cultural, or artistic phases. For the sake of simplicity, I refer, as defined above, to these time phases as (1) republican, (2) imperial, and (3) late antique (or late antiquity).

[3] For the purposes of this paper, southern Italy is roughly demarcated by the modern-day regions of Apulia, Basilicata, and Calabria (and corresponds, roughly, to Regions II and III from Augustan times). Central Italy encompasses the present-day regions of Toscana, Umbria, Marche, Lazio, Abruzzi, Molise, and Campania (and is roughly equivalent to Regions I, IV, V, VI, and VII from Augustan times). Northern Italy consists of the current regions of Val D'Aosta, Piedmonte, Liguria, Lombardia, Veneto, Trentino-Alto Adige, Friuli-Venezia, Giulia, and Emilia-Romagna (and generally comprises Regions VII, IX, X, and XI as demarcated during Augustan times).

site types are recognized: rural, urban1 (or city), urban2 (or settlement), and special (i.e., votive, industrial, or otherwise). Nearly all of the rural sites had been classified by the excavators as Roman rural, or at least suburban, villas, even though they varied in size and may not be located technically in the countryside on the basis of present-day geography. Most urban1 sites were also Roman *municipia*; however, some were urbanized pre-Roman cities. Sites not specifically marked as municipia in antiquity, but with some urban character, were labeled as urban2. Most of these could be described as settlements or small communities.

To discern the underlying dietary and economic information provided by the analysis of zooarchaeological data, two issues must first be considered: recovery biases (i.e., troweling versus sieving) and taphonomic biases. Although screening or sieving allows for the collection of presumably more representative faunal samples, it was not systematically conducted at each of these Roman sites in Italy. Potentially serious complications may ensue when comparing samples collected under different recovery regimes, but many of these relate to the contribution of small animals whose bones are tiny and consequently easily overlooked and missed during manual recovery in the trench. Studies, however, reveal that the bones of medium and large domestic animals have a fairly equal chance of being retrieved in both trench/trowel and screening operations.[4] Pigs are medium-sized animals; therefore, collection of their bones should not be significantly skewed by the recovery technique employed.

Taphonomic, or burial, conditions present another bias. The goals of most taphonomic research in zooarchaeology are to determine what natural and cultural processes have modified particular bone assemblages and to understand issues of site formation so that more accurate reconstructions of the original faunal assemblage can be formulated. Common taphonomic factors include weathering and physical alterations of bone from exposure to wind, water, or heat; chemical actions in the soil; discoloration and etching resulting from contact with plant roots and organic acids; and gnawing by rodents, carnivores, and other animals.[5] Taphonomic conditions can vary greatly both among and within sites and are subsequently very difficult to control for when comparing zooarchaeological data. No standard test exists to measure their incidence and prevalence; however, some idea can be gauged by

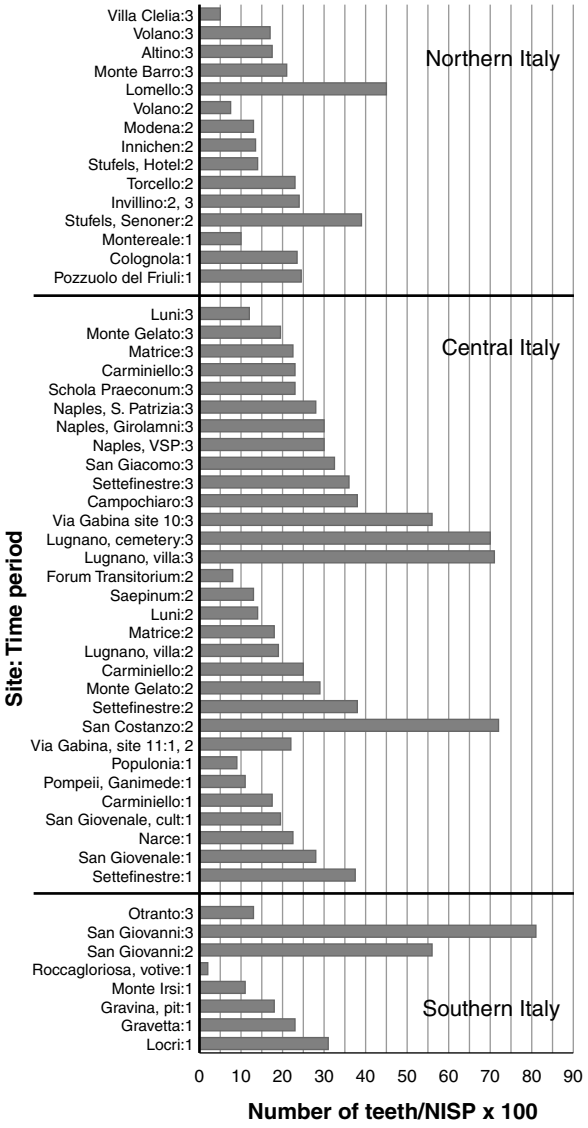

Fig. 2. Number of teeth/NISP × 100 figures for Roman period sites in Italy. Figures reflect combined totals for cattle, sheep/goat, and pig taxa only.

counting the teeth and expressing this as a proportion of the total number of identified specimens (NISP).[6] Teeth are fairly durable and survive well in the archaeological record. Very high percentages of them relative to other bone elements may indicate two general conditions: (1) pronounced taphonomic destruction wherein most nondental bones are destroyed, leaving only the teeth behind; or (2) differential deposition wherein more teeth (presumably as part of an animal's head) as opposed to postcranial bones are initially discarded, be this through the addition of extra teeth and/or the re-

[4] Barker 1975; Steele 1983.

[5] There are numerous references to taphonomic research in zooarchaeology. Of particular note is Lyman 1994.

[6] NISP is a common quantifying variable used in zooarchaeology. It is a tally of the number of bone specimens attributed to each taxon.

Table 2. NISP Frequencies for Mammalian Taxa among Roman Sites in Italy

Site	R[a]	Period[b]	Site Type[c]	NISP	% Cattle	% Sheep/ Goat	% Pig	% Equid	% Dog	% Cat	% Wild	% Rodent
Altino	N	Late antique	U1	732	42.3	18.3	38.0	1.1	0.2	0.0	0.0	0.0
Anagni	C	VIc–Vb	Sp	497	25.6	43.3	22.5	4.6	2.8	0.0	1.2	0.0
Aquileia	N	Imperial	Sp	601+	100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Aquileia, forum	N	2–5	U1	2468	67.1	7.1	9.6	14.0	1.4	0.1	0.6	0.0
Bolsena	C	II–1	U1	1110	12.1	49.2	37.2	0.1	0.1	0.0	1.4	0.0
Campochiaro	C	4–5	Sp	652	17.3	33.4	40.2	0.0	0.2	0.0	5.2	3.7
Cantone	C	I–1	Sp	824	0.6	32.5	66.9	0.0	0.0	0.0	0.0	0.0
Capaccio	S	Hellenistic	Sp	46+	0.0	38.3	0.0	0.0	31.9	29.8	0.0	0.0
Capua, Carillo	C	2–3	U1	46	6.5	28.3	60.9	0.0	4.3	0.0	0.0	0.0
Capua, Carillo	C	5–6	U1	42	12.2	17.1	68.3	2.4	0.0	0.0	0.0	0.0
Castelrotto	N	V–IV	U2	2469	45.9	29.9	21.2	0.4	0.8	0.0	1.8	0.0
Classe	N	Late antique	Sp	–	0.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Colognola	N	IV–II	U2	2018	34.6	24.1	32.0	0.2	2.4	0.0	6.3	0.4
Cosa	C	1–2	U1	27+	32.1	7.1	10.7	10.7	39.3	0.0	0.0	0.0
Cozzo Presepe	S	IV–III	U2	344+	13.8	58.2	14.2	0.0	0.9	0.0	12.8	0.0
Gravetta	S	IV–III	Sp	99	21.2	20.2	7.1	4.0	39.4	0.0	8.1	0.0
Gravina	S	IIb–1a	R	657	18.3	49.3	16.9	2.3	1.8	0.0	11.4	0.0
Gravina	S	VII–IIb	R	107	18.7	51.0	19.6	0.0	3.7	0.0	7.0	0.0
Gravina pit	S	I	R	316	2.2	67.4	22.1	0.0	1.3	0.0	7.0	0.0
Hipponion-Vibo Valentia	C	II	Sp	133	0.0	0.0	0.0	14.5	85.5	0.0	0.0	0.0
Imola, Villa Clelia	N	5–6	U2	25	80.0	8.0	12.0	0.0	0.0	0.0	0.0	0.0
Innichen	N	2–5	U2	740	15.7	72.6	9.2	0.9	0.4	0.0	1.2	0.0
Invillino	N	1–7	U2	4786	17.6	48.7	32.0	0.5	0.2	0.0	1.0	0.0
Invillino	N	2–5	U2	3430	27.1	39.3	30.6	0.9	0.0	0.0	2.2	0.0
Kaulonia	S	VI–II	U1	751	28.5	52.6	14.2	1.2	2.5	0.0	0.9	0.0
Le Colonne	C	I–2	R	547	21.0	26.7	45.2	2.4	0.2	0.0	4.6	0.0
Locri	S	VII–II	Sp	397	29.0	37.0	28.2	1.5	3.5	0.0	0.7	0.0
Lomello	N	4?	R	254	28.0	34.3	37.4	0.0	0.4	0.0	0.0	0.0
Lugnano, cemetery	C	5	Sp	822	5.7	9.7	33.8	2.4	42.2	0.0	1.8	4.3
Lugnano, villa	C	5	R	39	7.7	15.4	46.2	7.7	17.8	0.0	2.6	2.6
Lugnano, villa	C	1–3	R	41	7.3	12.2	31.7	2.4	0.0	0.0	46.3	0.0
Luni	C	3a	U1	107	37.4	23.3	38.3	0.9	0.0	0.0	0.0	0.0
Luni	C	4–6	U1	547	20.8	38.0	39.7	0.7	0.2	0.0	0.4	0.2
Matrice	C	1	R	272	20.2	32.0	44.1	0.4	0.7	0.0	2.5	0.0
Matrice	C	2–3	R	417	9.1	28.5	56.8	0.2	0.2	0.2	5.0	0.0
Matrice	C	4–5	R	894	10.2	35.0	46.1	2.7	0.3	3.9	1.5	0.0
Metaponto territory, kiln	S	II–1	U2	493	37.3	20.1	8.3	13.4	11.6	0.0	9.3	0.0
Metaponto territory, Pizz.	S	VIII–1	U2	356	39.1	12.3	10.9	17.1	8.9	0.0	10.6	1.1
Modena	N	Ic–1	U1	1328	11.1	38.9	48.6	0.0	1.1	0.0	0.3	0.0
Monte Barro	N	4–7	R	1300	11.0	28.7	57.2	0.1	0.0	0.0	2.9	0.1
Monte Gelato	C	1–2	R	532	3.8	12.0	39.5	0.2	43.4	0.0	1.1	0.0
Monte Gelato	C	4c–6c	R	496	5.4	35.5	56.5	0.2	1.0	0.0	0.6	0.8
Monte Irsi	S	I	R	45	28.9	31.1	37.8	2.2	0.0	0.0	0.0	0.0
Monte Irsi	S	III–II	R	117	27.3	46.2	23.0	2.6	0.0	0.0	0.9	0.0
Montereale	N	IIc–Ia	Sp	1164	0.5	46.2	53.2	0.0	0.0	0.0	0.1	0.0
Naniglio	S	Hellenistic	Sp	104	0.0	0.0	0.0	2.9	97.1	0.0	0.0	0.0
Naples, Carminiello	C	2–4	U1	110	1.8	31.8	60.0	0.9	5.5	0.0	0.0	0.0
Naples, Carminiello	C	5b–6	U1	2378	7.6	47.9	32.3	0.2	3.7	5.9	0.4	2.0
Naples, Carminiello	C	I–1	U1	236	5.1	27.5	66.5	0.4	0.4	0.0	0.0	0.0
Naples, Girolamini	C	4c	U1	741	6.6	35.2	57.2	0.1	0.1	0.0	0.8	0.0
Naples, Santa Maria la Nova	C	6	U1	74	9.5	25.7	59.5	0.0	0.0	0.0	2.7	2.7
Naples, Santa Patrizia	C	4	U1	560	1.6	19.0	77.0	0.0	1.3	0.9	0.2	0.0
Naples, Santa Sofia	C	1a	U1	46	21.7	26.1	52.2	0.0	0.0	0.0	0.0	0.0
Naples, Via San Paolo	C	5–6	U1	164	17.0	30.7	45.5	1.1	5.1	0.6	0.0	0.0
Narce	C	IV–II	R	87	19.8	51.2	18.6	2.3	3.4	0.0	0.0	4.7
Oppido Lucano	S	I–6	R	431	20.9	42.7	32.2	2.6	0.0	0.0	1.6	0.0
Ostia, bath	C	1–3b	U1	2566	10.0	32.5	55.6	0.3	1.2	0.1	0.2	0.0
Ostia, bath	C	3c–5	U1	151	11.9	19.9	65.5	0.7	1.3	0.7	0.0	0.0

Table 2 *(Continued)*

Site	R[a]	Period[b]	Site Type[c]	NISP	% Cattle	% Sheep/ Goat	% Pig	% Equid	% Dog	% Cat	% Wild	% Rodent
Ostia, castrum	C	1–5	U1	125	0.8	26.4	68.8	4.0	0.0	0.0	0.0	0.0
Ostia, castrum	C	III–I	U1	107	11.2	1.9	84.1	2.8	0.0	0.0	0.0	0.0
Otranto	S	1c–15	U1	602	23.4	21.1	15.4	0.7	32.4	0.0	7.0	0.0
Otranto	S	VI	U1	267	32.6	39.7	13.1	1.1	1.1	0.7	11.6	0.0
Palazzo Dugentesco	N	1–3	U2	44	20.5	45.5	31.8	0.0	0.0	0.0	2.3	0.0
Pistoia	C	1–3	U1	26	40.0	12.0	48.0	0.0	0.0	0.0	0.0	0.0
Pistoia	C	4–7	U1	244	31.1	20.1	44.3	2.9	0.0	0.0	1.6	0.0
Pompeii 94 and 95	C	Republican	U1	148	3.4	44.6	51.4	0.0	0.7	0.0	0.0	0.0
Pompeii, Casa di Ganimede	C	VI	U1	909	31.5	45.0	22.9	0.2	0.1	0.0	0.3	0.0
Pompeii, forum	C	1	U1	504+	10.5	26.9	62.1	0.2	0.0	0.0	0.2	0.0
Pompeii, forum	C	VI–1a	U1	2686+	19.0	22.3	54.4	0.4	1.9	0.2	0.7	1.1
Pompeii, gardens	C	1c	U1	205	30.7	17.1	39.0	3.9	7.3	1.4	0.5	0.0
Populonia	C	III	U1	2014	10.2	42.4	46.1	0.1	0.0	0.0	1.2	0.0
Pozzuolo del Friuli	N	I–1	U2	276	56.9	23.9	15.9	0.7	0.0	0.0	2.5	0.0
Quintili	C	1–2	R	157	0.0	11.5	72.6	0.0	0.0	0.0	0.0	15.9
Roccagloriosa	S	IV–III	U2	1787	34.1	45.4	15.7	1.5	1.3	0.0	1.6	0.0
Roccagloriosa, votive	S	IV–III	Sp	62	0.0	98.4	1.6	0.0	0.0	0.0	0.0	0.0
Rome, Aqua Marcia	C	1c–3a	U1/ Sp	389	13.9	12.3	68.9	1.3	3.1	0.0	0.5	0.0
Rome, Aqua Marcia	C	II	U1	5	60.0	20.0	20.0	0.0	0.0	0.0	0.0	0.0
Rome, Caput Africae	C	1	U1	42	4.8	9.5	81.0	0.0	2.4	0.0	0.0	2.4
Rome, Caput Africae	C	2–3	U1	167	0.6	25.1	71.9	0.0	0.6	0.0	0.6	1.2
Rome, Forum Transitorium	C	1	U1	72	12.5	9.7	77.8	0.0	0.0	0.0	0.0	0.0
Rome, Meta Sudans	C	5–6	U1	2451	14.7	20.3	42.3	13.7	6.1	1.5	1.4	0.0
Rome, San Omobono	C	VI–V	U1	2080	6.0	62.2	30.0	0.0	1.8	0.0	0.0	0.0
Rome, Schola Praeconum	C	5	U1	1614	9.4	35.9	52.5	0.6	1.5	0.1	0.1	0.0
Saepinum	C	2–3	U1	39	15.4	46.1	38.5	0.0	0.0	0.0	0.0	0.0
San Biago	S	3c–4a	R	236	9.3	50.8	37.7	0.8	0.4	0.0	0.4	0.4
San Costanzo	C	3–4	R	47	0.0	12.8	46.8	0.0	0.0	0.0	0.0	40.4
San Giacomo	C	5a	R	436	7.1	25.5	14.5	14.3	34.0	1.6	2.1	0.9
San Giovanni	S	1–4	R	178	9.0	19.1	60.6	0.6	3.4	0.0	3.9	3.4
San Giovanni	S	5–6	R	10763	6.1	15.5	70.4	1.8	0.5	0.1	2.0	3.6
San Giovenale	C	III–1	R	52	9.6	21.1	59.6	1.9	0.0	0.0	7.7	0.0
San Giovenale, cult	C	III–1	Sp	39	15.3	51.3	25.6	2.6	0.0	0.0	5.1	0.0
San Potito-Ovindoli	C	Imperial	R	311	19.3	18.6	38.9	3.5	0.3	0.0	19.0	0.3
Santorso, Vicenza	N	V–II	U2	1965	55.6	19.6	18.3	0.2	3.2	0.0	3.1	0.1
Settefinestre	C	4	R	910	13.8	25.6	43.7	1.8	3.8	0.0	10.3	0.9
Settefinestre	C	1c–3	R	2628	9.2	14.2	61.7	0.4	0.9	0.3	11.3	2.0
Settefinestre	C	Ic–1a	R	230	8.3	32.4	35.8	0.0	3.9	0.0	14.4	5.2
Spina	N	VI–IV	U1	–	20.0	15.0	50.0	1.5	2.0	0.0	11.5	0.0
Stufels, Hotel Dominik	N	1–5	U2	1150	28.4	44.4	25.2	0.9	0.0	0.0	1.0	0.0
Stufels, Senoner	N	2–4a	U2	1536	24.2	48.8	25.1	0.1	0.0	0.0	1.8	0.0
Tarquinia	C	III–II	U1	88	26.1	30.7	39.8	0.0	2.3	0.0	1.1	0.0
Tarquinia	C	VI–V	U1	411	16.3	32.1	47.0	1.0	2.2	0.0	1.4	0.0
Torcello	N	1–4	U2	76	19.7	42.2	36.8	0.0	0.0	0.0	1.3	0.0
Udine	N	4–6	U2	1076	26.6	38.2	33.4	0.5	0.2	0.0	1.2	0.0
Vaste (Hellenistic)	S	III	R/ Sp	147	1.4	1.4	97.2	0.0	0.0	0.0	0.0	0.0
Vaste (Republican)	S	II	R/ Sp	60	5.0	16.7	53.3	21.7	1.7	0.0	1.7	0.0
Via Gabina 10	C	Late antique	R	1815	10.3	21.6	40.2	2.7	13.5	0.1	3.1	8.5
Via Gabina 11	C	III–3	R	107	7.5	17.0	47.2	16.0	1.0	0.0	0.0	11.3
Volano	N	3c–4a	Sp	106	80.2	3.8	1.9	14.2	0.0	0.0	0.0	0.0
Volano	N	4c–5a	Sp	218	92.7	1.4	1.4	4.0	0.5	0.0	0.0	0.0

[a] R = geographic region: S = southern Italy; C = central Italy; N = northern Italy.

[b] Time periods are given in Roman numerals for centuries B.C. and in Arabic numerals for centuries A.D. The letters "a," "b," and "c" refer to "early," "middle," and "late," respectively.

[c] Site types: R = rural; U1 = urban1 (i.e., city); U2 = urban2 (i.e., settlement); Sp = special.

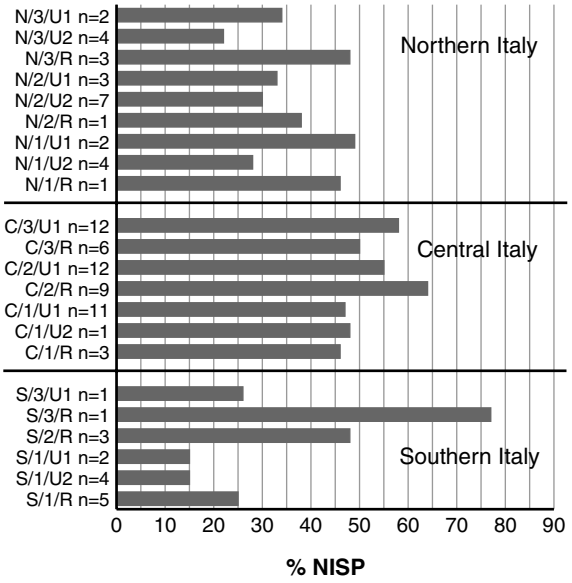

Fig. 3. Mean NISP frequencies of pigs from Roman sites in Italy, as arranged by geographic region, time period, and site type groupings (R = rural, U1 = urban1, U2 = urban2)

moval of nondental elements from the assemblage. While taphonomic conditions certainly varied among these Roman sites in Italy, the fact that teeth comprise less than 40% of the total NISP figures at nearly 90% of the sites used (fig. 2) suggests that preservation, taphonomic, and disposal conditions were not considerably different among the vast majority of sites. Thus, these factors also are controlled to some degree in this analysis.

As shown in figure 3 and table 2, pig bones were found at nearly every site in Roman Italy where faunal materials were recovered, and their frequencies often surpass those of all other animals. They are most numerous, relative to cattle and sheep/goat (i.e., the other two principal domestic taxa providing meat to the Roman diet), among sites in central and northern Italy. Their NISP frequency values tend to increase over time, presumably indicating the pig's enhanced economic role and increased dietary popularity through the ages. Further study of age data indicates that pig herd sizes varied considerably, and there is evidence for the practice of annual and semiannual breeding schemes. Most individuals did not survive beyond three years of age, with males preferentially killed as younger individuals.[7]

Volumes can be written about the information provided by zooarchaeological studies of animals. Here I concentrate on size variation in Roman pigs as revealed from comparative bone measurements, although I stress that this is just one aspect of zooarchaeological examination.[8] Although, as outlined above, I have made efforts to control recovery and taphonomic biases, these are essentially more important to dietary and economic reconstructions—topics that require reliable statistics for quantification and element representation. An examination of animal size as revealed through the analysis of withers,[9] or shoulder heights, is somewhat disassociated from these problems since it essentially depends on the number of whole and mature bones

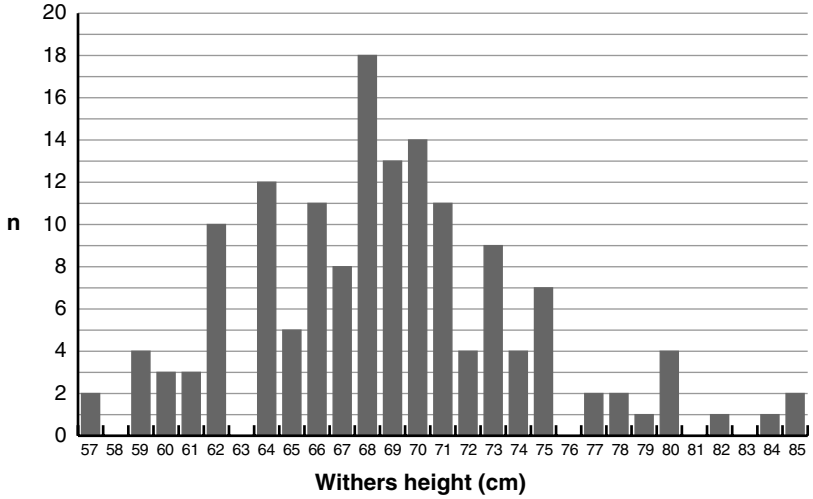

Fig. 4. Number of pigs per withers height category for Roman period sites in Italy

[7] MacKinnon 1999, 119–25, 134–9.

[8] See MacKinnon 1999 for more details regarding the zooarchaeology of Roman Italy.

[9] Withers heights are generally calculated in zooarchaeological studies by multiplying the greatest length of a long bone by an established factor for that particular element. In the case of the pig, the standard source of these factors is Teichert 1969.

Table 3. Range, Mean, and Sample Size for Pig Withers Heights among Roman Sites in Italy by Geographic Region and Time Period

Region	Period	Withers Height Range (cm)	Mean Withers Height (cm)	Sample Size
South	Republic	59.1–75.2	69.4	7
	Imperial	–	–	–
	Late antique	62.1–71.6	68.3	4
Central	Republic	59.1–74.7	66.1	21
	Imperial	57.9–85.9	72.2	14
	Late antique	57.3–84.1	70.1	27
North	Republic	61.6–80.9	68.0	37
	Imperial	65.3–73.4	68.7	9
	Late antique	59.8–78.8	70.4	32

recovered, which in turn can be measured. While taphonomic agents will certainly break apart whole bones, this effectively only reduces the sample size available to be measured rather than changes the size parameters of the live sample of animals from which it was drawn. If taphonomic agents, however, acted to destroy the complete bones of only smaller-sized pigs or if only the bones of the largest-sized pigs were retrieved, then this would certainly affect conclusions made about size estimates of the population. I assume that such peculiar taphonomic and recovery conditions were not the case here and that the sample of bones used in this analysis reflects the general size parameters of the Roman adult pig populations in Italy.

Only whole and mature bones provide reliable size estimates, a circumstance that presents a problem for pig analysis in that many bones are broken while many others derive from juvenile animals. Consequently, this study reflects size variation in mature pigs only. A sample of 151 Roman pig bones, collected from 30 sites,[10] yielded withers height estimates. Figure 4 plots these heights, and table 3 summarizes these data by listing the range, mean withers height, and sample size for the three geographic regions and temporal periods recognized here. The overall withers height range extends from ca. 57 cm to ca. 86 cm. This spread is too great to be explained by sexual size dimorphism, environmental differences among areas, or nutritional differences within a single breed of pig; the logical hypothesis is that different breeds existed. As shown in figure 4, most of the measures lie between 60 and 75 cm, indicative of a small animal; then there is a jump to a group concentrated around 80 cm. Some of these larger individuals may be small wild boars, but there are far too many for this to be the sole explanation, especially when unambiguous wild boar remains with withers heights well above 85 cm are noted in several of the samples. Rather, these zooarchaeological data suggest the presence of a second, larger breed of domestic pig, measuring in at around 80 cm. According to the data in table 3, it appears that this larger breed was more predominant at sites of imperial and late antique date in central Italy, where upper range limits are well above 80 cm.

Two other points are worth mentioning regarding pig measurements. First, the pattern is not fixed, but generally rural sites show the greatest spread of values and urban sites the least. This is especially marked among imperial and late antique sites in central Italy as graphically depicted in figure 5, and supports the hypothesis that cities were provided with pigs of fairly standard weight ranges. This in turn has important economic and marketing implications, to which I shall return later.

A second point about the distribution of withers measurements is that, regardless of region, the overall size of pigs tends to increase slightly over time, suggestive of improved breeding conditions through antiquity. Overall, however, ranges still remain broad, indicative of the raising of at least two breeds, although not necessarily both at a single site.

In sum, zooarchaeological data reveal the presence of at least two breeds of pigs in Roman Italy, a small one and a larger one, and hint at patterns of

[10] These sites are: Altino, Anagni, Aquileia, Bolsena, Carminiello, Castelrotto, Colognola, Girolamini, Gravina, Invillino, Locri, Lugnano, Luni, Matrice, Modena, Monte Barro, Monte Irsi, Montereale, Populonia, Rome (Aqua Marcia), Rome (Meta Sudans), Rome (Schola Praeconum), San Giovanni, Santa Patrizia, Santorso, Settefinestre, Stufels, Tarquinia, Udine, Via Gabina.

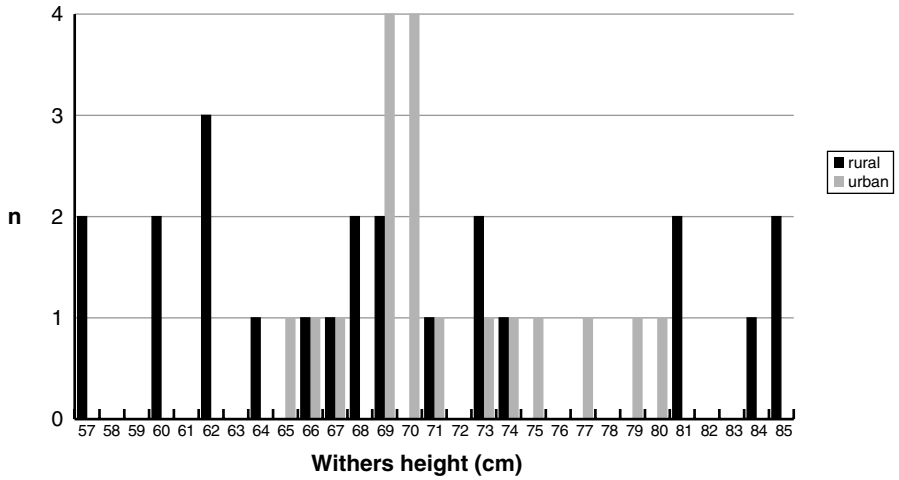

Fig. 5. Number of pigs per withers height category among urban and rural sites of imperial and late antique date in central Italy. All urban sites here exclusively derive from sites designated as urban1 (or "city").

husbandry related to the economic demand for pork.

PIGS IN THE ANCIENT TEXTS

References to pigs are dispersed throughout ancient literature and inscriptions, but like all texts, these require critical scrutiny to be interpreted effectively. Ideally, each reference must be contextualized within a temporal and social framework that includes details about the author's intention in writing, his experiences and acumen, and the demands and expectations of his audience, themselves molding and being molded by the literary genre in which he writes. Contextualizing ancient texts is clearly a formidable, and in most cases impossible, task to achieve on a detailed, specific basis.

One important source of animal information is the agricultural treatises of the Latin authors Cato, Varro, Columella, Palladius, and to some extent Virgil. Another good source is the encyclopedic volumes of Pliny, the Elder. These manuals often contain practical details that can be adapted for all levels of farming; however, they are clearly oriented toward an upper-class audience operating at a rural villa.[11] They generally promulgate the idea of profit maximization for the wealthy, presumably inexperienced, and frequently absentee landowner. Nonetheless, most of them seem to provide fairly reliable references about the role of animals in the Roman diet and economy, even if much of this needs to be interpreted within the context of a typically elite audience bias. The fact that a number of authors repeat important and basic information about animals in Roman life suggests that at least those recordings are true. Moreover, presumably audiences would not want to be told false details about animals, especially from the agricultural writers whose purpose was to educate them about profitable farm management and husbandry techniques. It is true that the Roman agricultural treatises in particular contain a mixture of descriptive and prescriptive details, which renders it difficult to judge how widespread and in what capacity their advice was followed. The fact that these agronomists use examples and anecdotes to illustrate concepts, however, shows that they were aware of possible problems the farmer might encounter. They regularly offer practical advice to counteract these perils, which in turn shows a vested personal interest in agricultural work, as opposed to writing their work as some theoretical or rhetorical exercise. While these manuals are not perfect reflections of Roman farm life, they do help illustrate the potential of Roman agriculture.[12]

Fortunately, these Roman agricultural and encyclopedic manuals contain a number of references to pigs. They discuss two levels of pig husbandry. At one level, a pig or small group of pigs can be kept around the farm to feed off scraps and litter (Plin. *NH* 8.77.206). Alternatively, large-scale breeding operations to supply the market demand for pork can be practiced.

Two kinds of pigs are described in the ancient texts, but not in explicit detail. The dominant type,

[11] White 1970.

[12] Morely 1996, 108.

ubiquitous throughout Italy, was similar in appearance to the wild boar, with hard, dense, black bristles (Col. 7.9.2; Pallad. 3.152; Lucr. 5.969–970). Smooth pigs and even white ones (Petron. *Sat.* 47; Juv. 13.117–118), however, may also be pastured in warmer and sunnier regions (Col. 7.9.2). The latter type, we are told, was frequently kept by bakers and millers and fed off the excess supplies of bran (Col. 7.9.3). This practice appears to have a long history given that Plautus (*Capt.* 4.1.807–808), writing more than two centuries earlier than Columella, complains that the pigs kept by the millers raise such a stench that no one can go to the mill.

Given the value and versatility of pig meat to the Romans, it is no wonder that the ancient authors devote considerable attention to the breeding of this animal. Many of the authors mention general characteristics sought in the best breeding boars and sows. According to Columella (7.9.1), boars should be of great size, with huge haunches, but not correspondingly long legs and hooves. Palladius (3.51) adds that they should be great-bodied, ample and round, with large hips and white bellies. Boars are fit for breeding from a year until they are four years (Col. 7.9.2). Pliny (*NH* 8.77.206) limits them to breeding between one and three years, while Varro (*Rust.* 2.4.8) has them beginning at eight months. Boars were to be removed from the sows two months prior to mating and then again after the females had conceived (Varro *Rust.* 2.1.118, 2.4.7–8).

Sows, on the other hand, should be large-bodied and pendent (Pallad. 3.152), but also long in shape (Col. 7.9.2). They should not be bred if under a year old (Varro *Rust.* 2.4.7); however, it is better to wait until 20 months, so that after their four month gestation period (Varro *Rust.* 2.1.19) they will be two years old when they first bear (Varro *Rust.* 2.4.7; Pallad. 3.153). From this point on, a sow can bear two litters a year until about seven years (Varro *Rust.* 2.4.14; Col. 7.9.3), following a pattern of four months pregnant and two months to suckle newborns (Varro *Rust.* 2.4.14).

In terms of breeding schemes, Columella (7.9.4) outlines a strategy for sucking-pig production wherein sows conceive twice a year, in the summer and in the winter. Their litters were fattened quickly and sold at the market, which, apparently in this case, was not too far from the farm (contra. Col. 7.9.3). Both Columella (7.9.4) and Palladius (3.153) note that if you eat or sell piglets, the mother will soon breed again. Sixty days of weaning was considered enough to fully fatten a suckling (Plin. *NH* 8.77.207).

Despite recognizing that sows can conceive twice a year, Varro makes no mention of Columella's sucking-pig production scheme. Rather, he cautions that such a rigorous biannual birthing schedule was not always advised. Newborns delivered in the winter months did not normally fare well under the cooler conditions, and at a time when the mother's milk was apparently of poorer quality (Varro *Rust.* 2.4.13).

A different pig breeding technique, centering on the production of good stock, was employed for farms without easy access to urban markets (Col. 7.9.3). In this scheme, annual litters are suggested, which should be born in July when the sow has plenty of milk and much food is available (Col. 7.9.4). Here, mature animals provide most of the meat.

The Roman authors name several regions as key centers of production for pigs or pork products, including areas of Gaul, Spain, and the northern fringes of the Roman empire. Overall, Italy appears to have been less productive, but several key areas are mentioned. Cato (cited in Varro *Rust.* 2.4.11) claims that, outside of Gaul, the best and largest hams and shoulders of pork come from the district around Milan, which boasted of exporting about 3,000 or 4,000 salted flitches annually. The Greek authors Strabo (5.1.12) and Polybius (2.15) echo the importance of Cisalpine Gaul in providing pigs for Rome. Other significant pig and pork producing areas of Italy included the regions of Campania, Samnium, Bruttium, and Lucania. According to the Theodosian Code (*Cod. Theod.* 14.4.10.3) and references in Cassiodorus (*Var.* 11.39), these regions (especially Lucania) were heavily taxed in kind for pigs and pork—over 3,000 tons worth per year. Lucania was also particularly famous for its sausages (Apic. 2.4).

PIGS IN ROMAN VISUAL CULTURE

The artistic evidence, too, has its biases. Visually, an animal may be depicted in a variety of ways—naturalistically, stylized, or abstractly—the form of which need not directly relate to the social function of that image, be this symbolic, religious, decorative, didactic, commemorative, or expressive of some aspect of a society.[13] As with the zooarchaeological and textual evidence, artistic images must be interpreted in context.

Collecting data on animals from Roman visual culture is perhaps more challenging than that for the zooarchaeological and textual components,

[13] Hicks 1993, 5.

Fig. 6. Closing of the Lustrum. Tetrarchic Five-Column Monument, Roman Forum. (Courtesy Deutsches Archäologisches Institut, Rome. Neg. 1935, 356)

both of which have their major hurdles. Animals appear in all manner of Roman visual culture—sculpture, painting, mosaic. The sculpture category alone can be extended to include anything from carved stone panel reliefs, to impressions on coins, to terra-cotta figurines. Many thousands of images exist, spread throughout the Roman world and continually expanding with new archaeological discoveries. While any complete examination is unattainable, much can still be learned from selective analyses.

Fig. 7. Lustration of the troops. Arch of Constantine, Rome. (Courtesy Art Resource. Alinari photograph 2535)

One Roman art theme in which pigs play a major role is animal sacrifice, with the *suovetaurilia*, or sacrifice of a bull, ram, and boar to the gods, dominating such scenes. Much has been made about the political and social message imbued in the human figures portrayed in such displays,[14] but considerably less exists concerning the animals, which on closer inspection do vary among depictions. Compare, for example, the large, erect-eared, fat-bellied, and smooth pig shown in the Tetrarchic Five-Column Monument (fig. 6) and the similarly depicted, though relatively smaller and lop-eared, version shown in a panel relief of Marcus Aurelius reused on the Arch of Constantine (fig. 7), to the more slender, long-snouted, and bristled wild-boar-like individual shown on the Altar from Vicus Aesculeti (fig. 8), or the rotund, short-snouted, and slightly hairy pig on the so-called Altar of Domitius Ahenobarbus (fig. 9). Between these extremes lies the smooth-skinned, lop-eared, but maned sow depicted in the Aeneas sacrifice scene on the Ara Pacis (fig. 10) and the leaner, long-legged, barrel-bellied, smooth-skinned, but bristled-back boars on the Column of Trajan (figs. 11–13). Then there is the erect-eared, maned, and excessively huge boar

[14] Ryberg 1955.

on the frieze of the Arch of Augustus at Susa (fig. 14) and the massively chubby, smooth-skinned, and short-snouted version on the early first-century A.D. *suovetaurilia* of the Louvre, Paris (fig. 15). Examples of pigs as sculpted in the round (as opposed to relief work) are rare for Roman Italy, but two bronze figurines from Herculaneum depict fairly rotund individuals. That shown on the rectangular stand (fig. 16) is quite fat and has erect ears and a short snout, while the other, from the Villa of the Papyri (fig. 17), is somewhat leaner in appearance and has relatively longer legs.[15] Color has not survived on any of these sculptures, but one painting from the Villa of Mysteries outside of Pompeii (Sacrifice to Priapus, fig. 18), dating to 60–40 B.C., depicts a small, long-legged, somewhat smooth, pinkish-brown pig, while that shown in the mosaic copy (in the Museo Borghese), made in imperial times of a third-century B.C. original painting, is brown and noticeably bristled (fig. 19).[16] Between these two extremes lies the grayish-white, bristled-back variety (fig. 20) as portrayed in a *lararium* painting from Pompeii (Regio VIII, insula 2 or 3). Finally, mention should be made of the cast of the dead pig from Villa Regina, Boscoreale (fig. 21), which has noticeably long legs, short erect ears, and a fairly long snout.

At least two different breeds of pigs can be identified in this sample of sculpted and painted images: (1) a larger, smooth, short-snouted, and generally lop-eared breed (e.g., figs. 6, 9, 10, and 16); and (2) a shorter, erect-eared, long-legged, and long-snouted version (e.g., figs. 8, 14, 17, 18, 19, and 21) more similar to the wild boar than to the fat domestic pigs of today. Both types, moreover, appear to coincide throughout the Roman period in Italy. There is no chronological transition where one breed figures more prominently in visual culture during republican times while the other breed dominates in images dating to the imperial era or late antiquity.

Fig. 8. Altar from Vicus Aesculeti. Rome, Museo dei Conservatori. (Courtesy Deutsches Archäologisches Institut, Rome. Neg. 1935, 388)

INTEGRATION OF DATA

What can come out of these data when they are integrated? Two points are worth highlighting. First, all three sources indicate the presence of at least two types of pig in Roman Italy. The zooarchaeological and literary data show that the smaller, thinner, leaner, and long-legged variety predominated in economic and dietary circumstances. Generations of improved breeding brought about a slight size increase in this type over time. If the Romans followed the advice of the agricultural writers and continued to choose the largest boars and sows as breeders, then a general size increase over time would have occurred.

A second point to mention is that the greatest range in pig measurements is associated with rural sites—a logical connection given that this is where the bulk of breeding operations took place. Urban sites generally show a more restricted range of size values, indicative perhaps of a fairly regimented and organized system of meat marketing, wherein only pigs of a certain weight or size were brought in and slaughtered. There is some support for this

[15] A point should be made about the age of the animals depicted and how this might affect their appearance. While it seems certain that the relief examples presented here show adult pigs, and consequently allow this age factor to be standardized, the same cannot be said of the two bronze examples. The jumping pig (fig. 17) may be a sub-adult, while that on the rectangular stand (fig. 16) may be a piglet. The facial features on the pig in fig. 16, especially its large eyes and full mouth, are typical of very young animals, including pigs, regardless of breed, and the adult version of this pig may appear quite different. On the basis of the ample body size and short legs of this pig, however, it conforms more to the larger, smooth-skinned, and short-legged variety.

[16] This pig may in fact be a small wild boar, given how noticeably dark and bristled it is in appearance.

Fig. 9. Suovetaurilia. Altar of Domitius Ahenobarbus, Paris, Louvre. (Courtesy Art Resource. Alinari photograph 2258)

among the ancient sources. According to references in the Latin texts, animals were a valuable form of property, which had to be sold in good condition. Legislation ordered that the vendor must promise that the animals can "eat and drink normally" (*Dig.* 19.1.2.4–5). Cicero (*Off.* 3.12–13,14,16) concurs, noting that the dealer was obliged to tell all the faults of his goods to the buyer and to uphold all honesty in sales. There are a number of references to butchers in the ancient texts and inscriptions, and evidence suggests that butchers (*lanii*) and market traders in meat (*macellarii*) were variously organized into *collegia* or other associations from at least the time of the late Republic.[17] The profession seems to have become more specialized over time as references to distinct dealers in pigs and pig products (e.g., *porcinarius*, or dealer in pork, cf. *CIL* 6.33900; *pernarius*, or dealer in ham, cf. *CIL* 6.31120; *suarii*, or dealers in swine, cf. *CIL* 6.1693; *confectorarius*, or dealer in dried pork, cf. *CIL* 6.9278) appear to replace the word "*lanius*" in the third and fourth centuries A.D.[18] Specific regulations concerning the weights of animals and meat cuts (in particular pigs and pork), however, are only available from the fourth century A.D. when the government was distributing meat rations to the inhabitants of Rome. According to the Theodosian Code, the Urban Prefect, Turcius Apronianus, in A.D. 367, instituted a system of weighing pigs intended to eliminate disputes caused by previous systems based on weight estimations by landholders and collectors (*Cod. Theod.* 14.4.2). In one earlier system both buyer and seller would draw up estimates for the weight. Sometimes these might be calculated by grabbing the skin of the animal and measuring the amount one was able to pull.[19] In another example, an inscription (*CIL* 6.1770–1) dated to A.D. 363 includes regulation about careful weighing of meat cuts, portioning of the various parts of the animal to the butcher, and terms of sale for hides and flesh.[20] Although these references provide no numerical values for these weights or measures that

Fig. 10. Aeneas's sacrifice of the sow. Rome, Ara Pacis, west end. (Courtesy Art Resource. Alinari photograph 27323)

[17] *CIL* 1.2.978, 6.167; Chioffi 1999; Frayn 1996; Waltzing 1895–1900, 26, 8.

[18] Chioffi 1998, 265; Loane 1938, 291.

[19] Herz 1988, 254.

[20] Loane 1938, 291; Waltzing 1895–1900, 2:90 n. 3, 92 n. 6.

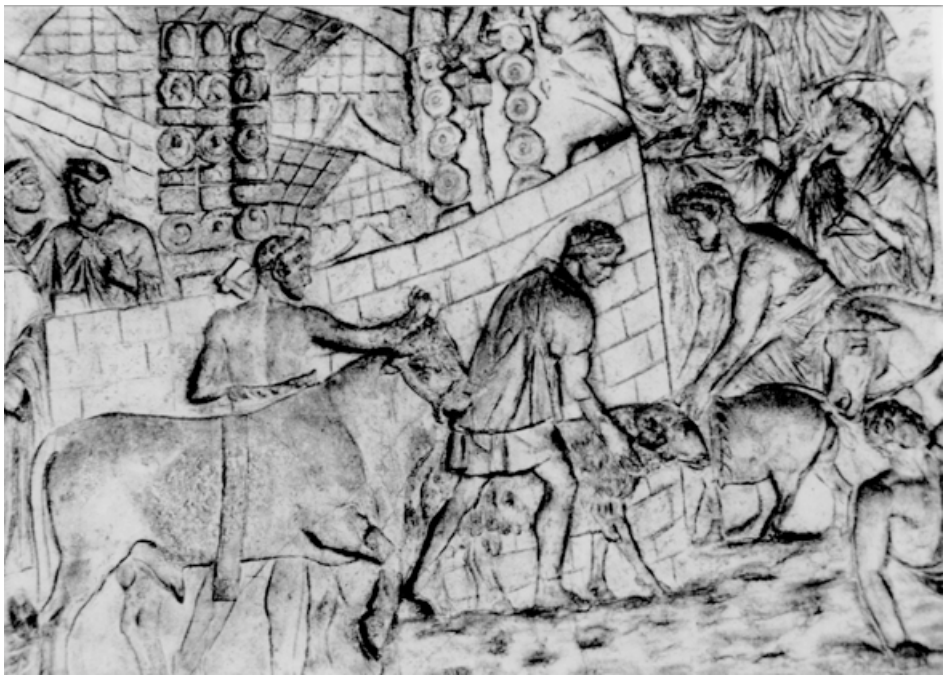

Fig. 11. Lustration of the camp. Rome, Column of Trajan, scene VIII. (After Ryberg 1955, pl. 36, fig. 55. From plaster reproduction in the Museo Civiltà Romana, EUR)

Fig. 12. Lustration of the camp. Rome, Column of Trajan, scene LIII. (After Ryberg 1955, pl. 37, fig. 56. From plaster reproduction in the Museo Civiltà Romana, EUR)

can be compared to withers estimates derived from zooarchaeological data, the animal bone information tells us that the smaller-sized breed supplied the bulk of the Roman pork for the diet, and presumably these weighing systems chiefly related to that breed in particular.[21]

[21] The predominance of the smaller breed of pig in the Roman diet finds further support when one inspects the images (derived chiefly from funerary monuments) of Roman butchers and meat-marketers at work as catalogued by Zimmer (1982). Of the six images shown that include pigs (or parts of them), only the erect-eared, long-legged, smaller-sized pig is depicted, although in three of these cases the butchered head of the pig is all that is available for examination.

Fig. 13. Lustration of the camp. Rome, Column of Trajan, scene CIII. (After Ryberg 1955, pl. 38, fig. 57. From plaster reproduction in the Museo Civiltà Romana, EUR)

If large, fat pigs were around in Roman times and provided more meat, why then did they not replace the leaner, long-legged, wild-boar-like breed, which the zooarchaeological data show is most prevalent at both urban and rural sites throughout antiquity? A point of clarification is required: the large Roman lop-eared pig (as shown in figs. 7 and 10, for example) must not be confused with the chubby Landrace, Berkshire, and Large White breeds known today. These modern and improved breeds are the result of the 19th-century introduction and crossbreeding of the fertile and fat Chinese (Cantonese) pig (*Sus vittatus*) with leaner European varieties. Nevertheless, a few hypotheses can be put forward for the Roman insistence on keeping the smaller pig breed. First, this breed is better adapted for forest feeding. The ancient sources concur that the most convenient foraging grounds for pigs are deciduous woodlands (Col. 7.9.6; Mart. 11.41; Ulp. *Dig.* 19.5.14.3; Strab. 5.1.12), and seasonal calendar depictions relate acorns and autumn with pig herding and hunting.[22] Genetically, these breeds are favored in these conditions—their bristles would offer some protection from the elements; their smaller, more compact size would help prevent overheating; and their longer legs would promote mobility, especially if pigs were being herded on the hoof to feeding grounds and markets. This is probably the system Columella (7.9.3) had in mind

Fig. 14. Suovetaurilia. Frieze of the Arch of Augustus at Susa, erected ca. 9–8 B.C. (After Ferrero 1901)

[22] Salzman 1990, 75, 95; Åkerström-Hougen 1974.

Fig. 15. Closing of the Lustrum. Suovetaurilia of the Louvre, Paris. (Courtesy Art Resource. Alinari photograph 22685)

when discussing pig-raising schemes that emphasized annual litters and quality stock.

The large, fat pig breed was probably maintained differently. It was likely to be stall-fed, kept in fewer numbers, and not herded over distances. Unlike the smaller foraging breed, this type would require greater individual expense and attention—be this in the form of sty construction, provisioning of fodder, and breeding manipulation—but this effort would pay off in terms of the profit obtained from the sale of their tender meat and production of a surplus of sucking-pigs raised on a semi-annual basis, as Columella (7.9.4) outlines. This large breed would also be beneficial in an urban setting, where it could act as a type of garbage disposal, consuming all manner of city waste. A few might also be reared at a rural farm for the same purpose.

Given the connection suggested between larger breeds and housing in pig sties, it is unfortunate that very little archaeological evidence for such structures exists. The only site of which I am aware that documents pig sties is Settefinestre, where a pig sty complex of 27 rooms opening up into a central courtyard was excavated.[23] Each sty corresponded neatly to the dimensions provided by Varro (*Rust.* 2.4.14) and Columella (7.9.10).[24] Pig bones were collected at this site, but the sample is fragmentary and only limited metric data are available.[25] In general, the Settefinestre pigs span a range of withers height estimates from very small to very large, but the bulk lies between 74 cm and 80 cm. These dimensions place these pigs at the upper range of the smaller domesticate, but do not preclude the existence of the larger breed at this site. While herding operations at Settefinestre may have concentrated on mass production of the smaller variety of pig (albeit an improved version given its larger than average size), the fat breed may have also

[23] Ricci 1985. Animal stalls have been outlined or conjectured from several Roman sites (Rossiter 1978 provides several Italian examples; Morris 1979 discusses stock building in Roman Britain; Davison 1989 provides information about animal stables in Roman military barracks), but out of all of the Roman Italian sites where zooarchaeological remains were also recovered only Settefinestre has evidence of enough stalls to house more than just a few animals. One problem is that the function of many rooms cannot always be determined on the basis of available archaeological and architectural evidence. Often the designation of "stable," "pen," "sty," and so forth is based chiefly on the position and dimensions of the room or structure in relation to other rooms, and not on zooarchaeological, botanical, entomological, or other biological, chemical, or geomorphological evidence that might help indicate the room's inhabitants.

[24] The ancient authors recommend that these be about 4 ft. high, wider than long, unroofed, and may include a door, although Columella (7.9.13) ignores the latter, stating that pigs can climb over walls that are not too high. The Settefinestre "sties" measure approximately 1.5 × 2 m and are presented as roofed in the reconstructions (Ricci 1985).

[25] King 1985, 291.

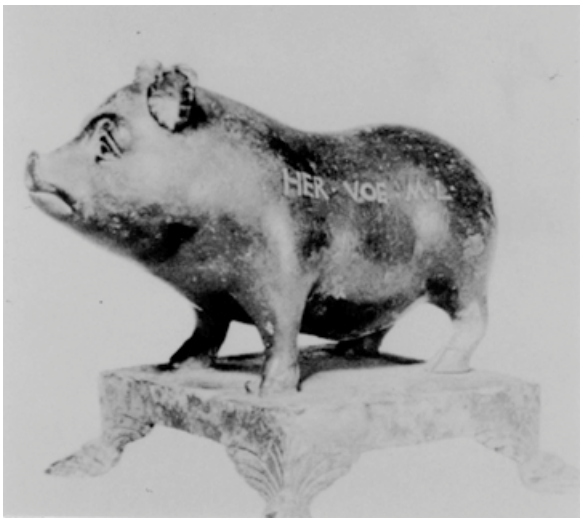

Fig. 16. Small bronze pig on a rectangular stand. Herculaneum. (Courtesy Museo Nazionale Archeologico, Naples)

Fig 17. Jumping pig. Herculaneum, Villa of the Papyri. (Courtesy Museo Nazionale Archeologico, Naples)

been raised at the site but exported more regularly; thus it would be less likely to appear in the zooarchaeological remains from the site, which indicate what was consumed locally. Some degree of interbreeding between the fat breed and the smaller breed probably occurred at Settefinestre; this would have been facilitated by the better level of control afforded by the sties.

Why this larger breed figures more prominently in artistic depictions may relate to its preference as a sacrificial victim. If these individuals were specially bred or selectively chosen, then it seems natural to sacrifice the biggest victim. This is difficult to test zooarchaeologically since most deposits derive from contexts assumed to be food and processing waste and are not specifically linked with animal sacrifice.[26] The breed of sacrificial pig is never announced in the ancient texts, but a few references mention sacrificing fattened swine (Prop. 4.1a.21–24; Hor. *Epist.* 1.16.58–59; Ov. *Fast.* 1.349–350). Since the Roman worshippers consumed a portion of the consecrated meat, a big, fat animal would provide for a large congregation. Outside of major urban areas and in the more remote or unfavorable pig-raising areas of the Roman world, however, the smaller breed may have been all that was available; in such situations, whatever pig was available could likely be sacrificed. Thus, the smaller breed is shown in depictions like the one from Susa (fig. 14), although this particular pig is greatly exaggerated.[27] Size is important in Roman art. The waist-high, rotund pigs shown in the Louvre (fig. 15) and Tetrarchic Five-Column Monument (fig. 6) reliefs would correspond to over 90 cm in withers height if realistically portrayed. This is exceptionally large, even by today's standards (compare it to the unnaturally small bull depicted in figs. 15 and 6), and may have some social message: big pig equals big status. Examples abound in the ancient texts linking animal size, dietary ostentation, and social status (most of these are in Martial's *Epigrams* and Petronius's *Satyricon*). Might a similar situation apply in their depiction in art?

How people, places, and things were shown in Roman visual culture certainly depended on many forces and influences. One of these was the degree to which the artistic work acted as imperial propaganda. Displaying the most ideal victim, in this case a large, perfectly formed pig, would certainly send a better message of prosperity, duty, and godly reverence to the Roman people than would depicting a more meager sacrificial victim. Art then shows what was aimed for in victims, whereas reality might have fallen short of this.

Another factor to consider in the analysis of Roman visual culture is the notion of "artistic license" and imitation. Artists may simply have copied others regardless of what type of pig breed existed, was

[26] None of the "special" sites listed in table 2 that are argued to be votive in nature yielded mature pig bones, which could provide withers measurements.

[27] The Susa relief represents an exceptional case since every figure, human and animal, is the full height of the frieze. That height alone determines figure size. Consequently, the pig depicted in the Susa relief is unnaturally large. If we filter out this bias and concentrate exclusively on variation in body type, then the pig in the Susa relief conforms best to the short-eared, bristled-back, long-snouted variety as outlined above.

Fig. 18. A sacrifice to Priapus. Pompeii, Villa of Mysteries. (After Hanfmann 1964, pl. 17. M. Carieri)

commonly known to them, or was chosen for sacrifice. As support, note how remarkably similar the animals are in the suovetaurilia scenes of the Louvre (fig. 15) and on the Tetrarchic Five-Column Monument (fig. 6) in contrast to the human figures. Temporally, these two works are separated by over 250 years (i.e., Louvre dates to A.D. 47; Tetrarchic Five-Column Monument dates to A.D. 303), and they are sculpted in completely different styles, but they show great uniformity in the appearance of the animals, down to the angle of their head and the position of their feet. Whether or not the sculptor of the Tetrarchic Five-Column Monument drew directly upon the suovetaurilia image on the Louvre example as a template for his work is unknown, but manuals and models of subject matter were available to Roman artists, and it seems probable that the highly canonical scene of the suovetaurilia existed as one of these standardized models.

In sum, while the process of linking zooarchaeological, textual, and artistic data for pigs in Roman Italy, and indeed any animal in antiquity, may be difficult considering the number of biases, complications, and unknowns inherent in any interdisciplinary project, I believe that the "marriage" of these sources is essential in our quest to understand better the role of animals in any period of the past where such rich and diverse sources of data are available. My analysis here details variation in pig breeds in antiquity, linking this to seemingly separate but nonetheless interrelated topics such as schemes of pig raising and the choice of sacrificial victim. All three sources of data show evidence for at least two different breeds of pigs in Roman Italy—a large, fat, somewhat smooth-skinned, short-legged type and a small, bristled, long-legged, erect-eared variety. The smaller breed generally was kept in herds, pannaged in forests for its food, and figured more prominently as a source of pork in the Roman diet of Italy. The larger breed seems to have been raised in a different manner, being stall fed, and in much reduced numbers compared to its smaller equivalent. Moreover, because of its grand size and the message of social and economic prosperity with which this quality is associated, this larger breed appears to predominate as a sacrificial victim in Roman religion and Roman visual culture.

CONCLUSION

Although this current study of pigs adds to our knowledge about these animals in Roman Italy, clearly, we have just begun to scratch the surface in terms of such integrative analyses, and research focusing on additional aspects of pigs in Roman life, as well as studies exploring the contributions of other animals, domestic and wild, is essential to

Fig. 19. Cult act. Mosaic copy, made in imperial times, of a third-century B.C. original painting. Rome, Mueso Borghese. (After Hafner 1969, 167)

Fig. 20. Pig being led for sacrifice. Detail from wall painting from a household shrine (*lararium*). Pompeii VIII, insula 2 or 3. (Courtesy Museo Nazionale Archeologico, Naples)

broaden our understanding of the role of animals in antiquity. Numerous factors and decisions influenced the husbandry tactics and dietary schemes adopted by the Romans, and these varied over both space and time, as King illustrates in his synthetic examination of animal bone data from the Roman world.[28] While this combined zooarchaeological, literary, and artistic study for pigs in Roman Italy suggests the presence of (at least) two breeds in this part of the Roman world, this need not imply that these same two breeds existed elsewhere in the empire, or that similar schemes of pig production and consumption as outlined for Roman Italy were practiced in the provinces. The economics of pig production in the Roman world are complex, and while not specifically the focus of this paper (which concentrates on determining pig breeds in Italy),[29] it seems probable that the Italian model of production that combined the herding of smaller breeds of pigs in forests (where available) and the exploitation of larger varieties and sucking-pigs at farms with convenient access to urban areas, or at farms equipped with sties, was practiced in other areas of the Roman world where sufficient resources and demands existed. At its foundation, this is a practical system that takes advantage of supply and demand while optimizing use of available resources. Certainly more data, especially zooarchaeological data from urban and rural sites throughout the Roman world, are required to clarify this issue. Attention, however, must not only be paid to reconstructing the age and sex demographics for the pigs from these sites, so we can better understand what animals were chosen for slaughter and integrate those data into the larger picture of animal husbandry, but also to the distribution and relative frequency of the various skeletal parts and how these patterns relate to the import and export of whole animals versus that of cuts of meat.

As regards the issue of breeds, the central focus of this paper, it is apparent that scores of different breeds of pigs are noted today in the area once encompassed by the Roman world.[30] Some of these actually differ in terms of size, shape, and overall morphology (and can be readily distinguished visually or phenotypically); others appear similar externally, but can be classified as breeds because their populations differ genetically; still others are not really true breeds but simply regional toponyms for a single variety of pig. All these factors have important repercussions for any study of ancient animals. Literary references to ancient animal breeds,

[28] King 1999.

[29] See MacKinnon 1999 for a greater discussion of the economics behind the production of pigs, caprines, and cattle in Roman Italy.

[30] Mason (1996) lists over 50 pig breeds for the Mediterranean region alone.

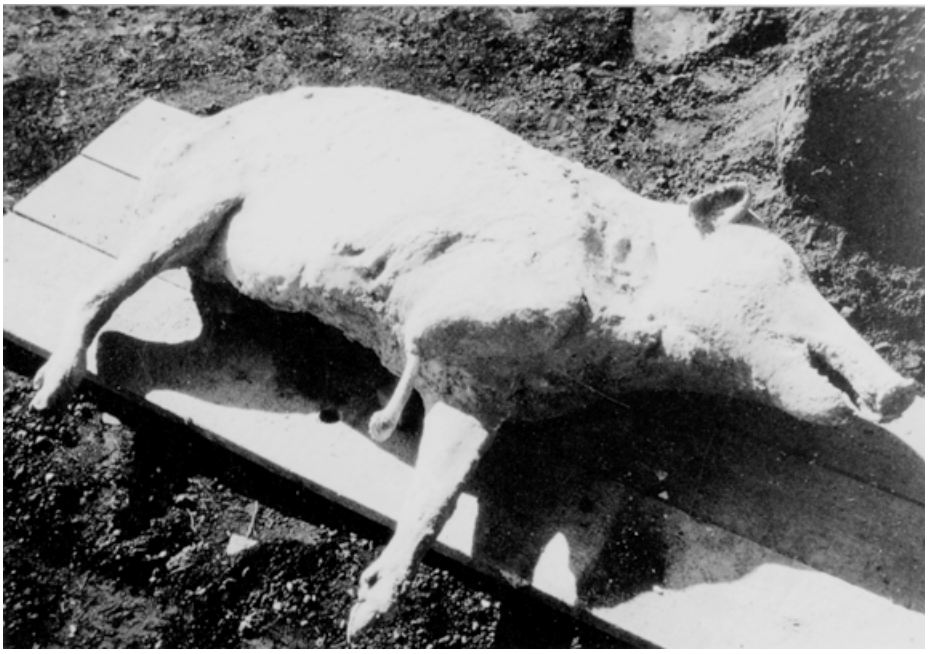

Fig. 21. Cast of dead pig from Villa Regina, Boscoreale (After De Caro 1994, tav. 12b)

in particular, need to be assessed with the problem of toponyms in mind. Artistic data must be examined within their cultural context to determine if standardized (Italian?) pictures of animals were disseminated to the Roman provinces or if these provincial images accurately reflect the characteristics of local breeds. Zooarchaeological evidence shows great promise in this quest to distinguish ancient animal breeds. As I have outlined here, size, or metric, variation is one technique that can be used to help differentiate ancient animal breeds. It is advantageous in being easily employed, but limited in that it cannot distinguish breeds that share similar size ranges. Other techniques such as the examination of nonmetric, or discrete, traits on animal bones as well as the analysis of DNA extracted from these bones hold promise for future research, but both are currently underdeveloped venues. Given the expense, DNA research is often impractical for most archaeological projects today; however, as technology develops, genetically separating ancient animal breeds on the basis of the extracted DNA may become more routine.[31] Nonmetric traits, or for example, the various bumps, grooves, crests, foramina (or holes), and similar features on bones, have been successfully implemented in distinguishing genetically related groups of humans,[32] and they hold promise in their use to define ancient animal breeds. To date, however, little zooarchaeological research has concentrated on the variation in nonmetric traits,[33] not because zooarchaeologists have been unaware of these, but principally because more research is required to define these traits among the various animal taxa and to clarify their relationship to interpopulation variation in modern control samples before implementing them on archaeological materials.

Animal breeds are important, today as in the past, and integrative research incorporating the methods and sources of data used to determine them—be these bones, literary references, images, or other materials—can only augment our understanding of the ancient world. As this example using pigs in Roman Italy illustrates, the choice of breed can vary tremendously depending on numerous factors such as geographic locale, environment, herding tactics, principal commodity exploited, market demands, among other temporal, spatial, technological, social, and economic variables. Determining which animal breed is used, and in what capacity, therefore, provides vital information about both the natural and cultural world, information

[31] Some recent examples of DNA analysis applied in zooarchaeology include Loreille et al. 1997 and Hardy et al. 1995.

[32] Saunders (1989) provides reviews of work on these kinds of features in human osteology.

[33] O'Connor (2000, 117–22) discusses several examples of zooarchaeological research involving nonmetric traits; however, the available pool is very small.

that in turn may not be available from examining any single source of data, no matter how comprehensive that source might seem.

DEPARTMENT OF ANTHROPOLOGY
UNIVERSITY OF WINNIPEG
515 PORTAGE AVENUE
WINNIPEG, MANITOBA R3B 2E9
CANADA
MICHMACKIN@YAHOO.COM

Appendix: Zooarchaeological Reports from Roman Period Sites in Italy

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Doric Measure and Architectural Design 2: A Modular Reading of the Classical Temple

MARK WILSON JONES

Abstract

The Doric temple is one of the ancient Greeks' most celebrated achievements and one of the great archetypes of architectural history. Not only was it the ultimate reference for other typologies (propylaea, stoas, and miscellaneous civic buildings), it was also, especially in its fifth-century form, a highly influential source for the later practice of classical architecture. Yet the methods used to design the ancient Doric temple remain a largely unresolved question despite the considerable scholarly effort dedicated to its investigation.

This lack of resolution reflects to some extent lapses of regularity and symmetry in Doric temple plans, lapses that Vitruvius called "the faults and incongruities" that flowed from the notorious problem associated with the configuration of the peristyle and its frieze at the corner. This problem was also compounded in the archaic period by the prevailing reliance on rules of thumb and a successive approach toward making individual decisions. But by the second quarter of the fifth century, architects had acquired a greater control over the design process, becoming able to instill their projects with improved coherence and precision, as well as neater proportions. The most striking manifestation of this shift is the widespread adoption of a 2:3 ratio between the widths of triglyphs and metopes, a relationship that automatically generated column spacings equivalent to 5 triglyph widths. This analysis of the facades of 10 relatively well preserved hexastyle temples shows that the triglyph width was much more than just one consideration out of many; it constituted the very lynchpin of a fully-fledged modular design method.

Such an interpretation helps to explain the consistency of temple facades while also, significantly, tallying with the evidence of Vitruvius, our sole ancient authority. Vitruvius described Doric design in modular terms, and he also chose a module equal to the triglyph width. In the past, scholars have tended either to trace Vitruvius's account only as far back as the Hellenistic period, or alternatively to doubt its legitimacy altogether. It now emerges that Vitruvius perpetuated principles and practices that went well back into the fifth century.*

The form of the classical Doric temple is highly predictable, more so perhaps than any other historic building type. By the fifth century B.C. the morphology of temples was governed by conventions that embraced even the smallest details. Architects had especially limited room for maneuver in designing the end facade. They might make the stylobate sit on four steps rather than three, or introduce extra elaboration at the junction between capital and shaft, but in essence facade design was a quest for perfection through the honing of proportions, profiles, and refinements.

Intuition suggests the existence of a method (or methods) that enabled architects to produce the highly conventional temples demanded of them.[1] This same consistency in design also suggests that such methods must have had a metrical component, an assumption supported by at least three kinds of evidence. First is the desire for mathematical harmony pervading diverse ancient architectural texts, whether Babylonian, Biblical, Greek, or Roman, including most notably Vitruvius's treatise.[2] Second is the relentless numerical content of Greek specifications and contracts for structures such as the Telesterion at Eleusis, the Tholos of Epidauros, and the Arsenal of Piraeus.[3] Third is the presence of accurate proportional correspondences in individual Doric temples themselves.

Be this as it may, Doric design strategy remains notoriously elusive. Although progress has been made in recent decades, no modern theory satisfactorily accounts for the reproducibility of design intentions, especially in temples of the classical period. Not a single fifth-century Doric temple dis-

*Having begun in 1992, this research was substantially complete before Part 1 of this article (Wilson Jones 2000a) was conceived; it was the virtue of clarifying metrological issues first that dictated the published sequence. I was fortunate to receive a grant from the British Academy to facilitate research in Greece and Italy. I am also much indebted to the British School at Athens for hospitality and for submitting applications for me to inspect various temple sites, as I am to the respective Ephorates responsible. I have benefited from comments received during discussing the ideas set down here with Jos de Waele, Manolis Korres, and Margaret Miles. Malcolm Bell, Jim Coulton, and Dieter Mertens were kind enough to read and comment on an early version of this text dating to 1994; I thank them not only for their encouragement but also for criticisms, which I have tried to address subsequently with the benefit of invaluable assistance provided by Ida Leggio.

[1] For general arguments relating to design method, see Coulton 1975.

[2] Wesenberg 1983; Koenigs 1990.

[3] Caskey 1905; Noack 1927, 112–7; Burford 1969; Jeppesen 1958.

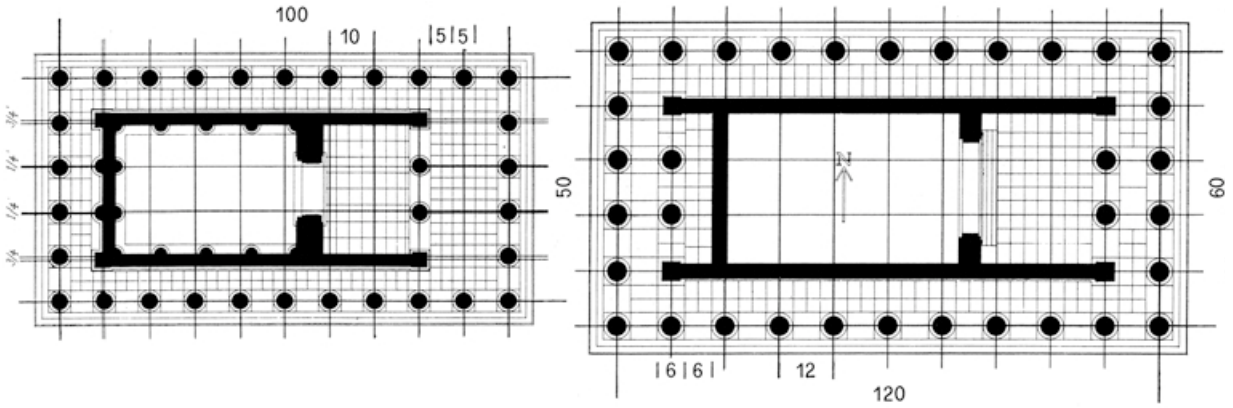

Fig. 1. Plans of Ionic temples of the Hellenistic period: the Temple of Athena at Priene (right) and the Temple of Leto at Xanthos (left), 1:200. Note in both cases the 1:1 proportion between the column plinths and the paving slabs in between, and the overall proportion of 1:2. Dimensions are shown in Attic feet of ca. 294–295 mm. (After Hansen 1991, fig. 11)

plays the proportional and dimensional transparency of Hellenistic temples in the Ionic mode like those of Athena Polias at Priene or of Leto at Xanthos (fig. 1).[4] Instead, specialists will argue interminably over the foot units used for individual Doric temples (to date a dozen or so values have been published for the Hephaisteion, a score or more for the Parthenon).[5] Research has got bogged down largely because of this unproductively narrow focus, which often neglects the principles that typically underlie Doric design.[6] Nor is it helpful to avoid grappling with the problem, as when buildings like these are judged "inscrutable," "enigmatic," or somehow too wonderful to be reduced to mere quantities.[7] This might be said of all creative work, of course, but it is equally true that buildings have to be dimensioned to get built, especially stone ones that adhere to a formal language as exacting as the Doric order.

The metrical opacity of Doric temples is not to be explained by some mysterious cause, but rather the procedures employed for setting out the overall plan on the one hand, and on the other a series of considered adjustments that were made for the sake of obtaining a "correct" elevation. As regards the setting out of the peristyle columns and the platform on which they stand, the stylobate, in the archaic period architects were apparently unable or disinclined to predict what was necessary to obtain a regular colonnade; they preferred to rely on rules of thumb of great conceptual simplicity—even if these might be considered flawed or even perverse from a rational standpoint. As J.J. Coulton and others have demonstrated, it was common in the sixth century for architects to assign stylobates a width:length ratio according to the number of columns supported. A stylobate carrying a 6 × 12 peristyle, for example, would be set out in the ratio 6:12 (i.e., 1:2). The fact that this proportion did not relate to the axes of the columns, but rather to the edge of the stylobate, generated shortcomings—from a rational perspective—such as column intervals and even column diameters that differ from front to flank.[8] This practice was modified over time to minimize inconsistencies, apparently on the basis of empirical observation rather than a concern for coherence in the abstract sense. What is more, such rules of thumb, as well as proportions generally, were often applied in a successive manner (more or less following the sequence of construction), and here is another reason why the resulting whole might not display proportional simplicity.[9]

Modifications had a special place in Doric design over and above the perennial considerations of formal ideals, aesthetics, site, budget, materials, construction, and so on;[10] the gauging of them was an art in itself, and this is particularly true of the classical period. The various refinements,[11] exacting distortions made to horizontals, verticals, and the size of otherwise standard elements, are but the most famous manifestation of an ethos that embraced diverse aspects of detailed design.[12] The

[4] Koenigs 1983; de Jong 1988; Hansen 1991.

[5] De Waele 1998; Bankel 1983, 1984b; Sonntagbauer 1998.

[6] For similar complaints, see Höcker 1986.

[7] Cooper (1996, 131), for example, quickly dismisses the apparent lack of metrical clarity at Bassae by recourse to the notion of "visual commensurability."

[8] Coulton 1974; 1988, 59 ff.; Tobin 1981.

[9] This step by step approach is mirrored in Vitruvius's (3.5) account of the Ionic order, see Coulton 1975, 69–71; 1988, 66.

[10] Vitr. 5.6.7 and 6.2. Cf. Coulton 1988, ch. 4; Wilson Jones 2000b, ch. 3.

[11] For the state of research on refinements, see Lewis 1994; Cooper 1996, ch. 9; Pakkanen 1997; Haselberger 1999.

[12] E.g., it was common for the architrave to be fractionally

most far reaching modifications stem from the formal conflict inherent in the Doric order, or what Vitruvius called "the faults and incongruities caused by the laws of its *symmetria*."[13] These laws prescribed a whole triglyph where the entablature turns the corner. When the thickness of the architrave-beam is substantially greater than the width of the triglyph, as was usually the case, the corner triglyph established a mutual antagonism between the ideals of a uniform frieze and colonnade (fig. 2,b).[14] A regular column spacing required the frieze to stretch toward the corner, while conversely a regular frieze required the corner columns to contract (fig. 2,c), this being the most favored option.[15] According to Vitruvius, both solutions were "faulty."

An awareness of the potential impact of such modifications constitutes for some scholars an invitation to try to reconstruct a chain of decisions leading back to a simpler hypothetical original conception prior to its modification. Figure 3 shows two types of shift as visualized by Hans Riemann for the Temple of Zeus at Olympia.[16] The shifts he describes, however, arguably characterize not so much a single project, but a compaction of preceding developments, which took place over an extended time. Yet it is not clear whether theoretical goals of the kind that were dear to Vitruvius had even been formulated in the archaic period; at any rate architects were fully absorbed coping with the basics of Doric composition by means of rules of thumb like those already mentioned.

By the second quarter of the fifth century, however, architects had acquired a greater control over the design process. Temple superstructures could be resolved according to a more unitarian conception (as manifest in neater proportions, the anticipation of the column rhythm in the joints of the krepidoma, increased regularity and, with time, greater coordination between peristyle and cella). Evidently rules of thumb and strategies of modification were either amended so as to produce better results, or they were overtaken by a more effective mechanism of control. What form might such a mechanism take? For the fifth century, there are no written sources to assist us (the building inscriptions from Piraeus, Epidauros, and Eleusis date to the mid fourth century or later),[17] so the surviving classical temples themselves must furnish our prime evidence. Interpretations of these temples

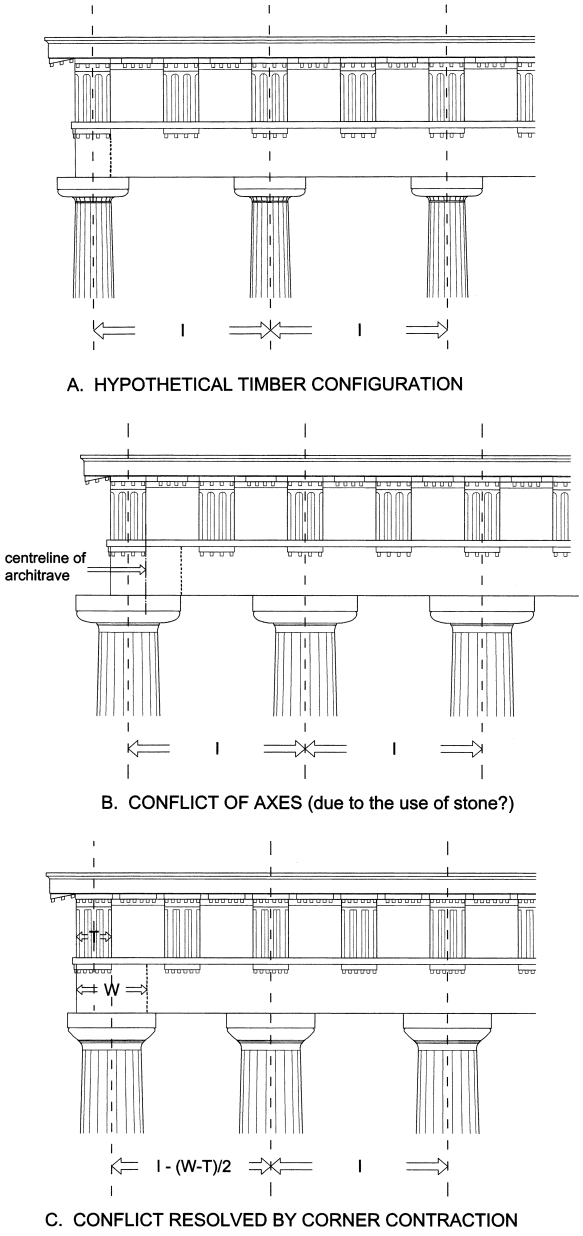

Fig. 2. The Doric corner problem. The typical corner configuration of the classical temple (c) derives from a conflict between the width of the triglyph and the cross-sectional width of the architrave (b), a conflict which might, perhaps, arise from the transposition into stone of a timber prototype (a). (Drawing by the author)

are to some extent subjective, however, so they change with changing perceptions and personal agendas. But while it is well to guard against adopting a partisan position, modern scholarship must be right to

taller than the frieze, likewise the height of the stylobate compared to the steps below. Cf. Seiler 1986, 59, n. 208; Bankel 1984a, Abb. 2 and 3.

[13] Vitr. 4.3.1; Tomlinson 1963.

[14] Riemann 1935, 28–33; 1951, 304.

[15] Gruben 1976, 41–3; Coulton 1988, 60–4; Mertens 1984a, 150–2; Gros 1992, 121–3.

[16] Riemann 1951; cf. 1960, Abb. 1 for a similar treatment of the Hephaisteion.

[17] Höcker 1986, 235.

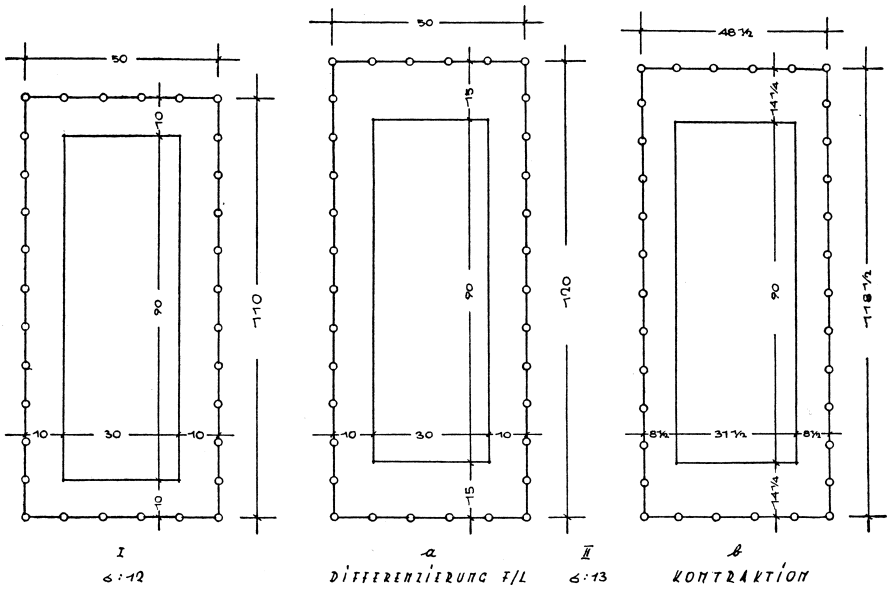

Fig. 3. Analysis of the layout of the Temple of Zeus at Olympia according to Riemann (1951, Abb. 2). A hypothetical regular scheme (I) is first modified for the sake of a more generous peristyle depth at both ends of the building (II, a), and then refined to take account of corner contraction (II, b).

distance itself from the early to mid 20th-century portrayal of Greek architects as master geometers adept at *traces regulateurs*, to use a term adopted by Le Corbusier.[18] The objections then of William Bell Dinsmoor to "intricate geometrical diagrams . . . or the golden section"[19] have since been compounded by doubts that geometrical methods could have coped with processes of modification and, more fundamentally, that architects of the classical period even made extensive use of drawings.[20] As a general rule, ancient architects exploited geometry for resolving details, especially those involving curvature (volutes, moldings, refinements), but not for the composition of whole buildings unless they were concentric or partially concentric in plan (e.g., theaters and amphitheatres). All things being equal, arithmetic was the more convenient, flexible tool and hence the dominant force in facade design.[21]

Following the affirmations of Dinsmoor, selective analyses of Riemann,[22] and the comparative studies of Coulton, current scholarship highlights the importance of arithmetical proportions for both ensembles and discrete elements, a case in point being Dieter Mertens's study of the unfinished temple at Segesta (fig. 4).[23] The facade returns the ratios 9:4 and 10:7, while the frieze embodies the same play of relationships as that specified in the building inscription for the Telesterion at Eleusis many decades later: 10/9 being the aspect ratio of the metopes; 3/5 that of the triglyphs; 3/2 the ratio between the widths of metopes and triglyphs. A coherent set of interlocking proportions is in fact characteristic of Doric entablatures in the classical period, particularly those with the last mentioned proportion. Figure 5 shows the most striking options. But just because we can detect certain proportions does not mean that we understand the processes that engendered them. How did architects know what ratio to assign to which physical limits? Which were more important and which less so? Why are some types of relationship present in

[18] While the heyday for such speculation was the inter-war period, it persisted later, see Bousquet 1952; Koch 1955, 70–81; Tiberi 1964; Brunés 1967; Pannuti 1974; Michaud 1977, appendix 4. For more attention to the constraints of numerical expression and hence a possible strategy for reconciling geometrical and arithmetical notation, see Frey 1992 and Bommelaer 2000, and for outline historiography and further bibliography, see Wilson Jones 2000b, 2–6 and ch. 5.

[19] Dinsmoor 1950, 161.

[20] Coulton 1974, 1975, 1983, 1985, 1988, 51–67, esp. 64; Mertens 1984b, 137. Nor does it seem helpful to extend the use of the term module to embrace geometrical approaches, as do Kurent 1972 and Pannuti 1974.

[21] Wilson Jones 1989b, 129–35; 1993, 429–32; 2000b, ch. 5 and 126–7.

[22] Riemann 1935, 1951, 1960.

[23] Mertens 1984a, 1984b. For general appreciation of the importance of proportion for ancient design, see Riemann 1935, 1951; Coulton 1974, 1975, 1985; Hoepfner 1984; Koenigs 1990; Wilson Jones 2000b.

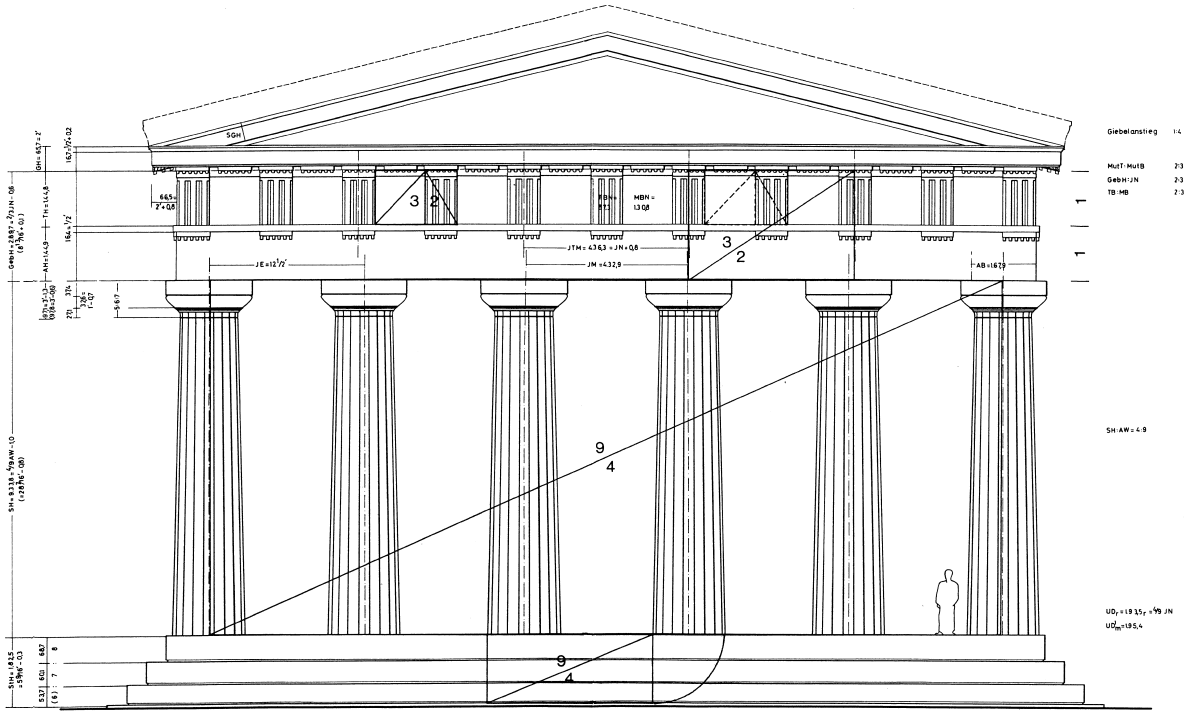

Fig. 4. Proportional analysis of the facade of the unfinished temple at Segesta, 1:200. (After Mertens 1984a, Beil. 24)

some buildings but not in others? How do proportional methods cope with modifications?

In addressing these questions it helps to distinguish between "schematic" proportions and "visual" ones. Schematic proportions are chosen for their neatness more than their beauty; visual proportions encapsulate aesthetic conventions but are not always satisfactory numerically.[24] A representative illustration of the latter is column slenderness. In any one period and geographical area it had a restricted range, and although there is no shortage of exceptions,[25] it was usual to advance slightly with respect to precedent. Ratios between the height and the lower diameter for West Greek temples progress from 4⅓, 4⅘, 4⅗, 4¾, to 4⅝ over the course of the fifth century;[26] simpler ratios of, say, 4, 4½, and 5 are notable by their absence. Of course there is an overlap; visually sensitive indices like entablature proportions may be mathematically simple (fig. 5), and mathematically simple proportions may be beautiful, but this does not vitiate the utility of the distinction.

When composing designs, architects juggled these schematic and visual proportions. For example, it is evident that the proportions of the temple at Segesta's facade (fig. 4) can only have been selected having been checked against the conventions affecting its components, for the column slenderness of 4⅝ fits predictably with the chronological evolution just mentioned. The successive application of certain ratios does not necessarily favor dimensional neatness, and the values obtained by calculation might have to be rounded off to the nearest whole dactyl (the standard 1/16th subdivision of the Greek foot unit). So while at Segesta it seems that design started from the premise of an 80 ft euthynteria and a 64 ft peristyle, the column height was calculated as 4/9 the latter, or 28⅘ ft, and rounded off to 28 ft, 7 dactyls. The typical column spacing worked out as 12 ft, 14 dactyls after allowing for contracted corner bays and a wider central bay, which for its part was tuned to 4/9 the column height, and so on, calculation by calculation. Potential solutions were presumably tested by trial and error until the desired result was achieved, bringing to mind the sculptor Polykleitos's maxim: "perfection was achieved gradually in course of many calculations."[27] Only occasionally, as in the case of

[24] This distinction is anticipated in Claude Perrault's late 17th-century contrast between abstract and customary beauty, see Herrmann 1973.

[25] Coulton 1979, 1984; Bommelaer 1984b.

[26] These ratios apply respectively to the columns of the following temples: those of Poseidon at Paestum, Athena at Syracuse, Juno Lacinia, and Concord at Agrigento, and the unfinished temple at Segesta.

[27] As translated by Marsden 1971, 107; cf. Pollitt 1974, 15.

the Hephaisteion, were architects able to achieve unified proportions in terms of both the whole and the parts.[28]

This iterative pursuit of perfection via proportional calculations and modifications, ever filtered by rules of thumb, the respect for precedent, and visual acuity, is certainly plausible in both analytical and historical terms. Nonetheless, it remains a remarkably contorted means of guaranteeing the reproducibility highlighted at the beginning of this article. So the door remains open to other strategies, providing they can cohabit with proportional relationships like those just described.

THE MODULAR HYPOTHESIS

My examination shows that from the second quarter of the fifth century B.C. many Doric temples were designed according to a method that was compatible with proportional manipulation, and yet better suited to both the pursuit of consistency and the very nature of the Doric order: a method based on modular principles. Vitruvius (*De arch.* 4) famously described the design of the Doric temple in modular terms, and modern specialists have enjoyed partial success inducing metrical units for individual buildings. The starting point for such research is usually Vitruvius's derivation of a module by dividing the width of the stylobate.[29] But a design module is more than an abstract metrical entity. Written sources—Vitruvius included—testify that Greek architects associated such modules with the width of physical elements, whether of the hole for the main spring in catapults,[30] columns, column bases, or plinths (cf. fig. 1).[31] Physical modules like these confer practical advantages since they correspond to serially repeated building components, and it is well to qualify analyses which do not take this lesson to heart. Published modules are often not modules in this sense but more akin to abstract units of measurement.[32]

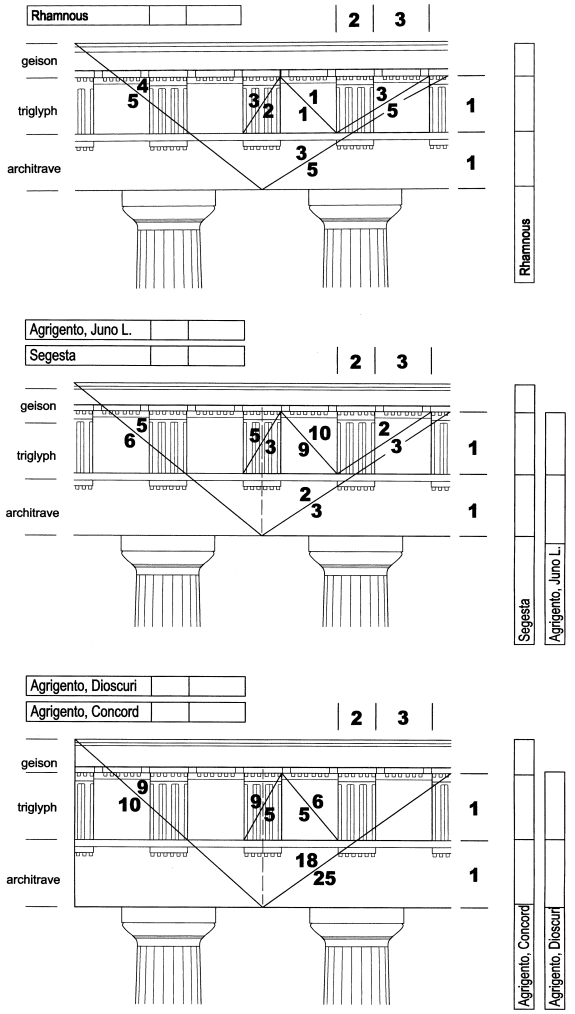

Fig. 5. The proportions of Doric entablatures of the classical period: three ideal schemes each including a 3:2 relationship between metope and triglyph and a 1:1 relationship between the heights of architrave and frieze. The comparative dimensions for actual temples shown alongside are based on a common triglyph width. The middle set of proportions is also documented by the inscription relating to the construction of the Telesterion at Eleusis. (Drawing by the author)

[28] Particularly striking is a 1:3:3:6 sequence between the width of a typical bay, the height of the order, the external width of the cella, and the width of the euthynteria. The bay can then be approximately divided by 5 to give the height of the wall blocks (each proportioned height:depth:length as 2:3:5), this in turn being approximately equal to the capital height and the width of the triglyphs, 1/2 the lower column diameter, 2/3 the upper column diameter and the width of the metopes, and 3/2 the height of the steps. For the actual measurements see the appendix, no. 2.

[29] Vitr. 4.3.3–7; Knell 1985, 85–95. Cf. Moe 1945; De Zwarte 1996. Waddell's (forthcoming) recent derivation of a module equivalent to one triglyph width from the width of the krepidoma will be discussed below in the section on the plan.

[30] As specified by Philon of Byzantion in his *Belopieca*, see Marsden 1971, 107–15. Vitruvius (1.2.4) also mentions physical features of artillery and ships, and "in other things, from various members." Cf. 10.10, 10.11.

[31] See Coulton 1989, esp. 86, including the attractive proposal that the term *embates* or *embater* (Vitr. 1.2.4 and 4.3.3, but otherwise unattested, see Gros 1992, 127–8; Corso and Romano 1997, 1:84, n. 157; 465, n. 133), could refer specifically to the square slabs of gridded stylobates like those illustrated in fig. 1.

[32] Coulton 1989, 87. For examples of modules/units understood in the more abstract sense, see Knell 1973, 114; Koenigs 1979; Bankel 1984a; De Zwarte 1996; Höcker 1986, 1993.

Some scholars recognize the frieze as a determinant of Doric design, and Wolf Koenigs has predicated his analyses on the assumption that the widths of triglyphs and metopes should be capable of being expressed neatly in terms of modules/feet.[33] But it is necessary to go further; I see the triglyph as the basic module for the Doric temple from around the middle of the fifth century B.C., if not a couple of decades or so earlier. This is both a new idea in as much as it goes counter to modern scholarship, and a very old one—for it is directly adapted from Vitruvius. As just mentioned, he divided the stylobate width to yield a module, and then assigned its multiples to major elements of the facade, including one module for the triglyph width. Not only is this the only element of the plan which is one module wide, but Vitruvius links modules, proportions, and triglyphs in two important passages.[34] I suggest that he inverted the chain of command, and that the triglyph was the real progenitor of the system.[35]

Enrolling the support of Vitruvius is not without its difficulties. The Greek sources he relied on date mostly from the late fourth to the second centuries,[36] so it is understandable that his detailed recommendations hardly match the realities of fifth-century design. Most notably, he sanctioned much more slender proportions, three rather than two triglyphs per bay, and the anathema—to Greek architects—of the frieze ending in a half metope.[37] So was the modular system another later contribution? Silvio Ferri believed so, calling it an arid creation of theoreticians who, long after the heyday of the Doric temple, wished retrospectively to set down a perfect model they knew never actually existed.[38] Vitruvius and his Hellenistic masters were guilty of pointless digressions on how things ought to have been.[39] Apart from a minority enthusiasm for modular design (applied to everything from Stonehenge to Roman town planning),[40] the method is widely disparaged as a mechanical, almost mindless, strategy, one at odds with the free workings of artistic genius and hence the excellence of Greek architecture—an antithesis to "real" design.[41] Burckhardt Wesenberg, the author of numerous punctillious examinations of Vitruvius and his sources, briefly dismisses the possibility that the Greeks themselves used modular methods for whole buildings, admitting it only for details such as the Ionic capital.[42] Those who accept modular design do so only for the fourth century or somewhat later. It is thought to be "possible to establish with some probability that a modular system was not used by Greek architects, at least before the late Hellenistic period."[43] Coming from Coulton, the scholar who perhaps has done more than anyone to crystallize contemporary thinking about Greek design processes, these words cannot be discarded lightly. Yet the following analysis shows a real possibility that, discounting inevitable distortions, Vitruvius perpetuated a practice originating in the classical era.

While modules are generally seen to be less malleable than proportions, this is not necessarily true. Any mathematical strategy is only as flexible as designers allow it to be. As is clear from Vitruvius's account, modular terms were not confined to integral values; fractions based on halves, thirds, quarters, fifths, sixths, and so on are also legitimate, albeit progressively less appealing as the terms increase.[44] The key words for modular design are *method* and *principle*: a method implies the intelligent pursuit of improvement; principles are elastic.

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[33] Koenigs 1979.

[34] Vitr. 1.2.4 and 6.3.7. The former is cited here in the conclusion; the latter concerns the use of Doric in (Italian) residential buildings: "if the columns of the peristyle are to be made in the Doric manner, use the modules just as I have described them in the fourth book for Doric temples and place the columns according to those modules and the proportions of the triglyphs." (trans. Howe and Rowland 1999).

[35] Vitruvius's approach has been championed before, notably in Moe's book *I numeri di Vitruvio* (1945), but Moe was primarily concerned with modules derived from the column diameter, an interpretation that has been ignored for the simple reason that it does not hold up to scrutiny. Moe's analysis embraces triglyph widths only in those buildings where this measure is half the column diameter or thereabouts, as in the case of the Hephaisteion. His work is also marred by an overemphasis on the number 27 and a bias toward geometrically inspired elevations.

[36] Gros 1978; Wesenberg 1983, 1984, 1996.

[37] The introduction of three triglyph bays seems to have taken place in stoas earlier than it did in temples, see Coulton 1976, 114–6. For a rare instance of the Vitruvian solution at Hadrian's Villa see Rocco 1994.

[38] Ferri 1960, 160: "come è vizio costante di tutti i teorici, essi hanno volentieri . . . dettato le leggi del perfetto tempio dorico che essi ben sapevano nessuno avrebbe mai costruito." Even more negative is the concluding sentence of Falus's study (1979, 270): "Celui qui examine les proportions et les principles de construction des temples grecs, n'a qu'une chose à faire, notamment à oublier tout ce qu'il venait de lire chez Vitruve."

[39] Ferri 1960, 161.

[40] Kurrent 1972, 1977.

[41] For representative comments in this vein, see Koch 1955, 80.

[42] Wesenberg 1994, 96; cf. Coulton 1989, 87.

[43] Coulton 1988, 66; cf. 1975, 68; 1989, 86. For the use of Vitruvian methods in the first century, see Étienne and Varène 1995. On the other hand, Koenigs (1979) entertains a late fourth-century date for his interpretation of modular method. Cf. Mertens 1984b, 144.

[44] Vitr. 4.3.4–7 (for a convenient list see Knell 1985, 88); 10.10.1–5; 10.11.4–9. Fifths are not used by Vitruvius but they are repeatedly by Philon, see Marsden 1971, 113.

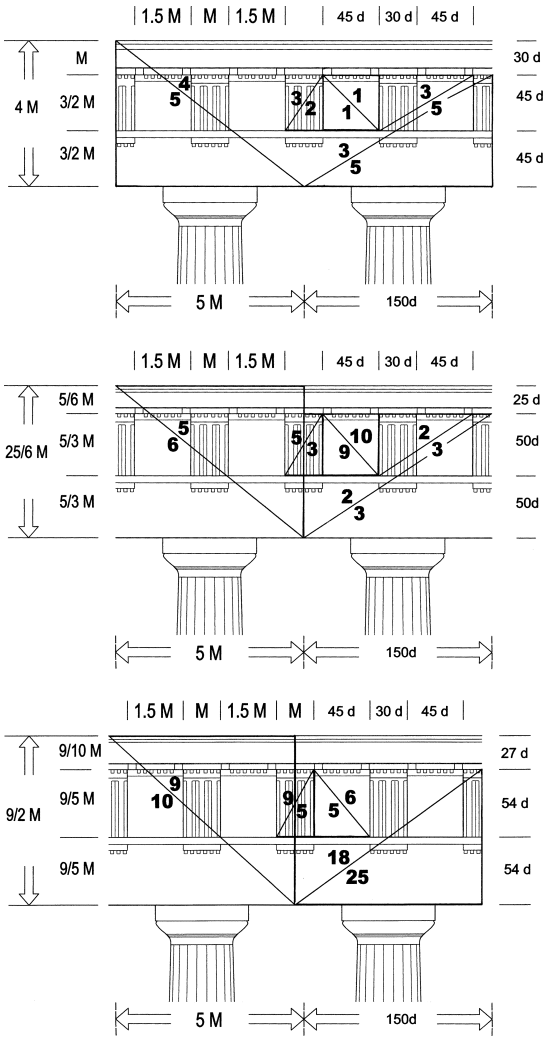

Fig. 6. The entablature schemes identified in the preceding figure analyzed in terms of modules (M) equal to the width of the triglyph. Assuming that the triglyph width was set at a multiple of 5 dactyls (d), in this case 30 dactyls, similarly convenient whole numbers of dactyls automatically follow for all major dimensions. (Drawing by the author)

In this analysis of modular design, I examine 10 generically similar and relatively well preserved Doric temples with hexastyle fronts and with metopes one-and-a-half times as wide as the neighboring triglyphs. My prime concern has been comparability, to ensure that the results pertaining to any single temple are neither fortuitous nor misleading.[45] The temples discussed here are those of Zeus at Olympia, Hephaistos at Athens, Apollo at Bassae, Poseidon at Sounion, Nemesis at Rhamnous, the Athenians at Delos, "Juno Lacinia," "Concord" and "the Dioscuri" at Agrigento, and the unfinished temple at Segesta. The chronological span, beginning with the Temple of Zeus at Olympia, reflects the reduced likelihood that modular principles had wide currency much earlier, while the cut-off point at the start of the fourth century reflects the relative willingness of scholars to accept this kind of interpretation for later periods in any case. The insistence on the canonic, Vitruvian, metope:triglyph width ratio of 3:2 derives from the fact that this relationship enhances metrical resonance by virtue of its correlate, a 5 triglyph module width for the bay, the typical column spacing measured at the axes (fig. 6). Significantly, it is clear that the bay width came into ascendency as a critical design constraint (supplanting the stylobate width in the hierarchy of design intentions) around the second quarter of the fifth century; the Temple of Zeus is in fact a key witness to this shift.[46] This also is a time when the work of Greek architects exhibits a more definite interest in abstract ordering principles.[47]

Emphasis is placed here on the end facade rather than on either the flanks (which are less easy to compare since they had varying numbers of columns) or the plan. A general awareness exists that the design of Doric temples tends to work from outside in, but there also is good reason to categorize the Doric temple as a "facade-driven" design, as distinct from "plan-driven" typologies (e.g., the theatre, the stadium, and Ionic temples of the Hellenistic period).[48] In other words, the typical Doric temple plan was organized to accommodate, over and above its other functions, a canonic frontage. One symptom is the relative heterogeneity of plan solutions; various options existed for positioning the cella, and for apportioning the pronaos and opisthodomos. And ultimately the adjustments to the plan associated with the corner problem only make sense as devices to obtain the desired elevation. For these reasons plans will be reviewed only after scrutiny of the facade is complete, and then only in sufficient depth to gauge if similar principles are likely to apply to them too.[49]

[45] Coulton 1974, 61.

[46] Riemann 1951, 304; Coulton 1974, 74.

[47] The Oympieion at Agrigento is a case in point, see Bell 1980.

[48] For this distinction, see Wilson Jones 2000b, 64–5.

[49] This focus on facades has the added advantage of reducing the number of measurements examined. Many of the limits of probable importance present options: for example, was the entablature height conceived as excluding or including the geison and/or the kyma? By omitting the plan we can avoid having to ponder similar choices relating to the width and length of the cella and its different compartments. It is also helpful to concentrate on relatively well preserved and documented buildings, because this minimizes gaps in the measurements available. The reconstructions at Delos and Rhamnous are relatively reliable; however, it is frustrating to work with

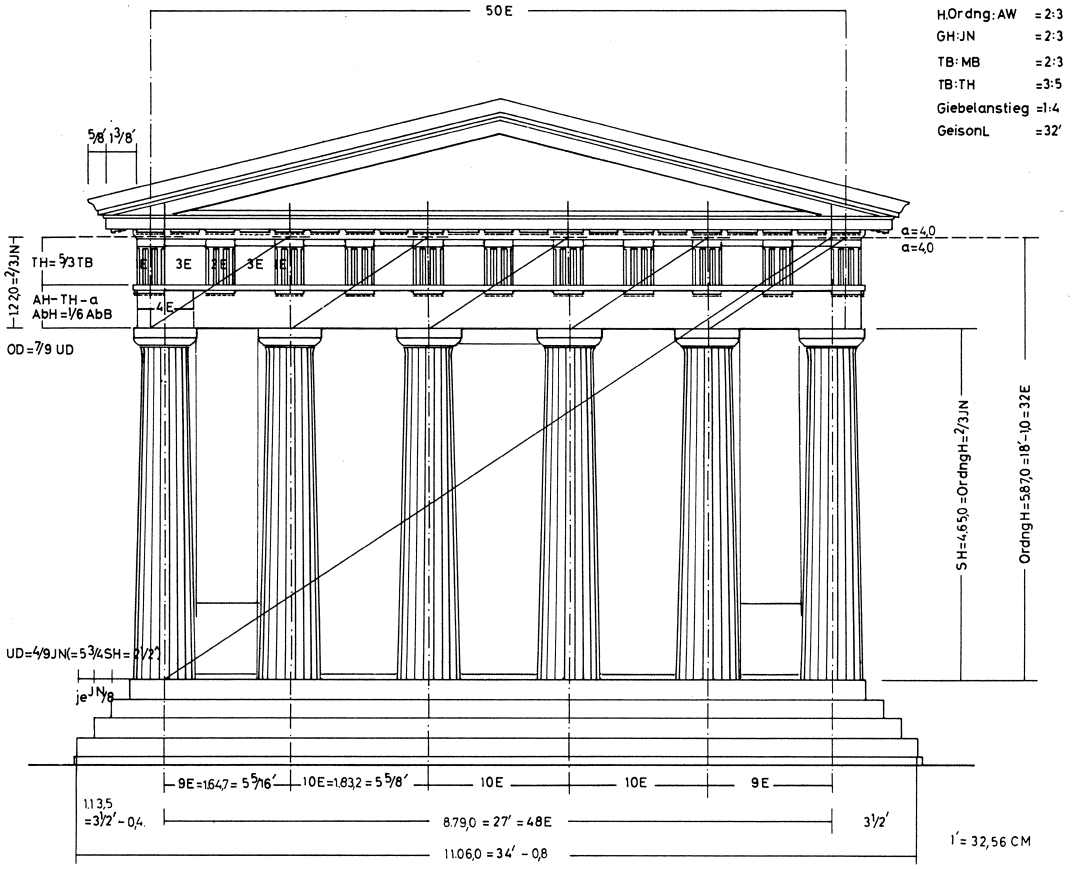

Fig. 7. Proportional and modular analysis of the facade of the so-called Temple of the Athenians, Delos, according to Mertens (1984a, Abb. 80), 1:100. Mertens's module "E" corresponds to half the triglyph module proposed here.

I advocate the following procedure for appraising individual temples:

1. Take the actual average triglyph width.
2. Establish if there is a proximate unit that divides 5 times into column bays as well as neatly into other important limits in both plan and elevation; the unit that returns the neatest pattern is a potential design module.
3. Check that schematic proportions relating to the facade as a whole can be conveniently expressed using such a module.
4. Check that the module corresponds to a dimension that can be expressed in terms of known feet and/or dactyls, the simpler the better.
5. Review smaller-scale components of the facade to see if they can be conveniently expressed in modules.
6. Review the plan likewise.

The temple the Athenians built on Delos around 425 B.C. (fig. 7) will be used to illustrate this procedure:

1. The triglyph width is 370 mm.
2. A module (M) close to this, of 366 mm, divides into the axial width of the peristyle 24 times, the column spacing 5 times and the height of the order (excluding the geison) 16 times. The discrepancies between the values thus calculated and those actually measured amount to 0, 1, and 10 mm respectively (appendix, no. 5).
3. As Mertens has shown, using a module half the size of the one proposed here, salient proportional relationships can be recast in such modules.[50] The 2:3 ratio between the height of the order and the peristyle width translates as 16 M:24 M; the 2:3 relationship between the entablature height (excluding the gei-

measurements that are not secure, and it may be noted that in both cases an improved pattern would be returned by slightly different column heights (12⅖ M rather than 12⅔ M at Delos; 11 M rather than 10¾ M at Rhamnous).

[50] Mertens 1984a, 220–7; Bommelaer 1984a.

son) and the typical column spacing translates as 3⅓ M:5 M; the 1:5 relationship between the entablature height (excluding the geison) and the total height of the order (including the geison) translates as 3⅓ M:16⅔ M; and of course the 2:3 relationship between the width of the triglyph and that of the metope translates as 1 M:1½ M.

4. The proposed module equals 20 dactyls or 1¼ Attic feet, as well as 18 dactyls or 1⅛ Doric feet, both of these being eminently plausible candidates for the unit used for construction.
5. Several smaller dimensions are modular, including the corner bay (4½ M), the entablature height (4 M), and the depth of the architrave (2 M).
6. Likewise several elements of the plan are modular; for example, the interaxial length of the peristyle is 44 M.

The Athenians' temple, with its amphiprostyle plan and Ionic traits, might be considered a unicum.[51] Yet similar modular patterns can be found in normal Doric peripteral temples of an earlier date—provided the key 2:3 frieze rhythm and 5 module bay widths are present. Perhaps the mathematical neatness of the 5 module bay encouraged architects to instill similar patterns—that is to say modular patterns—in entire facades. Entablature schemes like those illustrated in figure 6 are proof that numerical harmony can be expressed equally well in terms of proportions and triglyph modules; no doubt the modular approach rose to prominence in large part because this was so. Speculation as to the date when this occurred follows in due course; for the moment it is enough to observe that this development possibly had taken place by the time of the earliest building in the present group, the Temple of Zeus at Olympia. The typical bay measures 5 M wide and 10 M tall, while whole modules are used for the height of the entablature, 4 M, and that of the order, 14 M (appendix, no. 1). Modular patterns, however, are not sufficiently clear to defeat criticism (the krepidoma, for example, seems to evade any such definition), and all the later temples examined respond more positively to the procedure just described, save perhaps for the Temple of Concord at Agrigento.[52] But rather than argue the case for each of the 10 temples in turn, their analyses are presented in the appendix and most of them summarized graphically in figure 8; the quest here is to identify the general principles in common.

THE ANALYSIS OF HEXASTYLE TEMPLE FRONTS

Limits of Width

The main limits of the plan, working inwards, are the overall width (measured either at the euthynteria or the bottom step of the krepidoma, which rests on it),[53] that of the stylobate, and that of the peristyle, measured axially. Architects appear to have assigned whole numbers of triglyph modules to one or two of these limits, presumably gauging the remainder on the basis of the chosen column diameter and other considerations of detail (table 1).[54]

Table 1. Salient Modular Limits of Width

Temple	Overall Width	Width of Stylobate	Axial Width of Peristyle
With a three step krepidoma			
Olympia, Zeus	**29**?	26½	24⅛
Bassae, Apollo	**30**	27½	**25**
Athens, Hephaisteion	**30**	26¾	24½
Sounion, Poseidon	29⅗	26⅕	**24**
Rhamnous, Nemesis	**30**	26⅛	**24**
Segesta, unfinished	**30**	26½	**24**
With a four step krepidoma			
Agrigento, Juno	**32**	27½	**25**
Agrigento, Concord	**32**	27½	**25**
Agrigento, Dioscuri	**32**?	**27**	24⅖
Delos, Athenians' Apollo	30¼	26½	**24**

[51] Bommelaer 1984a.

[52] The actual triglyph width here is considerably larger than the proposed module (although this is not an insuperable obstacle, as will be argued below), while there are no obvious modular patterns either on the long side of the peristyle or in the layout of the cella.

[53] As qualified for each entry in the appendix.

[54] Whole number values are shown in bold throughout the tables.

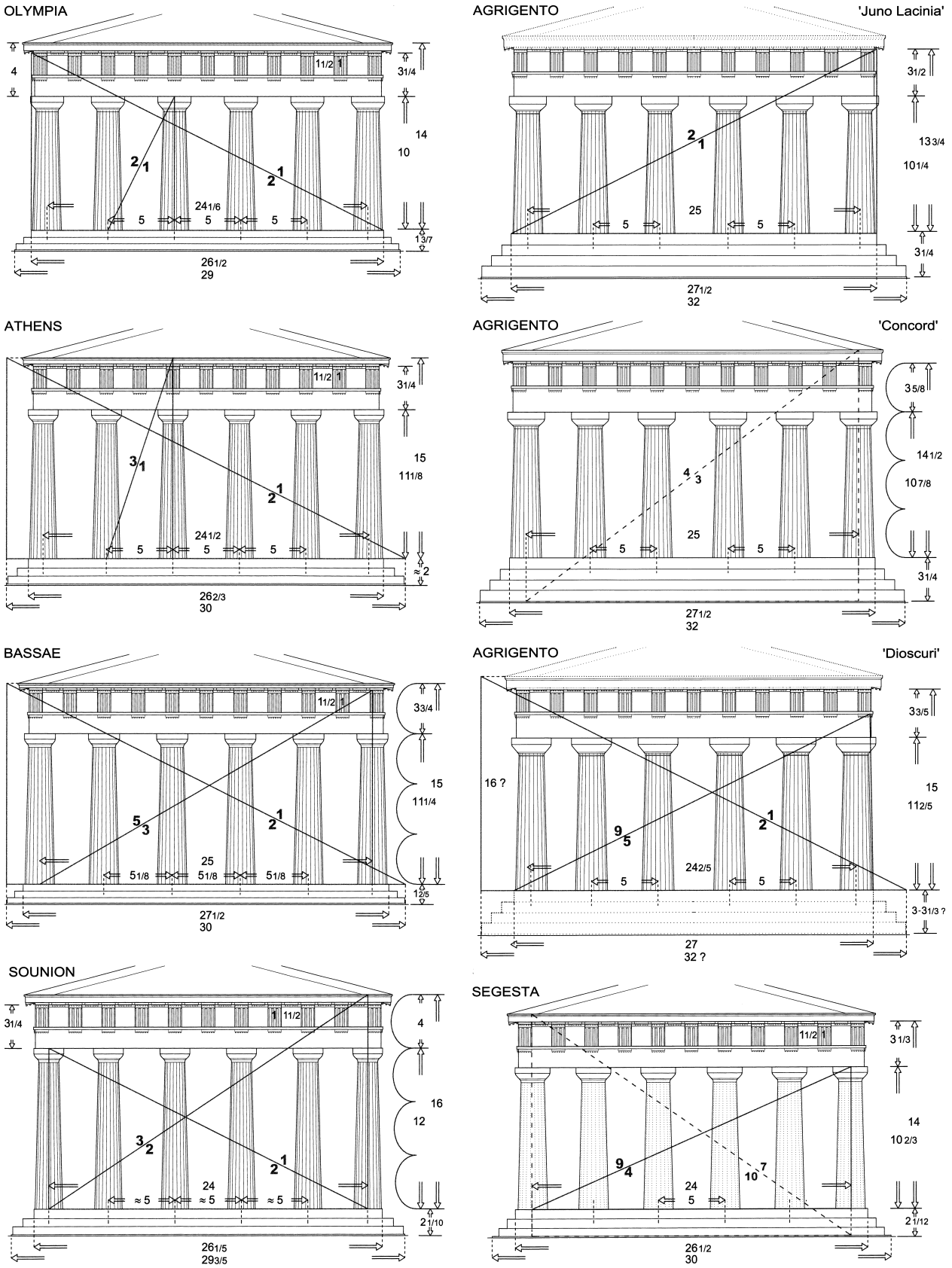

Fig. 8. Modular interpretation of eight Doric temple facades of the classical period. Each facade is scaled to a common triglyph width or module of 1 unit. (Drawing by the author)

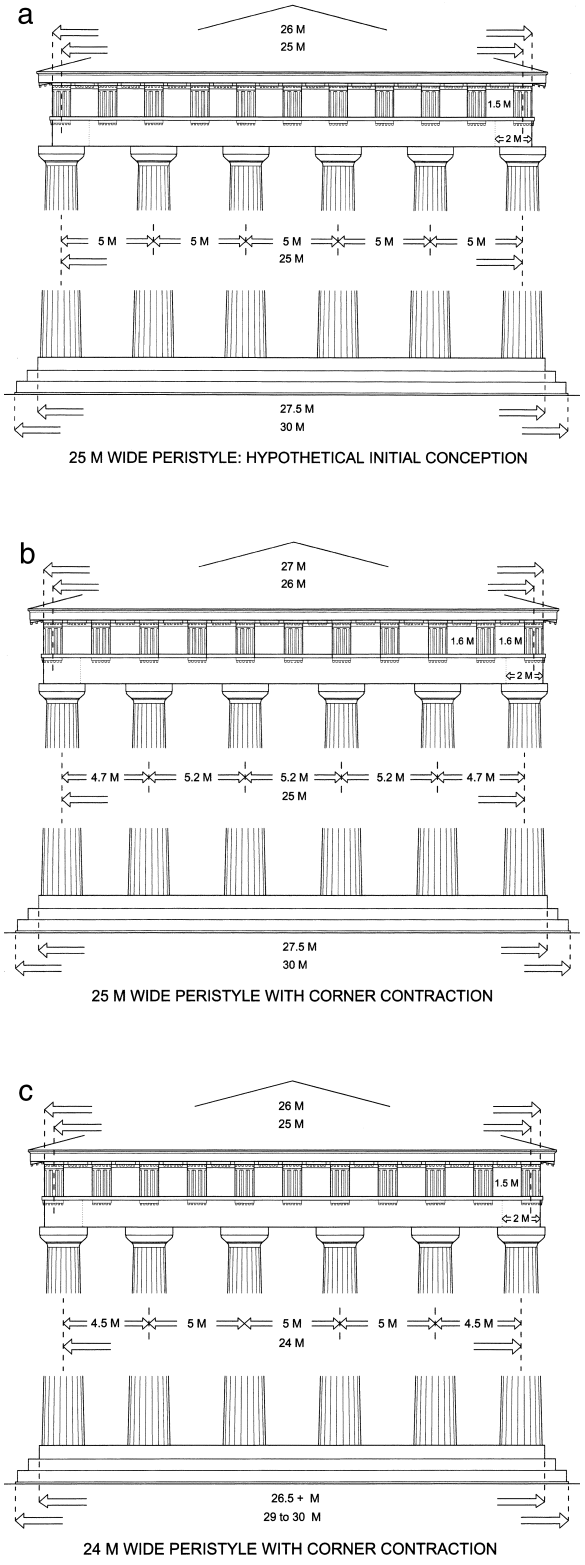

Fig. 9. The two most popular modular schemes for Doric temple facades, one with an axial peristyle width of 25 modules (b), the other with an axial peristyle width of 24 modules (c). Both can be derived from a hypothetical ideal conception based on regular bays 5 modules wide without corner contraction (a). (Drawing by the author)

The starting point for the krepidoma of a temple with three steps was often an overall width of 30 modules, while 32 was preferred for those with four. Alternatively, or at the same time, the axial width of the peristyle was typically made a whole number, either 24 or 25 modules. These options signal different approaches toward the corner problem. In the latter, the 25 module axial width of the frieze was simply transferred to the peristyle, a solution which had a theoretical appeal in so much as 25 M equals 5 bays of 5 M (fig. 9,a). This, however, took no account of corner contraction, which then forced the typical bay to exceed 5 modules by around 1/5 (fig. 9,b). Conversely, a 24 M peristyle anticipated corner contraction and allowed the typical column spacing to remain either exactly or close to 5 modules (fig. 9,c). At Delos this solution was obtained exactly, whereas at Sounion and Segesta the chosen contraction created discrepancies of a dactyl or two. At the Hephaisteion, on the other hand, a value of 24½ M combined with 5 M normal bays and relatively mild contraction.

Although the width of the stylobate frequently corresponds to half number values (26½ and 27½ M), that fact that whole numbers are rare suggests that this limit was usually a subordinate consideration, in contrast to archaic practice when it represented a fundamental constraint.[55] On occasions, however, as at the Temple of the Dioscuri at Agrigento, the stylobate width could be important and it is interesting to note that the number of modules used here, 27, is the same as that which Vitruvius would have used for such a design.[56] Whether the prime consideration was the peristyle or stylobate, the difference between their width is often 2½ M, an amount that allowed for the popular column diameter of around 2¼ modules, plus the oversail between the columns and the edge of the stylobate.[57]

The tolerances between predicted values and their real counterparts are small; those for the whole number values (e.g., 25 or 30) listed in table 1 are frequently less than 1 cm, and only on two occa-

[55] Riemann 1951, 295, 302; Coulton 1974; 1988, 59–60.

[56] Vitruvius actually divides the stylobate of a hexastyle temple into 29½ parts, but this assumes a wider central bay with three sets of triglyphs (i.e., 7½ M). Deducting the difference between 7½ M and 5 M yields 29½ M - 2½ M = 27 M. Cf. Moe 1945, esp. fig. 27. For the possibility that the Temple of Aphaia has a 27 M wide stylobate, see below.

[57] This value of 2¼ M may have been conceived as 2⅔ M on some occasions, by virtue of which the diameter equals 4/9 of a 5 M column spacing. By contrast, at Aegina, Athens, and Sounion the conceptual column diameter is likely to have been 2 M, even if this value is not precisely matched in reality.

Table 2. Salient Modular Limits of Height

Temple	Height of Order inc. Geison	Height of Order exc. Geison	Height of Column
Mainland and islands			
Olympia	**14**	13¼	**10**
Athens	**15**	14⅜	11⅛
Bassae	**15**	14⁷⁄₁₂	11¼
Sounion	**16**	15¼	**12**
Rhamnous	14¾	13¾	10¾
Delos	16⅔	**16**	12⅔
Sicily			
Agrigento, Juno	14¾	13¾	10¼
Agrigento, Concord	15½	14½	10⅞
Agrigento, Dioscuri	**16**	**15**	11⅖
Segesta	14¾	**14**	10⅔

sions do they exceed 3 cm. A notional mean error lies somewhere between 1 and 1½ cm, that is to say less than 0.1% or one in 1,000 compared with the average of the distances involved (ca. 15 m).[58] As might be expected, tolerances tend to be smaller for well preserved marble buildings, and larger for poorer preserved ones in humbler material.

The devil's advocate might object that the 2:3 triglyph:metope rhythm necessarily generates a total frieze width of 26 triglyph modules, and hence a peristyle width (measured at the column axes) in the region of 24 to 25 M. But the design of the krepidoma was an independent issue, and there is no reason, deliberate intention apart, why its width should so frequently match either 30 or 32 M.[59] This width measurement suggests that a modular conception could embrace the very first course of construction above the foundations, at the same time as furnishing one of a series of "proofs" in favor of the present proposals.

Limits of Height

In terms of modular simplicity the height of the order, measured either including or excluding the geison, usually took precedence over the column height, as shown in table 2. When the pediment and the flanks were capped by a terra-cotta kyma, it seems that it was excluded for metrical purposes, whereas if the kyma was made of marble it was more likely to be included.[60]

Other significant measures could be the height of the order plus krepidoma, the height of the order plus pediment, or the total height (i.e., order plus krepidoma plus pediment). Although there are instances of neat modular values in this last respect, definite patterns cannot be discerned since only about half of these buildings are preserved up to the peak of the pediment, and in some of them the total height converges only approximately on round numbers.[61] Furthermore, where the kyma is lost it is difficult to be sure if it was included in the

[58] Individual tolerances are given in the appendix. Those relating to the axial width are 6 mm (Bassae), 3 mm (Hephaisteion), 13 mm (Segesta), 10 mm (Juno), 24 mm (Concord), ca. 2 mm (Rhamnous), and 0 mm (Delos). It should be borne in mind that the modules proposed in each case represent my best guess; only a 1 mm error for a module would generate a discrepancy of ca. 2½ cm. In addition, there are no doubt numerous occasions when I have not been able to identify deviations that are caused not by error but by deliberate minor adjustments or rounding off to whole dactyls, as suggested in my reading of the plan at Sounion below.

[59] It might be argued that a 30 M overall width could have been generated by proportional calculation (30 M is 6/5 × 25 M and 5/4 × 24 M), but there is no clear proportional explanation for combinations like 30 and 24½ M or 32 and 25 M. Alternatively it might be argued that the use of the column number rule to set out the krepidoma, coupled with the decision to make 1/6th of its width equal to the typical column spacing, and this in its turn equal to 5 triglyph widths, necessarily generated overall widths of 30 M. Such a procedure, however, is less likely to result in simple measurements for the nominal triglyph widths than if these were the starting point. Nor does it is explain the choice of 32 M in the Sicilian examples. And since there is no reason why rules of thumb should lead to the same neat result, it is furthermore significant that the projection of the euthynteria relative to the axes of the peristyle was frequently and accurately defined by jumps of whole or half modules. The overall width less the peristyle width is 5 M at Bassae (with a tolerance of 2 mm), 5½ M in the Hephaisteion (tolerance 15 mm), 6 M at Segesta and Rhamnous (tolerances 17 and 1 mm, respectively), and 7 M at Agrigento, in Juno Lacinia and Concord (tolerances 9 and 10 mm, respectively).

[60] At Rhamnous the entablature measures 4 M including the kyma. At the Temple of Concord it seems possible that the (lost) kyma conspired to make the total height of the order 16 M, i.e., half the 32 M overall width.

[61] At Bassae, for example, the total height of the building exceeds 20 M by a substantial 8 cm or so.

Table 3. Modular Relationships between Limits of Width and Height with Reference to Width of Peristyle

Temple	Axial Width of Peristyle	Height of Column	Height of Order inc. Geison	Height of Order exc. Geison	Height of Facade exc. Pediment	Ratio
Bassae	**25**	–	**15**	–	–	5:3[a]
	25	11¼	–	–	–	20:9[b]
Sounion	**24**	–	**16**	–	–	3:2[c]
	24	**12**	–	–	–	2:1[d]
Delos	**24**	–	–	**16**	–	3:2[e]
Agrigento, Concord	**25**	–	–	–	18¾	4:3[f]
Segesta	**24**	–	–	**14**	–	12:7[g]
	24	10⅔	–	–	–	9:4[h]
	24	–	–	–	16⅘	10:7[i]

Note: Tolerances cited are as follows:
[a] 34 mm (13.231 m × 3/5 = 7.939 m versus 7.973 m).
[b] 5 mm (13.231 m × 9/20 = 5.954 m versus 5.959 m).
[c] 21 mm (ca. 12.320 m × 2/3 = 8.213 m versus 8.192 m).
[d] 20 mm (ca 12.320 m/2 = 6.160 m versus 6.140 m).
[e] 10 mm (8.79 m × 2/3 = 5.860 m versus 5.870 m).
[f] 16 mm (15.427 m × 3/4 = 11.570 m versus 11.554 m).
[g] 33 mm (21.030 m × 7/12 = 12.268 m versus 12.235 m).
[h] 9 mm (21.030 m × 4/9 = 9.347 m versus 9.338 m).
[i] 6 mm (21.030 m × 7/10 = 14.721 m versus 14.717 m).

design height or not.[62] It is nonetheless clear that the krepidoma height was typically not assigned a whole number of modules, which suggests it was primarily determined by conventions governing the height of the steps.[63] In fact the steps were tied to human scale and could not simply increase or decrease like the rest, so a big temple has a relatively low krepidoma and a small temple a relatively tall one. The pediment, too, often does not correspond to a simple modular expression. I suspect that it was more important for the combined height of krepidoma and pediment to make a whole or half number of modules.[64]

Modulated Proportions

It is highly significant that modular dimensions tend to complement salient schematic proportions. For example, in both the Hephaisteion and the temple at Bassae the 2:1 relationship between the overall width and the height of the order is expressed with didactic clarity in terms of modules, 30:15.[65] The peristyle width was usually a more important reference, however; it might relate to the height of the order including the geison, to the height of the order excluding the geison, to the height of the columns, or possibly even to the height of the whole facade excluding the pediment (table 3). On other occasions the width of the stylobate was important. This could be simply related to the height of the order excluding the geison or the height of the column (table 4).

Schematic proportions also influenced the design of the bay. As is well known, at Olympia the column height is twice the bay width, 10 and 5 M respectively.[66] Otherwise the entablature was included in this type of relationship on the front and/or the flank, either measured with or without the geison (table 5).

[62] A case in point is the temple at Segesta, where a total of 21 M including the kyma may be conjectured given that this particular value corresponds to 3/2 the height of the order, 7/8 the width of the peristyle, and 7/10 the width of the euthynteria.

[63] In addition, convention demanded that the step formed by the stylobate was taller than the steps below, and this may have caused departures from modular values that otherwise would have been simple. At the Hephaisteion, for example, the height of two lower steps are on average 344 mm tall, suggesting that the notional height of the krepidoma is 3 × 344 mm or 1032 mm, which exceeds 2 M (1027 mm) by just 5 mm.

[64] In temples with a three step krepidoma the sum of these heights is 5 M at Olympia, 5½ M plus 1 dactyl at the Hephaisteion, 5 M plus 2 dactyls at Bassae, 5 M less 2 dactyls at Sounion, 5½ M at Segesta. In temples with a four step krepidoma the same sum produces 6½ M at Agrigento (Concord) and 7 M at Delos.

[65] The tolerance between the ideal 2:1 ratio and the executed value is 10 mm at the Hephaisteion (15.420 m/2 = 7.710 m versus 7.700 m), and 34 mm at Bassae (15.874 m/2 = 7.937 m versus 7.903 m). The same relationship, this time expressed as 32 M to 16 M, can be reconstructed for the Temple of the Dioscuri at Agrigento assuming it to have had a 32 M euthynteria width like its predecessors, the temples of Juno Lacinia and Concord.

[66] This same 2:1 proportion appears approximately and unaccompanied by whole numbers of modules at the Temple of Juno Lacinia (and also at the Temple of Aphaia at Aegina).

Table 4. Modular Relationships between Limits of Width and Height with Reference to Width of Stylobate

Temple	Width of Stylobate	Height of Order exc. Geison	Height of Column in Modules	Ratio
Olympia	26½	13¼	–	2:1[a]
Agrigento, Dioscuri	**27**	**15**	–	9:5[b]
Agrigento, Juno	27½	13¾	–	2:1[c]
Athens	26⅔	–	11⅛	12:5[d]
Bassae	27½	–	11¼	22:9[e]

Note: Tolerances cited are as follows:
[a] 40 mm (27.680 m/2 = 13.840 m versus 13.800 m).
[b] 15 mm (13.860 m × 5/9 = 7.700 m versus 7.685 m). It may also be noted that the same relationship is seen with a tolerance of just 4 mm at Aegina (13.810 m/2 = 6.905 m versus 6.909 m).
[c] 12 mm (16.930 m/2 = 8.465 m versus 8.477 m).
[d] 5 mm (13.720 m × 5/12 = 5.717 m versus 5.712 m).
[e] 8 mm (14.547 × 9/22 = 5.951 m versus 5.959 m).

Table 5. Modular Relationships for Column Bays

Temple	Height of Order inc. Geison	Height of Order exc. Geison	Typical Column Spacing	Ratio
Bassae	**15**	–	**5**	3:1
Athens	**15**	–	**5**	3:1
Rhamnous, Nemesis	–	13¾	**5**	11:4
Agrigento, Juno	–	13¾	**5**	11:4
Agrigento, Dioscuri	–	**15**	**5**	3:1

Figure 6 highlights the tendency for entablatures to work out neatly in modular terms. In addition, their height could be simply related to the column spacing, the former either including or excluding the geison (table 6).

Alternatively, the entablature height could be related to that of the order. At the Temple of Concord a 1:4 relationship excluded the geison, but otherwise it was more usual for the geison to be included in the calculation. Measured in this way, the entablature height is 1/4 that of the order at Bassae and Sounion, and 2/7 at Olympia. The thrust of all this is that proportions and modules are not inherently hostile: if so desired, both may be tailored in mutual harmony, even when the simplicity of one had to be sacrificed to the other.[67]

Metrology

The next premise (4) of the procedure for identifying triglyph modules holds that candidates should be convenient expressions of units of measure widely used by the Greeks. Exceptions may be admitted, but if this were not the general rule, then the compilation of specifications, works on site, and the provision of materials and skills from outside the immediate locality of each individual project would have been unnecessarily complicated.

Part 1 of this study focused on the anthropomorphic metrological relief from the island of Salamis, only the second known document of its kind after the one in Oxford. Together, these two reliefs confirm the relevance of the following "international" standards: the 294–296 mm "Attic" foot, the 325–328 mm "Doric" foot, and the Egyptian royal cubit of 522–525 mm (which implies the existence of a "Samian" cubit of the same length, and hence a 348–350 mm "Samian" foot).

In addition, the Salamis relief returns a 306–308 mm unit, which could be either a local foot or the "common" foot mentioned by Herodotos. There is also mounting evidence in favor of a 298–300 mm "Ionic" foot, giving a total of five safe havens in a still uncertain environment. Indeed, metrical analyses of Greek buildings frequently point to units other than these standards, as if to negate their universality. It is important to highlight the fact that

[67] At the risk of making too crude a distinction, proportions appear to have had the upper hand at Olympia and Athens, as opposed to modules at the temples at Agrigento and Rhamnous.

Table 6. Modular Relationships for Entablatures

Temple	Height of Trabeation inc. Geison	Height of Trabeation exc. Geison	Typical Column Spacing	Ratio
Olympia (front)	**4**	–	**5**	5:4
Delos	**4**	–	**5**	5:4
Sounion	**4**	–	≃5	≃5:4
Bassae (flank)	3¾	–	**5**	4:3
Agrigento, Juno (both)	–	3½	**5**	10:7
Agrigento, Concord (flank)	–	3½	**5**	10:7
Delos (front)	–	3⅓	**5**	3:2
Segesta (flank)	–	3⅓	**5**	3:2
Rhamnous, Nemesis	–	**3**	**5**	5:3

the recourse to modular practices offers a sort of "escape route" out of this impasse, for the modules used for the design and construction of individual buildings do not have to be full-blooded units of measure—as long as they are related to them.[68] Indeed the present modular hypothesis provides further support for the "international" standards, in so far as triglyph modules frequently convert to convenient expressions of Doric, Attic, or "common" feet (table 7).

The recurrence of 5 dactyl multiples (e.g., 20, 25, 30, 40) is reminiscent of Roman architects' predilection for standardized shaft lengths in multiples of 5 ft, again 20, 25, 30, and 40. Just as in the Imperial period, the size of shafts was a major factor in Corinthian design, one fundamentally bound up with column proportions;[69] this pattern strongly suggests that triglyph modules represented a major factor in Doric design.[70] It also confirms that the Doric foot was recognized over a wide geographical area. The appeal of multiples of 5 may be linked to the fact that this number is one of the bases of Greek counting systems, but it also brings a specific advantage in this context. The web of proportions set in train by the 3:2 frieze rhythm happens to generate denominators of 5 (since 3 plus 2 equals 5), so modules in multiples of 5 units naturally foster commensurability. For example, figure 6 shows how simple dimensions for all the main components of the entablature follow from a triglyph width of 30 (6 × 5) dactyls.[71]

Meanwhile those triglyph modules which cannot be expressed in whole dactyls correspond to fractional multiples of Doric feet, which happen to favor metrical neatness in the buildings in question. Whether or not it is significant that the triglyph module of the Temple of Zeus at Olympia corresponds to 2 Egyptian royal cubits and 3 Samian feet, at 16/5 Doric feet this unit made the 10 M column height, the 5 M typical bay, and the 2½ M width of the capitals respectively 32, 16, and 8 Doric ft. At Segesta a module of 8/3 Doric ft allowed the overall width of the front to be 30 M and 80 ft, that of the peristyle to be 24 M and 64 ft. At Rhamnous the use of a 7/6 Doric feet module made the overall width 30 M and 35 ft, that of the peristyle 24 M and 28 ft (fig. 10). Out of the 10 temples under study, only at Bassae is the specification of a module in terms of feet something of a puzzle.[72]

DETAILED DESIGN

The design of some components of a Doric temple facade was tightly constrained by formal and technical factors. For others there was more latitude for choice, the capital being a case in point; it could be relatively tall or short, for example, with-

[68] Höcker 1993, esp. 45–8. Cf. Hoepfner 1984, 14.

[69] Wilson Jones 1989a; 2000b, 147–8, 155.

[70] Additional triglyph widths are easily accessible in publications, e.g., the 11 West Greek temples treated by Mertens (1984a, Anhänge C, 5) and the 11 assorted Doric buildings at Olympia described in the first volume of the German excavation reports (*Olympia* 1). Mertens's list yields widths that suggest nominal modules that include 50 dactyls, 3 ft (48 dactyls), 45 dactyls, 2½ ft or 40 dactyls, 30 dactyls, and 25 dactyls. Of the Olympia treasures no less than five converge on a single module of 20 dactyls. Although none appear in those examples, multiples of 2½ dactyls may also have been used; for a set of 12½ dactyl wide triglyphs, as defined by mason's marks, see Hoepfner 1984, 22.

[71] Here too is a potential explanation for the frequent occurrence in temple dimensions of multiples of 1/5 M, and not just the fractions 1/2, 1/4, and 1/8. Discounting minor adjustments, the nominal column spacing of the Temple of the Dioscuri at Agrigento is 125 dactyls, while that of the Temple of Juno Lacinia at Agrigento is 150 dactyls; see the appendix, nos. 6 and 8, and Mertens 1984a, Abb. 53, Abb. 70.

[72] A module of 529 mm might correspond to 9/5 Attic feet, 13/8 Doric feet, or perhaps 25 dactyls of a foot of ca. 338 mm, assuming that this might be equated with the 335 mm foot proposed by Cooper (1996, 131), although none of these options is especially convincing. The first produces the most round dimensions for important overall limits, but few at the level of details.

Table 7. Triglyph Widths from Hexastyle Temple Peristyles of the Fifth Century

Temple	Actual Width in mm	Nominal Ideal Design Module			
		mm	Doric Feet and Dactyls	Attic Feet and Dactyls	Common Feet
Olympia, Zeus	1060	1044[a]	3⅕	–	–
Segesta, unfinished	873	876	2⅔	–	–
Agrigento, Juno	614	616	30d	–	2
Agrigento, Concord	641	616	30d	–	2
Bassae, Apollo	535	530	1⅝ = 26d?	1⅘?	–
Athens, Hephaisteion	515	513	25d?	1¾?	1⅔?
Sounion, Poseidon	511	512	25d	–	1⅔
Agrigento, Dioscuri	510	512	25d	–	1⅔
Delphi, Athena	405	408	20d	–	1⅓
Rhamnous	377	381	1⅙	–	–
Delos, Athenians'	370	366	1⅛ = 18d	1¼ = 20d	1⅕

[a] 1044 mm = 2 Egyptian cubits, 3 Samian feet, and 3½ ft of 298–300 mm.

out adversely affecting the conventions bearing on other parts of the elevation. Architects were therefore frequently able to tailor the salient dimensions of capitals (height, breadth, and diameter at the junction with the neck of the shaft) to harmonize with other parts of the order, in particular the lower diameter of the column and/or the widths of triglyphs and metopes. A virtually identical set of neat proportions characterizes the Hephaisteion and the temple at Sounion, as summarized in table 8.

Put another way, the dimensions involved can be expressed cleanly in terms of triglyph modules: the capital height corresponds to 1 M, the metope width and upper column diameter to 1½ M, the lower column diameter to 2 M, and the abacus width to 2¼ M. (Interestingly enough, some of these values match those that Vitruvius recommends for his version of the Doric temple.[73]) It might be objected that this web of relationships is so simple that all the dimensions cited could be expressed neatly in terms of any other. There are several instances, however, where expressions work out particularly well in terms of triglyph modules (see the appendix). The frieze height, for example, is typically clearly related to the triglyph width (the most common ratios being 3/2, 8/5, 5/3, or 9/5), but is by contrast often relatively awkward in terms of other dimensions.[74]

Another factor was a concern to generate convenient values of feet; at Segesta, for example, the modular values for the height and the breadth of the capital conspired to produce 3 and 7 feet respectively. At a smaller scale, however, modular design seems to have been less manageable, and the subdivision of capitals was typically finalized according to proportional relationships and whole number values of dactyls.[75]

The size of certain elements may have been governed by rules of thumb couched in triglyph modules. In particular, architrave beams converge on a thickness of 2 M (actual values range from a minimum of 1⅝ to a maximum of 2¼ M). The nominal 2 M ideal made sense, in fact, in terms of constructional logic, since it meant that where architraves were made out of two beams side by side it was possible to carve the corner triglyphs out of one of them alone. What is more, architraves tend to be slimmer than 2 M where they are made of marble, and fatter when made of lower grade local stone. Here then is a rule of thumb informed by practical concerns.

Ironically, the widths of the metopes and triglyphs themselves were the most difficult to resolve as neat modular values. The frieze ideally should be regular, with alternate triglyphs standing axially over column centers and with whole triglyphs at the corners. But in reality the distribution of triglyphs and metopes was affected not only by the chosen solution to the corner problem but also by three further factors: the modular scheme chosen for the facade as a whole (whether the peristyle width was 24 M as opposed to 25 M); the thickness of the architrave/beam; and the presence or not of inward inclination of the peristyle. In practice, particular combinations of these factors meant that the theoretical dimensions for triglyphs and metopes had to be compromised. Indeed, in some cases the

[73] Namely the modular values for the column diameter, capital height, and metope width.

[74] At the Temple of Concord, for example, the frieze/triglyph height of 9/5 M corresponds to 36/25 and 54/85 of the height and the width of the capital.

[75] Cf. Coulton 1979.

Table 8. Ideal Relationships between Components of the External Orders of the Hephaisteion and the Temple of Poseidon at Sounion

Dimension	Metope Width and Upper Column Diam.	Lower Column Diameter	Abacus Width
Triglyph width (M) = capital height	3/2	2/1	9/4
Metope width = upper diameter	–	4/3	3/2
Lower diameter	–	–	9/8

scansion of the frieze was probably not finalized until its length could be verified physically once the architrave was actually in place. Only in about half of the temples examined do the average triglyph widths agree within 5 mm of their hypothetical values, while in some examples the discrepancies are substantially greater.[76]

Actual triglyph widths larger than the nominal ideal tend to occur in temples with a 25 M wide peristyle since this demanded the frieze to expand slightly with respect to the theoretical 1 M:1½ M rhythm (as in fig. 9,b). The more marked deviations occur in those examples of this type of scheme that also have an architrave beam fatter than the nominal guide value of 2 M, this being a further source of increment in the overall width. The temples at Agrigento are the most extreme examples from the present sample since they have not only a 25 M peristyle width and unusually fat architraves, but also no inward inclination to act in mitigation. Although the majority of the triglyphs and metopes at the west end of the Temple of Juno Lacinia were made 2–3 cm larger than their ideal widths, this was still not enough to avoid some supplementary stretching toward the corner (fig. 11).[77]

Column spacings that are larger on the front than on the flank is a well-known characteristic of many Doric temples, which in archaic times is in large part explained by laying out the stylobate according to column number ratios.[78] Although by the second quarter of the fifth century some architects were evidently able to calculate the stylobate to produce a regular peristyle, differences in rhythm persisted in temples like that of Juno Lacinia. This could be attributed to the continued application of rules of thumb, but it could just as well be explained in terms of modular design. The phenomenon occurs in temples that have 25 M peristyle widths and therefore frontal rhythms that are slightly larger than 5 triglyph modules—evidently there was a desire to reclaim for the flank spacing the ideal whole number value (table 9).

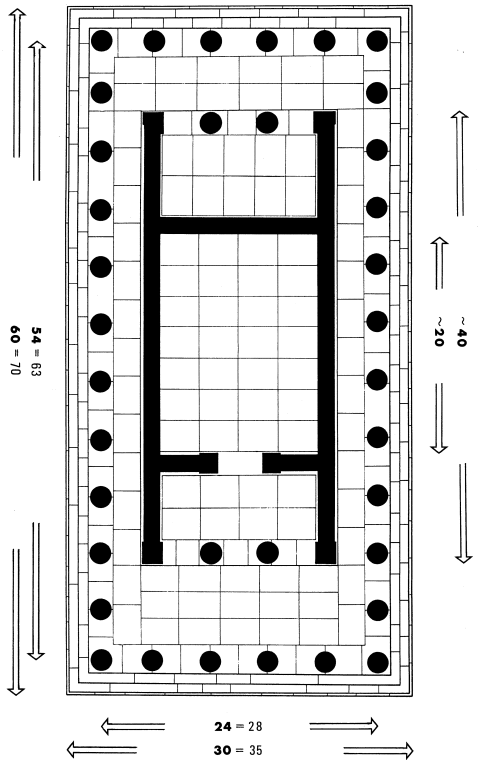

Fig. 10. Modular and dimensional interpretation of the plan of the Temple of Nemesis at Rhamnous, 1:250. Modular values are shown in bold typeface, foot values in normal typeface. (After Miles 1989, fig. 3)

[76] This divergence helps explain why scholars have been so ready to dismiss modular design: indeed, if analyses are predicated on actual surveyed triglyph widths they are bound in many cases not to produce significant patterns.

[77] The triglyphs on the flanks, at 614 mm, are almost exactly equal to the nominal ideal of 30 Doric dactyls, while those of the central bays on the west front average 634 mm. Here the triglyphs and metopes at the corners are respectively 5 and 7 cm bigger than those nearer the center, see Mertens 1984a, 100.

[78] Coulton 1974; 1988, 59–60; cf. Tobin 1981.

Table 9. Relationships between Column and Frieze Spacing (in M)

Temple	Column Spacing, Front	Frieze Spacing, Front	Column and Frieze Spacing, Flanks
Bassae	5⅛	5⅛	**5**
Agrigento, Juno	**5**	5⅛	**5**
Segesta	4⅞	**5**	**5**

This principle also seems to hold true at Segesta, even though the typical column rhythm on the front is narrower than that on the flanks. (It does not apply to the design of the Temple of Concord, however, which seems to follow a rather unusual logic.[79])

THE PLAN

Could modular design have influenced not just the rhythm of the flank elevation but also the layout of the whole plan? While a detailed examination of this question falls outside the scope of this study, it is possible to intimate a positive response courtesy of others' researches.

As mentioned in Part 1, the metrical units that have been induced by scholars for Doric temples frequently turn out be related to triglyph modules. Riemann's generic starting point for temple design is predicated on a 10 unit wide column bay (fig. 3,I). Clearly the same scheme can be expressed with bays 5 triglyph modules wide, while all his values for the temple at Olympia (fig. 3,IIb) can be similarly divided by 2 to reveal a plausible modular specification.[80]

Parallel conclusions apply to the Athenians' temple at Delos and that of Juno Lacinia at Agrigento. As we have already seen, at Delos Mertens also detected the use of a module corresponding to half my triglyph module throughout the building, so not only his elevation (fig. 7) but also his plan can now be reread halving his numbers (fig. 12).[81] The axial width is 24 M, the length of the cella is 36 M, the depth of both porches is 4 M and the total axial length 44 M, values which relate simply to the 4 M entablature and the 16 M height of the order. As regards the temple at Agrigento, several scholars converge on a module/foot around 307–308 mm,[82] this likewise being half my triglyph module (which might either be identified as 30 Doric dactyls or two "common" feet). Once again it is enough to take the plan analyzed in terms of these feet and halve the numbers shown to yield modular values (fig. 13). (It may be noted that the overall cella width at the toichobate, 16 M, is half the overall width of the euthynteria, while the interior width of the cella, 12½ M, is half the axial width of the peristyle.[83] Either exact or approximate, these relationships are not uncommon in other temples.)

A modular reading similarly infused with whole number values and simple fractions is obtained in the case of the Hephaisteion by taking Jos De Waele's plan and multiplying his foot values by 3/8; this is the same as reducing R. De Zwarte's module by 9/10.[84] At Rhamnous the triglyph mod-

[79] The design of this temple was predicated on that of Juno Lacinia, its predecessor further along the sacred ridge at Agrigento. As Mertens (1984a, 108 ff.; 1984b) has pointed out, both buildings share not only stylistic and typological affinities but the same overall width. More to the point, the reprise of the 30 Doric dactyl module arguably lies at the root of the connection. While the plans are almost identical, the later elevation was "improved" by virtue of an upward revision of the column height; meanwhile the column distribution was adjusted for the sake of a better alignment between the columns and the triglyphs. This adjustment resulted in a further increase in the typical widths of the triglyph, now some 2½ cm greater than the nominal module. But whereas in the earlier project the flank returned to the nominal ideal rhythm, here the actual triglyph width used for the front was carried around to the flanks, where it in effect governed the scansion by acting as a slightly larger module, this time 31 dactyls (appendix 1, no. 8). Apart from the desire for regularity, perhaps another motive for this unusual course of action lay in the consequent elongation of the later temple. Emulation through mimesis often involved just such a combination of identical and enlarged dimensions, (see Wilson Jones 1999; 2000b, 76, 79–80, ch. 8). In addition, the architect of the Temple of Concord may have been attracted by achieving a stylobate length equal to 64 of the original 30 dactyl modules.

[80] Riemann 1951. Meanwhile, Grunauer (1981, 275) advocates the use of a module of 421 mm, this being approximately equivalent to 2/5 the triglyph module proposed here.

[81] Mertens 1984a, 220–7.

[82] De Waele 1980; Ceretto Castigliano and Savio 1983; Höcker 1986, 1993.

[83] The peristyle is 25 M wide and nominally 60 M long (discounting corner contraction), the exact length being tailored in favor of a stylobate ratio of 9/4.

[84] De Zwarte 1996; De Waele 1998.

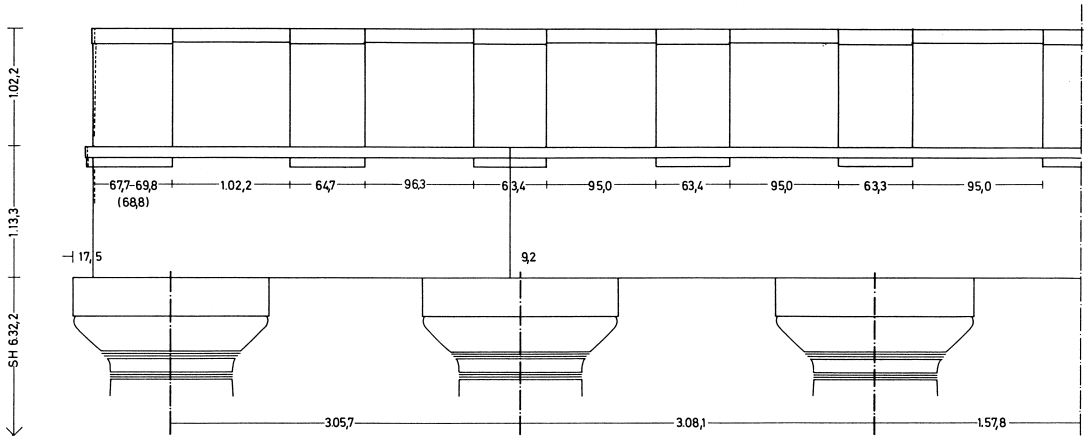

Fig. 11. So-called Temple of Juno Lacinia, Agrigento, detail of frieze showing the variation in size of triglyphs and metopes. (Mertens 1984a, Abb. 48)

ule corresponds to 6/5 of the foot unit sustained by Heiner Knell, revealing an approximate double square plan, 30 × 60 M at the euthynteria (fig. 10).[85]

At Segesta the plan rectangles of both the euthynteria and the peristyle fall out as whole number modular expressions. The former measures 70 M long × 30 M wide (admirably suiting the 7:3 ratio identified by Mertens) while the latter measures 64 × 24 M. It is true that these ideal lengths were executed with a substantial error (18 cm or one third of a percentage point) by the usual standards of accuracy encountered in this study;[86] perhaps this has to do with modifying the theoretical modular values for the sake of round numbers of feet. By this token the 64 M or 170⅔ ft length of the peristyle would have become 170 feet.[87]

Aside from individual examples, it is also interesting to consider the patterns that emerge in the light of comparative analyses. In his extensive study dedicated to the problem of laying out temple stylobates, Coulton demonstrated how the rule of thumb based on column numbers came in the classical period to be applied more often to the krepidoma or euthynteria. Thus a temple with a n × N peristyle has an overall width to length ratio of n:N. In his coverage of those peripteral buildings that are studied here, he highlighted the ensuing ratios of 6:15 for the temple at Bassae, 6:14 for the temple at Segesta, 6:13 for the Hephaisteion and the temple at Sounion, and 6:12 for the temple at Rhamnous.[88] It can hardly be a coincidence that in all but one instance (at Sounion) these significant column number ratios perfectly complement striking modular expressions: 30:75 M at Bassae, 30:70 M at Segesta, 30:65 M at Athens, 30:60 M at Rhamnous. We may therefore refine Coulton's rule as regards the second half of the fifth century into the formulation: "lay out the overall limits of temple platforms with a number of triglyph modules that in each direction correspond to the number of columns supported multiplied by 5."[89] A forthcoming publication by Gene Waddell comes to parallel conclusions on the basis of Coulton's and supplementary data.[90] There is a key difference with the present interpretation, however, in as much as Waddell believes the triglyph module to be derived from the krepidoma, rather than, as I see it, the other way around.[91]

[85] Knell 1973, 108–14. Curiously both the internal length of the cella and the overall length of the naos fail to match exactly 20 and 40 M, dimensions that would not only relate as 2:3 to the dimensions of the euthynteria, but also as 3:2 and 3:1 to the 13⅓ M internal width of the cella. No doubt 20 and 40 M represent the original intentions; I wonder if exactitude was discarded for the sake of a clever floor pattern that used whole slabs of just two sizes for all the spaces contained within the peristyle. For contrasting analysis, see De Waele 1991.

[86] The theoretical ideal of 64 M or 56.045 m for the interaxial length of the peristyle, measures about 18 cm more than the actual value of 55.866 m, representing a discrepancy of 0.32%.

[87] If the target was 170 feet instead (appendix, no. 10), the reduction would explain why the ideal bay of 5 M or 13⅓ ft was executed not as 13 ft, 5 dactyls, but 13 ft, 4½ dactyls. In the absence of a similarly solid metrical foundation it is difficult to speculate as to the reason why the flanking bays of the temple at Bassae exceed the ideal 5 M by as much as 3 cm.

[88] Coulton 1974, table 1.

[89] Alternatively, it can be encapsulated by the formula OvW = 5n M, OvL = 5N M.

[90] Waddell forthcoming. I am grateful to Gene Waddell for sight of his manuscript in November 2000.

[91] In this regard two observations are especially telling. First is the pattern described earlier in the choice of triglyph modules equivalent to round numbers like 20, 25, or 30 dactyls or simple fraction of feet, for this makes more sense if design started from this premise as opposed to, say, taking a krepidoma/euthynteria width based on site dimensions or budgetary

Coulton also argued that once the column number ratio rule passed over the stylobate in favor of the krepidoma, the stylobate width itself came to be calculated on the basis of the typical bay width, namely the formula StW = BayW (n + k), where n is the number of bays and k is an arbitrary correction factor, typically either 1/4 or 1/3. If we now couch this formula in modules, then the stylobate width for a hexastyle temple with 5 module bays should equal either 5 × 5¼ M = 26¼ M, or alternatively 5 × 5⅓ M = 26⅔ M. This is more or less the same range of stylobate widths encountered in practice for temples with 5 M wide bays. The stylobate widths of the temples at Rhamnous, Sounion, Olympia, Delos, Segesta, and Athens are 26⅛, 26⅕, 26½, 26½, 26½, and 26⅔ M respectively. So in terms of stylobate widths, the present proposals are in accord with Coulton's analysis, and yet they arguably better explain the repeated presence of the half modular value of 26½.[92]

It would be a mistake, however, to convey too simplistic an impression. While the plans of individual Doric temples conform to general patterns, they also display a conflict, tension, or dialogue (the appropriate word varies) between overall measurements based on proportional schemes and those calculated as the aggregate of their components. Since it was impossible almost by definition to get everything to harmonize, ideals had to be sacrificed, sometimes component measurements, sometimes overall ones. A case in point is the temple at Sounion, with its minor departures from an otherwise remarkably coherent conception. Heights of 12 M and 16 M for the columns and the order marry well with the 20 M length of the cella, the 24 M peristyle width, and the 64 M total length (appendix, no. 4), and not only do these dimensions create numerous simple interrelations, but the last mentioned corresponds to 100 Doric feet, making the temple a true *hekatompedon*. There was a price to be paid for achieving this, however, that is to say flank bays 2 dactyls less than the 125 dactyl (5 M) ideal,[93] as well as an euthynteria width of 740 dactyls rather than the more obvious figure of 750 dactyls or 30 M.[94] At the same time the wish to either reduce the extent of corner contraction or to assign whole number dactyl dimensions to the column spacing seems to have led to a peristyle width of 601 dactyls rather than the ideal 600. The diagnosis of temple plans calls for repeated checks of this kind, and is best addressed in a separate publication. The previous examples are sufficient to speculate that modular principles may have guided the design of entire temples, inside out and outside in. The number of variations on a theme echoes and amplifies Riemann's insight that the Greek architect "knew how to construct in an elastic manner his number cosmos."[95]

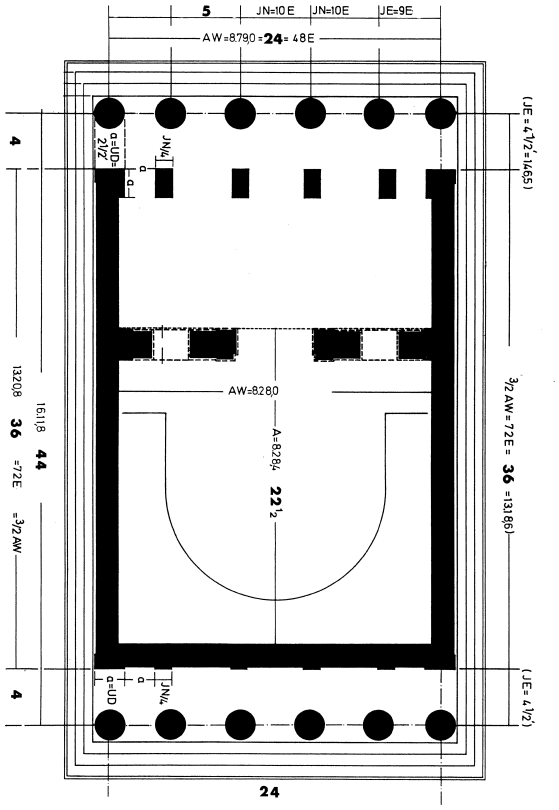

Fig. 12. Modular interpretation of the plan of the so-called Temple of the Athenians at Delos, 1:200. Modular values are shown in bold typeface. (After Mertens 1984a, Abb. 79)

constraints and then dividing it. Second is the superior accuracy of the predicted dimensions using my dimensionally simple nominal triglyph modules as opposed to values derived from fractions of the krepidoma width. Waddell makes the point, however, that the column number ratio rule for the krepidoma seems to have existed before the diffusion of modular design of the type I describe.

[92] The popular value of 26½ M means that the stylobate width conveniently measures 2½ M more than the 24 M interaxial width of the peristyle.

[93] Ten normal bays of 123 d + 2 corner bays of 115 d + 2 offsets from the peristyle axes to the euthynteria of 70 d = 1230 d + 230 d + 140 d = 1600 d (or 100 ft or 64 M).

[94] The offset from the peristyle axes to the euthynteria of 70 d (2⅘ M) was no doubt derived from the calculation of the length given in the preceding note. Thus the theoretical calculation of the euthynteria width yields an interaxial peristyle width of 24 M or 600 d + offsets to the euthynteria of 70 d = 600 d + 140 d = 740 d.

[95] Riemann 1951, 195 (he had in mind specifically the architect of the Hephaisteion).

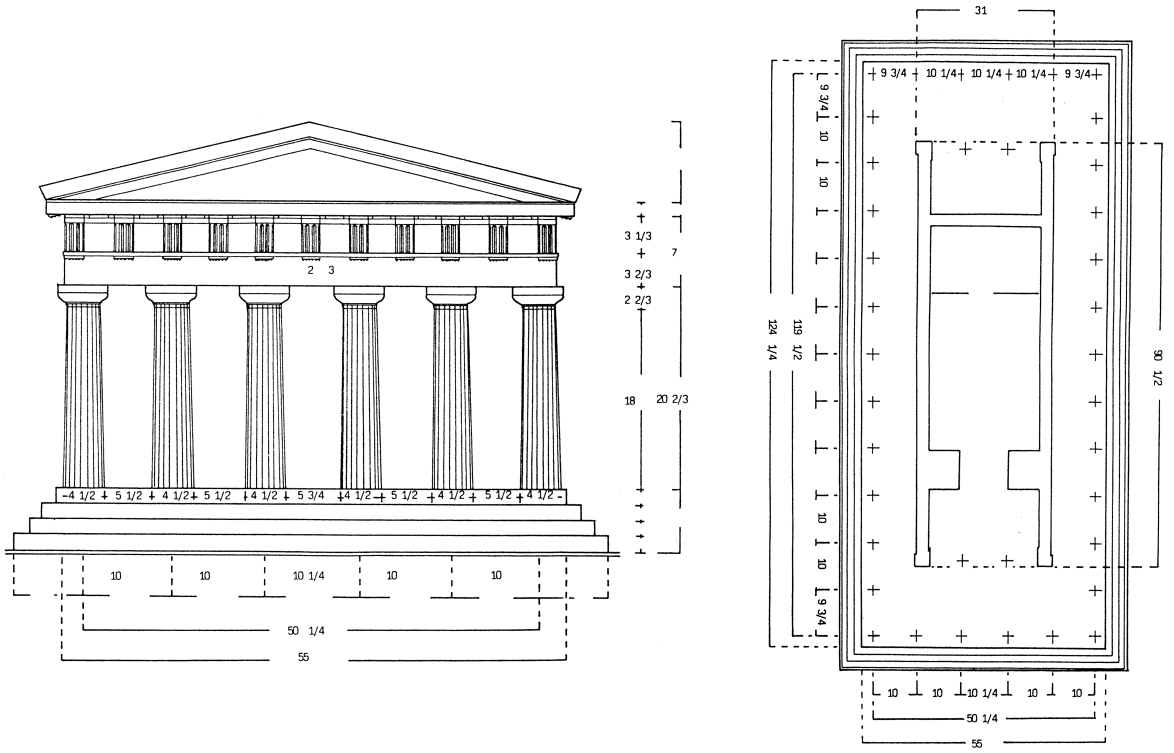

Fig. 13. The so-called Temple of Juno Lacinia, Agrigento, with dimensional analysis according to Höcker (1993, Abb. 3 and 4). The foot advocated corresponds to half the triglyph module proposed here.

WIDER PATTERNS

Are the patterns described for these 10 hexastyle temples more widely applicable? Other examples from the fifth century may be recruited, including the temples of Hera at Selinunte, Poseidon at Paestum, and Athena at Syracuse, but these are not without ambiguities and contradictions.[96] Perhaps the most tantalizing potential example of modular design is the Temple of Aphaia on the island of Aegina, not least because it was built before the Temple of Zeus at Olympia.[97] The column spacing on the flanks divided by 5 yields a potential triglyph module that generates a stylobate width of 27 M, this being double the 13½ M height of the order excluding the geison, as well as two thirds the 18 M height of the whole building excluding the krepidoma.[98] The consonant module or nominal triglyph width, 511 mm, is not only half the lower diameter of the frontal columns but also 25 dactyls of the Doric foot—the same size as the module used for the design of the Hephaisteion, the Temple of Poseidon at Sounion, and the Temple of the Dioscuri at Agrigento. The trouble here, however, is that Hansgeorg Bankel's detailed analysis of the building suggests that the unit used for its construction was not the Doric foot but the Attic foot instead. This, together with the fact that the ratio of triglyph width to metope width is appreciably different from the canonic 2:3 that is usually associated with modular design, must call this tentative

[96] The Selinunte temple approaches a scheme similar to that used for the Temple of Apollo at Bassae (but with an euthynteria width of 30 M) assuming a module of 45 Doric dactyls; the actual triglyphs, however, measure almost 1/16th or 5 cm more than this theoretical value, this being either the consequence of coping with the frieze expansion by the unusual device of stretching the triglyphs alone, or the perpetuation of the more compact frieze proportions of earlier temples (for comparative data, see Mertens 1984a, Anhänge C, 5).

At Paestum a plausible module is 2¾ Doric feet (44 dactyls), the stylobate width being 27 such modules, and the height of the order 14 modules. There are signs of a pattern using a 45 dactyl module instead, however, which raises the question whether design was affected by a modular disjunction like that observable between the front and flanks of the Temple of Concord.

At Syracuse a stylobate divided into 27 triglyph modules (of 40 Doric dactyls) returns 15 M as the likely height of the order, but there is hardly an unambiguous pattern.

[97] The precise date remains controversial, see Bankel 1993, 169–70; Gill 1993.

[98] Assuming a module of 511½ mm or 25 Doric dactyls, 27 M makes 13.810 m (actual value ca. 13.800 m); 13½ M makes 6.911 (actual value 6.930 m); 18 M makes 9.198 m (actual value 9.228 m).

reading into doubt. Or perhaps the pattern detected in terms of the triglyph width is in this case a reflection of the use of the lower column diameter as a module (this being twice as great). Nonetheless, bearing in mind that Bankel has drawn attention to other types of modular correspondences,[99] it seems quite plausible that the designer of this temple experimented with an early formulation of a modular approach to design, the experience of which went on to be exploited by those architects who elaborated the methods described here for later temples.

Relatively few hexastyle temples from the fourth century are well preserved, but positive signs of modular design may be observed at least in those of Athena Pronaia at Delphi and of Zeus at Nemea. As one might expect, the plan organization is comparable to previous examples, with familiar combinations for the width of euthynteria, stylobate, and peristyle (30, 27, and 24½ M respectively at Delphi; 30, 27½, and 25 M at Nemea).[100] Equally predictable is a lightening of proportions in elevation—that is, an increase in modular values for the columns coupled with a decrease for the entablature: 13 modules being used for the column height at Delphi and 14 or so at Nemea; in both cases the entablature height excluding the geison shrinks to 3 M.[101]

The question remains whether the same methods were used for other types of building. As anticipated in Part 1, the octastyle Parthenon may conform to analogous principles. Berger's *Proportionsmodul* of 858 mm is 12 mm greater than the actual triglyph width of 846 mm, a discrepancy that, as we have seen, is consistent with the adjustment of the frieze during the detailed phases of design. In other words, the Proportionsmodul is simply the triglyph module. Given the controversy over the original, unexecuted, intentions behind the Parthenon's Doric companion on the Acropolis, the Propylaea,[102] it would be unwise to attempt here a rapid analysis of its plan. Suffice it to observe that a nominal module of 36 Doric dactyls or 40 Attic dactyls may be inferred from the actual triglyph width of 726 mm, and that the heights of the columns fit 8, 12, and 14 such modules.[103]

The marble tholos at Delphi (ca. 380–370 B.C.) makes a telling counterpoint. As a circular structure, it presents neither the corner problem, nor any differentiation front and flank. We might therefore expect the building to be an unblemished example of modular design, and indeed it is. The starting point was a 20 Doric dactyl (411 mm) wide triglyph. The canonic 5 M column spacing yields 100 dactyl bays (on the face of the frieze), while the circuit of 20 columns generates a total circumference of 100 M. Key linear dimensions include the overall diameter of 36 M and half of this, 18 M, for the height of the order,[104] while 20 modules was the likely target for both the diameter of the cella and the total height of the facade, krepidoma included.[105] The tholos is in effect a veritable manifesto for modular design.

MOTIVATIONS

The explanation for the rise of modular design can be sought at a number of levels, including practical advantages.[106] The new method helped resolve the problem of the Doric facade via schemes that could be scaled to taste (subject to regulating differentially the height of the steps). It enabled solutions to be codified in an easily transmittable form from architect to architect, from place to place and from generation to generation.[107] Thus it acted as the key to mimesis and the guarantor of universality—subject, of course, to variation, whether resulting from a degree of incompleteness in the pub-

[99] Bankel (1993, esp. 146) identified two types of modules, one based on a denominator of 30 Attic dactyls, the other on a denominator of 11 Attic dactyls. For contrasting analysis see De Zwarte 1994–1995.

[100] Assuming a module of 408 mm or 20 Doric dactyls at Delphi, 30 M makes 12.240 m (actual value ca. 12.270 m); 27 M makes 11.016 (actual value 11.011 m); 24½ M makes 9.996 m (actual value 10.025 m). Assuming a module of 732 mm or 40 Attic dactyls at Nemea, 30 M makes 21.960 m (actual value 21.957 m); 27½ M makes 20.130 m (actual value 20.085 m); 25 M makes 18.300 (actual value somewhere between 18.25 and 18.34 m). For measurements, see Michaud 1977; Hill 1966.

[101] At Delphi 13 M makes 5.304 m (actual value 5.282 m); 3 M makes 1.224 m (actual value 1.218 m). At Nemea 14⅛ M makes 10.329 m (actual value 10.325 m); 3 M makes 2.196 m (actual value 2.184 m). I have not studied the temples of Athena Alea at Tegea and of Zeus at Stratos; for metrical analyses, see Bankel 1984a.

[102] See De Waele 1990 for previous interpretations of its design.

[103] The column heights are as follows: Pinakotecca, 5.839 m or 7.93 M; west porch, 8.84 m or 12.01 M; east porch, inc. plinth, 8.850 m or 12.02 M; central block (Ionic), 10.28 m or 13.97 M.

[104] Assuming 5 drums per column, as proposed by Amandry and Bousquet 1940–1941 (cf. Seiler 1986, abb. 28; Bommelaer 1997), as opposed to the 4 drums restored by Charbonneaux and Gottlob 1925–1931.

[105] Pending a more detailed analysis, I base this hypothesis on my own measurements, supplemented by those of Charbonneaux and Gottlob 1925–1931; Amandry and Bousquet 1940–1941; Seiler 1986, 56–71.

[106] *Pace* Wesenberg 1994, 96.

[107] On the question of transmission see Coulton 1983. In my view the modular hypothesis sits well with the broad thrust of his arguments.

lished description or deliberate modification. Modular design facilitated the calculation of interrelationships between different members, and it would have been necessary to specify dimensions in feet and dactyls only at an advanced stage of design. The calculation of corner contraction was doubtless rendered more immediate by being couched in triglyph widths, since this dimension was inherent in the calculation itself. Modular methods allowed designers to quickly predict the visual consequences of any new variation, since comparison with existing buildings was so easy. Given an awareness of precedent it would have been a simple matter to envisage the effect of changing, say, the height of the order from 15 to 15½ or 16 modules.

Modular design was not formulaic, however; it did not offer recipes for passive copying. There were options that were more popular than others, to be sure, but the onus was very much on individual architects to create the appropriate modular organism that suited their own reinterpretation of the temple theme. Did particular personalities—among them Libon at Olympia, Iktinos at Bassae, and the elusive "Hephaisteion architect"—favor particular types of modular solution? Precisely because of the universality of these proportional and modular schemes (and the likelihood that they were codified in treatises or manuals), they are not much help for the purposes of attribution. To judge by the proportions of their capitals, the Parthenon and the Propylaea might be ascribed to the same hand, yet the sources name Iktinos and Kallikrates for the former and Mnesikles for the latter.[108]

Modular design offered theoretical advantages as well. It has been argued that the Doric temple was fundamentally modular in character, in as much as it might be interpreted as an assembly of modular dedications (columns, triglyphs, metopes, roof tiles, and so on) financed by subscription.[109] More to the point, modular design represented a strategy for retrieving mathematical harmony for the Doric order, for in spite of what Vitruvius called the "faults and embarrassments" associated with the corner problem, the salient dimensions of temples could still be a whole number of modules simply related to one another. Contrary to a popular prejudice, as we have seen, modules and proportions could reinforce one another. Different architects may have stressed one aspect more than the other, but the ideal was for both to work together, as is especially clear in the temples at Sounion, Delos, Segesta, and of Juno Lacinia at Agrigento. In fact Vitruvius often shows some difficulty in neatly separating the two concepts.[110] And it seems that the way modules in fifth-century practice tended to be selected with proportional harmony in mind also reconciles a perceived opposition between the design principles of adding the parts to create the whole on the one hand, and subdividing the whole to create the parts on the other.[111]

The rise of modular design early in the fifth century coincides with an increased attention to mathematical harmony, as architects began to master the formal difficulties of Doric design. This is about the time when the Greeks—who were the first to conceive of ethics and aesthetics in terms of number[112]—invested intellectual energy in design theory. The concept of *symmetria*, the commensurability of number, proportion, shape, and measure, came to the fore as the central principle underlying perfection in art, architecture, and any kind of fabrication. It is the most important single element of Greek theory as preserved by Vitruvius, for he used symmetria far more than any other critical term and repeatedly gave it explicit emphasis.[113] In contradistinction to the uncertain and the relative, metrical exactitude was held to be a guarantor of the certain and the absolute,[114] and in these terms the modular design of the Doric temple enhanced its objective beauty.

Architects probably learned much from an exchange with sculptors, who were coming to master the lifelike representation of dynamic human postures. The aims of sculptors working with statuary parallel those of architects working with the Doric order: in both cases the idea was to reproduce time and again variations of recognizable models without resorting to copying.[115] The analyses of some archaic statues reveals principles which have much in common with those documented here: a definite modularity; a care to coordinate modular values and arithmetical ratios; the selection of appealing or convenient numbers for the size of the base module and overall dimensions. The Kuros from

[108] Miles 1989, 241; Bankel 1993, 145.

[109] Fehr 1996.

[110] E.g., Vitr. 9.5.1.

[111] Bommelaer 2000.

[112] Preißhofen 1984; Koenigs 1990, 121–3.

[113] Vitr. 1.3.2; 3.1.1; 5.1.6; 5.6.7; 6.2.1; 7. pref. 12–14. Cf. Pollitt 1974, 14–22, 256–8; Knell 1985, 30–4; Gros 1989; *id.* 1990, xi, 56–60; Wilson Jones 2000b, ch. 2.

[114] Koenigs 1990, 123.

[115] On the importance of mimesis to ancient architects, see Wesenberg 1994, 98. For discussion in the context of the Roman period, see Wilson Jones 1993, 1999, 2000b, esp. 7–9, 79–80, 123–6, 156, 174.

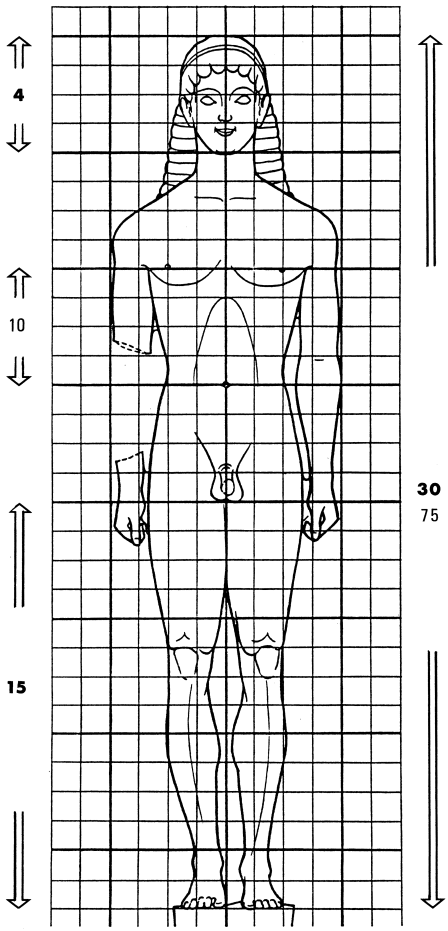

Fig. 14. Modular interpretation of the Tenea kuros according to Ahrens (1968–1971, Abb. 9). Modular values are shown in bold typeface, dactyl values in normal typeface. The width of each small square measures 1 module or 2½ dactyls; the width of each large square measures 4 modules or 10 dactyls.

Tenea, for example, seems to have been set out using a module of 2½ dactyls, multiples of which determined several critical limits of the statue (fig. 14), while the total height is the same number, 30, as that which fixed the overall width of so many hexastyle temples.[116] Paradoxically, at this relatively early date modular methods of the kind described here were not used for temples, while sculptors abandoned such schemes (on account of their relative rigidity) just at the time when modular design came to be taken up in architecture. This crossover may be explained on the one hand because the sort of modular design practiced by archaic sculptors, inspired by the square grids of the Egyptian canons, was ill-suited to the differentiated Doric peristyle. On the other hand, it may well have been classical sculptors' freer conception of the relation between mathematics and form, which showed architects the way to achieving symmetria without being tied to a homogenous, inflexible straitjacket.[117] Thus we can better grasp the thinking behind Vitruvius's famous parallel between the symmetria of the well-formed body and that of a well-designed building in Book III (a connection explored from another angle in Part 1 of the present study).[118] The same concept is also explicitly linked with modular design based on triglyphs: "*Symmetria* is a proper agreement between the members of the work itself, and relation between the different parts and the whole general scheme, in accordance with a certain part selected as standard. Thus in the human body there is a kind of symmetrical harmony between forearm, foot, palm, finger, and other small parts; so it is with perfect buildings. In the case of temples, symmetria may be calculated from the thickness of a column, from a triglyph, and also from an embater."[119]

After the architects of Doric temples perceived the virtues of a modular approach, there could not have been a more appropriate base unit than the triglyph width. The triglyph played a decisive role in the very origins of the Doric order, and undoubtedly carried a potent symbolic charge, even if its nature still eludes consensus.[120] Over the centuries down to the Roman period some parts of the Doric order changed substantially, yet the triglyph remained essentially the same; it was the true leitmotif of the Doric order. It was intimately linked to the corner problem and other adjustments related to the formal resolution of the frieze. In effect the new status of the triglyph as the metrical fulcrum of design during the Classical period is but the mathematical expression of this architectural reality.

CONCLUSION

The case for modular design may rest: we have the evidence, the motivation, and a witness. The evidence presents itself in the accuracy with which

[116] Berger 1990, 159–60; cf. Ahrens 1968–1971.

[117] The limits of a limb, for example, can be sized as a specific dimension proportioned to other key measurements while not fitting into a grid of the kind used for the Tenea kuros. For an appreciation of such dynamics, see Berger 1990, 160 ff.

[118] Vitr. 3.1.1. For a possible connection between Vitruvian Man and the metrological relief from Salamis, see Part 1 (Wilson Jones 2000a).

[119] Vitr. 1.2.4, as translated by M.H. Morgan with this author's emendation of "also" instead of "even" on the last line. For the significance of the term embater, see supra, n. 31.

[120] Weickenmeier 1985. My own study of this problem is in preparation.

Doric temples return modular measurements, in the marriage between those modular values and simple proportions, and in the consistent resolution of the basic triglyph module in terms of documented units of measure. The motivation lies in the desire for universality, for method, for harmony, and for resolving the problem of the Doric corner in the most economical and transmittable fashion. The witness is Vitruvius, our main ancient authority, who had at least indirect access to Greek sources. Indeed it would be strange if his account of Doric design did not have some validity despite its theoretical nature; if there might be such a thing as a maxim for interpreting Vitruvius, never is he wholly right, but never is he wholly wrong. According to the analysis presented here he was right enough about the basic principle; modular design was practiced by Greek architects from the early classical period, and was the core of a procedure that gave birth to many of the finest architectural landmarks of the ancient world.

DEPARTMENT OF ARCHITECTURE AND CIVIL ENGINEERING
UNIVERSITY OF BATH
BATH BA2 7AY
UNITED KINGDOM
M.W.JONES@BATH.AC.UK

Appendix

1. TEMPLE OF ZEUS, OLYMPIA, CA. 470 B.C.

The proposed triglyph module is 1,044 mm, equivalent to 16/5 of a Doric foot 326.25 mm long (as well as 2 Egyptian royal cubits and 3 Samian feet). Because this module cannot be expressed in whole numbers of dactyls, it was probably often necessary to round off theoretical values to the nearest suitable dactyl. Measurements are taken from Bohn 1892 (pls. VIII–XVI); Grunauer 1981 gives some slightly different values.

Modular Analysis of Measurements

Component Dimensions	Triglyph Module	Doric Feet	Adjusted to Whole Dactyls	Metric Value	Actual Value	Difference in cm
Measures of width						
Euthynteria width	29	92⅘	92¾'	30.260	30.200	+6.0
Stylobate width	26½	84⅘	84', 13d	27.670	27.680	-1.0
Axial width of front	24⅙	77⅓	77⅜'	25.243	25.240	+0.3
Typical column spacing	5	16	–	5.220	5.225	-0.5
Column diameter	2⅛	6⅘	6', 13d	2.222	2.220	+0.2
Upper column diameter	1⁷⁄₁₀	5½	–	1.794	1.780	+1.4
Abacus width	2½	8	–	2.613	2.610	+0.3
Metope width	1½	4⅘	–	1.566	1.567	-0.1
Triglyph width	1	3⅕	3', 4d	1.060	1.060	0.0
Measures of height						
Krepidoma	1³⁄₇?	4⁴⁄₇?	4⅝'	1.509	1.520	-1.1
Column[a]	10	32	–	10.440	10.430	+1.0
Trabeation excluding geison	3¼	10⅖	10⅜	3.385	3.370	+1.5
Height of order exc. geison	13¼	42⅖	42⅜	13.825	13.800	+2.5
Trabeation including geison	4	12⅘	12¾	4.160	4.165	-0.5
Order including geison	14	44⅘	44¾	14.600	14.595	+0.5
Pediment	3⁴⁄₇?	11³⁄₇?	11⅜	3.714	3.715	-0.1
Total to apex of pediment	19	60⅘	60¾	19.820	19.830	-1.0

[a] Grunauer (1981, 273) calculates 10.52 m for the peristyle columns, 10.44 m for those of the pronaos.

Salient Relationships

Component Dimensions	Triglyph Width	Metope Width	Abacus Width	Trabeation Height	Typical Column Spacing	Column Height
Triglyph width	–	3/2	5/2	4/1	5/1	10/1
Metope width	–	–	5/3	8/3	10/3	20/3
Abacus width	–	–	–	8/5	2/1	4/1
Trabeation height	–	–	–	–	5/4	5/2
Typical column spacing	–	–	–	–	–	2/1

2. HEPHAISTEION, ATHENS, CA. 450 B.C.

The proposed triglyph module is 514 mm, which might be either 25 dactyls of a Doric foot of 329 mm, or 1¾ feet (28 dactyls) of an Attic foot of 293.7 mm, the latter being more conveniently divisible into halves, quarters, and eighths (cf. Riemann 1951, 306 n. 40; 1960, esp. 188). Measurements are taken from Koch 1955; see also Dinsmoor 1941; Riemann 1960; Knell 1973; De Zwarte 1996; De Waele 1998.

Modular Analysis of Measurements

Component Dimensions	Triglyph Module	Metric Value	Actual Value	Difference in cm
Measures of width				
Euthynteria width	30	15.420	15.420	0.0
Stylobate width	26⅔	13.706	13.720	-1.4
Axial width of peristyle	24½	12.593	12.580	+1.3
Typical column spacing	5	2.570	2.580	-1.0
Corner colum spacing	4¾?	2.441	2.420	+2.1
Typical stylobate block	2½	1.285	1.290	-0.5
Width of abacus	2¼	1.156	1.141	+1.5
Lower column diameter	2	1.028	1.018	+1.0
Depth of architrave, initially?	2	1.028	1.000	+2.8
Upper column diameter	1½	0.771	0.790	-1.9
Metope width	1½	0.771	0.775	-0.4
Width of wall blocks	1½	0.771	0.760	+1.1
Triglyph width	1	0.514	0.515	-0.1
External width of cella, initially	15?	7.710	7.760	-5.0
Internal width of cella, initially	12?	6.168	6.240	-7.2
Measures of height				
Krepidoma, initially?	2[a]	1.028	1.054	-2.6
Column	11⅛	5.718	5.712	+0.6
Trabeation excluding geison	3¼	1.670	1.668	+0.2
Trabeation including geison	3⅞	1.992	1.988	+0.4
Order including geison	15	7.710	7.700	+1.0
Facade excluding pediment	17[a]	8.738	8.754	-1.6
Pediment	3½	1.799	1.780	+1.9
Total to apex of pediment	20½	10.537	10.534	+0.3
Wall blocks	1	0.514	0.512	+0.2
Capitals	1	0.514	0.503	+1.1

[a] The extra with respect to the ideal value may be attributed to the addition of a dactyl to the height of the topmost step (vertical edge of stylobate) as compared to the steps below.

Salient Relationships

Component Dimensions	Triglyph Width	Capital Height	Metope Width	Upper Column Diameter	Lower Column Diameter	Abacus Width
Triglyph width	–	1/1	3/2	3/2	2/1	9/4
Capital height	–	–	3/2	3/2	2/1	9/4
Metope width	–	–	–	1/1	4/3	3/2
Upper column diameter	–	–	–	–	4/3	3/2
Lower column diameter	–	–	–	–	–	9/8

3. TEMPLE OF APOLLO, BASSAE, CA. 430 B.C.

The proposed triglyph module is 529 mm, a unit which might possibly be 9/5 Attic feet of 293.9 mm. Measurements are taken from Cooper et al. 1992–1996.

Modular Analysis of Measurements

Component Dimensions	Triglyph Module	Metric Value	Actual Value	Difference in cm
Measures of width				
Euthynteria width	30½	16.134	16.134	0.0
Width at bottom step	30	15.870	15.874	-0.4
Stylobate width	27½	14.547	14.547	0.0
Axial width of front	25	13.225	13.231	-0.6
Typical column spacing (front)	5⅛	2.711	2.725	-1.4
Lower column diameter	2⅛	1.124	1.137	-1.3
Upper column diameter	1¾	0.926	0.927	-0.1
Width of abacus	2¼	1.190	1.170–1.230	–
Width of metope (flanks)	1½	0.794	0.802	-0.8
Width of triglyph	1	0.529	0.533	-0.4
Depth of architrave beam	1⅞–2	0.990–1.060	1.010–1.070	–
Internal length of cella	3	16.928	ca. 17.000	–
External width of cella	1	8.464	ca. 8.470	–
Internal width of cella (measured between opposing antae)	12½	6.612	ca. 6.620	–
Measures of height				
Stylobate	1⅖	0.741	0.752	-1.1
Column	11¼	5.951	5.959	-0.8
Trabeation including geison	3¾	1.984	1.944	+4.0
Order including geison	15	7.935	7.903	+3.2
Total height excluding kyma, initially?	20	10.580	10.675	-9.5
Total height excluding kyma, actual	20⅛	10.646	–	-2.9
Capital height	1	0.529	0.533	-0.4
Geison	½	0.265	0.274	-0.9
Measures of length				
Length at bottom step	75	39.675	39.568	+10.7
Axial length of peristyle	70	37.030	36.994	+3.6
Typical column spacing (flank)	5	2.645	2.676	-3.1

Salient Relationships

Component Dimensions	Triglyph Width	Capital Height	Metope Width	Upper Column Diameter	Lower Column Diameter	Abacus Width
Triglyph width	–	1/1	3/2	7/4	17/8	9/4
Capital height	–	–	3/2	7/4	17/8	9/4
Metope width	–	–	–	7/6	17/12	3/2
Upper column diameter	–	–	–	–	17/14	9/7
Lower column diameter	–	–	–	–	–	18/17

4. TEMPLE OF POSEIDON, SOUNION, CA. 435 B.C.?

The proposed triglyph module is 512.5 mm, equivalent to 25 dactyls of a Doric foot 328 mm long. Measurements are taken from Plommer 1950 and Knell 1973; cf. Blouet et al. 1838.

Modular Analysis of Measurements

Component Dimensions	Triglyph Module	Doric Dactyls	Adjusted Dimension	Metric Value	Actual Value	Difference in cm
Measures of width						
Euthynteria width	29⅗	740	–	15.170	15.200	-3.0
Stylobate width	26⅕	655	–	13.427	13.400	+2.7
Axial width of peristyle	24	600	601	12.320	≤12.320	–
Typical column spacing	5?	125?	123	2.522	2.520	+0.2
Corner column spacing	–	–	116	2.378	2.380	-0.2
Abacus width	2¼	56¼	56	1.148	1.141	+0.7
Lower column diameter	2	50	–	1.025	≃1.020	≃0.5
Upper column diameter	1½	37½	38	0.779	0.779	0.0
Metope width	1½	37½	37	0.758	≃0.750	≃0.8
Triglyph width	1	25	–	0.512	0.511	+0.1
Measures of height						
Stylobate (initially 2 M?)	2$\frac{1}{10}$	52½	53	1.086	1.080	+0.6
Column	12	300	–	6.150	6.140	+1.0
Trabeation up to geison	3¼	81¼	81	1.661	1.665	-0.4
Order excluding geison	15¼	381¼	381	7.810	7.805	+0.5
Trabeation including geison	4	100	–	2.050	2.055	-0.5
Order including geison	16	400	–	8.200	8.195	+0.5
Pediment excluding kyma (initially 3 M?)	2$\frac{9}{10}$?	72½	72	1.476	1.445	+3.1
Total excluding kyma	21?	525	–	10.762	10.720	+4.2
Capital	1	25	24	0.492	0.489	+0.3
Geison	¾	18¾	19	0.389	0.390	-0.1
Measures of length						
Euthynteria length	64	1600	–	32.800	32.830	-3.0
Internal length of cella	20	500	–	10.250	10.240	+1.0

Salient Relationships

Component Dimensions	Triglyph Width	Capital Height	Metope Width	Upper Column Diameter	Lower Column Diameter	Abacus Width
Triglyph width	–	1/1	3/2	3/2	2/1	9/4
Capital height	–	–	3/2	3/2	2/1	9/4
Metope width	–	–	–	1/1	4/3	3/2
Upper column diameter	–	–	–	–	4/3	3/2
Lower column diameter	–	–	–	–	–	9/8

5. ATHENIANS' TEMPLE OF APOLLO, DELOS, CA. 420 B.C.

The proposed triglyph module is 366.25 mm, equivalent to either 20 dactyls of an Attic foot 293 mm long, or 18 dactyls of a Doric foot 325.6 mm long. Measurements are taken from Courby 1931; cf. Mertens 1984a, 220–7. The following table assumes an Attic foot.

Modular Analysis of Measurements

Component Dimensions	Triglyph Module	Attic Dactyls	Adjusted Dimension	Metric Value	Actual Value	Difference in cm
Measures of width						
Width at bottom step	30¼	605	–	11.079	11.060	+1.9
Stylobate width	26½	530	–	9.706	9.686	+2.0
Axial width of peristyle	24	480	–	8.790	8.790	0.0
Typical column spacing	5	100	–	1.831	1.832	-0.1
Corner column spacing	4½	90	–	1.648	1.647	+0.1
Abacus width	2⅜	47½	47	0.861	0.854	+0.7
Lower column diameter (initially 2¼?)	2⅔	44⅘	44	0.806	0.810	-0.4
Upper column diameter	1¾	35	–	0.641	0.630	+1.1
Metope width	1½	30	–	0.549	0.545	+0.4
Triglyph width	1	20	–	0.366	0.370	-0.4
Width of soffit of architrave	2	40	–	0.732	≃0.740	-0.8
Measures of height						
Krepidoma	2⅘	56	–	1.026	≃1.029	-0.3
Column (alternatively 12⅗ M)	12⅔	253⅓	254	4.651	4.650	+0.1
Trabeation excluding geison	3⅔	68	–	1.245	1.260	-1.5
Order excluding geison	16[a]	320	321	5.860	5.910	-5.0
Trabeation including geison	4	80	–	1.465	1.480	-1.5
Order including geison	16⅔	333⅓	333	6.098	6.130	-3.2
Pediment	4⅕	84	–	1.575	≃1.550	–
Total (initially 24 M?)	23⅔	473⅓	–	8.680	≃8.670	–
Capital	1	20	–	0.366	0.355	+1.1
Geison	⅗	12	–	0.220	0.220	0.0
Measures of length						
Length at bottom step	51½	1030	–	18.862	18.850	+1.2
Stylobate length	46½	930	–	17.031	17.014	+1.7
Axial length of peristyle	44	880	–	16.115	16.118	-0.3
External length of cella	36	720	–	13.185	13.208	-2.3
Axial depth of porticoes	4	80	–	1.465	1.455	+1.0

[a] The excess height of the order with respect to the ideal value of 16 M might be attributable to the (unusual) presence of a kyma bed molding between the frieze and the geison, if not a slight overestimate of the column height by Courby.

Salient Relationships

Component Dimensions	Triglyph Width	Capital Height	Metope Width	Upper Column Diameter	Lower Column Diameter	Abacus Width
Triglyph width	–	1/1	3/2	7/4	≃9/4	19/8
Capital height	–	–	3/2	7/4	≃9/4	19/8
Metope width	–	–	–	7/6	≃3/2	19/12
Upper column diameter	–	–	–	–	≃9/7	19/14
Lower column diameter	–	–	–	–	–	19/18

6. TEMPLE OF NEMESIS, RHAMNOUS, CA. 430–420 B.C.

The proposed triglyph module is 381 mm, equivalent to 1⅛ Doric feet of 326.5 mm long. Measurements are taken from Knell 1973, 108–14 and Miles 1989.

Modular Analysis of Measurements

Component Dimensions	Triglyph Module	Doric Feet	Metric Value	Actual Value, Knell	Actual Value, Miles
Measures of width					
Euthynteria width	30	35'	11.430	11.456	11.412
Stylobate width	26⅛	≃30½'	9.960	9.956	9.960
Axial width of peristyle	24	28'	9.144	9.148	9.146
Typical column spacing, front	5	–	1.905	1.896	1.906?
Corner column spacing	4½	84d	1.715	1.730	1.734?
Corner column spacing, adjusted	–	85d	1.735	–	–
Abacus width	2	–	0.762	–	0.754
Abacus width, rounded off	–	37d	0.755	–	–
Lower column diameter	1⅞	35d	0.714	0.711	0.714
Upper column diameter	1½	28d	0.571	–	0.565
Metope width	1½	28d	0.571	–	0.572
Triglyph width	1	18⅔d	0.381	–	0.377
Triglyph width, rounded off	–	18½d	0.377	–	–
Cella width	17	–	6.477	6.320	≃6.500
Internal width of cella	13⅓	–	5.080	5.056	5.150
Measures of height					
Krepidoma	2⅜	–	0.905	–	0.906
Column (initially 11?)	10¾	≃12½'	4.095	4.100	4.101
Trabeation up to geison	3	2⅝'	1.143	–	1.143
Order excluding geison	13¾	≃16'	5.238	–	5.244
Trabeation including kyma	4	4⅔'	1.524	–	1.513?
Trabeation inc. kyma, rounded off	–	74d	1.510	–	–
Order inc. kyma (initially 15?)	14¾	–	5.619	–	5.620?
Total to top of pediment	20	23⅓'	7.620	–	7.593?
Total to top of pediment, rounded off	–	23¼'	7.593	–	–
Capital	⅚	–	0.314	–	0.317
Geison and kyma	1	–	0.381	–	≃0.370?
Measures of length					
Euthynteria length	60	70'	22.860	22.861	≃22.883
Axial length of peristyle	54	63'	20.574	20.524	20.590
Cella length initially	40?	–	15.240	–	–
Cella length adjusted	–	39¾	15.145	15.165	–
Typical column spacing, flank	5	–	1.880	1.896	1.906

Salient Relationships

Component Dimensions	Triglyph Width	Capital Height	Metope Width	Upper Column Diameter	Lower Column Diameter	Abacus Width
Triglyph width	–	5/6	3/2	3/2	15/8	2/1
Capital height	–	–	9/5	9/5	9/4	5/3
Metope width	–	–	–	1/1	5/4	4/3
Upper column diameter	–	–	–	–	5/4	4/3
Lower column diameter	–	–	–	–	–	16/15

7. TEMPLE "OF JUNO-LACINIA," AGRIGENTO, CA. 455 B.C.

The proposed triglyph module is 616.5 mm, equivalent to 30 dactyls of a Doric foot 328.8 mm long. Measurements are taken from Mertens 1984a.

Modular Analysis of Measurements

Component Dimensions	Triglyph Module	Doric Dactyls	Adjusted Dimension	Metric Value	Actual Value	Difference in cm
Measures of width						
Euthynteria width	32	960 = 60'	–	19.728	19.740	-1.2
Stylobate width	27½	825	–	16.953	16.930	+2.3
Axial width of front	25	750	–	15.413	15.415	-0.2
Spacing of intermediate bay	5	150	–	3.082	3.081	+0.1
Abacus width	2⅘	84	–	1.726	1.720	+0.6
Depth of architrave, beam	2¼	67½	67	1.377	1.375	+0.2
Lower column diameter	2¼	67½	67	1.377	1.375	+0.2
Upper column diameter	1¾	52½	52	1.069	1.070	-0.1
Metope width	1½	45	–	0.925	0.921	+0.4
Triglyph width	1	30	–	0.616	0.643	-2.7
Cella width, toichobate	16	480 = 30'	–	9.864	9.883	-1.9
Internal width of cella	12½	375	–	7.706	7.718	-1.2
Measures of height						
Stylobate	3¼	97½	98	2.014	2.030	-1.6
Column	10¼	307½	–	6.319	6.322	-0.3
Trabeation up to geison	3½	105	–	2.158	2.155	+0.3
Order excluding geison	13¾	412½	–	8.477	8.477	0.0
Facade up to geison	17	510	510½	10.491	10.507	-1.6
Facade including geison	18?	–	–	–	–	–
Capital	1⅖	42	–	0.863	0.863	0.0
Geison (cf. Temple of Concord)	1?	–	–	–	–	–
Measures of length	61⅞	1856 = 116'	–	38.145	38.130	+1.5
Stylobate length = 9/4 SW	59½	1785	–	36.682	36.730	-4.8
Axial length of peristyle	45	1350	–	27.742	27.805	-6.3
Cella length, walls	24	720 = 40'	–	14.796	14.840	-4.4
Interior length of cella	5	150	–	3.082	3.073	+0.9
Typical column spacing Triglyph width	1	30	–	0.616	0.614	+0.2

Salient Relationships

Component Dimensions	Triglyph Width	Capital Height	Metope Width	Upper Column Diameter	Lower Column Diameter	Abacus Width
Triglyph width	–	7/5	3/2	7/4	9/4	14/5
Capital height	–	–	15/14	5/4	45/28	2/1
Metope width	–	–	–	7/6	3/2	28/15
Upper column diameter	–	–	–	–	9/7	56/35
Lower column diameter	–	–	–	–	–	56/45

8. TEMPLE "OF CONCORD," AGRIGENTO, CA. 435 B.C.

The proposed triglyph module is 616 mm, equivalent to 30 dactyls of a Doric foot 328.5 mm long. Measurements are taken from Mertens 1984a, 108.

Modular Analysis of Measurements

Component Dimensions	Triglyph Module	Doric Dactyls	Adjusted Dimension	Metric Value	Actual Value	Difference in cm
Measures of width						
Euthynteria width	32	960 = 60'	–	19.712	19.750	-3.8
Stylobate width	27½	825	–	16.940	16.910	+3.0
Stylobate width, based on SL × 3/7	–	823	–	16.899	–	-1.1
Axial width of peristyle	25	750	–	15.400	15.427	-2.7
Typical column spacing	5	150	–	3.080	3.105	-2.5
Corner column spacing	–	–	–	–	–	–
Abacus width	2⅚	85	–	1.745	1.740	+0.5
Lower column diameter	2⅓	70	–	1.437	1.420	+1.7
Upper column diameter	1⅚	55	–	1.129	1.110	+1.9
Metope width	1½	45	–	0.924	0.961	-3.7
Triglyph width	1	30	–	0.616	0.641	-2.5
Measures of height						
Stylobate	3¼	97½	98	2.012	2.010	+0.2
Column	10⅞	326¼	327	6.716	6.712	+0.4
Trabeation up to geison	3⅝	108¾	108	2.218	2.220	-0.2
Order excluding geison	14½	435	–	8.934	8.932	+0.2
Order including geison	15½	465	–	9.553	9.544	+0.9
Facade excluding pediment	18¾	562½	563	11.562	11.554	+0.8
Pediment	3¼	97½	98	2.013	2.018	-0.5
Total excluding terra-cotta	22	660	661	13.575	13.572	+0.3
Capital	1¼	37½	38	0.780	0.789	-0.9
Geison block	1	30	–	0.616	0.612	+0.4
Measures of length						
Stylobate length	64	1920 = 120'	–	39.424	39.440	-1.6
Axial length of peristyle	61½	–	–	37.884	37.855	+2.9
Typical column spacing	5⅕	156	–	3.203	3.203	0.0

Alternatively, several measurements of length relate better to a module of 638 mm (this being closer to the average actual triglyph width of ca. 641 mm):

Modular Analysis of Measurements

Component Dimensions	Triglyph Module	Doric Dactyls	Adjusted Dimension	Metric Value	Actual Value	Difference in cm
Measures of length						
Typical column spacing	5	–	–	3.190	3.203	-1.3
Column diameter (9/4 M)	2	–	–	1.418	1.420	-0.2
Column	10⅔	–	–	6.699	6.712	-1.3
Trabeation up to geison	3½	–	–	2.223	2.220	+0.3
Order excluding geison	14½	–	–	8.932	8.932	0.0
Metope width	1	–	–	0.957	0.961	-0.4
Cella length to walls	45½	–	–	28.710	28.710	0.0

9. TEMPLE "OF THE DIOSCURI," AGRIGENTO, CA. 420 B.C.

The proposed triglyph module is 512.4 mm, equivalent to 25 dactyls of a Doric foot 327.9 mm long. Measurements are taken from Mertens 1984a, 117.

Modular Analysis of Measurements

Component Dimensions	Triglyph Module	Doric Dactyls	Adjusted Dimension	Metric Value	Actual Value	Difference in cm
Measures of width						
Euthynteria width	32?	–	–	–	–	–
Stylobate width	27	675	–	13.835	13.860	-2.5
Axial width of front	24⅖	610	–	12.503	12.510	-0.7
Spacing of typical bay	5	125	–	2.562	2.548	+1.4
Abacus width	3	75	–	1.537	1.510	+2.7
Depth of architrave, beam	2⅖	60	–	1.229	1.223	+0.6
Lower column diameter	2⅖	60	–	1.229	1.220	+0.9
Upper column diameter	1⅞	46⅞	47	0.963	0.970	-0.7
Metope width	1½	37½	–	0.769	0.764	+0.5
Triglyph width	1	25	–	0.512	0.510	+0.2
Measures of height						
Column	11⅖	285	–	5.841	5.830	+1.1
Trabeation excluding geison	3⅗	90	–	1.845	1.855	-1.0
Order excluding geison	15	375	–	7.686	7.685	+0.1
Geison block	1?	25?	–	–	–	–
Order including geison	16?	400?	–	–	–	–
Capital	1⅓	33⅓	–	0.683	0.684	-0.1

Salient Relationships

Component Dimensions	Triglyph Width	Capital Height	Metope Width	Upper Column Diameter	Lower Column Diameter	Abacus Width
Triglyph width	–	4/3	3/2	15/8	12/5	3/1
Capital height	–	–	9/8	45/32	9/5	9/4
Metope width	–	–	–	5/4	8/5	2/1
Upper column diameter	–	–	–	–	32/25	8/5
Lower column diameter	–	–	–	–	–	5/4

10. UNFINISHED TEMPLE, SEGESTA, BEFORE 409 B.C.

The proposed triglyph module is 875.7 mm, equivalent to 8/3 Doric feet 328.4 mm long. Measurements are taken from Mertens 1984a, 39.

Modular Analysis of Measurements

Component Dimensions	Triglyph Module	Doric Feet	Adjusted Dimension	Metric Value	Actual Value	Difference in cm
Measures of width						
Euthynteria width	30	80	–	26.271	26.267	+0.4
Stylobate width	26½	70⅔	70', 10d	23.193	23.175	+1.8
Axial width of front	24	64	–	21.017	21.030	-1.3
Abacus width	2⅝	7	–	2.299	2.296	+0.3
Lower column diameter	2⅔	5 25/27	5', 14d	1.929	1.935	-0.6
Upper column diameter	1¾	4⅔	75d	1.539	1.551	-1.2
Metope width	1½	4	–	1.313	≃1.308	+0.5
Triglyph width	1	2⅔	2', 10d	0.862	0.863	-0.1
Depth of architrave beam	1⅞	5	82	1.682	1.679	+0.3
Measures of height						
Stylobate	≃2 1/12	–	5', 9d	1.827	1.825	+0.2
Column	10⅔	28⅘	28', 7d	9.339	9.338	+0.1
Trabeation excluding geison	3⅓	8⅘	8', 13d	2.894	2.897	-0.3
Order excluding geison	14	37⅓	37', 4d	12.232	12.235	-0.3
Order including geison	14¾	39⅓	39', 4d	12.889	12.892	-0.3
Facade (order + stylobate)	16⅘	44⅘	44', 13d	14.716	14.717	-0.1
Pediment	≃3⅖	9', 2d	–	2.996	2.997	-0.1
Total including stylobate	20¼	54	–	17.732	17.714	+1.8
Total including kyma	21?	–	–	–	–	–
Geison	¾	2	–	0.657	0.657	0.0
Capital	1⅛	3	–	0.985	0.985	0.0
Measures of length						
Euthynteria length, initially?	70	–	–	–	–	–
Euthynteria length, adjusted?	69¾	186	–	61.080	61.120	-4.0
Axial length, initially?	64	–	–	–	–	–
Axial length, adjusted?	63¾	170	–	55.826	55.866	-4.0
Typical column spacing	5	13⅓	13', 4d	4.351	4.354	-0.3

Salient Relationships

Component Dimensions	Triglyph Width	Capital Height	Metope Width	Upper Column Diameter	Lower Column Diameter	Abacus Width
Triglyph width	–	9/8	3/2	7/4	9/4	21/8
Capital height	–	–	4/3	14/9	2/1	7/3
Metope width	–	–	–	7/6	3/2	7/4
Upper column dimension	–	–	–	–	9/7	3/2
Lower column dimension	–	–	–	–	–	7/6

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BOOK REVIEWS

THE INVENTION OF JANE HARRISON, by *Mary Beard*. Pp. xv + 229, figs. 9. Harvard University Press, Cambridge 2000. $35. ISBN 0-674-00212-1 (cloth).

This is an odd book. The subject is Jane Harrison (1850–1928), British classicist and student of Greek art and religion, who published several important books on early Greek ritual. The title implies a study of Harrison's scholarly self-fashioning. The first half narrates her early London years, her initial exposure to archaeology, and her relationship with Eugenie Sellers Strong. A short deconstructive account of Harrison and the Ritualists dominates the center. The final chapter is concerned with the prolonged dispute between Harrison acolytes Hope Mirrlees and Jessie Stewart over her biographical legacy. It is not clear who is inventing Jane Harrison, except Mary Beard.

The account of the London years will most interest archaeologists. The central question is how Harrison, a scholar who used archaeology extensively, mastered the discipline. Cambridge in her undergraduate years offered no classical archaeology (and she had no graduate archaeological education). She learned archaeology in an apprentice system with mentors, museum study, and travel. Even acting in plays based on classical themes played its role, bringing Harrison into contact with important archaeological figures. Beard provides an excellent insight into the London world of those classical dramas and their importance for Harrison.

Beard's discussion of other aspects of her archaeological apprenticeship is less satisfactory. None of Harrison's mentoring figures, like the archaeologist Charles Newton or the art historian D.S. McColl, is considered in sufficient depth. Harrison's contacts with continental scholars receive sporadic treatment. The influence of German archaeologists is stressed, but the extent and nature of their interactions is not made sufficiently clear. Harrison translated and edited works by French scholars such as Pierre Paris and Maxime Collignon, and she was clearly shaped by their approach to classical archaeology. Neither receives a mention in the Beard text. A discussion of the introduction of classical archaeology in the Cambridge classical curriculum proves interesting but irrelevant, for the reforms were instituted after Harrison left Cambridge.

A full and nuanced picture of Harrison's archeological education does not emerge, partly because Beard almost always keeps Harrison at center stage. Her teachers and mentors only play walk-on roles. Significantly, Beard is at her best when describing Harrison as lecturer or tutor, the teacher and not the pupil. This excessive highlighting of Harrison is accompanied by a rather tabloid-style consideration of her sexuality. Did she have an affair with Eugenie Sellers; how sexual was her relationship with Hope Mirrlees?

The handling of Eugenie Sellers Strong highlights some of the strengths and many of the weaknesses of Beard's narrative. Strong was a younger London contemporary of Harrison and much influenced by her. At some point they quarreled and parted. Both went on to distinguished archaeological careers. For a variety of reasons, bashing Eugenie Strong has been part of British patriarchal classical discourse for a century. Regrettably, Beard buys into it. Her account is at best grudging and often nasty. The picture presented here of Strong and her accomplishments is inaccurate and unfair: very little of her scholarship is discussed, and her positive impact on a great range of friends and followers is hardly considered.

The work's claim to originality is based heavily on the author's use of the Harrison and Strong archives in Cambridge. Much useful material has been discovered. However, Beard works from the postmodern concept of archives as the creation of people with agendas, and that frees her to shape material to suit her purposes. A photograph of Strong in the Strong archives with Strong's name written on it becomes a "mystery woman," possibly Jane Harrison, because Beard needs Harrison at that place at that time. Archival context is not sufficiently respected.

The limitations of this work are to be regretted, because Mary Beard knows a great deal about Jane Harrison and this formative period in British classics. A more complete and balanced biography is still needed, however, if we are to understand how the young Jane Harrison became one of the most archaeologically sensitive classical scholars of her age.

STEPHEN L. DYSON

CLASSICS DEPARTMENT
338 MFAC-ELLICOTT COMPLEX
UNIVERSITY OF BUFFALO
BUFFALO, NEW YORK 14261-001
CLDYSON@ACSU.BUFFALO.EDU

THE LAST NEANDERTHAL: THE RISE, SUCCESS, AND MYSTERIOUS EXTINCTION OF OUR CLOSEST HUMAN RELATIVES, by *Ian Tattersall*. Pp. 208, b&w figs. 18, b&w ills. 3, color figs. 17, color ills. 105. Westview, Boulder 1999. $25. ISBN 0-8133-3675-9 (paper).

EXTINCT HUMANS, by *Ian Tattersall* and *Jeffrey Schwartz*. Pp. 256, figs. 124. Westview, Boulder 2000. $50. ISBN 0-8133-3482-9 (cloth).

These two handsome volumes address the ever-popular topic of human evolution from the vantage point of the two experienced scientists who hold the most extreme of all possible interpretations of past human variation. For them, any and all variation that can be observed in the past is taxonomic in nature. These are, after all, the authors who have found two separate species among the human mandibles from the Skhul site, Israel, and require three species to describe the two crania and the mandible from Dmanisi, Georgia. This taxonomic theme

is both the organizing principle and the main focus of the books, and it sets up a basic tension in the volumes since, for the most part, taxonomic variation is not evident in the excellent illustrations.

Although these volumes focus on the Neandertal issue, a question of the late Pleistocene inhabitants of Europe and western Asia, they take the opportunity to illustrate many of the best-preserved fossil humans from earlier times. These images are superb, among the best ever to be published. Their only drawback is an occasional mislabeling. For instance, in *Extinct Humans*, figure 24b shows the Hadar mandible AL 400-1 and labels the anterior premolar as having a single cusp, when it is actually bicuspid; figure 56 illustrates the East Turkana cranium KNM-ER 3732 and misidentifies it as "either *Homo erectus* or *H. ergaster*," when it is obviously similar to KNM-ER 1470 (although smaller), and therefore is one of the best examples of *Australopithecus rudolfensis*. These are books where anatomy is all-important, the basis for explaining everything, and yet the authors quite incorrectly assert that some Neandertal chins are actually not chins, and that the matrix on the internal border of a Neandertal nose is actually its anatomy.

These errors reflect the fact that the only significant problems with these books are found in the words. Many of them are misleading or downright wrong. For instance, consider the books' titles, which arguably contain the least misleading words: of course, there are no more Neandertals, so at least in theory, there was a "last" one, and since all prehistoric human populations are extinct, who could disagree with "extinct species"? But something more is meant by this use of "extinct." Tattersall does not mean "last Neandertal" in the sense that there was a last Mohican, but in the sense that there was a last dodo. Neandertal extinction without descendants is indeed mysterious to these authors, as it would be to any observers who can believe that a population that looks and behaves like other human populations somehow can't have been one.

All in all, the treatment of this issue recalls the public outcry to the documentary called "The Last Tasmanian"—an outcry over land rights issues raised by the many inhabitants of Tasmania who trace part of their ancestry to the Aboriginal Tasmanians, and who believe that the "one drop of blood" criterion should work *for* them, for a change. This is not different in principle from the outcry that might be heard over these volumes from the many inhabitants of Europe who could trace part of their ancestry to the much more ancient Aboriginal Europeans—that is, Neandertals. According to a genetic analysis by Rosalind Harding, included among the inhabitants with such a grievance would be all Europeans with red hair and freckles. Her work reportedly shows that the mutation for these uniquely European characteristics is much older than the earliest "modern" Europeans. This implies the mutation was either native to Europe before Europeans became modern, or that the first modern Europeans carried it into Europe. Harding believes the former, that this mutation originated within the earlier Neandertal populations, because the extreme depigmentation that comes along with the mutation would be disastrously maladaptive in a tropical or subtropical setting, where Tattersall and Schwartz believe modern Europeans came from. (This is not a personal issue—neither Tattersall nor Schwartz nor I are redheaded or freckled.)

For readers who neither know nor care about the specific details of human evolution, these coffee table volumes stand virtually unsurpassed. For others, including many who read this journal, who are more in the know and are unable or unwilling to explain the inexplicable to guests who might examine these handsome volumes and question the words in them, there is a problem because these illustrations bear eminent and convincing witness to the record of evolution in a widespread human species. They show the clear distinction between the time when only australopithecines lived, in their great variety of species, and the time when a single lineage of *Homo* dispersed widely and developed geographic variation akin to the variation of today. The illustrations show the combination of persistence for local features across vast spans of time, and the great similarities of evolutionary change everywhere.

The choice is whether these similarities are magical, or have an evolutionary explanation. This returns us to the all-important role played by anatomy. The underlying precept in these volumes is that species are underidentified, so that a conservative approach is to regard any anatomical difference as a taxonomic difference. The result of this approach, however, is a taxonomy clearly framed in these volumes that obfuscates evolutionary process. This is not because of the mistakes and misidentifications described above, but because the approach denies the possibility of any evolutionary explanation for variation, since if all variations require taxonomic recognition, how could any evolution occur within taxa? Perhaps this is the case—a graduate student was once overheard muttering "What's wrong with circular reasoning, it makes sense!"—but on the chance there is something to the notion that microevolution is a significant force of change, that evolution is actually caused by selection, mutation, migration, and drift, perhaps we should consider the possibility that pictures speak louder than words.

Milford H. Wolpoff

department of anthropology
university of michigan
ann arbor, michigan 48109-1382
wolpoff@umich.edu

The Archaeology of Animal Bones, by *Terry O'Connor*. Pp. ix + 206, figs. 31, ills. 25, tables 18. Texas A&M University Press, College Station 2000. $34.95. ISBN 0-89096959-0 (cloth).

There are regrettably few books written within the discipline of zooarchaeology that do not fall into the category of manuals, and so the prospect of a work of review and critique by one of the leading practitioners and debaters in the field is eagerly welcomed. O'Connor sets out his position early: his text will be opinionated, and he expects his readers to challenge his views. These are refreshing words to find in the preface, and the reader is primed to expect some healthy argument on the scientific, and perhaps nonscientific, methodologies and

interpretations that are dear to the hearts of animal bone analysts. If anyone is prepared to shoot some of those sacred cows, in the nicest possible way of course, then O'Connor may be the one to do it.

And to a large extent he has succeeded, as in his rational discussion of the deficiencies in the quantification methods applied to animal bone assemblages, and his warnings of the inadvisability of using certain biometric data. His critical examination of the methods of aging animal remains is succinct and accessible, even to those who may not be involved in hands-on analysis. In these chapters, which are essentially concerned with procedures, O'Connor has brought together most of the current literature and presented his well-considered arguments in a highly readable fashion, and the inclusion of his own case studies is an excellent illustrative strategy.

Although the book is about animal bones, only rarely are animals themselves presented. O'Connor is straightforward about his premise—he states clearly that his book concerns the means of, and reasons for, studying the scraps of bone that represent meals, pets, vermin, and the web of relationships that humans make with other vertebrates. His aim, he says, is to show why this field of scholarship is important. Nevertheless, the majority of his readership is likely to be students and other archaeologists who perhaps have had no direct interaction with domestic animals beyond modern popular pets. By rarely invoking the reality of archaeological domesticates, he may be reinforcing the tendency for people to see cattle, sheep, and pigs in terms of our modern, highly bred animals, and most archaeological animal bone would not reflect these stereotypes. An opportunity has perhaps been missed here to encourage readers to consider the wide differences between our modern perceptions and the actuality of domestic beasts of the past.

O'Connor's stated task, however, is to draw attention to the value of faunal evidence in defining human behavior, and in his later chapters where he deals with the processes of interpretation, he brings together a wide range of studies that show just how pertinent this evidence can be. It would have been useful if the chapter on climate, environment, and small mammals could have been longer and more comprehensive, as this is an area much neglected until recent years, but one that is now attracting greater scholarly interest and consequently producing exciting results. But that criticism apart, O'Connor's review is extensive and raises some compelling arguments for more integration of faunal studies with other lines of archaeological investigation.

This book will, of course, be on the reading list of every student undertaking any sort of environmental archaeology study, and it will thus exert a considerable influence. So it is most fortunate that O'Connor has produced a quality work that will justify the level of citation it is certain to achieve.

Kate Clark

department of archaeology
university of southampton
southampton so17 1bj
united kingdom
kate.mclark@virgin.net

An Archaeology of Natural Places, by *Richard Bradley*. Pp. vii + 177, figs. 38, pls. 12, tables 6. Routledge, London 2000. $75 (cloth); $24.99 (paper). ISBN 0-415-22149-8 (cloth); 0-415-22150-1 (paper).

This is an excellent book and a pleasure to read. It is well produced and affordable (in paperback). As with his other books, Richard Bradley brings a simple concept to life by weaving an interesting narrative based on field and ethnographic data. In many respects this is a complementary volume to his *Significance of Monuments* (London 1998).

The book's premise is that many natural places have a sacred character that transcends time and culture. It has three parts: an introduction to the concepts (with ethnographic references to the Saami [Lapps] in Finland and the observations of the second-century A.D. Greek traveler Pausanias); then explorations and field data; and finally interpretations. Throughout, the diversity of emphasis on northwest Europe, the classical Mediterranean, and the British Isles reflects the author's wide-ranging scholarship.

In order to ensure a dependable food supply of reindeer, fish, and birds, the Saami of Finland dedicate their sacrifices to natural forces, divine masters of the animals, and the supernatural rulers of different regions, and they associate these sacrifices with the exploitation of the natural landscape. Certain places in the landscape, therefore, have special significance for the ritual calendar, and that significance is extended and reflected in the domestic sphere through the organization of space in the Saami tent.

Bradley then considers the classical world of Pausanias, where the commonest natural feature ascribed a sacred character is the spring, but Pausanias also mentions other sacred places. Caves were important as they linked the outer world with the chthonic; similarly, the seashore defines the edge of settled land. People apparently saw marginal or liminal zones as links between worlds, and they often used shamanism as a vehicle to perceive and envision a place and its origins and appropriate activities. Many landscape features thus inherently have special powers and can play a role in a mythical narrative, to be interpreted and reinterpreted over generations.

Bradley contends that the archaeological potential of unaltered places can be seen as a new form of landscape archaeology. Natural locations, like those for Stonehenge or Newgrange, could have had a long-established cultural importance before the sites were developed and received monuments. I suspect that many of us would subscribe to this view—there is something about certain places that seem to lead to their choice as a monumental or burial site. Without knowing the vertical and spatial mosaic of vegetation that may have been present at the site of Stonehenge at the beginning of the third millennium B.C., we find it difficult to comprehend what made it special. Without referring to shamanistic cosmology, what gave this place significance may have been, for all we know, a particular arrangement of woodland, a natural clearing frequented by red deer, a crossing point of hunter-gatherers, the site of the first successful wheat crop,

or any other concurrence of ideas, spirits, vegetation, or movements of people and animals.

Bradley borrows some elements for his thesis from C. Tilley's *Phenomenology of Landscape* (Oxford 1994), which attempts to recreate perceptions of individuals in the past, and from C. Richard's "Henges and Water" (*Journal of Material Culture* 1 [1996] 313–36), which suggests that natural features associated with water were responsible for the location of ceremonial sites such as late Neolithic henges in Britain. Bradley takes such ideas and moves the discussion one level further; he suggests that it is possible to assess the significance of place, whether marked by monuments or not, provided that the area being analyzed is near areas that do have archaeological material.

In part two, Bradley investigates, through case studies, where votive objects are deposited, the locations of rock art, the production sites of artifacts, and the relationships between monuments and natural topography. The importance of a specific place can be seen in the way artifacts were treated and how and where they were deposited. One must consider the biography of the artifact itself (cf. M. Shanks and C. Tilley, *Re-constructing Archaeology* [Cambridge 1987]), as well as the circumstances of its deposition (cf. J.D. Hill, *Ritual and Rubbish in the Iron Age of Wessex* [Oxford 1995]). This can be seen at Flag Fen (F. Pryor, *Antiquity* 62 [1992] 439–531), for example, where hundreds of artifacts were deliberately broken or deformed prior to deposition in shallow water on the edge of a fen embayment next to a timber avenue. Indeed, some artifacts were so poorly made as to suggest that they were made specifically for deposition.

Bradley looks in some detail at Galician and schematic rock art in the north of the Iberian peninsula. There seem to be connections between the images themselves and a multitude of factors, including their location in the landscape; the accessibility of the designs, both physical and intellectual; their integration and relationship with the wider settlement pattern; and their treatment in later periods. One of Bradley's central themes is that the places selected must have had significance before the rock art was created—the Saami, for example, select a site because the natural terrain resembles a living creature, often a god.

What do monuments do to the places where they are built? Establishing the significance of a place transforms how it is experienced. The character of a place can be changed by the scale of a monument sited in it, by the workforce that builds the monument, and by layers of meaning added to the place through years of use. One such layer of meaning is the cultural biography of the artifacts used at a site, including the significance of where and how they were manufactured, how they came to the site, how they were used at the site, and finally how they were deposited.

Another layer of meaning is the transformation of the site's significance over time, in many cases well into completely new and different cultural periods. This aspect is often overlooked—earlier prehistoric landscape studies tend to be dominated by the monument rather than its situation and change in meaning over time. Bradley cites a notable exception in the Wessex Linear Ditch Project (R. Bradley, R. Entwistle, and F. Raymond, *Prehistoric Land Divisions on Salisbury Plain* [London 1994]): their investigation of extensive Iron Age ditch systems across the Salisbury Plain revealed structured deposits in their already recut basal fills, much like that seen at contemporary settlement and hillfort sites. These boundary ditches were sited in a landscape that was already well developed, and seem to relate to particular round barrows, perhaps following older land divisions whose significance was ensured by the presence of the dead. Here there are links between boundary, death and occupation, burial, deposition and offerings, all creating margins in the landscape.

If we are to develop Richard Bradley's ideas, we should reexamine already well investigated areas whose archaeological remains are extensive, both geographically and diachronically. Central to this is our inability to really imagine, let alone accurately describe, the spatial and vegetational depth and variability of landscapes through time in which sites were set. Our models for prehistoric landscape change are still relatively simplistic and rooted in conventional patterns. To break free of this straitjacket of poor resolution of landscape data, field archaeologists need to continue to develop a detailed holistic paleoenvironmental approach that investigates not only the site itself but its immediate hinterlands. Some archaeologists are already doing precisely this; see R. Cleal, K. Walker, and R. Montague, *Stonehenge in Its Landscape* (London 1995); B. Bender, S. Hamilton, and C. Tilley, "Leskernick," *PPS* 63 (1997) 147–78; S.E. van der Leeuw, *Understanding the Natural and Anthropogenic Causes of Land Degradation and Desertification in the Mediterranean Basin* (Luxembourg 1997); P.V. Castro et al., *Aguas Project* (Luxembourg 1998); and C. French, H. Lewis, M. Allen, and R. Scaife, "Palaeoenvironmental and Archaeological Investigations on Wyke Down," *Proceedings of the Dorset Natural History and Archaeological Society* 122 (2000) 53–71.

I enjoyed this book immensely, and missed only some evocative photographs of Bradley's special places. Everyone interested in the development of landscapes and prehistoric archaeology would be well advised to read it for the insights and visions that it generates.

Charles A.I. French

department of archaeology
cambridge university
cambridge cb2 3dz
united kingdom
caif2@hermes.cam.ac.uk

Ancestral Geographies of the Neolithic: Landscape, Monuments and Memory, by *Mark Edmonds*. Pp. xi + 173, b&w ills. 64. Routledge, New York 1999. $85 (cloth); $25.99 (paper). ISBN 0-415-07677 (cloth); ISBN 0-415-20432-1 (paper).

"Hambledon Hill. A chalk dome with three great spurs that rises between Child Okeford and Shroton in Dorset. Cretaceous. Marine life made geology by pressure and time. Crows wheel above slopes that shift." The style is very 1990s, reminding me of Irvine Welsh: "It was me and

Jamieson. Just me. On this journey, this high speed journey through this strange land in this strange vehicle. Just me and Sandy Jamieson. But they were trying to disturb me, trying to wake me; the way they always did." This book is a high speed journey (154 pages of text and a curious postscript) through a strange land (the British Neolithic) in a strange vehicle (a book). It will certainly wake some archaeologists.

The British Neolithic, well known as a peripheral spin-off of Gordon Childe's Neolithic Revolution, has been undergoing its own revolution in recent years. Childe's Neolithic, with permanent settlements of houses, domesticated crops and animals, pottery, polished stone axes, and formal burials, worked well in the Near East, pushing across central Europe with the Linear Pottery culture. It was dominated by economic change. Archaeologists studied the economics of it all during the 1960s and 1970s. Processualism was the dominant theory of the time. The problem was that archaeologists in England were having great difficulty actually finding the permanent settlements, houses, and even real evidence for domesticated crops at the start of the Neolithic. Our colleagues in Ireland were, however, having far fewer problems. They had settlements, houses, domesticated crops, and huge field systems. England, unlike Ireland, needed a different Neolithic. This realization came as archaeologists attempted to put the people back into processual archaeology's grand scheme of things. The individual was a key element of the postprocessual theories evolving in the 1980s and 1990s. How to put people back into the Neolithic was something of a problem if writing in the conventional scientific language of archaeology.

And so we return to this book. It addresses the two big problems of the British Neolithic. First, what was the British "Neolithic" if it was not the revolution in economics with all those funny "ritual" sites (causewayed enclosure, long barrows) being built because farmers had newly-found leisure. Second, how can the individual be put back into the Neolithic? The book essentially consists of two parallel narratives, one on Neolithic archaeology and the other a story book putting the people back into the "Neolithic." The associated illustrations parallel this divide, some being archaeologically conventional (plans with scales and north points or dead objects in situ with photographic scales), the others atmospheric (montages of piles of human bones, struck flint, or coppiced woodland). "The study of the past is an act of the imagination, bounded by convention and by evidence, but creative nonetheless."

Narrative one is the archaeology bounded by convention and by evidence. Here we see Mark Edmonds's interest in landscape archaeology coming to the fore. Landscape archaeology, although with new elements, is of course one of the great traditions of British archaeology, led by people such as O.G.S. Crawford and Sir Cyril Fox in the 1920s and 1930s. The "new" landscape archaeology was theoretically underpinned in the late 1980s and 1990s. Clearly Neolithic peoples in Britain, as elsewhere, were embedded in their landscapes. They knew their hills and valleys, their rivers and lithic sources. They knew their woodlands and paths. They knew whom to visit and whom to avoid, where to visit and where to avoid, and when.

Most of England is deforested today. The importance of woodland is the core of chapter 3, and the chapter title, "Ancestral Geographies," is reused in the book's title. This emphasizes a recurring theme in the book. Neolithic landscapes, like ours today, are lived-in landscapes with histories "filled with the voices and wisdom of those that have gone before." These ancestral geographies are reflected in the monuments discussed, flint mines, causewayed enclosures, and long barrows. Long barrows trace ancestral histories back to the houses and villages of central Europe. Enclosures map social geographies.

Narrative two is pure imagination. Every other chapter is a story. "Her father knew. The vessel went back to when his father's bones had been raised, when he had given meat to all the clan. That had been a powerful time." The stories bring to life themes from the chapters bounded by convention and by evidence. What did it feel like to find and knap flint, to bury the dead, butcher animals ("breastbones cracked"), or feast after marriage ("it would be dawn before the last head felt the earth")?

So what is it all for, who is it all for, and does it succeed? This is a logical step in the way British Neolithic studies (and prehistory in general) has been going over the last 30 years or so, since, as David Clarke suggested, "archaeology had lost its innocence." Since then, we also seem to have lost our nerve. This is one of a series of recent British publications that have tried to regain that nerve. Much of the excitement of archaeology had been lost in the test tube, with much of the best popular archaeological writing being done by nonarchaeologists.

This book merges serious archaeology with imagination and as such rekindles enthusiasm for the Neolithic. It will annoy some. Like this review it has no in-text references—you may never be able to find my quote from Irvine Welsh. I doubt if this will worry most readers, but students newly entering the Neolithic may not know where to go next. Do not let this put them, or you, off. This is not what this book is all about. It is about presenting archaeology. As a new approach, bedded in a developing discipline, it succeeds. Go and buy one and try it yourself. If you do not like it you could always return to Irvine Welsh. I suspect, however, that Mark Edmonds's *Ancestral Geographies of the Neolithic* will become a classic, if not in Neolithic archaeology, at least in the history of archaeological theory.

Peter Drewett

institute of archaeology
university college london
31-34 gordon square
london wc1h opy
united kingdom
p.drewett@ucl.ac.uk

Rethinking World-Systems: Diasporas, Colonies, and Interaction in Uruk Mesopotamia, by *Gil J. Stein*. Pp. xvi + 207, b&w figs. 24, tables 4, map 1. University of Arizona Press, Tucson 1999. $40. ISBN 0-8165-2009-7 (cloth).

Striking a balance between approaches that provide general, comparative analytical frameworks and those that

stress the idiosyncratic historical development of certain regions or groups is a daunting task. It is this difficult theoretical terrain that Stein tries to navigate. To his credit, he manages to present a strong case for an approach that gives considerable attention to indigenous peoples, while avoiding the relativistic traps of postprocessualism. In this brief volume, Stein demonstrates that sound, empirically based research of a comparative nature can give proper attention to the role of individuals in social systems. This is a stimulating study from beginning to end and deserves the widest possible audience.

Stein's goal in this book is twofold: first, to examine critically the world-systems theory (WST) model as it applies to archaeology, and second, to recommend two complementary models (trade-diaspora and distance-parity) as more appropriate to the preindustrial contexts within which most archaeologists work. He undertakes the former task in the first three chapters, and the latter in chapters 4–8. Chapter 1 positions the debate in the idiom of interregional interaction and secondary state formation; Stein argues that the term "system" implies regularities and structural forms that belie the actual heterogeneity, and indistinct nature of boundaries, characteristic of many cultures. Basically, he argues that the generalizing world-systems model obscures the important variation between societies.

Chapter 2 provides a fine review of WST, and some of the central criticisms of the approach. Stein identifies three key assumptions that underlie the world-systems perspective: centralized control by the core, core regulation of unequal exchange in its favor, and long-distance trade that determines the character of the economy in the periphery. In the critique that comprises the second half of the chapter, he notes various instances in which these fundamental notions do not hold. While these criticisms are certainly true for Wallerstein's initial formulation, Stein uses a broad brush to dismiss the various revisions, which he suggests eviscerate the approach, making it untenable. This judgment seems somewhat hasty, especially since there is insufficient consideration of some important ideas of Chase-Dunn and Hall, even though he mentions their efforts. Stein moves this important discussion to the use of WST in archaeology in chapter 3, where he argues that the efforts of various scholars to use the approach have repeatedly demonstrated the deficiencies of the model. Once again, he is correct in stating that the archaeological record often confounds the basic assumptions of Wallerstein's model; he skillfully pulls together a number of examples that show how ancient states were unable to control activities in the peripheries. He does not acknowledge, however, the way that Chase-Dunn and Hall's distinction between core-periphery differentiation and hierarchy would address many of the concerns about the role of people in the periphery as active agents of change.

In the next two chapters, Stein presents his own remedy for the problems he has identified. He makes a strong case for the utility of the trade-diaspora and distance-parity models as alternatives that are sensitive to both the general and historically/culturally specific events that structure interaction. In a trade-diaspora, a concept developed by Abner Cohen, a tightly organized group of foreign merchants engage in substantial commercial activities with, while preserving their social, ethnic, and perhaps religious separation from, a host community, and concomitantly associating with others who share the same cultural identity. Using a good array of ethnographic and historical evidence, Stein demonstrates that such communities fall along a continuum, from minor players who are tolerated by their hosts to powerful groups that dominate the indigenous population. The distance-parity model that Stein proposes suggests that the ability of the core to exercise its will (i.e., power) over its periphery declines as distance from the core increases. In chapter 5, Stein lays out clearly the archaeological implications of these two models compared to WST, and what the material correlates should be in each case. This section is an exemplar of how to put theoretical concepts into operation so that one can translate abstract notions into archaeological interpretation. As Stein notes, what one needs to explore these issues is an area with site components that begin prior to external contact and persist through the period of interaction.

Chapters 6 and 7 offer the case study to evaluate the models. Chapter 6 provides the general background. Stein first examines the archaeological evidence for the emergence of civilization in the southern Mesopotamian alluvial plains and then discusses the Uruk expansion (3700–3100 B.C.), during which Mesopotamian colonies were established in the Zagros region and the upper reaches of the Tigris-Euphrates drainage. Through the examination of remains at sites like Habuba Kabira, Godin, and Tepecik, Stein argues that southern Mesopotamians settled along well-known routes, and that their relations with local polities varied. He then describes the Late Chalcolithic polities of southeast Anatolia, such as Arslantepe, that have evidence for craft specialization, monumental public architecture, and administrative artifacts (stamp seals and sealings). With this material as background, Stein examines Algaze's claims for an Uruk world system and finds them wanting.

In chapter 7, Stein turns his attention to the site of Hacinebi Tepe to explore how these larger processes played out at a secondary center. His excavations at this site in the Taurus piedmont zone revealed two major periods in the fourth millennium B.C.: phases A and B1 before any major interaction with Uruk Mesopotamia, and phase B2 when a southern Mesopotamian enclave existed at the site. He argues persuasively that precontact Hacinebi was a chiefdom, with some substantial public architecture, an extensive regional trade network (exotic goods include copper, cowrie shells, and chlorite) to obtain prestige goods, and administrative and social ranking. A generalized agropastoral strategy characterized subsistence. Craft production was widespread throughout the community, so Stein suggests the existence of a dual system in which small-scale specialization was an adjunct to domestic production.

The archaeological data for the contact period reveal considerable continuity, despite the presence of southern Mesopotamians whom Stein identifies on the basis of Uruk style pottery, imported bitumen, cylinder seals, and other elements. He argues that the two communities, living in the same settlement, maintained completely

distinct ways of life; the faunal remains indicate that the two groups even processed food differently. Each group stayed true to its cultural roots with minimal interaction despite the physical proximity, and the two enjoyed seemingly peaceful relations over a period of three to four centuries.

Stein does an excellent job of pulling together the various lines of evidence in a tightly argued chapter. He concludes that the available evidence strongly supports the trade-diaspora and distance-parity models; he suggests that the Uruk colonists had minimal influence on the local residents, as one would expect since the outsiders were a distinct minority a great distance from their homeland. Furthermore, he implies that the colonists were at the site only at the sufferance of the locals, who selectively adopted only those foreign elements they found particularly useful. I agree with this assessment and have found evidence for similar actions by local people confronted by intruders in the North American fur trade and ancient Cyprus; I applaud Stein's demonstration of the fact that people on the periphery can negotiate the terms of their involvement in exchange networks.

The final chapter succinctly summarizes the key points. Stein revisits his criticism of WST assumptions and the reasons he believes that his models are better alternatives. In a good concluding statement, he also indicates how the models may help guide future research. In particular, such thinking promotes research that sees how influences flow in two directions in contact situations. He also calls for more nuanced consideration of variation in the archaeological record.

From a technical standpoint, the book is very well produced, with only a handful of minor typographical errors. The photographs and drawings are all sharp and instructive; a few of the captions could be more detailed. The tables nicely summarize the key data.

Stein has developed two highly useful models to further our understanding of interregional interaction. I disagree with his contention that we should dispense with the world-systems model—the various refinements of WST over the past several decades have augmented, not diminished, the approach. This general matter aside, there are some specific points in the book with which one could take issue, but these in no way detract from the importance of Stein's contribution. Here is a book that all scholars of the past should read. The judicious use of comparative material and the abundance of site-specific information should satisfy the generalist and specialist alike. The writing is elegant, and the arguments well presented. This fine combination of theory and data advances the dialogue on interaction studies and would work well as a text in upper level undergraduate and graduate classes.

P. Nick Kardulias

department of sociology and anthropology,
and program in archaeology
kauke hall
college of wooster
wooster, ohio 44691-2363
pkardulias@acs.wooster.edu

The Archaeology of Geological Catastrophes, edited by *W.J. McGuire, D.R. Griffiths, P.L. Hancock,* and *I.S. Stewart.* (Geological Society Special Publication 171). Pp. ix + 417, figs. 263. The Geological Society, Bath 2000. $132, £79. ISBN 1-86329-062-2 (cloth).

This volume's 28 articles are meant to "address the archaeological identification and cultural significance of large-scale geological events, mainly earthquakes and volcanic eruptions." As part of that aim, the book hopes for more interdisciplinary cooperation among geologists and archaeologists. The various articles achieve this goal to differing extents: the exposition of how geology can aid archaeology is in places outstanding, but this is more the exception than the rule.

Over the last 20 years, the new field of environmental geology has appeared, "the branch of earth science that studies the entire spectrum of human interactions with the physical environment." (E.A. Keller, *Environmental Geology* [Upper Saddle River, NJ 2000] 4). The "geoarchaeology" of the current volume falls under the rubric of environmental geology. Unfortunately, the volume under review offers no articles on, for instance, Krakatoa (and barely mentions it) or volcanic mudslides or tsunamis, all of which strike me as geologic catastrophes. I hope the omissions will be covered in later volumes.

The writers focus on a wide range of locations, from Thera and Vesuvius to Turkey, Yemen, the Scottish Highlands, Alaska, Mexico, and Papua New Guinea. This geographical smorgasbord is interesting, with something for everyone. A few articles are devoted solely to seismic activity; by far the greater number settles down happily to volcanic events.

Four of the essays are devoted to Thera, "arguably the most prominent geological catastrophe in the archaeological record." In the article on the eruption and its effects on Minoan Crete, J. Driessen and C.F. Macdonald assess the archaeological evidence in terms of possible seismic and volcanic effects. Much of this is a restatement of the authors' earlier work (*The Troubled Island* [*Aegaeum* 17, Liège 1997]) but no less welcome. Given a strong seismic earthquake some time before the eruption, the effects of the eruption itself—a tsunami (conceded to be smaller than first thought by earlier writers), visibility of the eruption from Crete, and climatic changes that must have made agriculture chancy for a few years—the authors conclude a profound societal stress. This stress likely led to the waning of Minoan culture and its absorption to some degree into the Mycenaean world.

On one point, the amount of Theran ash fall on Crete, Driessen and Macdonald could have made good use of the study, in the same volume, by J.R. Riehle, D.E. Dumond, C.E. Meyer, and J.M. Schaaf on the tephras of the Brooks River Archaeological District, including the 1912 Mt. Katmai eruption. These authors present known rather than postulated data. Isopach maps of the thickness of ash fall from the eruption reveal direct biological effects of the tephra. For eastern Crete, Driessen and Macdonald

suggest that Thera dumped an ash fall of "more than 15 cm, sufficient to cause substantial damage to crops, livestock, buildings and water supplies." But this is not in accord with observable data: the Katmai tephra caused such damage only when far thicker. Not that this necessarily invalidates Driessen and Macdonald's argument, but such differences must be addressed. The Katmai study suggests instead support for R.J. Blong's claim that Thera's tephra fall on Crete had minimal effect (*Thera and the Aegean World* 2 [London 1980] 217–25).

On a different subject, an implied caution to archaeologists (don't take written sources on faith) runs through several of the articles; and in two of them that caution is overt. J.P. Grattan, D.D. Gilbertson, and A. Dill question a report of a low-intensity eruption of a dormant volcano in Germany in 1783, when a fissure eruption in Iceland covered much of central Europe with a dry, acid fog. Someone sent a letter to a local German newspaper describing the effects and products of a spurious volcanic eruption of Gleichberg, a dormant volcano near Schweinfurt. Although the description was detailed, there is no geologic evidence of an eruption at Gleichberg in the last two million years. The authors conclude the report is likely a hoax or possibly a misunderstanding. Archaeologists can draw an important lesson: if we can't trust a written report that is only 200 years old, what do we do with those 2000 years old? In their article on classical and archaeological evidence for earthquakes in central mainland Greece, V. Buck and I. Stewart compare the archaeological record with accounts by Strabo, Thucydides, and Diodorus Siculus. All are found wanting. As the authors say, their argument is to "illustrate the uncertainty that accompanies literary and archaeological information, and to highlight the need for caution when using interdisciplinary methods."

If we have to be skeptical about ancient written sources, how are we to treat the Delphic oracle? In what the book calls "perhaps the most intriguing proposal," authors J.Z. De Boer and J.R. Hale suggest a geological origin for the oracle. (The only catastrophe I can associate with Delphi is driving a camper there 30 years ago on mountain roads undergoing repair!) This is possibly the best article in the book, well written and fully integrating geology and archaeology. Moderns reject the ancient descriptions; the authors postulate that the Pythia inhaled bituminous gases, got into a mantic mood, and made her declarations. To understand how this came about, one needs the geologic description that precedes the archaeological. A major fault zone and a minor swarm of fractures intersect very near the site; these allowed ground water carrying hydrocarbon gases—from the same geologic horizon that provides the oil of the Middle East—to rise and be breathed. These gases, in sufficient concentration, should have mild narcotic effects.

This book does—and does not—accomplish its stated purpose; most of the articles are at least readable, but a few are dense enough to discourage even the informed expert. Nonetheless, on balance, I find the work impressive, both in its aims and its contents. A caveat: the archaeologist who does not have a geological background will find some articles difficult in places. But the benefits of seeing these two sciences cooperate make this volume worthwhile.

Les Cole

756 opal avenue
ventura, california 93004
lhcole@rain.org

Fragmentation in Archaeology: People, Places and Broken Objects in the Prehistory of South Eastern Europe, by *John Chapman*. Pp. xii + 296, figs. 42, maps 3, tables 27. Routledge, London 2000. $100. ISBN 0-415-15803 (cloth).

Not "a grand narrative in the Childen mode" (xiii), this is nonetheless a wide-ranging analysis of several millennia through the Mesolithic, Neolithic, and Copper Age, which draws on evidence from 10 countries of southeast Europe, Greece apart. At its heart lies a concern to put the material culture of these times and places center stage in the lives of people. This is played out by reference to the linked hypotheses of enchainment by fragmentation and of integration by accumulation. From very close attention to the condition, deposition, and character of material objects, linked to an interest in the treatment of the human body after death and in places as ancestral "timemarks," John Chapman is able to work through a series of powerful case studies. These range from the Neolithic and Copper Age sequence in southeast Hungary and the late Copper Age in northeast Bulgaria (ch. 5), to the differing worlds of the late Mesolithic of the Danube Gorges and the rise of the great tell at Vinča-Belo Brdo on the Danube just south of Belgrade (ch. 6). Based on impressively wide reading, sensitive both to anthropological theory and to the archaeological material itself, this is a distinguished and thought-provoking addition to the literature on the prehistory of southeast Europe. It should also cause reflection in other fields.

"Enchainment," taken from Marilyn Strathern's famous treatment of indigenous conceptions of social relationships in Melanesia, is an idea of linkage between people. The individual may not be self-contained, and objects associated with people may transfer something of their own and their previous owners' biographies when they come into new hands. Another important (though hardly in itself new) idea is that of deliberate or "structured" deposition, the conscious placing of material in chosen contexts, as opposed to the thoughtless or other abandonment of "rubbish." This is familiar from the mortuary record of the region, but Chapman builds a convincing case for the deliberate retention of material in the domestic sphere. By the time of developed tells (roughly, fifth to fourth millennia B.C.), such deposition had an important part to play in the network of associations of place, past and corporate groups that these sites may represent, and which the author therefore calls "timemarks." Pit-digging provides links with the ancestors (140), and burnt houses may represent contexts where material was deliberately accumulated to be added to the material substance of an ancestral past.

The further, fundamental part of the argument concerns fragmentation. Chapman invites us to reconsider the process of fragmentation, arguing not only that many objects were deliberately broken but also that their all-too-frequent incompleteness at the point of archaeological recovery is the result of deliberate retention, removal, and circulation of pieces elsewhere as part of enchainment. The related but opposed principle is that of accumulation, whereby whole objects, or objects forming sets, particularly from the onset of copper and gold metallurgy, are retained, constituting hoards, grave sets, and even the contents of houses to be burnt. Tension between these principles is seen as a major factor in the developed Copper Age contexts of the later fifth and earlier fourth millennia B.C.

This perspective encourages welcome attention to the materiality of this period and to the links between people, places, and objects. The general case for various kinds of linkage and enchainment, for the importance of place and timemarks, and for various tensions and shifts in relationships across the millennia, is powerful. One might have wished at the outset for a longer discussion of the nature of individuals, though Chapman is surely right to contest imposing modern, western conceptions on this time and area. The case for at least some deliberate breakage and deliberate deposition is strong, but the claim for deliberately created incompleteness will be controversial. Chapman is perhaps too ready to reject alternative (and simpler) explanations for the incompleteness of objects as recovered from many excavations.

The argument may be more convincing with selected, perhaps special objects, such as figurines and prosopomorphic lids. In the case of pottery, there are few examples where either enough excavation or sufficient post-excavation analysis has been done. Even at Endrõd 119, a small Early Neolithic occupation in the Körös valley of the Great Hungarian Plain, and one of the few detailed case studies available to support the hypothesis, analysis of pottery is in fact still in progress. The site was fully excavated by Makkay, but only to the edges of the alluvial ridge on which it lies. As the interim report made clear, the site was plow-damaged and excavated with the help of workmen (as far as I know without sieving). Surfaces survived only in the top of the largest subsoil pits. There are indications that pots from these contexts are more complete than those from the pits (pers. comm., Elisabetta Starnini). Other processes than deliberate human intervention must presumably be taken into account. Some of the other rejected hypotheses for the motives behind breakage and deposition may also have to be considered. The case may work better in earlier situations of mobility than in later contexts of more settled life. Nor is it entirely clear in particular cases how the "tension" between fragmentation and accumulation is seen to have been played out. One might comment that a sense of local agency is missing, overshadowed by these two near-universal principles.

Perhaps for these reasons, the focus in the longer case studies later in the book shifts noticeably away from fragmentation to place. Here the author continues themes he has already explored in a notable series of papers. This final discussion builds on these, adding for example the speculation that at Vlasac and Lepenski Vir in the Danube Gorges the ancestors became sedentary long before the living, and a demonstration of the rapid transformation of the site at Vinča from an interesting if unremarkable occupation to a regionally astonishing concentration of objects and ritual activity. It is perhaps in these ways that the links between people, objects, and places best come alive.

Alasdair Whittle

school of history and archaeology
cardiff university
p.o. box 909
cardiff cf10 3xu
wales
united kingdom
whittle@cardiff.ac.uk

Lerna: A Preclassical Site in the Argolid 4: The Architecture, Stratification, and Pottery of Lerna III, by *Martha Heath Wiencke*. Vol. 1, pp. xvii + 311; vol. 2, pp. xxv + 484. American School of Classical Studies, Princeton 2000. $90. ISBN 0-87661-226-5 (cloth).

Even after half a century, Lerna is still the key site for understanding the cultural development in the Early and Middle Bronze Ages in southern Greece. It is of great importance that the entire documentation for John L. Caskey's excavations in the 1950s is now being gradually published. This is the second volume with archaeological data, following J.B. Rutter's publication of the pottery of Lerna IV (EH III; Princeton 1995). It presents the stratigraphy, architecture, and pottery of Lerna III.

The first part of the book is devoted to architecture and stratigraphy. In the introduction we are reminded that as far back as his preparations in the 1960s for the final publication, Caskey had already established a four-stage ceramic division, Lerna III [= EH II] A, B, C, and D, which can be correlated with four building sequences. The most striking break in the sequence occurs between phases B and C, and is marked by radical innovations both within the pottery repertoire and architectural features. At the beginning, Wiencke deals briefly with the few sherds of EH I that date from before phase Lerna IIIA and are sporadic finds on the site.

Caskey's general scheme is retained in Wiencke's treatment with corrections based on the studies of stratigraphy and pottery that have taken place since his time; his scheme can now be substantiated, and Wiencke's study creates a firm foundation for evaluating the development of EH II in the northeast Peloponnese. In addition to Caskey's four main phases, Wiencke introduces in part 1 a series of subphases defined on stratigraphic evidence. Architecture and pottery (in part 2) are presented chronologically according to phase: Lerna IIIA early and late; B early, middle, and late; C early, middle, and late; and D.

From phase A no constructions are preserved, and it is known only from fills. For Lerna IIIA early, two deposits contain the greater part of the material, and Neolithic sherds, deriving from the first inhabitants of the site, are

plentiful in both. The definition of Lerna IIIA late is also dependent on fills no less mixed: fill A470 from trench AP contained 50% Neolithic sherd material (31), and layers in trench HTJ contained up to 60%. But the number of Neolithic sherds decreases as levels get closer to the first floor dated to Lerna IIIB early.

Lerna IIIB is considered to be a long and important phase with a chronology based on stratigraphy and habitation debris rather than fills. The scattered nature of the deposits, however, makes the reconstruction of the stratigraphic sequence difficult. The deposits are mostly located on top of the Lerna IIIA fill horizons and Neolithic layers. Strata with walls and floors from early, middle, and late IIIB are found only in test trenches, which were small and yielded few sherds. It is possible, however, to outline with reasonable certainty the characteristic pottery contents of Lerna IIIB early and middle. More contexts are at hand for defining late B. In addition to the stratified contexts, mixed deposits with A and B material are dealt with in some detail.

The stratification of Lerna IIIC is better documented with substantial walls, well-defined rooms, and floor levels related to the architecture. Phase C begins before the construction of the first corridor house BG: material from the beginning of early C derives from strata below BG. The house itself was evidently razed to the foundations in order to establish a level surface for the succeeding "House of the Tiles." During these operations the connecting floors were removed, and it is not possible to say with certainty if BG was built in early C (which is likely) or not until mid C. The house was probably abandoned in middle C. The best stratified material from phase C is found in the narrow rooms in the elaborate fortification system that was already established in early C (W-69, perhaps already in late B) and gradually extended during the succeeding phases. In addition, substantial floor levels with a rich repertoire of pottery were found in situ in rooms built inside and near the fortification walls.

Stratified pottery from phase IIID was recovered mainly from inside the House of the Tiles; these deposits, which actually define phase D ceramically, did also, however, contain elements of intrusions from earlier phases and even from Lerna IV (EH III).

A few points should be kept in mind concerning the reliability of the stratigraphy, and the various phases and subphases. First, the stratigraphy of Lerna III is difficult to interpret, especially since sections (no measurements are given) are not used to document the stratigraphy, but rather to illustrate the way the excavator explained the stratigraphy (9). Second, the excavation's understandable focus on the House of the Tiles meant that the lower strata are poorly illuminated, and the subdivisions in Lerna IIIA and, to some extent, in Lerna IIIB seem doubtful. It is furthermore regrettable that so much of the material excavated was discarded (ca. 75%), and for rather obscure reasons, before sufficient analysis and study (315).

Wiencke analyzes the architecture in detail, and she devotes a chapter to the House of the Tiles with a useful summary of its reconstructions and a distribution of the corridor house type and its significance. The construction of the fortification system is likewise presented in detail, but unlike the corridor houses, the study of the history and significance of this important feature is left for the future (649). One should finally note the lack of a comprehensive presentation of the tumulus covering the central part of the House of the Tiles. Since it may date to the succeeding period (Lerna IV), it may well be presented in a forthcoming volume.

The catalogue of pottery (part 2) is divided into phases, subphases, and contextual units as established in part 1. Under each heading, the pottery is presented by class (16 classes are defined) and shape (23 major shapes are distinguished). Fabric is indicated for individual sherds. The definition of classes partly resembles Rutter's classification of the pottery from Lerna IV with two major groupings: painted and unpainted. It is the opinion of the reviewer that Rutter's system functions better because fabric is given greater weight as a criterion in the separation of classes. Except for coarse ware, Wiencke's classes are, in principle, based on surface treatments. That the terminology is difficult to follow is shown, for instance, in table 4, where the classes are grouped inconsistently under the heading "Pottery Fabrics." In an important chapter (529–609), the development of pottery shapes is summarized, and their origins and geographical and chronological significance are presented. A series of tables summarizes the occurrence of shapes and decorations in the various phases; these tables are useful and illuminating even if the statistics, influenced by the rather fortuitous discarding of sherd material, are hardly reliable.

In a concluding summary, the subphases are outlined, and the characteristic features of the development of Lerna III are related to the larger historical framework established by recent excavations and studies. Thanks to Lerna, the period of the corridor houses is now firmly established as the first genuine protopalatial phase in southern Greece and neighboring islands. This was a period of monumental architecture, early systems of administration, specialized storage facilities, and specific building materials not to be found in this region until Mycenaean times.

How EH II came to an end is one of the important questions still remaining to be answered. In guarded terms, Wiencke supports Caskey's hypothesis of an influx of newcomers as the reason for the sudden fall of the culture. As several scholars have shown, the destructions at the different sites did not occur at the same time. Joseph Maran's recent contribution to the study (*Kulturwandel auf dem griechischen Festland und den Kykladen im späten* 3. *Jahrtausend v. Chr.* [Bonn 1998]) appeared too late to be included in Wiencke's study, but this reviewer is inclined, like Maran, to consider the beginning of Lefkandi I to be almost contemporary with the transition between Lerna IIIB and C, and thus to see the origin of the period of the corridor houses as connected to the Lefkandi I phenomenon in its earlier phases. There is thus hardly any reason to believe that newcomers bearing the cultural characteristics of Lefkandi I should have caused the fall of Lerna III, since it already was in existence for more than 200 years. As Maran emphasizes, one could point to several reasons for each of the radical changes that occurred between EH II and EH III, includ-

ing newcomers from the north and influences from across the Aegean. Weisshaar's "Übergangsphase" in Tiryns, however, could indicate a more gradual development to which the complex stratigraphy at Lerna may or may not correspond.

Most of the above criticisms can be ascribed to the fact that the excavations at Lerna were conducted almost 50 years ago. And Wiencke is not to be blamed for that. She has written a brilliant report on this important period in Lerna. The book is well arranged and clear in composition, easy to use. The descriptions of the stratigraphy and the architecture are precise, exhaustive, and straightforward. Related evidence (e.g., faunal and floral) is placed in its proper context. Even if one could fully discuss the principles of pottery classification, the catalogue functions well and the pottery is discussed thoroughly in the studies.

Wiencke's report on Lerna III will become the standard work for EH II in southern Greece and will be cited wherever in the Aegean and southeastern Europe this crucial period is studied. I join with previous reviewers of the Lerna volumes in saying that we look forward eagerly to the next volume in this magnificent series of publications.

Søren Dietz

ny carlsberg glyptotek
dantes plads 7
dk-1556 copenhagen v
denmark
sd@glyptoteket.dk

Pseira. Vol. 4, Minoan Buildings in Areas B, C, D, and F, edited by *Philip P. Betancourt* and *Costis Davaras* (with contributions by *Eleni Armpis, Eleni S. Banou, Philip P. Betancourt, Polyxeni Bougia, Costis Davaras, Heidi M.C. Dierckx, William R. Farrand, Cheryl R. Floyd, Paul Goldberg, Robert B. Koehl, John C. McEnroe, George Mitrakis, George H. Myer, Marianna Nikolaïdou, Lada Onyshkevych, Maria Parisi, David S. Reese, Mark Rose, Georgia Salpata, Werner H. Schoch, Eleni Velona, Charles J. Vitaliano, Dorothy B. Vitaliano, Fotini Zervaki,* and *Vasso Zographaki*). (University Monograph 105.) Pp. xxi + 346, ills. 75, figs. 59, pls. 38. University of Pennsylvania Museum of Archaeology and Anthropology, Philadelphia 1999. $72. ISBN 0-924171-74-X (cloth).

The fourth volume of the final publication of the excavations and restudy of Pseira considers a large number of buildings, probably all domestic in nature, that either formed part of the main occupation on the promontory to the north of the town square (area B), or are situated on the hill to the west of it (areas C, D, and F). Seager already cleared most of the architecture considered here during his 1906–1907 campaigns, but about 10 buildings or parts of them were re-excavated as part of the new research program. Drawings and photographs are of good quality, but this volume, like some of the earlier ones, too frequently repeats the names of specialists, suffers from too many subheadings, and seems to be unnecessarily wordy. Notwithstanding, the book is of course valuable for the inclusion of Seager's material, much of which is published here for the first time, including the fine MM IIB (Classical Kamares) and LM IB vases from building BE.

In general, the volume consists of a simple presentation of the evidence without much attention to interpretation and contextual associations, which we are promised in a forthcoming volume. The only exception is the detailed discussion of building BC, a construction that is unusual for the site because of the presence of eight ashlar bases, forming two *polythyra*, and for the gypsum paving slabs and dadoes, imported from the mainland of Crete, that make up the sunken area, which is provided with a drain. Betancourt suggests (44) that its proximity to building BS/BV or Plateia building—discussed in detail in *Pseira*, vol. 3 (Philadelphia 1999)—may imply that the two buildings acted as a unit. This is an interesting proposal, but it is not backed up by a detailed analysis of circulation patterns and architectural techniques.

For the rest of the volume, there are a few observations that are worth highlighting. For instance, it is argued in the introduction that the town was destroyed in LM IA and that the 38 buildings described here were mainly LM IB constructions, except building DA, which dates to LM IIIA-B, the only building hitherto identified that belongs to the reoccupation period. Interesting also is that some other Pseiran buildings reveal special architectural features, such as building BH, for which about 15 ashlar blocks and fragments were inventoried.

The most interesting feature discussed is the town square (area BR), an area with an irregular surface on which a *kernos* was found, similar to other open urban areas such as Malia and Gournia. The Pseira square differs from other Minoan examples by its irregular surface punctuated by large rocks. Davaras (169) uses this feature to reconsider the incorporation of natural features within Minoan urban landscapes. Indeed, sites such as Monastiraki and Gournia have open areas flanked by impressive natural features, which may have had religious and ritual connotations. In the latter cases, the surfaces of the courts, however, are flatter. A single, unusual stone arrowhead provokes the question: "Can this be an example of the weapons carried by those who attacked Pseira in LM IB?" (88). As such the question may raise an eyebrow, but Seager already assumed a hostile attack as the cause for the destruction of the settlement. The only evidence, however, was the discovery of some fine stone vases on a street, considered by Seager to have been "dropped by plunderers"—there are few traces of a burnt destruction (already noted by Pendlebury, *The Archaeology of Crete* [London 1939] 228) and no burnt human bones in the streets, unlike Mochlos [R.B. Seager, "Excavations at Mochlos," *AJA* 13 (1909) 301]).

Jan Driessen

département d'archéologie
université catholique de louvain
1348-louvain-la-neuve
belgium
driessen@arke.ucl.ac.be

Regional Mycenaean Decorated Pottery, by *Penelope A. Mountjoy.* (Deutsches Archäologisches Institut). Pp. 1,233, figs. 474, pls. 8, tables 2. Marie Leidorf, Rahden 1999. DM 275. ISBN 3-89646-011-0 (paper).

Over the past two decades, Penelope Mountjoy has emerged as the most productive scholar writing on the subject of Mycenaean pottery. From detailed studies of stratified ceramic sequences or individual deposits unearthed at sites such as Mycenae, Athens, Phylakopi, Thorikos, Asine, Rhodes, and most recently Troy, to assessments of larger regional assemblages recovered either by surface survey (in the southeastern Argolid) or by early excavations left only partially published (in Boeotia), Mountjoy's familiarity with the spatial variation in Mycenaean pottery over roughly six centuries is extraordinary. Her *Mycenaean Decorated Pottery* (*SIMA* 73 [Göteborg 1986]) is a valuable field manual for the rapid recognition and dating of Late Helladic lustrous-painted tablewares. With *Mycenaean Pottery* (Oxford 1993), she supplied students with a general introduction to the Late Bronze Age pottery of the Greek mainland that is more user-friendly than Furumark's bulky and intimidating classic *The Mycenaean Pottery* (Stockholm 1941), yet much more informative than Lacy's *Greek Pottery in the Bronze Age* (London 1967) or the even more summary treatments in other handbooks. With the pair of volumes under review here, Mountjoy has brought her unparalleled experience with the full spatial and temporal range of Mycenaean pottery to bear on the problem of identifying regional or even more narrowly localized peculiarities.

Mountjoy's approach to this topic is epic in scope, including capsule descriptions of over 4,000 vessels, most of them whole or largely restorable, and each illustrated by a high-quality line drawing. She organizes her presentation of this huge corpus of material according to 11 regions, each the subject of an individual chapter within which the coverage is subdivided initially according to sub-regions—either modern administrative units (nomes) or islands (except in the cases of Aegina, treated together with Attica, and Kythera, combined with Laconia)—and subsequently by period and then by shape (according to the sequence of Furumark's typology). Naturally enough, better-known regions such as the Argolid (474 entries), Attica with Aegina (660 entries), and Rhodes (281 entries) are represented by many more examples than less well-documented nomes such as Phthiotis (35) and Aitolo-Akarnania (39) or than understudied islands like Ikaria (2) or Andros (1). But already at this level there are some surprises: Phocis (323) and Melos (204) are abundantly represented, Arcadia (0) very poorly. Coverage is by no means limited to the pottery actually catalogued and illustrated, however, so that these numbers can be deceiving: despite the lack of published data from Arcadia when Mountjoy's book went to press, preliminary reports on the Mycenaean pottery found in the two major cemeteries of Palaiokastro and Vourvoura (Analipsis) nevertheless merited six pages in her text (294–9). The presentation of the decorated pottery of each subregion or island is preceded by a brief site gazetteer building upon, and updating as necessary (e.g., Kokla, Kalapodi), the listings in Hope Simpson and Dickinson's compendium of 1979. A phase-by-phase assessment of the pottery's general significance follows, in which important individual deposits are succinctly canvassed and significant developments noted. Within the ensuing regional catalogues, Mountjoy regularly cites in footnotes published examples of what she does not illustrate, thus ensuring that a full portrait emerges of each phase within every spatial unit surveyed. Locating all subregions and islands is facilitated by two large-scale maps, one for the Greek mainland and immediately adjacent islands (14, fig. 1) and a second for the further removed islands of the Aegean (861, fig. 352), while handsomely drawn maps placed at the beginning of each major geographical section locate sites within their mainland subregions or on their islands.

This is primarily a reference work, only the introduction to which (15–58) is likely to be of interest to the general reader. Here, Mountjoy presents, in summary form and in chronological order, the evidence for regional peculiarities in the pottery of each of 13 discrete phases beginning with LH I and ending with Submycenaean. Her coverage of each phase begins with a listing of the principal deposits which define it, continues with a sketch of that phase's "historical background" usually followed by an enumeration of the phase's "characteristic shapes and motifs," and then concludes with an assessment of the "regional styles" and typologically less extensive "regional preferences" that can be identified within it. Her treatments of a number of the phases feature special subjects conditioned by either historical or taxonomic circumstances peculiar to them. Thus for the earliest phases (LH I–IIA), she includes discussions of the "diffusion" of the new Mycenaean style. After reviewing Dickinson's division of decorated LH IIA pottery into two major classes, "palatial" and "domestic," she suggests that a third, termed "pseudo-Minoan," be wedged stylistically between genuine Minoan imports and Mycenaean "palatial" adaptations of them. She appends a special section on the distribution of the small number of decorative types that define the LH IIIB2 phase. But despite the potential significance of the subsequent "Transitional LH IIIB2–IIIC Early" phase as the first post-palatial stylistic horizon, she here omits the normal "historical background" discussion or any assessment of regional peculiarities. Her cumbersome terminology for this phase, virtually assured by its hybrid nomenclature to become a scholarly dumping ground for chronologically mixed deposits rather than pure ones, should be abandoned as soon as possible in favor of the designation originally proposed for it by this reviewer, "LH IIIC Phase 1" ("LH IIIC Pottery and Some Historical Implications," in *Symposium on the Dark Ages in Greece*, edited by E.N. Davis [New York 1977] 1–20). Alternatively, if the quadripartite (Early, Middle, Late, Submycenaean) schema popularized by Mountjoy for the LH IIIC period since 1986 is to be followed, then "LH IIIC Earliest" would be preferable.

A special section on the relative chronology of the LH IIIC period (38–41, table II) introduces the extensive coverage of the four phases that Mountjoy presently rec-

ognizes within it, understandably much lengthier than the sections devoted to the various phases of the Mycenaean palatial era [LH IIIA1–2, LH IIIB (General), LH IIIB2] because they witness more ceramic regionalism, even though the palatial and postpalatial eras are of roughly comparable duration. Whereas during the 15th and 14th centuries B.C. Mountjoy recognizes only two distinct regional styles, one characteristic of LH IIB Thessaly and Phthiotis and one of LH IIIA1–2 Phocis, and during the 13th century she identifies none at all, during the 12th and 11th centuries she isolates five in the LH IIIC Early phase, two in LH IIIC Middle, and two more in LH IIIC Late. It is the identification and characterization of such regional styles, whatever their date, that are the principal scholarly contributions of these volumes, along with the recognition of phases during which ceramic regionalism is negligible. It is not altogether clear from Mountjoy's presentation how the stylistic phases termed LH IIIB2 and Submycenaean should be viewed, since both can be considered as much regional styles as chronologically prescribed ones.

The sheer number of vessels catalogued and illustrated make these volumes an indispensable tool for future researchers. But just as all Mycenaean ceramic specialists have had to learn how to put up with some drawbacks of Furumark's massive typology of 1941, they will have to reconcile themselves to some minor failings of Mountjoy's opus. Her system of references is archaic, depending on all sorts of specialized abbreviations for books (8–11) and in the case of periodicals (7) regularly omitting any reference to authors. A useful set of concluding indices correlate the items catalogued here with their museum inventory numbers (1159–81), site proveniences (helpfully subcategorized by date and shape, 1182–213), and shapes (subcategorized by date and region, 1214–32). Regrettably, although understandably, there is no indexing of motifs. But there is also no general index, with the result that specialists interested in particular styles (e.g., Ephyraean, Zygouries, Close, Octopus) or in even broader categories such as pictorially decorated pottery will have to spend hours flipping through over 1,000 pages of catalogue. Finally, added white paint is rarely differentiated from unpainted areas in the drawings (thanks to faulty reduction by the press rather than to any oversight by the author), and the catalogue entries are usually too abbreviated to make clear where added white was applied. Such minor quibbles should not, however, detract from the fact that the catalogue, making up over 90% of the publication, is of superb quality, with copious cross-references and a minimal number of typographical errors and inconsistencies in presentation. Although a few important studies were published while Mountjoy's manuscript was in press (1995–1999), a greater number have in fact surfaced in the short time since her work appeared in print. But thanks to her preexisting familiarity with material already known from sites such as Prosymna and Medeon, and entire regions such as the Corinthia and the Ionian islands, only three excavation reports need be cited here as important supplementary bibliography: M. Jacob-Felsch, "Die spätmykenische und frühprotogeometrische Keramik," in *Kalapodi* 1, edited by R.C.S. Felsch, 1–213 (Mainz 1996); K. Kalogeropoulos, *Die frühmykenischen Grabfunde von Analipsis* (Athens 1998); and W. Güntner, *Tiryns* 12: *Figürlich bemalte mykenische Keramik aus Tiryns* (Mainz 2000).

With Mountjoy's magnificent assembling of information on Mycenaean painted pottery in hand, we now need a series of equally authoritative surveys of the unpainted fine wares, storage and transport vessels, and cooking pottery within these same regions. Will these sustain her identifications of localized ceramic traditions, require only minor modifications in them, or else contradict them in one or more important ways? Moreover, her coverage needs to be extended to the rest of the Late Bronze Age eastern Mediterranean, where painted pottery traditions closely linked to that which we call "Mycenaean" flourished for all or part of the period, most obviously Crete, but also central Macedonia, parts of the western Anatolian littoral and southern Italy, and the Levantine coast (especially Cyprus, Cilicia, and Philistia). Most importantly, the significance of the regional variability that Mountjoy has documented requires interpretation. For in comparison to the enormous collection of data contained in these two volumes, she has kept interpretation to an absolute minimum, although she has recently shown herself more than willing to explore some of the possibilities elsewhere ("The East Aegean-West Anatolian Interface in the Late Bronze Age," *AS* 48 [1998] 33–67). Such interpretation, however, will also require more extensive discussion of theoretical approaches to the evaluation of spatial variation in ceramics, as well as greater concern for precise definitions of, and meaningful differentiations between, such terms as "regional" vs. "local" and "style" vs. "preference."

Jeremy B. Rutter

department of classics
dartmouth college
hanover, new hampshire 03755
jeremy.rutter@dartmouth.edu

Towards a Hermeneutics of Aegean Bronze Age Ship Imagery, by *Michael Wedde*. (Peleus, Studien zur Archäologie und Geschichte Griechenlands und Zyperns 6.) Pp. 356, figs. 361, maps 3, tables 4. Bibliopolis, Mannheim 2000. DM 90. ISBN 3-933925-09-6 (cloth).

Un modèle d'analyse des figurations de navires dans le monde égéen à l'Age du bronze. M. Wedde, après ses études universitaires en Suisse et sous la direction, à Athènes, de Klaus Kilian et, à Mannheim, de W. Schiering, a révisé et publie ici une thèse soutenue en 1992.

En cinq chapitres, il justifie d'abord la démarche "herméneutique" de l'ouvrage, puis il évoque la question toujours débattue de la proue et de la poupe, il étudie les modes de propulsion, la structure de la coque, les accessoires de combat. Il réserve un autre chapitre à une éventuelle spécification du contexte cultuel et il termine par une réflexion sur l'apport de cette approche nouvelle, très en vogue aujourd'hui, à des problèmes souvent, mais pas toujours bien traités par les savants qui se sont intéressés à la marine créto-mycénienne, depuis les *frying*

pans de Syros jusqu'aux fresques de Théra en passant par tant de modèles réduits et de pierres gravées.

Un glossaire naval attentif, une bibliographie très complète, un catalogue bien illustré et classé complètent le travail.

On pardonnera (11 sq.) les critiques inspirées par la *New* ou la *Theoretical Archaeology*: l'auteur enfonce parfois des portes ouvertes, mais cela semble l'avoir aidé dans sa démarche (cf. sa propre bibliographie, 280) et cela peut aider aussi son lecteur—et lui-même n'est pas toujours dupe (voir la note, 12, n. 8). Les thèses qu'il résume (34) sur la *Pictorial analysis* sont très acceptables, dans la mesure surtout où elles insistent sur l'influence de la personnalité des créateurs, de leurs intentions et de leurs conditions matérielles de travail.

Le résultat est d'abord un classement chronologique des différents profils de navire. A vrai dire, il n'est pas moins discutable dans le détail que ceux des prédécesseurs (62). Prudemment, l'auteur évite donc un tel classement pour les modes de propulsion, pagaye, rame et voile: il se contente d'en esquisser l'évolution probable. Même prudence, après quelques pertinentes observations critiques sur la charpente des bateaux. Quant au développement guerrier de l'éperon, l'auteur discute avec précision les évidences offertes depuis Hérodote ou Thucydide par tous les spécialistes et il fournit une sorte d'excursus sur l'origine de la trière: il semblerait favorable à une certaine continuité depuis le Mycénien jusqu'à l'Archaïque à travers les étapes du Géométrique, mais il conclut, là comme ailleurs par un *non liquet*!

En revanche, c'est très fermement que Wedde rejette toute spécification des figurations de navires à usage cultuel ou rituel: il en établit avec raison le caractère banal et la ressemblance aux autres types de bateaux.

La conclusion générale est de déception. Après de nombreuses études et ces plus de trois cents pages de valeureuse méthodologie, l'auteur—de façon très scientifique, au fond—montre qu'il reste encore beaucoup à faire pour avoir une vision sûre de l'iconographie navale de l'Age du Bronze. D'où le titre de l'ouvrage: *Towards a Hermeneutics* . . . L'intérêt du travail est dans la qualité des analyses de détail, dans les classements et l'extension du matériel reproduit (370 exemples retenus, Chypre étant exclue).

Indispensable à toute bibliothèque universitaire intéressée à l'histoire navale et à la marine créto-mycénienne.

Henri et Micheline van Effenterre

boulevard de port-royal 70
75005 paris
france

Neolithic and Chalcolithic Pottery of the Southern Levant, by *Yosef Garfinkel*, with a contribution by *Claire Epstein*. (Qedem 39.) Pp. xx + 341, color pls. 4, b&w ills. 375. Institute of Archaeology, Hebrew University of Jerusalem, Jerusalem 1999. $60. ISSN 0333-5844 (cloth).

Garfinkel's book is at first sight a traditional typology of early ceramics from the southern Levant, spanning the Yarmukian through Ghassulian cultures. It constitutes at the same time, however, a Herculean effort at revising some long-established chronological ideas, published in a highly influential chronological overview by Ruth Amiran in 1969. The southern Levant has a long history of archaeological research, and Garfinkel draws a huge amount of material together, discussing the history of research in order to make his argument for a new subdivision of the Late Neolithic through Chalcolithic periods of the region. He even goes so far as to suggest renaming the well-known "Pottery Neolithic B" as "Early Chalcolithic." Such redesignations, even if wisely chosen, are not easily adopted because there is so much writing that relies on the older, traditional terminology.

The author treats each period separately. Brief notes on the Pre-Pottery Neolithic are followed by chapters on the Pottery Neolithic, Early, Middle, and Late Chalcolithic, and a general discussion that sums up the foregoing chapters and provides links between the relative chronology and absolute dates. The section on the Golan in the chapter on the Late Chalcolithic is written by Claire Epstein.

Garfinkel's general approach has a number of drawbacks, some of which are not to be blamed on the author. First, he relies on a concept of typology that determines types subjectively rather than through measurement of dimensions (diameter, wall thickness, rim angle). For example, the use of histograms for an empirically derived distinction between small, medium, and large vessels would be more appropriate than an arbitrary class division of D. 0–10 cm, 10–20 cm, etc. Quantitative analysis only comes into play in comparisons between assemblages. To a large extent, this results from old site publications that do not include adequate statistics for a more sophisticated approach.

The focus on shapes, rather than on different ways of making vessels—as apparent in paste, shape, and decoration—precludes the incorporation of body sherds into the typology and makes the volume less useful as a reference for an excavator than it could be: finding complete vessels in excavations is the exception, and reconstructing whole shapes from small bits of rims and other "diagnostic" parts is hazardous. Again, this problem is in part a result of the necessity of working with old site reports that focus on complete vessels rather than the more quotidian finds of "diagnostic sherds." I find the author's inclusion of much material from old site reports with all their weaknesses admirable, since this enhances the quality of the book as an overview; methodologically, however, the reliance on complete vessels is a drawback.

Distribution maps overemphasize regional boundaries. For example, the Ceramic Neolithic map suggests that a site's pottery is either entirely constituted by Yarmukian Ware, *or* by Jericho IX, *or* by Nizzanim Ware. Is there no overlap in site assemblages that contain a certain amount of sherds with decoration or shapes in Yarmukian as well as Jericho IX style? An inspection of forms occurring in all three Ceramic Neolithic "wares" as described by the author reveals considerable similarities. To put it simply, a comparison between sites (or any other units) should not only take into account differences, but also similarities. As a result, regional bound-

aries would appear more flexible and open; probably nearer to past social realities.

The author has a deep knowledge of all the sites he includes in his work, and he discusses, in an informed way, important problems of the stratigraphy of many sites, with Jericho as his most important. However, he leaves the reader somewhat in the dark about his own methods of analysis. We are not told what the criteria were for the choice of "key sites" that form the basis of this work (Munhata, Sha'ar Hagolan, Jericho, 'Ein el-Jarba, Abu Zureiq, Tel 'Ali, and Beth Shean XVIII). I would also have liked to see some other items included in this discussion. Is the occurrence of fan scrapers, adzes, and basalt vessels unimportant to a chronology or chorology?

The inclusion of absolute dates in this book is laudable. The large number of sites and strata excavated and discussed stands in contrast to the small number of ^{14}C dates. This is a general problem with Levantine and Near Eastern archaeology in general, and in no way the fault of the author. New methods, such as AMS dating and the statistical evaluation of radiocarbon dates, could help enormously in the task of chronological ordering. But this needs a switch in archaeological *Zeitgeist* and a better appreciation of the increasing exactitude of such methods.

Garfinkel's supraregional comparisons are not always convincing. While absolute dates prove that Wadi Rabah ware is contemporary with part of the Halaf period, the author's general approach to typology—focusing on shapes rather than decoration or paste—leads him to overestimate similarities in simple, widely occurring ceramic forms. Considering the elaborate and highly distinctive decoration of Halafian ceramics, I find it difficult to conclude that the Wadi Rabah culture is, as the author would like it, a "Levantine Halafian." For another period, the Late Chalcolithic, I would have expected a hint at functional and morphological parallels, however vague, to Uruk sites in Syria. For example, jars with four vertical lugs are similar to some Middle to Late Uruk ones. V-shaped bowls, found in large numbers at sites such as Shiqmim, might be functionally related to Coba bowls, early beveled rim bowls and other mass-produced (ration?) containers in Syria and Mesopotamia.

Criticism should not deter from the great value of this work. In my view, its strongest aspect is the excellent history of research on the chronology of the periods in question. Garfinkel's coherent presentation, a succinct style, and a lavishly illustrated and clearly presented catalogue of published and new material (from Beth Shean and a few other sites) make this book indispensable for all libraries that house Near Eastern collections and for any scholar who works on this period. Presentation of the material in a uniform framework (as far as possible, all drawings are at the same scale) and the inclusion of some high-quality color and a large number of black-and-white photographs add to the value of the volume.

Reinhard Bernbeck

department of anthropology
binghamton university
binghamton, new york 13902-6000
rbernbec@binghamton.edu

The Domestication of Metals: The Rise of Complex Metal Industries in Anatolia, by *K. Aslıhan Yener*. (Culture and History of the Ancient Near East 4.) Pp. xi + 210, pls. 18. Brill, Leiden 2000. Hfl 132.22, $74, €60. ISSN 1566-2055; ISBN 90-04-11864-0 (cloth).

In writing this book the author seems to have had two basic goals in mind. The first was to demonstrate that Anatolia played a major role in the development of metallurgical technology from earliest times to ca. 2000 B.C. This is an "Anatoliocentric" study, written to counteract the "Pan-Mesopotamian" point of view that tends to dominate much of the literature published in the past 50 years. The second goal was to demonstrate that the Bokardağ region of the Taurus mountains served as one of the great metal mining centers of the ancient (and Medieval) world and, in the third millennium B.C., the Early Bronze Age, as a major source of tin for the bronze industries of Anatolia and neighboring lands. All this in 128 pages of text. Does Aslıhan Yener achieve her goals?

The first 66 pages of the book document the development of Anatolian metallurgical technology from ca. 9000 to 3000, from Çayönü Tepesi to Mersin. Although virtually all sites receive at least brief mention, Yener concentrates upon three sites as individual case studies. Değirmentepe represents the Ubaid period (ca. 4000–3900), characterized by the nascent specialization of metal production together with the storage and distribution of metals and agricultural products. The discovery of seals and clay sealings, especially in building I, documents the existence of a system of administration not previously attested in Anatolia. Yener's suggestion that sulfide ores were already being smelted (35) can now be paralleled by similar claims for contemporary Eneolithic copper metallurgy in the Balkans (N. Ryndina et al., *JAS* 26 [1999] 1059–68).

Finds from Arslantepe-Malatya constitute case study 2, documenting the technological changes and cultural choices that took place during the Uruk period (ca. 3800–2900, and note that this Anatolian book still uses Mesopotamian terminology). The Uruk period proper (ca. 3400–2900) is, for Yener, a period in which the use of metal became part of the "the technology of prestige and power" (44–66), as now illustrated by the 75 metal objects from a remarkable "royal" burial excavated at Arslantepe in 1996 and dated to ca. 3000. Many of the artifacts from this remarkable tomb, including a dagger with pronounced midrib, were made of an alloy having 50% copper and 50% silver.

In this first part of her book, Yener provides a brief, but substantive and remarkably up-to-date, account of the evidence for Anatolian metals and metalworking down to the beginning of the Early Bronze Age. As much of her account is based upon a literature written in Turkish, her account will be a great boon to all those scholars, including this reviewer, unable to read (or in many cases even get access to) Turkish publications. Yener's account of recent finds from the period of incipient metal technology (ca. 9000–6000) can now be supplemented by reference to Ulf-Dietrich Schoop, *Die Geburt des Hephaistos* (Espelkamp 1995).

Case study 3, the Early Bronze Age, constitutes the second half of Yener's monograph (67–109). The typesites are Kestel (mining) and Göltepe (ore preparation and smelting), and the emphasis is upon the production of tin. This is obviously the most original and most controversial part of Yener's monograph.

In the Early Bronze Age we have the first use of metals, both precious and base, on a large scale, what Yener calls the "industrial production" of metal. The tin for the extensive amount of bronze produced during the third millennium B.C. came, according to Yener, from mines in the Bolkardağ region of the Taurus mountains. The best example of such a mine, at Kestel, was investigated by Yener and her team following discoveries made by Turkish geologists between the years 1986 and 1996. Yener estimates (98) that some 200 tons of metallic tin were produced from the ore extracted from the Kestel mine during the 1,000 years of the Early Bronze Age. The arrival of the Old Assyria merchants, bringing with them sacks of tin from the ore extracted from more extensive (and richer) tin deposits located to the east of Assyria, presumably in Central Asia, marked the end of the feasibility of the Taurus production sites (98).

A vast amount of time and effort, and considerable research funding for work in the field and in the laboratory, has gone into attempts to document the reality of an Early Bronze Age source of tin in the Taurus mountains. The various research projects involved in this effort have received a great deal of publicity. Are the final results, as presented by Yener in this volume, convincing?

What has to be understood at the outset is that Yener has made an enormous contribution to our understanding of Early Bronze Age metallurgy through her pioneering fieldwork in documenting the scope and the antiquity of ancient mining operations in the Taurus area. Working under difficult conditions, and under circumstances that would have defeated a less determined scholar, especially one who was not a native of Turkey, Yener carried out a research project that will remain of great service to all scholars of Bronze Age archaeology for many years to come. The silver (and lead) mines of the Taurus were certainly being exploited at least as early as the Early Bronze Age, giving rise to the semi-legendary accounts of the "Silver Mountain" recorded in the royal inscriptions of Sargon of Akkad. The Taurus was also a source of gold. Indeed this reviewer would still argue that what Yener investigated at Kestel constitutes an Early Bronze Age gold mine. But sources of precious metal were not sufficiently dramatic; Yener was out to solve the enigma of Early Bronze Age sources of tin.

Yener is now prepared to admit that the whole cycle of processes involved in Taurus tin production constitute a remarkable understanding of ore geology and the chemistry of tin on the part of the Early Bronze Age miners, and an investment of time and energy that is "difficult to understand in today's standards" (120). The whole operation can be understood only if one assumes that tin, in the third millennium B.C., was a rare and costly material, the equivalent of gold in the modern world (121).

Is this a reasonable assumption? Perhaps not. The relative price of metals in the ancient world is a thorny problem to deal with. The textual evidence is disparate and offers widely variable figures. Citing only one text can give a very misleading impression. Suffice to say here that there is nothing in the textual evidence from the ancient Near East during the period ca. 2300–1700 to indicate that tin was a metal of exceptional value. One shekel of gold was equal to seven or eight shekels of silver, whereas one shekel of silver was worth eight to 10 shekels of tin. Gold, in other words, was some 60 to 80 times the value of tin. In a text from Ebla, dating to EB III or, in other words, the major period of mining activity at Kestel, two minas of tin were used to purchase 20 garments of linen (the text is TM.75.G.3109 = *Archivi reali di Ebla* 3 [Rome 1982] no. 94). Also, an Amorite dagger could be had for 20 Dilmun shekels of tin (according to TM.75.G.1325 = *Archivi reali di Ebla* 1 [Rome 1985] no. 12).

James D. Muhly

american school of classical studies
at athens
souidias 54
gr 106 76 athens
greece
jmuhly@ascsa.edu.gr

The Complete Temples of Ancient Egypt, by *Richard H. Wilkinson.* Pp. 256, b&w figs. 362, color figs. 173. Thames and Hudson, New York 2000. $39.95. ISBN 0-500-05100-3 (cloth).

Altägypten im römischen Reich: Der römische Pharao und seine Tempel. Vol. 1, Römische Politik und altägyptische Ideologie von Augustus bis Diokletian, Tempelbau in Oberägypten, by *Günther Hölbl.* (Zaberns Bildbände zur Archäologie.) Pp. 122, figs. 162. Philipp von Zabern, Mainz 2000. DM 68, €34.77. ISBN 3-8053-2392-1.

In the new *Oxford Encyclopedia of Ancient Egypt*, edited by D. Redford (Oxford 2001), one of the longest entries is R. Gundlach's discussion of "Temples" (363–79). Its length is a fair reflection of the high proportion of time and effort that Egyptologists have expended on the study of religious architecture, as well as the beliefs and institutions that such buildings represent. It is a surprising fact, therefore, that relatively few monographs have been published specifically on the topics of Egyptian religion or temples. Fortunately, however, the last few years of the 20th century have witnessed a flurry of books tackling a variety of aspects of the religious architecture, ideology, and liturgy of the pharaonic, Ptolemaic, and Roman periods.

The two books reviewed here are total contrasts in terms of the extent of their subjects: Wilkinson attempts to provide a popular, comprehensive account of the entire range of Egyptian religious structures, from prehistory until the fourth century A.D., while Hölbl deals purely with certain aspects of the Roman period. Wilkinson's

work should perhaps be dealt with first, since it is by far the more ambitious of the two in its scope.

The Complete Temples is the latest in a series of "complete" books from Thames and Hudson, the earlier volumes having dealt with Tutankhamun, the Valley of the Kings, and the pyramids. Compared with the three other books in the series, Wilkinson's topic is an extremely wide-ranging remit for a single author to encompass satisfactorily. Few Egyptologists would claim to be adequately equipped to deal with the whole chronological and geographical range of religious structures, from the Neolithic stone circle at Nabta Playa through the Memphite pyramid temples of the Old Kingdom to the massive Ptolemaic and Roman complexes at Edfu and Dendera.

Given the literally monumental nature of his task, many readers will probably feel that Wilkinson copes reasonably well under the circumstances, although, as with any book on this scale, there will always be specialists who feel that their own areas have been poorly served. I would have liked a fuller discussion of the earliest evidence for cult places: in the section on temple origins, there are perfunctory summaries of the remains at Nabta Playa, Hierakonpolis, Buto, and Abydos, but almost nothing on the fascinating early temple complexes at Koptos and Elephantine (and only a brief aside on the Medamud remains, 22). There appears to be no discussion either of the votive chapels at Deir el-Medina and the workmen's village at el-Amarna—two groups of mud brick shrines that provide some of the best evidence for a more popular (i.e., less state-controlled) style of religious building during the New Kingdom. At the other end of the chronological scale, there are probably grounds for complaint that the magnificent Temple of Horus at Edfu, described by Wilkinson himself as the most complete and best preserved of all the temples of Egypt, is squeezed into about three pages (at least a third of which is taken up by illustrations).

But these are the kind of grumbles that the author must surely have anticipated, and the real question is not how much is covered, but how well the text is written. The answer, as far as the quality of the writing is concerned, is rather patchy. Some sections, such as the discussion of priests and temple personnel (90–5) and types of columns and pillars (66–7), are mines of information presented in the familiar accessible and stimulating jackdaw format that Thames and Hudson has perfected; other entries, however, are inadequate (the sheer brevity of the section on decorating the temple—surely a crucial topic—precludes any attempt at analysis).

There is probably too much that needs to be included in a complete discussion of Egyptian temples, so that Wilkinson's valiant attempts to encapsulate such vast topics as foundation rituals, axial and spatial orientation, and methods of construction are barely able to extend beyond a couple of pages each—hardly sufficient for all the existing data. These problems would be difficult enough if the book was simply attempting to describe and analyze the development of cultic buildings in Egypt; but given the fact that a gazetteer of archaeological sites takes up more than half of the book (about 140 of the 256 pages) and the propensity for Thames and Hudson to fill up many pages with photographs, diagrams, and tables, it is a wonder that Wilkinson can do justice to any of the individual subjects.

Within the gazetteer, there is a clear attempt to make the list as comprehensive as possible, but, given that virtually every excavated site in Egypt has yielded some kind of religious structure, the descriptions are often brief to the point of breathlessness (e.g., the great complex of temples at Tanis is summarized in about 600 words, and this is the longest of the entries describing sites in the Nile Delta). Compare Dieter Arnold's recent *Temples of the Last Pharaohs* (Oxford 1999), which has a more restricted chronological coverage (1550 B.C.–A.D. 385; Wilkinson's is 4500 B.C.–A.D. 138), but nevertheless manages to deal with a vast amount of material while somehow giving the impression of a leisurely stroll through the ruins. The unfavorable comparison with Arnold's erudite tome is probably an indication that, as most of the above review suggests, Wilkinson was doomed by the sheer comprehensiveness of his format, which constantly forces him to be encyclopedic and superficial rather than discursive and illuminating.

More than 40 new temples were constructed during the three centuries from Augustus to Diocletian. If we add to these the numerous buildings that were elaborated, expanded, or decorated during this period, then it is no surprise that the range of surviving Egyptian temples includes a good number that were either founded or modified in the Roman period. If we also take into account the fact that our current view of Egyptian temples is significantly—perhaps disproportionately—influenced by the well-preserved examples at Edfu, Dendera, Philae, and Kom Ombo, there are clearly good grounds for studying their historical and religious context in some detail, as Günther Hölbl does in the first volume of *Altägypten im römischen Reich.*

Although Hölbl takes the physical appearance of the Roman temples of Upper Egypt as his principal subject matter (volume 2 is intended to cover the Roman temples in Nubia and the Oases), the ultimate focus of this volume is not the buildings themselves but the more abstract question of the relationship between Roman emperors and Egyptian religion, as the subtitle indicates. Anyone standing before the Temple of Khnum at Esna and reading the hieroglyphic names beside one Egyptian king being crowned (Tiberius) and another raising the mace to smite Egypt's enemies (Domitian) cannot fail to have been curious about the apparent fusion of divine pharaoh with these familiar Roman emperors—was anyone, Egyptian or Roman, actually convinced by the charade?

Another recent book focuses on roughly the same theme, D. Frankfurt's *Religion in Roman Egypt* (Princeton 1998); it is worth reading alongside *Altägypten im römischen Reich*, for it provides a more abstract, textually-oriented counterpart to Hölbl's physical catalogue of temple buildings and reliefs, although Hölbl does stress the extent to which Roman Egypt, unlike many of the smaller regions of the empire, was able to retain a great deal of its distinctive political and religious identity while still being absorbed into the *Pax Romana.*

Just over half of Hölbl's book is taken up by lavishly illustrated descriptions of the many Upper Egyptian temples constructed between the reigns of Augustus and Diocletian (30 B.C.–A.D. 305). Not unexpectedly, it is the temples of Esna, Dendera, and Kom Ombo that are described in greatest detail. A brief section at the end of the book presents a number of well-argued conclusions concerning the nature of the Roman pharaoh, particularly stressing the pragmatism of the emperors, most of whom seem to have carefully exploited the tension between their largely symbolic cultic roles as pharaohs and the potential of the Egyptian institution of kingship to bolster their political roles as rulers over the empire as a whole.

Unfortunately, the lack of an index to *Altägypten im römischen Reich* will significantly reduce its usefulness to scholars (some of the money devoted to color plates could surely have been more profitably diverted to this purpose), and some kind of chronological table would also have been a useful addition.

Both of these books certainly fill a gap in the literature. From a purely academic point of view, Hölbl's text is the more successful and useful of the two, but *The Complete Temples* will undoubtedly reach a wide and appreciative audience, while providing Egyptologists with yet another convenient (if slightly flawed) reference source.

Ian Shaw

department of archaeology (sacos)
university of liverpool
14 abercromby square
liverpool l69 3bx
ishaw@liv.ac.uk

Sparta in Laconia: The Archaeology of a City and Its Countryside: Proceedings of the 19th British Museum Classical Colloquium Held with the British School at Athens and King's and University Colleges, London 6–8 December 1995, edited by *W.G. Cavanagh* and *S.E.C. Walker*. (British School at Athens Studies 4) Pp. 170, figs. 152, tables 5. British School at Athens, London 1998. £26.50. ISBN 0-9-4887-31-6 (cloth).

"Like the sages of Mistra, modern tourists know that the great site they see is not ancient Sparta, but few have the inclination or time to seek it out. We hope that the publication of these colloquium papers will show readers the nature of what has been missed, and that they will urge action to raise Sparta's profile for archaeologists and visitors alike" (D. Williams, "Preface and Acknowledgments," 17).

Williams's plea will not go unheeded with the publication of this far-ranging collection of essays on the archaeology and material culture of Sparta, and her position in the broader region of Laconia. The individual articles emphasize a variety of methodologies, provide reflection on British work done in the area, and discuss the whole range of Laconian chronological periods (from EH to Byzantine) and artistic media (tombs to bronzes to pottery). Other volumes of this type are commonly criticized for a general lack of coherence; this collection of essays, however, is united by more than the overarching theme of Sparta. The inherent difficulties and complexities in working on Spartan material and the critical presentation of scholarship past and present on Laconia are apparent in all essays in some form. The book presents a fine summary of much of what is important, unique, controversial, and compelling about Spartan and Laconian studies.

The arrangement and choice of the articles are well thought-out and undoubtedly reflect forethought on the part of the colloquium organizers in their invitations to speakers. The five initial entries (H.W. Catling, "The Work of the British School at Athens at Sparta and in Laconia"; T.G. Spyropoulos, "Pellana: The Adminstrative Centre of Prehistoric Laconia"; P. Cartledge, "City and *Chora* in Sparta: Archaic to Hellenistic"; R. Förtsch, "Spartan Art: Its Many Different Deaths"; and S. Hodkinson, "Patterns of Bronze Dedications at Spartan Sanctuaries, c. 650–350 B.C.") cover vexing questions about Spartan/Laconian archaeology in an introductory manner. Catling's excellent overview of the motivations behind and quality of previous British School work in the region will become the first stop for any scholar working on Spartan/Laconian material. Förtsch and Hodkinson apply new methodologies to address the question of the apparent decline of artistic production in the Archaic period toward the development of a more austere society. Spyropoulos and Cartledge both address urban identity and centralization of authority in the region, the former in the Bronze Age and the latter primarily in the Classical period. Spyropoulos relies on new material excavated from Pellana (perhaps too much with the pride and single vision of the excavator) to identify that city as an important regional center. Cartledge explores the delineation of boundary by means other than walls in order to define the urban Sparta's separation from the *perioikos*.

The next seven contributions consist of C.M. Stibbe, "Exceptional Shapes and Decorations in Laconian Pottery"; T.J. Smith, "Dances, Drinks, and Dedications: The Archaic *Komos* in Laconia"; M. Pipili, "Archaic Laconian Vase-Painting"; G.B. Waywell, J.J. Wilkes, and S.E.C. Walker, "The Ancient Theatre at Sparta"; Anastasia Panayotopoulou, "Roman Mosaics from Sparta"; A. Vasiliki Karapanayiotou-Oikonomopoulou, "A Roman Portrait of the Early Second Century A.D. from Monemvasia"; and S. Raftopoulou, "New Finds from Sparta"—these papers address specific media or new finds from the region. Many of these articles present unusual and rarely cited material in a new light as well as offering valuable new conclusions about Spartan religious or social customs. The conclusions of Stibbe, Smith, and Pipili mesh particularly well together, linking the peculiarities of vessel shape and decoration with probable function in religious practice. Waywell, Wilkes, and Walker present an excellent update on the new discoveries at the ancient theater. Panayotopoulou's work on mosaics notes rightly the lack of publication on Spartan mosaics and begins to fill that gap. Karapanayiotou and Raftopoulou's publications of recent material from Sparta emphasize the importance of continuing to uncover the rich material culture of the ancient city.

The three concluding articles (C.B. Mee and W.G. Cavanaugh, "Diversity in a Greek Landscape: The Laco-

nia Survey and Rural Sites Project"; K. Wilkinson, "Geoarchaeological Studies of the Spartan Acropolis and Evrotas Valley"; and D.M. Nicol, "Byzantine Mistra—Sparta in the Mind") focus sharply on the landscape of Laconia, its settlement patterns, its geoarchaeology, and Sparta's lack of longevity as a marked topographical feature.

The volume as a whole is marked by a quality of scholarship that is limited, I suspect, only by the time constraints of colloquium presentation. Phrases such as "limits of space" (62) and "I won't go further now into the details" (74) betray the original oral nature of the entries, and the reader is left wanting the more detailed treatment that publication should have afforded. The book has few deficiencies: some unevenness in the quality of photographs and a couple of jarring hyphenated words that are remnants of a previous page layout. The only serious omission is a unified map of the region indicating all sites, landmarks, and physical features mentioned in the collection of articles.

This book is not meant for a general audience, and many articles will be too technical for the undergraduate student, although the enthusiastic presentation of new finds (e.g., Raftopoulou, and Waywell et al.) and application of new methodologies (Mee and Cavanaugh, Förtsch, and Hodkinson) could be used with guidance in upper level courses. For the scholar and specialist, there are valuable reviews of the scholarly literature and background essential for the examination of important questions. The extensive bibliography on 11, double-columned pages is a noteworthy contribution to future Laconian studies.

As a fitting conclusion to this volume, Nicol reminds us that it "never occurred to Byzantine scholars to climb down and investigate its [Sparta's] mortal remains." The archaeological reader is reminded that antiquity's and our own concerns may differ, and that our preconceptions and biases about the nature of Sparta and her role in the region of Laconia, must, in the future, be tested against the material record. This book is an introduction to the myriad ways this task might be accomplished.

Christina A. Salowey

department of philosophy, religion,
and classics
hollins university
p.o. box 9733
roanoke, virginia 24020
csalowey@hollins.edu

Defining Ancient Arkadia, edited by *Thomas Heine Nielsen* and *James Roy.* (Acts of the Copenhagen Polis Centre 6.) Pp. 491, figs. 12, ills. 10, maps 4. Royal Danish Academy of Sciences and Letters and C.A. Reitzel, Copenhagen 1999. DKr 620. ISBN 87-7876-160-3 (cloth).

The latest publication of the Copenhagen Polis Centre, which has been studying the nature and history of the Greek polis since 1993, is devoted to a single region, ancient Arkadia, a term referring to a territory much larger than that of the modern district. The unified theme of the volume, an outcome of a symposium, reflects the recent resurgence of interest in regional studies, while the focus on Arkadia builds on previous research at the Centre and fits in with the recent attention shown by both historians and archaeologists to this region. Most papers make extensive use of archaeological evidence to examine different aspects of mainly Archaic and Classical Arkadia: group identities, temple building, settlement patterns and communications, and economic and social interaction.

The first three papers focus on the overlapping and fluid levels of group identity in Arkadian communities. Employing Smith's definition of an ethnic group, Nielsen conclusively shows that the Arkadians, by Classical times at least, considered themselves, and were recognized as, a distinct ethnic group within the larger Greek ethnic group. Political fragmentation into individual communities was accompanied by fragmentation of identity into local and subregional identities, which were consistently politicized. In contrast, regional identity was rarely politicized and only in opposition to Sparta. Building on Nielsen's conclusions, Pretzler zooms in on one community, Tegea, to examine its identity as it emerges from Pausanias's description of the city and its traditions. Her study underlines the continual contribution of local cults and myths, especially those related to the conflict with Sparta, to the forging of Tegean community identity. Through a careful analysis of an Aristotelian passage, Hansen concludes that Aristotle referred to the Arkadian ethnos as a conglomeration of poleis, a reference that agrees with recent research that Classical Arkadia was essentially settled in poleis rather than *komai.*

In the next section, Voyatzis surveys the development of Arkadian temples, highlighting their role in affirming the unity, strength, and independence of the communities responsible. Forsén, Forsén, and Østby report on the recent excavations of a Late Archaic temple near Asea and investigate its importance and role. Based on its size and material, they argue that the temple developed into a regional religious center for the Mainalian tribe.

The remaining papers deal with the degree of variation in the development of Arkadian communities and emphasize the role played by the distinct physical environment and historical factors in patterns of settlement, communication, and economic activity. Jost studies the settlement pattern of Arkadia by surveying the architectural traces of the defensive, political, and religious functions of the settlements. Pikoulas presents the results of his research on the relationship between road networks and settlement patterns. Using his unique research method of "*kapheneion* work," which involves pursuing the local oral tradition (best mined at local coffee shops) and employing locals as survey guides, Pikoulas reconstructs the cartwheel road network by tracing roads on the basis of carved roadbeds and wheel ruts. He arrives at the attractive conclusion that the dense and systematic road network, which shows extensive communication between the individual communities of Arkadia, was part of a larger Peloponnesian network, the creation of Sparta and the Peloponnesian League. I found somewhat circular his argument that the selection of the site for Megalopolis was affected by the fact that preexisting roads crossed there (302) since, as he says (306), rut roads cannot be easily dated and the history of settlements helps their dating. Furthermore, it is not persuasive that permanent

watchers were employed where mountainous terrain made visibility poor (251); it is more likely that drivers sent companions ahead to check for coming traffic.

In examining Arkadian economic activity, Roy makes wise use of the evidence to argue that Arkadian communities exploited the harsh landscape in several ways. Although all communities pursued similar economic activities focused on agriculture and animal husbandry, larger communities had the possibility to expand their activities through control of more land. Morgan discerns significant differences in, and local patterns of, economic development in early Arkadia, based on the variable environmental conditions and the different political and economic relations with its neighbors, all of which also affected the timing of the emergence of local identities.

This publication challenges the traditional view of Arkadia as a backward, impoverished, and isolated region. Although its physical environment limited the potential of production, Arkadia's economic resources were not insignificant, and social structures were adaptable to local economic realities. Arkadia's communities were involved in export and import trade and open to outside artistic influences; they laid out great expenses for the building of temples, which functioned as statements of independence, unity, and strength. Politically, Arkadia was a region composed of poleis, some of which were united into tribal states.

There are several typographical errors (over 70), a mixup in maps 1 and 2 (marble route), and a need for more temple plans. In view of the unified theme of the volume, a unified bibliography and a general introduction with information on environment and history would have made sense and would have avoided repetitions. Though there are several questions still left open because of the incomplete state of research, this rich and stimulating collection adds a different dimension to the ambitious project of the Copenhagen Polis Centre and constitutes a major contribution not only to the history and archaeology of Arkadia but also to the nature of the relationship between polis and region.

Gina Salapata

classical studies programme
school of history, philosophy, and politics
massey university
palmerston north
new zealand
g.salapata@massey.ac.nz

Ancient Greek Cult Practice from the Archaeological Evidence. Proceedings of the Fourth International Seminar on Ancient Greek Cult, Organized by the Swedish Institute at Athens, 22–24 October 1993, edited by *Robin Hägg*. (*SkrAth* 8°, 15.) Pp. 249, b&w figs. 186, tables 15, maps 4. Paul Åströms, Stockholm 1998. $55. ISSN 0081-9921; ISBN 91-7916-036-0 (paper).

The papers in this collection on Greek cult were first presented in 1993, at the fourth and final seminar in a series by the Swedish Institute in Athens on "archaeological sources available for the study of ancient Greek cult practice." The papers were published five years later, with some updating, and this review comes three years after that, so both the volume and review are already partly out of date. The earlier seminars in the series considered the themes of iconography, epigraphy, and the role of religion in the early Greek polis. Of the 14 papers presented at the seminar, 12 are published here in full, and another in summary; one, by M. Bietak, is absent. The topics, spanning roughly the Protogeometric through Roman periods, address either the archaeology of a specific site or specific categories of material evidence (bones, altars, figurines, sickles, curse tablets). The organization of the papers is roughly chronological, with those focused primarily on Geometric through Archaic data coming earlier.

The goals and methodological approach of this seminar are not specified, and neither "religion" nor "cult" is defined. The general aims are to present new data, to move beyond simplistic approaches to the archaeology of cult, and to overturn some old interpretations. As with many seminars, all the authors have not followed the same agenda. Some provide fairly traditional site reports, or offer conclusions about "sacrifice" and "male" versus "female" offerings without explaining their underlying assumptions. The book is aimed at professional archaeologists and graduate students, but could be useful to undergraduates doing specialized research. It is unlikely to be as useful to lay persons, especially since architectural plans and site illustrations are often not explained or labeled in sufficient detail.

L. Marangou's first chapter presents the reexcavated Geometric through Hellenistic sanctuary at Minoa in Amorgos. More explanations would be helpful, such as exactly why the two superposed eighth-century "altar" stones represent two phases and what precisely the finds and bones consist of in the layers of "burnt sacrifice" (19). Marangou relies too heavily on using assertive words and phrases ("undoubtedly," "very probably") at the expense of explicit argumentation. Her suggestions about a chronological change in divine focus at the sanctuary (from the site founder "Ktistes," to Dionysus, to the Alexandrian Triad), although preliminary, are promising.

A. Bammer focuses primarily on surviving finds and burnt layers from the eighth–sixth century sanctuaries of the Artemision at Ephesus, and documents cult diversity before construction of the main temple. He summarizes useful information about the bones, mostly from butchered, domesticated animals (35, 38–9), and also human bones from possible scapegoat rituals (40). Bammer connects the eighth-century *peripteros* with an unexpectedly early, rational or philosophical approach to religion and architecture (47).

R. Hägg reveals one motivation for this seminar in his plea for archaeologists to take greater care with osteological data. He documents the value of preserving, recording, and examining bones from cult sites, using examples mostly from analyses carried out by David Reese in the late 1980s and 1990s. Hägg argues convincingly that the archaeological evidence, "contemporary" and of itself "unbiased," provides information unavailable from the iconographic and literary or epigraphic sources, re-

vealing the "everyday reality" of cult, adding new and different information, and correcting misconceptions (50, 55–6).

B. Bergquist offers an interpretation of, and date for, the broadroom below the Temple of Herakles on Thasos. She argues forcefully against the excavators' "retrograde application of site continuity" (65; i.e., their assumption that because a building is a temple, its precursor must be related in function). Using bone data from Kommos as a model, she convincingly makes the case that the range of butchered bone types, the abundance of drinking cups, and the broadroom architecture itself shows the Early Archaic building to have been intended for ritual feasting by worshippers.

C. Morgan looks at the Early Protogeometric-Geometric sanctuary of Poseidon at Isthmia. She addresses difficult, very useful questions about how social and political behavior is reflected in the material record, and examines the relationship of votive offerings and contemporaneous burial goods as reflections of social investment in display (76). (She also notes that gender distinctions are conjectural in the absence of sufficient mortuary osteological data.) Morgan argues for local variation in the expression of wealth and status, for example between the Corinthia and Argolid (88), and against misapplying modern ideas about the separation of cult and burial (90).

E. Gebhard's chapter and related appendices (A and B) constitute a straightforward depositional history and helpful list of finds from the temple treasury of the Archaic Temple of Poseidon at Isthmia.

G. Ekroth looks at evidence for the types of altars and the nature of sacrifices in Greek hero cults. He finds little justification for the claims of modern scholars (relying heavily on Hellenistic and Roman sources) that the altars, rituals, and terminology for sacrifices to heroes and gods differ. Instead, the archaeological evidence seems to show that from Archaic to early Hellenistic times, sacrifices to heroes were the usual *thysia,* in which only a portion of the animal was burned for the god. In late Hellenistic to Roman times, however, a special altar may have developed for sacrifices to heroes, and holocausts became more common (129).

J. Binder, like Bergquist, criticizes a chronology based on the "genius loci." She refutes Mylonas's and Travlos's idea—apparently based only on the existence of the cult there in archaic times—that the cult of Demeter and Kore was established at Eleusis ca. 1500 B.C.E. at the site of a Mycenaean megaron. Instead, Binder affirms Ferdinand Noack's and others' Early Archaic date for the establishment of the cult, and shows that Kore may not have been part of Demeter's cult until later in the seventh century.

S. Huber reports on a Geometric-Hellenistic sacrificial area and a sixth-century pit filled with votive vessels (mostly miniature hydriae, but also 30 unusual pitchers) near the Sanctuary of Apollo Daphnephoros in Eretria. The high-necked pitchers were decorated with scenes of women in procession that resemble other images on funerary amphorae. The hydriae, unusual in such numbers at an Apollo sanctuary, the female images, and the pit's proximity to both a stream and the Apollo sanctuary all lead Huber to suggest (perhaps too definitively) that the area was dedicated to Artemis (155).

P. Themelis summarizes the evidence from an Archaic-Hellenistic sanctuary at Messene. He presents parallels from Santa Venera in Paestum, and includes a catalogue of terra-cottas that help identify the site's deities.

U. Kron thoroughly discusses the types, uses, and meanings of sickles as votives and equipment in Greek sanctuaries from Geometric through Roman times. She argues successfully against their identification as strigils and for their use in cult initiations of boys and girls.

B. Alroth examines votive offerings, mainly figurines, in a preliminary attempt to judge whether political and economic changes from the classical to Hellenistic periods are mirrored in votive practices. She seeks to define explicitly what might constitute "change" (218–20). Alroth concludes that dedications did continue regularly, with local variations in their extent and nature; she rightly notes that only the systematic investigation and timely publication of sanctuaries will answer many questions (228).

Lastly, N. Bookidis, following on the research of H.S. Versnel, summarizes the evidence from the Sanctuary of Demeter and Kore at Corinth for curse tablets. Many were located in a building, separate from the temples and stoa, that may have had a connection with underworld spirits (231).

Although this volume would have benefited from a more coherent and consistently applied goal of defining and identifying the archaeological manifestations of religious behavior, it is nevertheless a useful and informative collection of papers, with a generally successful agenda of encouraging new theoretical and practical approaches.

Shelby Brown

the cotsen institute of archaeology
university of california, los angeles
a210 fowler
los angeles, california 90095-1510
sbrown8366@aol.com

Griechische Familienweihungen: Untersuchungen einer Repräsentationsform von ihren Anfängen bis zum Ende des 4. Jhr. v. Chr., by *Christoph Löhr.* (Internationale Archäologie 54.) Pp. xviii + 271, pls. 36. Marie Leidorf, Rahden 2000. DM 139.80. ISBN 3-89646-326-8; ISSN 0939-0561X (cloth).

In this revised 1995–1996 Free University dissertation, Löhr offers a fine catalogue and analysis of monuments erected as "family dedications" from 600 to 300 B.C.E. He grants that these objects, varying greatly in type and reason for dedication, do not constitute a uniform genre. Still, scholars of Greek art, archaeology, and culture will benefit from Löhr's study of single dedications and groups of dedications placed side by side that iconographically represent two or more family members, were offered by one or more members for others, and/or were erected jointly by several relatives. We find pieces important for art history (e.g., Geneleos's group [no. 10] and Daochos's monument [no. 139]), political history (Philip and

Alexander [nos. 137, 138, 140, 142]), even literary history (Gorgias, Isokrates, and Aristotle [nos. 96, 136, 162–163]). Löhr gives equal billing to dedications known only from temple inventories and literary sources, a welcome addition to conventional practice.

The catalogue contains 175 *lemmata* with descriptions of remains, up-to-date bibliographies, texts of inscriptions with translations, and commentaries. The catalogue's hallmarks are clarity of format and explanation, accuracy of information and bibliography, and admirable caution. Löhr, for example, cautiously leaves open the question of whether side-by-side dedications of relatives began with one monument that was later joined by others or were erected together as a family series (nos. 61, 68, 73, 79). His discussion often focuses on reconstruction of original appearance, and the problems can be daunting: for instance, only four statue bases remain from an original six (no. 68) erected at Olympia to commemorate victories by Diagoras of Rhodes and his sons and grandsons, and they are described differently by Pausanias and in the scholia to Pindar's *Olympian* 7. Löhr's treatments are lucid, though usually limited to critical discussion of previous scholarship. His autopsy of many remains makes the presentations clear, but one wishes it produced more new information, perhaps a new reading of the dedicatory inscription on Geneleos's group. The photographs hardly allow us to see for ourselves: their poor quality and paucity compare unfavorably, for example, with those in K. Kissas's *Die attischen Statuen- und Stelenbasen* (Bonn 2000).

The analytical section synthesizes the commentaries and, most interestingly, discusses how these dedications functioned socially. Family groups of statues, arranged paratactically without evident interaction, seem not to call attention to the group as "family." Since intimate domesticity was portrayed in other media, Löhr concludes its absence here was intentional; dedicators wished to represent their families as citizen units in the public sphere, rather than bring images of private life into that sphere. Viewers had to read inscriptions to understand the family relationships, although groups of statues could point to "family" by their composition (Geneleos framed the four younger members with their parents) and by alternating statue-types (statesmen and athletes in Daochos's monument). Löhr does a good job of contextualizing this material in other ways too. The context might be cultural: a family group could represent to Greek viewers συγγενὲς ἦθος or inherited quality, an idea that, as articulated by Pindar, appeared in family groups of athletes. The context is political in Löhr's discussion of Perikles' citizenship law as the background for increased representation of married couples in the fourth century. The context can be social: the monuments' concept of family resembles the fluid kinship of ἀγχιστεία, which allows various groupings that extend even to the children of nephews. Private concerns appear in mothers' dedications for their children. In such ways, Löhr shows how families represented themselves in public, thus increasing our understanding of the social functions of dedications, a timely subject not least thanks to F. de Polignac. One might also compare self-representation in grave reliefs studied by C. Breuer (*Reliefs und Epigramme* [Cologne 1995]) and A. Scholl (*Die attischen Bildfeldstelen* [Berlin 1996]).

My only serious reservation concerns Löhr's conception of his project. It reflects traditions of publication in classical archaeology and epigraphy, but those traditions suffer from a limiting focus on inscribed monuments. A study of family monuments should include ones without inscriptions but identifiable as family offerings iconographically (e.g., Akropolis 581: O. Palagia, *Hesperia* 64 [1995] 493–501) or by general context (Löhr does mention the Brauronian *arktoi*). Indeed, a synthetic study of family dedications should treat them all, including terracottas, which were often offered in family contexts (e.g., the pinakes from Lokroi Epizephyrioi: C. Sourvinou-Inwood, *JHS* 98 [1978] 101–21). But this is hardly a fair criticism of Löhr's book; synthetic approaches must be grounded in thorough studies of limited corpora, precisely what he provides.

Joseph W. Day

department of classics
wabash college
crawfordsville, indiana 47933
dayj@wabash.edu

Panathenäische Preisamphoren: Eine athenische Vasengattung und ihre Funktion (vom 6.-4. Jahrhundert v. Chr.), by *Martin Bentz*. (*AntK*, Beih. 18.) Pp. 376, figs. 9, pls. 136, tables 15. Antike Kunst, Basel 1998. SF 238. ISBN 3-909064-18-3 (cloth).

The author presents us with a masterly synthesis of what is known and what can be surmised from a group of vessels that are familiar yet generally ignored: the Panathenaic prize amphoras of the Archaic and Classical periods. He presents a catalogue of 995 amphoras and fragments, many illustrated with excellent photographs, but the value of the text is greater than the catalogue, useful as that is for reference. The goal of the study is to place the prize amphoras in their historical context, both as luxury pottery and as prizes in the Athenian games. As Bentz points out (9), these jars constitute "the largest group of official Athenian monuments to be preserved."

The text is divided into four chapters: (1) what we know about the Panathenaic games and the amphoras that contained the olive oil which was the actual prize; (2) the sources, amount, and value of that oil, and the production and capacity of the amphoras; (3) the standardized imagery that decorates these containers; and (4) evidence for the reuse of the amphoras. The result is a clear and well-reasoned study that will interest not only students of Athenian pottery and of the history of Greek sports, but also political historians who can gain new insights into the organization of ancient Athens, epigraphers who are provided with a 250-year sequence of dated letter forms, and art historians who are interested in archaism and in how imagery changes during a long and constant tradition. The scope of the author's competency is broad, stretching from the *Athenaion politeia* to Beazley's attributions, and from how to distinguish boxing from the *pankration* to systems of weights and measures.

The topics presented are so varied that it is possible to touch on only a few of the more interesting points. The accepted preservation rate of 1% for Athenian pottery is based on Panathenaic amphoras, since a fourth-century inscription lists the number of amphoras given as prizes in the games, and the totals can be compared with the number of preserved examples. The author's enlarged catalogue reinforces this statistically depressing percentage. The inscription and passages of the Athenaion politeia that discuss the magistrates in charge of prizes indicate the public nature of the production order. Bentz connects this order with the shield blazons of the figure of Athena on the obverse (specific to different workshops) and with the archon's names inscribed on fourth-century examples. The picture that emerges of elected officials placing an order with a potter's workshop for some 1,500 amphoras every four years is one of the rare pieces of evidence that we have for the workings of this industry (not to mention of the olive oil trade, which is also discussed.)

In 1972, T.B.L. Webster proposed that the painted pottery that found its way around the Mediterranean, and especially to Etruria, was the result of a second-hand trade. This thesis has been little accepted, but needs some reconsideration in the light of Bentz's discussion of the trader's marks, and the contexts and findspots of Panathenaic amphoras. As the author points out, the trader's marks cannot be the result of primary trade in pottery in this case, although some may reflect the exportation of the oil. Likewise, Etruscans who chose to be buried with Panathenaic amphoras could not have won them themselves, since non-Greeks were not allowed to compete. Exports of Panathenaic amphoras follow the same geographical pattern as that of Athenian pottery as a whole, although, since 80% of the prize amphoras were found in Greece proper, the actual numbers follow a different model. Bentz attributes this difference to the trade in Athenian olive oil, for which the amphoras were the equivalent of "brand" packaging. In this, Panathenaic amphoras were like Corinthian aryballoi, attractive containers for an expensive product, though certainly kept and reused after they were empty. Some scholars, such as Vickers and Gill (*Artful Crafts* [Oxford 1994]), have stated that Athenian painted pottery was treated in antiquity as nearly worthless containers; Bentz's thoughtful examination of the evidence supplied by prize amphoras, which certainly were containers, demonstrates from a new perspective that this is too extreme.

The text and catalogue are augmented by appendices that list amphora volumes and sizes, the shield blazons of Athena and the figures found on the obverse columns in the fourth century, the various sport events portrayed on the reverses, and findspots. With the catalogue and the plates, these appendices will make this book the standard starting point for any study related to Panathenaic amphoras for many years to come.

Timothy McNiven

history of art department
100 hayes hall
108 n. oval mall
columbus, ohio 43210
mcniven.1@osu.edu

Polychrome Bilder auf weissgrundigen Lekythen, by *Ulrike Koch-Brinkmann*. Pp. 127, color pls.156, color fold-out pls. 2, color reconstructions 21. Biering and Brinkmann, Munich 1999. DM 189. ISBN 3-930609-18-5 (paper).

Koch-Brinkmann's lavishly illustrated book on polychrome paintings on white ground lekythoi is one of several books published by Biering and Brinkmann that deal predominantly with the technical aspects of ancient paintings. Fairbanks, *Athenian White Lekythoi* 1–2 (New York 1907, 1914), classified white ground lekythoi according to their technique, but most scholars concentrated on style (W. Riezler, *Weißgrundige attische Lekythen* [Munich 1914]; E. Buschor, *Attische Lekythen der Parthenonzeit* [Munich 1925]) and workshops (E. Haspels, *Attic Black-figured Lekythoi* [Paris 1936]; D.C. Kurtz, *Athenian White Lekythoi* [Oxford 1975]). In 1938, Beazley gave a concise description of the style and the iconography of these vases, also touching on technical aspects. Their iconography is usually dealt with in studies of Athenian burial customs; for instance, N. Nakayama, *Untersuchung der auf weißgrundigen Lekythen dargestellten Grabmäler* (Freiburg 1982), dedicated a monograph to the grave monuments depicted on white lekythoi.

Koch-Brinkmann is mainly concerned with the reconstruction of the colors of classical lekythoi and in extension the polychromy of classical panel paintings. Close inspection with the help of a microscope and observation of various stages of surface decay allow a detailed reconstruction of the painting process from the preliminary sketch to the last brush stroke. The author follows the well-known history of the development of white ground lekythoi and charts the influence of the use of glaze and matte outlines and the addition of various colors on the style of painting. Each stage is superbly illustrated with photographs and startlingly colorful reconstructions. These, although doubtlessly correct, are disappointingly flat. The use of nonceramic paints gave painters more freedom of expression and enabled them to express complex relationships by the use of similar colors. Occasionally too much importance is accorded to the technique: Koch-Brinkmann claims that the use of color gave painters the freedom to join the spheres of the living and the dead.

The paintings on white ground lekythoi are technically distinct from red figure vase paintings and are commonly thought to be close to the lost panel paintings of classical Athens. Koch-Brinkmann examines the technique of the paintings in the *tomba delle danzatrici* in Ruvo, which is comparable to the paintings on lekythoi assigned to Group R. The author discusses the paintings on the Amazon sarcophagus from Tarquinia more extensively, and it is the only painting that she illustrates. The sarcophagus is dated around 350 B.C. and attributed to a Greek artist. Its painted decoration is more advanced in the use of light and shadow and shading, but its technique corresponds to paintings on later white lekythoi and the group of Huge Lekythoi: the artist first incised the layout and then drew a more detailed sketch with matte black paint. Movement and figures are demarcated by lines; composition and garments are defined by areas

of color. According to Koch-Brinkmann, Etruscan wall paintings are influenced by Greek painting techniques since they show parallels to paintings on white lekythoi. They are more advanced in the depiction of depth, however, since figures in the back are not defined by a different color, but by darker shades of color. Thus Etruscan paintings help to reconstruct the appearance of paintings at a time when white lekythoi ceased to be made.

Some of Koch-Brinkmann's observations have interesting implications. For instance, it is often thought that preliminary sketches, like those on the grave stelai of Demetrias, were used in the late fourth century not only to define the outlines of figures but also to use hatching to create shading. A similar technique, however, occurs on a white lekythos from the Kerameikos (3146), which was made 100 years earlier. Similarly, for the tomb of Persephone at Vergina (late 4th century), Koch-Brinkmann believes that the lack of colors in the figures around Hades and Persephone is not caused by erosion but indicates that the painting was never completed. For technical reasons she attributes the group of Demeter and Moira to a different artist. The author's reconstruction of the original colors of polychrome paintings is of particular use in the case of the wall paintings of Campania, where it helps to determine the accuracy of Roman copies of Greek paintings and to distinguish Roman invention from the Greek original.

Koch-Brinkmann's brief discussion of ancient writers on the history of painting is necessary, but does not add anything new. A short but useful index gives easy access to the subjects discussed in the book, but regrettably there is no summary, which would make the book a less daunting read for non-German speakers.

Thomas Mannack

beazley archive
ashmolean museum
oxford ox1 2ph
thomas.mannack@beazley-archive.oxford.ac.uk

Archaische Keramik aus Olympia, by *Erika Kunze-Götte, Joachim Heiden,* and *Johannes Burow.* (*OlForsch* 28.) Pp. ix + 316, figs. 10, pls. 90. Walter de Gruyter, Berlin 2000. DM 200. ISBN 3-11-016559-7 (cloth).

Three separate contributions are brought together here to fill an important gap in the publication of finds from Olympia. Kunze-Götte studies the Laconian and Elean Laconianizing decorated pottery, Heiden the Corinthian, and Burow the Attic black-figure. It is remarkable how undistinguished the Corinthian and Attic black-figure pottery is for such a wealthy sanctuary. The Laconian, however, rises above its average quality and quantity, reinforcing notions of a special Spartan interest in the sanctuary.

H. Kyrieleis, the series editor, explains in the foreword the poor preservation of the pottery and the general method of study (comparisons with vases found elsewhere), since almost none of the pottery came from contexts helpful for either dating or use. A plan of the sanctuary, however, would still have been helpful to readers.

In the Laconian catalogue, 107 pieces represent at least 65 cups (39 with figured tondos) and a dozen vases of other shapes. The quality is unusually high, leading Kunze-Götte to argue for their presence here as dedications. Vases trickle into Olympia from 600 to 550 B.C., becoming steadier thereafter, including one or two vases by each of the major Laconian artists, except the Boreads Painter with a half dozen or so.

Kunze-Götte makes an important contribution in distinguishing a group of high quality cups from the last quarter of the century, otherwise a period of decline for Laconian; because of their details of drawing, excellent black paint and lack of white slip, she suggests they were made by artists who spent time in Athens. The group (Chimaira Painter, Cyrene Painter, a newly named Olympia Painter, and a late follower of the Naucratis Painter) is called the Reform Workshop. Her theory has merit, especially because of the technical improvements.

Occasionally, dating of vases, figure identifications, and attributions are less cautious than expected. These should be judged individually. A few figure identifications were missed: nos. 21 A (pl. 11) may show a draped figure standing behind the chariot team; 35 F (pl. 15) has a hoplite holding chariot reins(?) rather than a sword; and 49 A (pl. 25, upside down) should be the base of the neck and at right the raised wing of the siren. Most significant, though, since it obviates a lengthy discussion (23–6) of *Mischwesen* and the *Seedrachenleib* is 9 E (pl. 4), which is upside down and in fact joins fragment 9 A, giving the Gorgon's arm, part of her dress, and some black-red feathers of her wing.

Another 32 pieces (nos. 108–139), mostly jugs, are identified as Laconianizing products of Elean vase makers, as the paler fabric, popularity of animals, especially birds, and awkward drawing styles make clear. Laconian influence in Elis can be traced back to the seventh century, but most of the pieces are dated to the second half of the sixth century. No. 123 (pl. 45) is likely upside down.

J. Heiden's study of the Corinthian pottery catalogues 107 selected pieces out of a minimum total of 258 Corinthian vase finds at Olympia. Of the 258, 103 are kotylai and 104 are perfume containers (68 aryballoi, 17 alabastra, 19 lekythoi), suggesting to Heiden their use at Olympia as personal items by visitors or athletes (respectively) rather than votives. (There are, however, seven miniature vases [nos. 99–105] which one assumes were dedications.) This is remarkable, and is supported by the Athenian pottery, mainly lekythoi. The earliest Corinthian pieces are two Thapsos Class vases (Late Geometric), with another 19 pieces down to the Transitional phase. The other 83 are late seventh to sixth century or later. The increase in numbers is explained by the growing popularity of the Olympic festival rather than by any strengthened relationship with Corinth. Only two vases stand out from the main group, a round aryballos (no. 27) of the Soldier-Dancer Group with komasts wearing helmets, and an Early Corinthian panther-shaped plastic vase (no. 96).

Of the Attic black figure vases, about two dozen had been published before, while Beazley listed 10 lekythoi and a skyphos. J. Burow catalogues 646 pieces, mostly lekythoi (438), cups (about 100) and skyphoi (about 50); 13 fragments from Panathenaic amphoras are worth not-

ing. Some cups (ca. 550–525 B.C.) are of better quality, perhaps brought as votives, but otherwise the vase painting runs from average to abysmal. The very earliest includes cup fragments by the Heidelberg Painter (560–550 B.C.), a large band cup by Lydos and krater fragments from Lydos's Circle (550–540 B.C.), but the majority are lekythoi of the late sixth to first quarter of the fifth century (Class of Athens 581 and Haimon Painter Workshop are common; the best is by the Athena Painter). The latest are palmette lekythoi reaching beyond the mid fifth century. No special or common themes stand out on the vases.

Kunze-Götte provides an index of all Laconian vases she cites as comparisons, as well as a general index and plate index for her contribution. A concordance of inventory numbers to catalogue numbers for all three studies is found at the end, as is a list of negative numbers for each plate. Notably absent, however, is a list of painters and workshops for each of the studies.

Vase descriptions are commendably complete in the catalogue entries. Photographs are excellent; profiles and drawings are useful, especially for the Corinthian. We must indeed be grateful to all three scholars for the care they have taken in publishing at last this large body of fine ware pottery from such an important site.

Gerald Schaus

department of archaeology and
classical studies
wilfrid laurier university
waterloo, ontario n2l 3c5
canada
gschaus@wlu.ca

Corpus Vasorum Antiquorum. Deutschland 72. Hannover, Kestner-Museum 2, by *Alexander Mlasowsky* (Union Académique Internationale.) Pp. 88, pls. 63, Beilage 13. C.H. Beck, Munich 2000. DM 142. ISBN 3-406-46822-5 (cloth).

The first volume of the *CVA* devoted to the Kestner Museum in Hanover appeared in 1971 (not 1976 as stated in the preface of this volume under review) and included the Attic Geometric, Black-figure, Red-figure, and White-ground vases. This second volume is a potpourri of some 149 vases, old and new acquisitions, Greek and non-Greek, in many styles: Late Helladic, Boeotian, Attic (Geometric, Black-figure, Red-figure), Corinthian, East Greek, South Italian Red-figure (Apulian, Campanian, Paestan), Etruscan Corinthianizing, Daunian, and Gnathian, Black-glaze, and Hellenistic relief-ware.

This volume also marks the end of a long tradition for the German volumes of the *CVA*: the plates are now printed on both sides and bound in with the text and profiles. Doubtless economic necessity has forced this change, but it is a pity, especially for those interested in style. The quality of the plates is generally excellent. Only about one quarter of the vases have their profiles included, however. If the art of the potter is to be considered on an equal footing with that of the painter, should not more vases have profile drawings? They are particularly important for dating nonfigured work (for example, the Protocorinthian skyphos and cup, pls. 6.6 and 6.7). Those that are published are at 1:1, not always necessary, indeed on occasion causing confusion (see Beilage 9).

The descriptions of the scenes are generally accurate and easy to read, but there is little analysis of iconography. The author has included many references for the more ambitious vases, but the bibliography might be more selective. A useful addition here, as in some previous volumes of the German *CVA* (e.g., Würzburg 4), is the provision, wherever possible, of capacities and weights. The Munsell soil color chart or the CEC chart would have provided a more objective description of the color of the fabric. Moreover, use of diluted glaze and accessory color should have been more carefully detailed.

Because the vases cover such a diverse range, one cannot expect the author to be an expert in all areas. We, therefore, offer the following comments in the hope that they may increase the usefulness of this volume.

Pl. 7.1–5 (1960.29): the author cites as comparandum an olpe in *CVA* Turin (Torino) I—it is in fact in Turin II. The accepted citation for Amyx, *Corinthian Vase-Painting of the Archaic Period* (Berkeley 1988) is *CorVP*, not *CVP*.

Pl. 9.11–14 (1966.27): an aryballos with a very common motif (palmette with felines either side). The author compares this with work by both the Reggio and Borowski painters, but the vases assigned to these two hands vary considerably (Benson vs. Amyx). Attribution of such generic work is very difficult.

Pls. 21–24 (L9.1989): a fragmentary dinos with stand, attributed to the Kyllenios Painter by Moore (but see D. Williams on the Sophilos dinos, "Sophilos in the British Museum," *Greek Vases in the J. Paul Getty Museum* 1 [1983] 30, who cites von Bothmer). The attribution needs more explicit argument, as the proportions of the animals seem different from other vases attributed to this hand. The subjects show an equestrian race (with tripods) below a centauromachy, which might have had Kaineus in the missing section on one side. It is interesting that the height of the bowl (38.5 cm) is very close to that of the Louvre dinos (38), which also has an equestrian race (with many tripods) below a gigantomachy.

Pl. 29.5–6 (1992.202): Beazley, *ARV* 225.7 and p. 1636, states that this cup was in the Lucerne Market (Ars Antiqua, *Auktion* 3 [*Antike Kunstwerke aus Sammlung Prof. B. Meissner*] 1961, 101 and pl. 43); this should have been mentioned.

Pl. 38.1–3 (R 1906.159): the author may be correct in identifying the scene on side A as "Dionysos and Maenads," but Trendall was more cautious. The object above the head of the youth is not a "flower" but a stylized goat skull, presumably indicative of a sanctuary.

Pl. 40.1–3 (1966.76): this small red-figure bell-krater is listed as Apulian, perhaps from a local workshop, datable to the third quarter of the fourth century, but the vase is Attic of the very end of the fifth century, probably a minor, late work by the Kadmos Painter, showing the relationship between him and the Painter of London F 64.

Pl. 41.1–4 (775): Hermes does not wear "Oriental headgear," just a normal (for Apulian) *petasos* (the front part of the brim is lost in the break). The description should indicate that this must be the meeting at Sparta.

Pl. 45.1–3 (782): this kantharos is by the Baltimore Painter; the only doubt expressed in *RVAp* (p. 882) about

these small vases was whether they were by the painter himself or one of his associates. Are the appliqués really "Frauenköpfen"? Each wears an oriental cap: Adonis?

Pl. 45.4–7 (R 1906.165): Workshop of the Baltimore Painter? The lines on the chest of the male figure suggest that he was wearing a petasos (cf. *RVAp* 2, pl. 378.7).

Pl. 48.3–4 (1926.91): this owl-skyphos is listed as Apulian, "Circle of the Farwell Group," and a very similar example in Worcester is noted. In fact both skyphoi are Lucanian and belong to the "Spanner" group (see A.D. Trendall, *Red-figured Vases of Lucania, Campania and Sicily*, Suppl. 3 [London 1983] 9–10).

Pl. 51.3–5 (1956.1): this red-figure pelike is not Campanian but Apulian, as the parallels cited for shape and decoration, all Apulian, ought to have suggested.

Pl. 55 (1973.16): this oinochoe of shape 3 was considered to be Campanian by A.D. Trendall and Campanian under Paestan influence by Schauenburg ("Unteritalische Kentaurenbilder," *ÖJh* 51 [1976–1977] 30–1). Mlasowsky documents this but catalogues the vase as Etruscan, without argument. He notes that it was found in Campania, and it looks Campanian to us.

Ian McPhee

archaeology and art history
la trobe university
bundoora, victoria 3083
australia
i.mcphee@latrobe.edu.au

Elizabeth Pemberton

school of fine arts, classical studies,
and archaeology
university of melbourne
parkville, victoria 3010
australia
e.pemberton@arts.unimelb.edu.au

Hellenistic Sculpture. Vol. 2, The Styles of ca. 200–100 B.C., by *Brunilde Sismondo Ridgway.* (Wisconsin Studies in Classics.) Pp. xix + 374, ills. 24, pls. 82. Univsersity of Wisconsin Press, Madison 2000. $45. ISBN 0-299-16710-0 (cloth).

In this book, Brunilde Sismondo Ridgway continues her study of Hellenistic sculpture, focusing primarily on work from the second century B.C.E. As with her other books, her discussion is detailed and stimulating, forcing the reader to reconsider the monuments in depth, aided by the thorough and extensive review of previous scholarship in the text and chapter notes.

At first glance, the second century might seem an arbitrary range, but Ridgway justifies it by seeing the art of this period as transitional. The political instability of the period means that there is a relative lack of public art, and at the end of the period Rome had come to dominate not only the politics of the Greek world, but also artistic patronage. In this light, she sees Pliny's comment that "art ended" in the third century and was only revived in the later half of the second as reflecting the shift in the artistic landscape.

This landscape has been dominated in the literature by the Pergamon Altar, and Ridgway devotes two chapters to it. Regarding the Gigantomachy frieze, she raises a number of questions about the firmness of our knowledge of this monument, and consequently of second-century sculpture in general. She reviews the evidence on dating, particularly the ambiguity of the inscriptions, and favors redating the work from 180/160 to 165/140 (see S. Rotroff's review of G. de Luca and W. Radt, *Sondagen im Fundament des Grossen Altars*, *AJA* 105 [2001] 129–30; and N.T. de Grummond and B.S. Ridgway, eds., *From Pergamon to Sperlonga: Sculpture and Context* [Berkeley 2000]). She questions too whether the monument is an altar, and favors the suggestion that it is a heroon without an altar in the center, since the findspots of many pieces attributed to the altar were widely scattered. Her detailed discussion of the style of the frieze emphasizes its classical elements, with the result that its style is no longer the epitome of the Baroque. Given the key position of the work in histories of Hellenistic sculpture, these challenges, particularly the dating, will generate some controversy. Without diminishing its artistic achievement, Ridgway rightly questions the overwhelming degree of the monument's importance and influence in art historical discussion.

This reassessment is also important for our understanding of the Telephos frieze in the next chapter. She emphasizes the Baroque qualities of its style, arguing more for its similarity rather than its dissimilarity to the Gigantomachy, based on details of renderings. Indeed, if we consider the monument as a whole, both in terms of workshop and patronage, then we should expect more stylistic affinity. In this light, she attributes the differences between the two to considerations of subject matter, scale, and placement.

The use of continuous narrative in the Telephos frieze has also magnified its importance for the development of narrative Greek art, but Ridgway points to several precedents for this type of narrative structure. I agree that this type of multiple scene narrative became more widespread under Roman patronage, and would favor not attributing undue influence to the Telephos frieze for its development. Looking at other sculptural narratives, Ridgway also questions how much we know in fact about the Aemilius Paulus monument at Delphi and whether it is the representation of the Battle of Pydna with its riderless horse. She would argue that the battle scenes are more formulaic in composition and motifs, and that the monument was appropriated by the Roman general rather than built for him. If so, then it is likely that continuous narration is not present. In discussing the Iphigeneia frieze at Termessos, Ridgway sees continuous narration as occurring mostly in connection with temples and with epic/tragic subjects, a point that I find convincing. Indeed, continuous narration places clear structural demands on composition and framing, which limits its use in a sculptural context.

In her review of other architectural sculpture in chapter 4, Ridgway notes that the dominant type of sculptural decoration is the continuous frieze. She minimizes the stylistic and iconographic impact of Pergamon on these works, such as the Temple of Artemis at Magnesia and the Hekateion at Lagina. She emphasizes the decorative and generic quality of the architectural sculpture of this period, rather than its propagandistic or political intent.

Given the picture that she creates of decentralization during the second century, we should also see the use of well-used motifs and subjects as being capable of conveying a range of meanings simultaneously rather than a single intent, whether political, religious, or decorative.

Her review of original statuary in the round is limited by the number of datable monuments, but these include some of the more famous works of Hellenistic sculpture. Ridgway rejects the dominance of a Rhodian school in works such as the Nike of Samothrace, and points out again our lack of firm facts for dating this work. She notes the stylistic similarity of the work to the Pergamon Gigantomachy, and would place its date as around 160. Among works at Pergamon she notes the wide range of style in works associated with the Library and North Stoa and concludes that statuary, like architectural relief, is dominated by standard types and that subject and placement determine much of the style of a work.

The discussion of original reliefs in chapter 6 is dominated by funerary stelai and altars from Asia Minor and East Greece. This allows for the development of a picture of Hellenistic workshops responding to changes in social and religious customs. These workshops had a repertory of models to draw upon as appropriate, as they did for larger-scale monuments.

Ridgway sees a revival of the creation of cult statues in the second century, mainly acrolithic in medium, accompanied by new lavish rituals. While there is a revival of signatures in connection with these statues and fulsome payments made to sculptors such as Damophon and their workshops, the work itself does not seem to have been particularly famous or influential. The signatures instead show the wide diffusion of the workshops and of stylistic heterogeneity and formulaic iconography. This leads to lengthy discussion of Boethus and the work found in the Mahdia shipwreck. Since recent technical study has dissociated the winged Eros from the herm with the signature of Boethos, there is no reason to attribute the bronze to that sculptor. Ridgway does use the literary evidence for Boethos to propose that there were three groups of sculptors, one of whom moved from Calchedon eventually to Athens, another that moved to Nikomedeia and then possibly to Athens to merge with the first group, and finally a group working in silver, and probably at a miniature scale, in Carthage. Such a reconstruction would confirm the idea of moving and merging workshops in this period.

As in her other books, Ridgway downplays the traditional idea of copies. In discussing copies, she speculates that many works were created to supply an emerging Roman demand for Greek work, but that the purpose and context for this market were quite different from Greek norms. Two-dimensional representations, rather than sculptural originals, may well have exerted more influence on workshops seeking to meet this demand. The artistic eclecticism of this production is not, as Ridgway sees it, a result of slavish imitation of older originals, but "a form of aesthetic freedom, an emancipation from rules that pleased through its novelty and contrast" (270). This led to the creation of new types, such as the Borghese Warrior, and the adaptation of older models. While this sometimes has been seen as lessening the originality of Hellenistic sculpture, it should not be so. Dutch genre painting, for example, is not considered as "copywork" and is valued for its evocation of Dutch culture. Indeed, the importance of private and Roman patronage of Hellenistic artists by the end of the second century necessarily brings about a change in subject and style as artists and workshops respond creatively to a new environment. This includes the creation of new types such as old women that should be regarded as Roman creations, even if their makers may have been Greek. Accordingly, some of the work discussed in this chapter that has at times been placed in the second century, such as the "originals" of the Sperlonga sculptures, Ridgway places as creations of the first century, when Roman patronage and rule are usual.

This review cannot do justice to the depth, detail, and range of Professor Ridgway's book. Undoubtedly, many of her proposals, especially on workshops/schools and dating, will be controversial and be the subject of extended debate. Indeed, I would find her book an excellent choice of text for a graduate seminar on Hellenistic sculpture, in that it would introduce students to the range of opinions on the subject and provide a starting point for research and discussion.

Disagreements over specific monuments, however, should not obscure the more fundamental challenge that Ridgway poses historiographically. The picture of second-century sculpture that she presents is one that does not have a clear order and unity: stylistic heterogeneity and flexibility during the period, and even within the same work; our inability, therefore, to use style reliably to date works; the diffusion and movement of workshops around the Mediterranean, but without a clearly defined and structured "school"; the gradual shift of patronage toward Rome; the reliance upon a repertory of types and formulas for subject matter and composition. The Pergamon Altar deservedly remains one of the key monuments of the period, but by lessening its overarching centrality to the historical structure of second-century sculpture, we are left without the clear schematic diagram of sources and influences, progressions and developments that a history attempts to construct (see J.J. Pollitt, "The Phantom of a Rhodian School of Sculpture," in de Grummond and Ridgway, *From Pergamon to Sperlonga* 92–110, with a review of the literature on that subject).

An extended transitional period without a clear geographic center, artistic school or dominant handful of artists, or clear and consistent source of patronage is a more challenging framework for the art historian to utilize. Ultimately, one might ask whether such a label as Hellenistic art, encompassing work from the late fourth to the late first centuries and a shift from east to west in geographical center, implies a more unified art and culture than existed. Still, it is necessary to develop some kind of chronological and artistic order for this period so that we can understand how style and subject are responsive to their context. If we think of Hellenistic art as being essentially cosmopolitan (J.J. Pollitt, *Art in the Hellenistic Age* [Cambridge 1986] 10–13), then we should expect that the fundamental conditions sustaining the production of sculpture would be somewhat independent of specific political states and should extend into the level of small city or family. Indeed, that sculpture did not die during the second century shows a widespread, if modest and decentralized, infrastructure to sustain its makers between periods of larger-scale patronage. When such conditions arose, as at Pergamon, the sculptors assem-

bled from a variety of places could cooperate effectively with each other and their patrons to visualize their aspirations. This is an association, and not a school, that would give way to new combinations afterward. Ridgway's model does not lend itself to convenient categories, divisions, and labels. Instead, it challenges us to look anew at the period and perhaps to develop a different kind of schematic to aid in understanding it. However the debates about individual monuments settles out, this broader point needs to be considered extensively.

Mark D. Stansbury-O'Donnell

department of art history
university of st. thomas
2115 summit avenue
st. paul, minnesota 55105
m9stansburyo@stthomas.edu

Ellinistichesii Khram Oksa B Baktrii, Yuzhnyi Tadjikistan. Vol. 1, Raskopki. Arkhitektura. Religioznaya Zhizn (Russian; trans.: The Hellenistic Temple of the Oxus in Bactria, South Tajikistan. Vol. 1, Excavations, Architecture, Religious Life, with English summary), by *B.A. Litvinskii* and *I.R. Pichikyan*. Pp. 503, figs. 77. Vostochnaya Literatura, Moscow 2000. ISBN 5-02-018184-5 (cloth).

The indefatigable archaeologist and prolific writer Boris Anatolovich Litvinskii and his collaborator, the late Igor Rubenovich Pichikyan, have produced the first of two large volumes on a site that is perhaps comparable in importance to Ay Khanum, excavated by the French in northern Afghanistan. The difference between the two sites is significant, for the Afghan site was what may be described as a purely Greek city, whereas Takht-e Sangin was a native temple site with many Hellenistic influences. Taken together, both provide a clear idea of the mixture of populations and cultures of ancient Bactria.

The book begins with a survey of previous publications about the Greco-Bactrians, especially about the "Treasure of the Oxus" now in the British Museum, which the authors believe came from a site near their excavations. Takht-e Sangin is located on the western bank of the Vakhsh River where it joins the Panj (Upper Oxus). In the first part of the book, the authors describe the results of their excavations. The main structure was a temple (51 m^2) with a large courtyard, containing Hellenistic column bases and fire altars. Coins of the Greco-Bactrian kings and early Kushans indicate that, though the temple functioned from ca. 300 B.C. to A.D. 200, its floruit was in the time of the Greco-Bactrian era (ca. 300–120 B.C.). The authors describe architecture of the site in detail, with reconstructed ground plans, and give analyses of building techniques. Apparently the temple served both Greeks and local Zoroastrians, who, in their rites and practices, are to be distinguished from the later Zoroastrians of western Iran, who canonized their scriptures and established an orthodoxy under the Sasanians (ca. A.D. 225–650). In the east, ancient beliefs and practices prevailed.

The second part of the book focuses on the origin and development of what the authors call Iranian and eastern Hellenistic fire temples. While archaeologists, architects, and students of religion differ on the origin of fire temples and altars, they seem to range from early historic Syria and Mesopotamia to Dura Europus of the Achaemenids; the temple at Takht-e Sangin, however, may derive from even earlier prehistoric sources, according to the authors. This, in my opinion, seems dubious.

Part three of the book concerns cults and rituals, in which water as well as fire played a central role. Again, the authors survey past work, publications, and opinions, discuss the inventories of other excavated temples, and compare their objects with those found at Takht-e Sangin (to be described in detail in volume 2). Two appendices conclude the volume, one on the geomorphological setting of the site by P. Kerzum and A. Kerzum, and an inventory of the coin finds by the late E.V. Zeimal.

The bibliography is rich, and the descriptions of the excavations are detailed; both make this volume a primary source book for Central Asian temple archaeology. And the printing and format of the book is superior to former similar publications in the USSR.

Richard N. Frye

department of near eastern languages
and civilizations
harvard university
cambridge, massachusetts 02138
frye@fas.harvard.edu

India: An Archaeological History, Palaeolithic Beginnings through Early Historic Foundations, by *Dilip K. Chakrabarti*. Pp. xvi + 374, figs. 56, tables 34, maps 8. Oxford University Press, New Delhi 1999. $29.95. ISBN 019-564573-1 (cloth).

The Archaeology of the Indian Subcontinent and Sri Lanka: A Selected Bibliography, by *Robert B. Marks Ridinger*. (Bibliographies and Indexes in Anthropology 10.) Pp. viii + 267. Greenwood, Westport, Conn. 2000. $79.50. ISBN 0-313-30001-1 (cloth).

India: An Archaeological History was designed as a textbook by Dilip Chakrabarti of Cambridge University, a leading authority on the history of archaeological research of the Subcontinent and a masterful synthesizer of the prehistory and early history of India. A prolific author and well-known scholar, Chakrabarti co-edited with F.R. Allchin *A Source-Book of Indian Archaeology*, (New Delhi 1979 and 1997).

The "India" of this volume, Chakrabarti notes (xv), is the Sanskrit *Bharatavarsha*, the subcontinent as a whole, and covers the Paleolithic from the Acheulean and Sohan industry through the development of villages, the Indus or Harappan civilization, developments in non-Harappan India, and the Iron Age into the early centuries C.E. The area covers 4.4 million km^2, encompassing Pakistan, India, Nepal, Bangladesh, and Bhutan (compa-

rable to Europe [without Russia] at 4.72 million km^2). Although the contributions of several early 16th-century prehistorians are noted, the author emphasizes British and Indian research over the last 200 years to 1998, creating the most up-to-date overview available of the Subcontinent for the Lower Paleolithic through Early Historic periods.

The volume contains a preface, eight chapters supplemented by endnotes, a 423-item bibliography, illustrations and maps, and an index. The initial chapter documents the history of archaeological research, the importance of the Anthropological Survey of India, the John Marshall era (1902–1944), contributions by Mortimer Wheeler, and Post-Independence research. This segment incorporates elements of Chakrabarti's own book-length assessment, *A History of Indian Archaeology from the Beginning to 1947* (New Delhi 1988). The physical geography, ecology, frontiers and boundaries, and languages are also reviewed, and there is a lengthy discussion (36–9) of Risley's seven racial categories of Indian people (*Census of India, 1901,* vol. 1: *India* [Calcutta 1903]).

Following the exposition of these academic and physical contexts, the author devotes a detailed chapter to the Paleolithic: prior research, osteological evidence, climate and chronology, tool types and distributions, and "evidence of art (?)." The third chapter considers the Mesolithic and associated rock art, climate, chronology, and eight major sites, including Bagor I, Baghor II, Adamgarh, Sarai Nahar Rai, and Paisra.

"The Growth of Villages: From Baluchistan to Haryana and Gujarat" is the title of the expansive fourth chapter, in which six areas are documented: Baluchistan, Bannu, Gomal Valley, Kirthar Piedmont and Kohistan, Potwar Plateau, and the Indus-Hakra Plain. His discussion emphasizes Baluchistan and the Indus-Hakra Plain, documenting many sites of importance including the Mehrgarh culture type-site in the Kachhi Plain and Kot Diji sites distributed through eight regions in the Indus Basin. The other four areas of village growth are accorded minimal discussion, although Chakrabarti does review the development of Agavallis as a center of early metallurgy.

A fifth chapter provides a brief but splendid synthesis of Indus or Harappan culture with half of the presentation focusing on nine major sites and the general features of Harappan settlements. Among the sites profiled are Mohenjodaro, Chanhudaro, Harappa, Kalibangan, Lothal, and Dholavira. The latter half of the chapter is an overview of the general features of Harappan civilization: seals, script, pottery, metallurgy, weights and measures, domesticated plants and animals, trade (maritime and overland, including the Oxus-Indus interaction zone), religion, and sculpture. A skimpy interpretation of the chronology, sociopolitical characteristics, and the decline and transformation of Indus culture complete the discussion. There are elements here of Chakrabarti's own work, *The External Trade of Indus Civilization* (New Delhi 1990), which should be consulted as a supplement. Chapter 6 documents Neolithic-Chalcolithic and "Iron-bearing culture" in non-Harappan India with discussions of evidence from Gandara, Kashmir, Rajasthan (Jodhpura and Ahar cultures), Madhya Pradesh, South India, Orissa and Bihar, and Uttar Pradesh followed by a short interpretive summary. Chakrabarti's own *The Early Use of Iron in India* (Delhi 1992) emends the latter discourse on the Early Bronze Age.

Early Historic India is the subject of chapter 7, beginning with a summary of political and economic frameworks followed by a discussion of seven regional settlement analyses, and topical reviews of inscriptions, coins, fine arts (sculpture, painting, and terra-cotta), and architecture. Chakrabarti's *The Archaeology of Ancient Indian Cities* (Delhi 1995), a revision of his 1972 University of Calcutta dissertation, is a specialized assessment of incipient urbanization and presents a different perspective from F.R. Allchin's *The Archaeology of Early Historic South Asia* (Cambridge 1995). The eighth chapter, "Some General Issues," departs dramatically from the text's format, with brief assessments of geography, prehistory, settlements, agriculture, metallurgy, and trade and trade routes.

Paleolithic and Mesolithic materials are afforded more detailed treatments than those of the Neolithic-Chalcolithic and early Iron Age, and readers might have anticipated greater equity. Although scholars may take issue with his interpretations of Baluchistan-Indus connections (149), most would agree that Northern Black Polished Ware (NBPW) must not be assumed to be a pan-Indian Early Historic trait. For maps 1–6 and 8, one finds the disconcerting statement that "this map is neither accurate nor to scale"; a political map of India, however, would have been a useful addition. In the main, the illustrations are poorly rendered and detract from the excellent narrative and cogent summaries. And finally, the volume is printed on acidic paper and will quickly become a candidate for preservation reformatting.

As a basic primer, Chakrabarti's *India: An Archaeological History* provides an excellent overview of Indian prehistory and early history. Five decades ago, Stuart Piggott's *Prehistoric India to 1000 B.C.* (Harmondsworth 1950) provided the initial synthesis and incorporated new, detailed, and unpublished information. Two other syntheses followed, F.R. Allchin and Bridget Allchin's Penguin paperback, *The Birth of Civilization: India and Pakistan before 500 B.C.* (Harmondsworth 1968), and R.E.M. Wheeler's *Early India and Pakistan to Ashoka* (London 1969). Collectively, these provided pioneering introductions to Subcontinent archaeology.

Within the last 25 years, Indian scholar H.D. Sankalia prepared a popular work, *Prehistory of India* (New Delhi 1977), which retitled and updated his earlier editions (Bombay 1963 and Pune 1974). Many specialists, however, have preferred D.P. Agrawal's scholarly *The Archaeology of India* (London 1982), while Walter Fairservis's *The Roots of Ancient India* (2nd ed., Chicago 1975) emphasizes northwest India and has a useful, extensive bibliography. Although Chakrabarti does not mention Allchin and Allchin's significant text, *The Rise of Civilization in India and Pakistan* (Cambridge 1982), his own compelling text is a more comprehensive and current assessment through the early centuries C.E. and is recommended as a primary source, taking a rightfully earned position superior to the earlier syntheses.

Ridinger's selected bibliography on *The Archaeology of the Indian Subcontinent and Sri Lanka* contains 639 annotated entries covering the period from 1832 to 1999; the volume, he writes, "has been assembled with a view to providing the researcher who is unfamiliar with this mas-

sive body of literature a framework for both introduction and more detailed independent investigation" (vii). Unfortunately, we are not informed as to the author's criteria for the selection (or rejection) of entries. Emphasis is placed on the late 19th and 20th centuries. India has 470 entries (220 general and 250 specific entries [1–75 and 76–172], the latter divided into 25 areas or regions alphabetically from Andaman Islands to West Bengal). In addition, there are four entries for Bangladesh (163—5), 93 for Pakistan (167–96), and 49 for Sri Lanka (197–214), plus 23 entries on periodicals and serials. He observes correctly that Chakrabarti's *Ancient Bangladesh* (Delhi 1992) is the only systematic review on that country available for the Paleolithic through pre-Islamic era. Two appendices, one with a list of 12 South Asian archaeological laws and legislation, and a 37-page index of proper nouns and topics, complete the volume. The references and annotations are accurate and detailed, but there were a few minor typographical errors. This expensive volume provides cogent summaries and is essential for research libraries.

Charles C. Kolb

national endowment for the humanities
1100 pennsylvania avenue, nw
washington, dc 20506
ckolb@neh.gov

La Cultura del Medio Bronzo nell'agrigentino ed i rapporti con il mondo miceneo, by *Giuseppe Castellana*. Pp. 291, pls. 174, figs. 152, maps 7, tables 12. Regione Siciliana, Assessorato Regionale Beni Culturali ed Ambientali e della Pubblica Istruzione, Palermo 2000 (cloth).

Giuseppe Castellana, the Director of the Regional Archaeological Museum at Agrigento, has followed his 1998 volume on Monte Grande (*Il santuario castellucciano di Monte Grande* [Agrigento]; see my review, *AJA* 105 [2001] 134–5) with this work, which discusses the Middle Bronze Age in the area of Agrigento and the contacts with the Mycenaean world. In his work Castellana has routinely commented upon the evidence for commercial relationships between the Bronze Age peoples of Sicily and the peoples to the east. This volume gathers evidence from his excavations and those of others in support of a bold hypothesis about the development of the Thapsos culture. In short, he argues that the Thapsos culture developed from the Early Bronze Age Castellucian culture stimulated by trade with the Aegean. Monte Grande, he suggests, played a leading role in this development and the site itself demonstrates the period of transition from Castellucian to Thapsos.

At first glance, this volume appears to be a patchwork of discussions of a variety of sites in the Agrigento area. There are 10 chapters, whose titles seem disparate: "Passage from Castellucian to Thapsos in the Agrigento Area," "Contacts with the Aegean before the Mycenaeans," "A Catalog of Aegean Ceramics," "The Village of Madre Chiesa," "The Site of Madre Chiesa in the Middle Bronze Age World," "A Catalog of Thapsos Ceramics in the Territory of Palma di Montechiaro," "Village of Scirinda," "A Consideration of Thapsos Culture," "A Catalog of Scirinda Ceramics," and "Tomb Furnishings from the Territory of San Angelo Muxaro." A careful reading of each chapter, however, demonstrates Castellana's clear line of argument. My single complaint of the volume is that it and Castellana's argument would have been well served by a short introduction outlining his hypothesis.

Castellana offers specific details of LBA Cycladic and Mycenaean pottery found at various sites in Sicily: LH IIB/IIIA from late Castelluccian contexts, LH IIIA from Cannatello in Middle Bronze Age contexts, and LC IIIA from Pantelica Nord. Essentially, he reviews the excavations and finds from a number of sites and weaves them into his narrative of transition from the Castelluccian pastoral and agricultural society to the commercial Thapsian.

In addition, he demonstrates a direct transition from Castelluccian to Thapsos using evidence from architecture and pottery; this transition requires neither an invasion nor an interruption, nor were Rodì-Ciavolaro ceramics a required part of this development. The site of Madre Chiesa, he suggests, superbly illustrates the passage from Castelluccian to Thapsos. The site of Cannatello demonstrates the contemporary use of circular and rectangular rooms, and Thapsos (Syracuse), as is well known, with its changeover from circular to rectangular rooms/huts, corresponds to a moment of radical urban planning.

Castellana argues that the area around Agrigento, and Monte Grande in specific with its traffic in sulfur products, played a fundamental role in the EBA transition from Castelluccian to the Thapsos, based on commercial ties to the Aegean. He suggests that the first contacts with the Aegean must have profoundly transformed the economic and social character of the coastal communities of the Castelluccians: prior to this contact they formed closed communities with an agricultural and pastoral economy and a social organization based on groupings of blood relatives; with contact they became a transmarine culture open to the mercantile dynamics of the Myceneaen world.

Castellana supports his hypothesis using a number of sites, including the Castelluccian site of La Muculufa, which he discusses as an example of a small settlement instead of its published interpretation as the seat of a religious league. As one of the excavators of La Muculufa, I suggest that, although it was not the Aegean commercial site that Monte Grande was, it does display characteristics of a seat of a religious league whose political and social organization corresponds, however, to the organization of Monte Grande. In future discussions, Castellana needs to include evidence from a wide variety of sites, even those which may not, at first glance, support his premise.

In spite of this minor weakness, Castellana's study forms an important first step toward a new approach to the study of the Bronze and Iron Age peoples in Sicily. This is a well-produced volume; in addition to the detail provided in the text, appendices, and bibliography, it contains color photographs for both site and objects, and clear line drawings for site plans and small finds. All who are interested in Mediterranean commerce and, of course, the prehistory of Sicily, will benefit from the evidence

that Castellana presents and his conclusions. Like his earlier publication on Monte Grande, this is an important critical addition to the studies of Mediterranean commerce in the prehistoric era as well as to western Mediterranean studies in general.

Susan S. Lukesh

221 west library wing
hofstra university
hempstead, new york 11549-1440
susan.s.lukesh@hofstra.edu

Romanization in the Time of Augustus, by *Ramsay MacMullen*. Pp. vi + 222, figs. 20. Yale University Press, New Haven 2000. $25. ISBN 0-300-08254-1 (cloth).

Standard scholarship exploring Rome's expansion into the provinces evinces the notion that the inhabitants of the newly yoked provinces, clinging to their native traditions, generally resisted acculturation. This was the broadly stated theme and conclusion made over 25 years ago by the contributors of the groundbreaking collection of essays, *Assimilation et résistance à la culture gréco-romaine dans le monde ancien* (Paris 1976). Ramsey MacMullen's estimable new study challenges this resistance doctrine by arguing as his central theme that, contrary to resisting Rome's culture "pushing" out from Italy and overwhelming the conquered province, the provincials tended to "pull" Rome to themselves and embraced the outward trappings of Roman culture. The benefits Rome offered to the provincials, especially potential wealth, far outweighed the desire to retain complete adherence to ethnic or cultural separateness. MacMullen stresses moreover that the push toward acculturation resulted not so much from Romans immigrating to these newly acquired territories but more importantly from new patterns of behavior brought from Italy and instilled in provincial populations.

MacMullen's study also demonstrates how the degree of acculturation—or perhaps better to use the controversial term "romanization"—varied throughout the provinces. He divides his investigation into four basic geographical areas: the east, Africa, Spain, and Gaul. This organization allows for discernible contrasts to be highlighted for homogeneous ethnic or cultural groups. He points out, quite rightly, that acculturation in the Greek east, practically speaking, was minimal. While it is certainly true that the outward signs of *Romanitas* were present—colonies of veterans, Italian cement, centuriation—it is unlikely they did not deeply affect culture change. After all, the east was already civilized! Rome's contributions lay in military strength, governmental administration, and technology. In most everything else, native Greek traditions won out over imported Roman cultural expressions; for example, Latin among even Roman colonists died out after only a few generations.

The "pull" of Roman acculturation in the Augustan era, as MacMullen demonstrates, is more keenly evident in the west, although it appears to be primarily an urban phenomenon. Also, as MacMullen purports, the process belongs to the realm of the elite, whether they be Italian colonists or native inhabitants who, by freely adopting Roman customs and orienting their outward lifestyles toward the Italian model, find quicker entrée into the Roman economy. The usual trappings of Roman urban architecture, such as fora, temples, baths, and amphitheaters, which spring forth in Africa, Spain, and Gaul, and which are lacking in the east, also accompany this new wealth fostered under Augustus.

All too often nowadays, the trend in modern Roman provincial scholarship tends toward the collecting of papers by various scholars connected by a central theme. While useful for offering multiple viewpoints, these collections often lack the comprehensiveness and cohesion that can be achieved by one scholar. MacMullen brings to the scholarly table decades of investigation of the Roman provinces, and this valuable book represents the fruit of his breadth of knowledge and erudition to bring together, with admirable results, an accessible study of Roman provincial acculturation during the formative period under Augustus.

Michael Hoff

deparment of art and art history
university of nebraska
lincoln, nebraska 68588-0114
mhoff@unl.edu

Imperial Women: A Study in Public Images, 40 BC–AD 68, by *Susan E. Wood*. Pp. xi + 370, ills. 146. Brill, Leiden 1999 (cloth); 2000 (paper). Hfl 297.50, $157, €135 (cloth); $34.90 (paper). ISSN 0169-8958 (cloth); ISBN 90-04-11281-2 (cloth); 90 04 11950 7 (paper).

During the Roman Republic, portrait statues were on view throughout the city of Rome, but nearly every one was male. Public statues and coin portraits were intended primarily to honor achievements in war and politics, and these were spheres of activity in which women did not compete. Prior to 35 B.C., in fact, we have evidence for only four public portraits of women, two of whom were Vestal Virgins, and the sudden dedication of so many portraits of imperial women in the public spaces of Augustan and Julio-Claudian Rome must have been far more striking to the ancient spectator than we usually think.

For a long time, scholars expressed little interest in these women and their images, and even the magisterial series *Das römische Herrscherbild* has virtually ignored the aristocratic women of the early empire. The tide began to change a few years ago when Elizabeth Bartman and Rolf Winkes published monographic studies on Livia and the other women of the Augustan court. And now, in her valuable and very readable new book, Susan Wood has provided us with an overview of the imagery of imperial women from 40 B.C. through A.D. 68, that is, from the Second Triumvirate through the death of Nero.

Six chapters are devoted to the histories and portraiture of the most important women in the imperial court. Livia and Antonia Minor each receive their own chapters, and the others are essentially organized by reign: Augustan

(Octavia Minor and Julia, daughter of Augustus), Tiberian (Vipsania Agrippina and Livilla, the mother and wife, respectively, of Drusus the Younger), Caligulan (Agrippina the Elder and her daughters), and Claudian/Neronian (Messalina, Agrippina the Younger, and Nero's wives Claudia Octavia and Poppaea). There is an appendix on genealogy and nomenclature, eight genealogical charts, and indices of proper names, cities, and museums. The 146 illustrations are, in general, of good quality.

Each chapter begins with concise summaries of the lives of the women in question and a careful and lucid presentation of the literary and epigraphic evidence. Wood then explains her reasons for assigning specific types to each woman and describes how those types developed over time. The emphasis is on portraiture in stone, although good use is made of coins and cameos, and Wood is to be commended for focusing as much as she does on works of art that have an archaeological context. She is honest about recognizing that some of her attributions are less plausible than others, and she does not attempt to attribute a type to every woman in the dynasty.

There will never be universal agreement on the portraiture of the Julio-Claudians, either male or female, and some scholars will find a few of the author's attributions to be problematic. The Béziers-Copenhagen type, now usually assigned to Julia, daughter of Augustus, is here identified as an early type of Vipsania Agrippina, the daughter of Agrippa and first wife of Tiberius. But there is no literary or epigraphic evidence for the dedication of her portraits prior to A.D. 23, when her son Drusus received posthumous honors from the Senate, and this identification seems unlikely. Her connection of the Leptis-Malta type to Livilla, the wife of Drusus the Younger, is also difficult to accept. Livilla was the first person in the imperial family to have suffered *damnatio memoriae*, and it seems to me inconceivable that her portraits would have remained standing in central Italian Augustea after the Senate had ordered them destroyed. Since a Leptis-Malta type portrait was found next to a statue of Germanicus in the headquarters of the Augustales at Rusellae, a Livilla identification can be ruled out. The Juno Ludovisi type, tentatively linked to Livia here, is surely a goddess. The beaded fillet or *infula* indicates sanctity in general, not necessarily that the wearer is a priestess. The redating of the Grand Camée to the Claudian period, and the argument that the "nodus" type reappears at the same time, will also not attract many adherents.

But in general this will be a good book to give to students who want to acquaint themselves with Julio-Claudian women and their problematic portraiture. I hope that scholarship will now turn toward more detailed studies of the Flavian and Antonine women, who have been rather neglected recently, as have their children. One also looks forward to the continuation of current trends in portrait scholarship, in which epigraphy and archaeological context play such a prominent role.

C. Brian Rose

department of classics
university of cincinnati
cincinnati, ohio 45221-0226
brian.rose@uc.edu

Bild und Bildersprache der römischen Kaiser: Beispiele und Analysen, by *Maria R. Alföldi*. (Kulturgeschichte der Antiken Welt 81). Pp. 304, b&w ills. 260. Philipp von Zabern, Mainz 1999. DM 68, €34.77. ISBN 3-8053-2455-3 (cloth).

Maria Alföldi's book offers a history and analysis of the visual language of Roman imperial iconography. Introductory chapters explore the concepts of image (*Bild*) and the language of images (*Bildersprache*), the function of images in imperial Rome, and the significance of visual culture in a society of limited literacy. The core of the book is formed by a series of analyses of key themes in Roman imperial iconography: the emperor and the gods, victory, the emperor's work on behalf of the *respublica*, and the staging of the imperial person. These chapters are framed by sketches of the construction of the imperial language of images during the late Republic and of its transformation under the dual pressures of Christianization and social change in late antiquity.

The most distinctive feature of Alföldi's book is her concentration on coinage as a source for the analysis of Roman imperial art. Some three-quarters or more of the copious illustrations are plates of coins—sometimes as many as 10 coins on a plate—interspersed with some historical reliefs and one or two portraits. She makes excellent use of this rich body of numismatic evidence to contextualize and sometimes reinterpret (e.g., the sculptures of the Severan Arch at Leptis Magna, 137–41) the patchy and disparate record of monumental historical reliefs. Her chosen emphasis highlights the continuity of certain themes in Roman imperial art—for example, those of dynastic succession and concepts of blood or other relatedness, the emperor and the army, and civic self-presentation in scenes of *adlocutio*.

The serial character of images on coins, and the relative fullness of the record, gives a particularly interesting slant on the transformation of Roman imperial art in late antiquity. The author sketches the disappearance in the early fourth century of narrative scenes on coins, which told the viewer what the emperor does, in favor of frontal hieratic images of imperial office. Dates when key images or types of images drop out of the iconographic repertoire, or when new types enter (e.g., the emperor presented frontally and seated on a throne hitherto reserved to gods) can be determined with some precision, and consequently they can be tied to specific conjunctures concerning the late antique reconstruction of the imperial institution, in particular the succession crisis of Constantine with his eldest son (179). Spurts in the Christianization of imperial iconography take place during political crises, when the reigning emperor is threatened by usurpers (193–5). The beginnings of a history of Roman imperial iconography can thus take shape in which cultural tradition, social structure, and the individual agency of emperors respond to changing circumstances and specific events.

Sadly, the potential of such an approach is not fully realized. Notwithstanding the title of the book and her claims of interest in the effect of imperial imagery on various groups of viewers (9), Alföldi ignores the theo-

retical advances of the last 20 years of Roman art history (Hölscher and Zanker on the language of imagery, Brilliant and Elsner on the viewer), categorized by Alföldi as the "social historical approach" (206). Her own more "simple" project is to find out what "information" the "small man on the street" may have derived from such images (7), and to see to what extent the information derived from coins can complement or correct our literary sources. Even these limited intellectual ambitions are poorly sustained. Alföldi offers an interesting comparison between Trajan's self-representation accompanied by divine protectors and that of Commodus (remarkably similar), and she adds an analysis of the famous Commodus-Herakles portrait (54–6). Surprisingly, however, she does not use the coin evidence to normalize this image, but interprets the portrait as a "reflection" of the madness of Commodus well attested in the narrative of Dio Cassius, hardly the disinterested view of a representative "small man on the street."

It is difficult to see to whom this book is aimed. The coin-based analysis of imperial iconography is insufficiently elaborated, and too poorly informed by contemporary theoretical debates, to be of much interest to specialists in the field. On the other hand, the general readership, who need to have it explained that *akephalos* means "headless" (98) will be ill-served by a survey of Roman imperial art with such a particularly slanted selection of images and by a concluding 25 pages of primary sources quoted in their original Greek and Latin.

Jeremy Tanner

institute of archaeology
university college london
31-34 gordon square
london, wc1h opy
united kingdom
j.tanner@ucl.ac.uk

Wooden Furniture in Herculaneum: Form, Technique and Function, by *Stephan T.A.M. Mols*. (Circumvesuviana 2.) Pp. viii + 321, pls. 201. J.C. Gieben, Amsterdam 1999. DFl. 350. ISBN 90-5063-317-X (cloth).

Stephan Mols's *Wooden Furniture in Herculaneum* is recommended for anyone interested in ancient furniture, life in the Vesuvian cities, or the material culture of early imperial Rome. The Herculaneum furniture, famous because of its good state of preservation—although in carbonized form—has not been readily accessible, either to visitors to the area or in published illustrations, with the exception of several pieces still on view at the site. This book, therefore, fills an important lacuna: Mols publishes the collection in its entirety for the first time.

The author became interested in the Herculaneum furniture when he visited the site in 1984 while working at Pompeii on a research project for the Catholic University of Nijmegen. He subsequently completed a course in furniture making and design, and then chose the Herculaneum furniture as the subject of his dissertation (1994), which was revised and published as the volume here under review. The result is a well organized, comprehensive study, clearly written (elegantly translated from the Dutch), that catalogues the beds and couches, tables, seating, and storage furniture from the site, discusses the techniques used to make them, and sets the pieces in their social and historical context.

The eruption of A.D. 79 (and later eruptions) engulfed the town of Herculaneum in mud and lava that subsequently hardened, encasing and preserving the organic materials left behind when the inhabitants fled. These include extensive remains of food, clothing, bedding, and 41 extant pieces of wooden furniture, preserved in whole or in part.

Little survives of the organic objects that were recovered from the early excavations at Herculaneum. The more recently excavated pieces of furniture are on display in the rooms of the houses in which they were found or are kept in storerooms at the site. As they were never properly published, they have been—strangely—essentially ignored in histories of Roman furniture. The Herculaneum wooden furniture, however, is more valuable in some respects than the better known stone or metal examples, as a great variety of types is represented, and the findspots have revealed not only the function of the pieces but also the purpose of the rooms in which they were found and even the social status of the houses' occupants.

The wooden furniture and architectural elements still in situ are now in perilous condition, either encased in glass that does not protect them well from the elements, attracts dust and dirt, and retains moisture, or they are entirely exposed so that tourists may touch them (it is hard to say which situation is worse for the wood). The urgent need to record these pieces before they disappear completely has been met by Mols's publication.

His text proceeds by chapters. First is a "general framework" that includes a brief history of ancient furniture and comments on literary sources pertaining to the Herculaneum furniture. Unfortunately, the history of ancient furniture is too brief to be of any real use, the information presented contains errors, and sources are cited uncritically. Still, it is useful to have the bibliographical references all in one place.

His second chapter treats the subject of the carbonization, excavation, and preservation of the furniture. Surviving are 12 beds and couches, six tables, four seats, 12 cupboards, and one chest. Most of these pieces were originally recovered in fragments, but in many cases enough was preserved to make a "faithful reconstruction" of the original form. This is an important revelation, as the visitor to the site imagines (unless looking closely) that the furniture was found in the form in which it now exists. The traditional means of conserving the furniture at Herculaneum has been with paraffin wax mixed with carbon powder, utilizing metal supports. The paraffin has formed a thick, dark crust on the exterior of the wood, obscuring decoration, tool marks, and joinery. It is impressive that Mols has been able to get so much information from these pieces, considering the amount of wax and dust on the surface. Other interesting details regarding preservation, reconstruction,

and present condition and situation of the objects are recorded: 18 pieces of furniture are still set up in the rooms where they were discovered, and five are on view but not in their original locations.

In the third chapter, the pieces themselves are considered according to form: beds and couches, tables, seating, storage furniture, and finally the library of the Villa of the Papyri. This interesting and instructive discussion forms a substantial introduction to the catalogue that follows the text.

Finally, there are chapters on materials and techniques and on the function of the furniture within the context of the Roman household. In the tools and techniques section, a brief history is again given, this time of ancient woodworking methods. Although there is a great deal of information here, out-of-date sources are used to support the author's contentions, resulting in an inaccurate reconstruction of the history of ancient woodworking technology. Comments on the techniques used for the furniture from Herculaneum are interesting and useful, however. Wood species analyses undertaken in conjunction with Mols's study have identified the following woods from Herculaneum: silver fir, oak, walnut, boxwood, hornbeam, maple, and beech. One three-legged table from the House of the Carbonized Furniture had a walnut top and boxwood legs, the same combination used for seven of the banquet tables from the Tumulus MM burial at Gordion, Turkey (eighth century B.C.).

The catalogue comes next, containing detailed entries arranged according to furniture form; this is one of the book's most significant contributions. The catalogue is followed by several appendices, the most important being a collection of the archival and published references (18th through 20th centuries) documenting the furniture finds excavated at the site.

The plates include photographs of the individual pieces of furniture and the author's drawings showing the methods of construction, often down to the minutest of details. The black-and-white photos are disappointingly dark and muddy, but then the furniture is actually as dark and muddy as it looks in the photographs. Many shots were taken in situ, and one can appreciate the pieces in their original settings but also their current state of deterioration.

The drawings are well executed and provide valuable information regarding methods of construction and joinery that would not otherwise be available. In some cases, they are confusing, because of the use of various patterns added in to designate "crosscut wood," "reconstructions," "modern elements," and "bone in cross-section." With some determination, however, the reader can decipher the graphics and get at the information presented.

The plate captions are somewhat problematic, as the photographs have only numbers to identify them, while the author's drawings have more complete captions; one must continually turn to the list of captions at the beginning of the plates in order to correlate the photos with the drawings. One is grateful for the illustrations, however, which finally show the objects that have up until now been virtually unavailable, and grateful to Stephan Mols, who has rescued one of the most essential collections of ancient furniture.

Elizabeth Simpson

the bard graduate center
18 west 86th street
new york, new york 10024
lizhanim@aol.com

Les marbres blancs des Pyrénées: Approches scientifiques et historiques, edited by *Jean Cabanot, Robert Sablayrolles,* and *Jean-Luc Schenck.* (Entretiens d'Archéologie et d'Histoire 2.) Pp. 312, figs. 115, color pl. 1, tables 16. Musée Archéologique Départemental, Saint-Bernard-de-Comminges 1995. ISBN 2-9502446-7-X (cloth).

Unlike most colored marbles, which generally have distinctive patterns and can often be ascribed to a provenance by a close visual inspection, white marbles generally present difficulties in suggesting origins from a hand-specimen examination alone. While the grain size and subtleties of shades of color in white marble can sometimes give a useful indication of origin, on the whole it is often difficult to make a rigorous diagnosis of the source without resort to scientific analysis. Studies of the regional characterization of white marble, such as this book edited by Cabanot, Sablayrolles, and Schenck, are therefore greatly welcomed.

This book comprises 16 conference papers, one each in English and Spanish and the rest in French. Although the title suggests that these papers all concern white marble from the Pyrenees, the scope of the book is in fact somewhat wider. The scientific groundwork is laid by the first seven papers, which deal with different approaches to the characterization of white classical marbles, principally those from Carrara and the main Greek and Asia Minor quarries, and all include detailed tables of results. The opening paper by Hertz outlines the results of stable isotope analysis, Mazeran deals with thermoluminescence, while Blanc covers cathodoluminescence. Moens, de Paepe, and Waelkens have adopted a multidisciplinary approach, which includes petrology, while Perez usefully discusses the comparatively new method of image processing with illustrations that clearly show the varying textures from different quarries.

The second and larger section of the book is made up of nine papers dealing with different aspects of Pyreneean white marble. The most important of these comes from the Saint-Beat quarries in the Haute-Garonne and is a highly crystalline marble with a saccharoid aspect and few secondary minerals. Costedoat deals with the geology of the region and the characterization of the main quarries; Fabre and Sablayrolles review the dating evidence and distribution. The presence of Dressel 1A Roman transport amphorae (Peacock and Williams, *Amphorae and the Roman Economy* [London 1986] Class 3) at Saint-Beat suggests a late Republican date for the opening of those quarries. The actual products of the quar-

ries, mostly from Saint-Beat, are dealt with by Schenck (altars), Bergmann (sculpture), Immerzeel (sarcophagi), and Cabanot (capitals). Lest we forget that Pyreneean marble was still quarried well after the Roman era, there is a final paper by Bresc-Bautier on its use in the 16th and later centuries at the courts of the kings of France. There is also a careful conclusion by N. Duval and 27 pages of conference discussions.

All in all, this is a useful book, and it should have a wider appeal than just those whose main interest is Pyreneean white marble. Moreover, it is to be hoped that this collection of papers will generate a greater awareness of the availability of such marble during the Roman period. For example, as far as the writers are aware, Pyreneean white marble has not yet been recorded from Britain. However, moderately high totals of the colored marbles Campan rose and vert from the Pyrenees are present in later first century A.D. contexts at Fishbourne Palace and London, and it is possible that Saint-Beat marble from the same region may also be represented in the unsourced white marble from both sites (Peacock and Williams, *ASMOSIA* 4 [Bordeaux 1999] 353–57). This book should act as a spur to encourage such work.

David Williams

department of archaeology
university of southampton
southampton so17 1bj
united kingdom
dfw@soton.ac.uk

David Peacock

department of archaeology
university of southampton
southampton so17 1bj
united kingdom
d.p.peacock@soton.ac.uk

The Obelisk Base in Constantinople: Court Art and Imperial Ideology, by *Bente Kiilerich*. (*ActaAArtHist*, Series Altera in 8°, 10, Institutum Romanum Norvegiae.) Pp. 194, b&w ills. 71. Giorgio Bretschneider, Rome 1998. Lit 150,000. ISSN 1120-4672 (paper).

In A.D. 390, Theodosius I (379–395) erected an obelisk on the central barrier of the Hippodrome of Constantinople. The obelisk was originally a 15th-century B.C. dedication of Thutmosis III at the Temple of Amon, Thebes; both it and the fourth-century A.D. sculptured base that supports it survive today in modern Istanbul. Together, they form one of the few monumental imperial works known to have been erected in the late fourth-century Byzantine capital; the Columns of Theodosius and of Arcadius are two others. Among these official commissions, the obelisk and its base holds pride of place as it is the only one to have survived intact; it is therefore an invaluable monument for the study of late Roman art.

Bente Kiilerich's study of the obelisk base offers the first comprehensive assessment of this important monument since Gerda Bruns's landmark publication *Der Obelisk und seine Basis auf dem Hippodrome zu Konstantinopel* (Istanbul 1935). Its stated aim is "to present a comprehensive view of the obelisk base as an important art historical monument as well as a significant document of imperial ideology" (18). To this end, the author begins with an overview of the history of scholarship. She then continues with a series of detailed descriptions of the base's inscriptions and reliefs. These descriptions provide the foundation for the subsequent discussions of style and iconography.

Does the author achieve her purpose? Yes and no. The organizational scheme, workmanlike in its thoroughness, produces what is indeed a comprehensive assessment of the monument's style and iconography and concludes by interpreting the base as an expression of late imperial ideology. Specifically, Kiilerich observes how the hieratic elements of the base's sculptured fields work together with the iconographic details of costume and figure identification to create an image of Theodosian dynastic power. This approach, and the conclusions that derive from it, represents an obvious reworking of familiar terrain: Kiilerich has followed Bruns's organizational scheme, updating it with recent scholarship to articulate the currently accepted understanding of the base in terms of style and iconography. While some of her ideas represent an elaboration of previous suggestions, there is little interest in probing beneath the surface of established ideas and attitudes except as a corrective to statements of fact. As such, her study produces no particularly new or startling insights into the monument's overall workings, and her discussions, while based on the most painstaking of careful observations, tend to lack depth or interest.

This tendency is particularly apparent in the use of the term "court art" so prominent in the title. No definition of the term is ever provided, and we are left to wonder whether she intends the term to refer to monumental public art produced by imperial mandate or the full range of public and private commissions that constitute the late fourth-century ouevre. Further, in a work whose stated aim is a comprehensive art historical treatment of the obelisk base, it is surprising that there is no real assessment of the base in its most characteristic and traditional role as avatar of the Theodosian Renaissance.

These criticisms notwithstanding, the publication of Kiilerich's study is a welcome event. The art of late antiquity is an increasingly popular field for study, but it has not been well served by publication, especially in English. By providing a comprehensive overview of scholarship that is often inaccessible, either because it is published in specialized periodicals that are difficult to access or because potential readers know only English, Kiilerich makes not only the obelisk base, but also the art of the later Roman world, more comprehensible.

Sarah E. Bassett

department of art history
wayne state university
detroit, michigan 48202
aa2582@wayne.edu

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CONTENTS OF VOLUME 105 (2001)

NEWSLETTERS

NECROLOGIES

PROCEEDINGS

BOOK REVIEWS

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