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Tripods, Triglyphs, and the Origin of the Doric Frieze
MARK WILSON JONES

Abstract
The standard wisdom on the origins of the Doric order revolves around the doctrine of petrification, by which a previously established timber vocabulary came to be perpetuated in stone once society acquired the means to build in this material. While the petrification doctrine takes its authority from the Roman architect-writer Vitruvius, and finds support from parallel processes observable elsewhere in the world, it none the less copes inadequately with the archaeological realities of Greece in the late Geometric and early Archaic periods. In particular, the form, size, and placement of the triglyphs in the frieze are not necessarily demanded by the logic of timber construction and the configuration of early temple superstructures.

A growing number of scholars accordingly challenge the Vitruvian consensus, whether by tracing the Doric frieze back to Mycenae, Egypt, the Orient, and idioms of pattern making in Geometric art, or by arguing for symbolic modes of interpretation. After briefly reviewing these approaches, this paper presents connections between triglyphs and tripods, ritual objects of considerable significance for early Greek cultural and religious life. The formal characteristics of tripods and representations of tripods find echoes in the generic compositional structure of the triglyph. Depictions of multiple tripods alternating with decorative motifs recall the rhythmical disposition of the triglyph and metope frieze, while certain small-scale details on bronze tripod legs find counterparts in non-canonic types of triglyph. The concluding section initiates a debate over the explanation for these affinities by exploring the significance of the tripod and its many associations: as aristocratic gift with heroic overtones, as agonistic prize, as oracular instrument, as Apolline symbol, as the Greeks’ ultimate votive offering. Some of these themes can strike chords with Greek temples, so there thus emerges the possibility that the triglyph frieze was invented to articulate visually the programmatic concerns of their builders.

Conventional wisdom sees the origin and the early development of the Doric order, and hence the Doric temple as a whole, as the fruit of constructional logic mediated by aesthetic experience. The triglyph frieze is such a paradigm of this way of thinking that merely to raise the question of symbolic content might appear to be rhetorical or polemical in intention.

The possibility for conveying meaning in Greek sacred architecture is instead seen to reside either in the way temples relate to the landscape, an idea popularized by Vincent Scully in his book The Earth, Temple and the Gods, or in the sculpture associated with friezes, pediments, and acroteria. Standing proud as they do against the backdrop of mountains, or high up on a promontory or acropolis, Greek temples lend themselves to readings that emphasize the role of structure and nature. It is well to be aware, however, just how much such perceptions are conditioned on the one hand by the loss of sculpture, paint, and miscellaneous paraphernalia, and on the other by modernist architectural theory promoting constructional rationalism as the proper basis for design.

THE DOCTRINE OF PETRIFICATION

Mainstream opinion on the rise of the Doric order is conditioned by the doctrine of petrification, by which the formal characteristics of a timber system came to be canonized in stone. This idea is directly attributable to a famous passage (4.2.2) by the Roman architect-writer Vitruvius:

After occasional bouts of speculation related to this topic going back to 1993, I was fortunate to be awarded a grant in 1997 from the British Academy to carry out research in Greece. The British School at Athens provided invaluable hospitality and assistance on this and subsequent visits, and I am grateful to the National Museum in Athens for permission to study and photograph artifacts in its collection. Fledgling hypotheses were presented to half a dozen local chapters of the Archaeological Institute of America in the academic year 1997–1998, and over the years I have also benefited from lively discussions with many scholars and friends—often failing, it must be said, to convince them of the merit of the ideas presented here with more evidence—including Barbara Barletta, Malcolm Bell, Jim Coulton, Michael Djordjevich, Gottfried Gruben, Thomas Howe, Manolis Korres, Dieter Mertens, Margaret Miles, Catherine Morgan, and Joseph Rykwert. I would also like to thank Martin Schäfer for courtesies beyond the call of duty at the German Archaeological Institute in Athens, as well as Sophia Diamantopolou and Ida Leggio for valuable research assistance in Athens and Rome respectively.

1 Scully 1969.
2 For a critical review of the significance of sculptural programs, see Knell 1990.
3 Howe 1985, esp. 29–50; Forster 1996.
So it was that ancient carpenters, engaged in building somewhere or other, after laying the tie-beams so that they projected from the inside to the outside of the walls, closed up the space between the beams, and above them ornamented the coronae and gables with carpentry work of beauty greater than usual; then they cut off the projecting ends of the beams, bringing them into line and flush with the face of the walls; next, as this had an ugly look to them, they fastened boards, shaped as triglyphs are now made, on the ends of the beams, where they had been cut off in front, and painted them with blue wax so that the cutting off of the ends of the beams, being concealed, would not offend the eye. Hence it was in imitation of the arrangement of the tie-beams that men began to employ, in Doric buildings, the device of triglyphs and metopes between the beams.

Vitruvius then went on to deal in a like manner with mutules, the projecting brackets in the geison course surmounting the frieze (4.2.3):

Later, others in other buildings allowed the projecting principal rafters to run out till they were flush with the triglyphs, and then formed their projections into simae. From that practice, like the triglyphs from the arrangement of the tie-beams, the system of mutules under the coronae was devised from the projections of the principal rafters. Hence generally, in buildings of stone and marble, the mutules are carved with a downward slant, in imitation of the principal rafters.

As a unique ancient testimony, this passage demands serious consideration. But it must also be remembered that the bulk of the sources on which Vitruvius based his account date from the fourth to the second centuries, that is to say well after the appearance of the Doric order in the seventh century B.C. The text could well represent post-rationalization rather than straightforward reporting. Yet even if it may bear unkind comparison with Rudyard Kipling’s “Just So” stories, Vitruvius’s version of events, if it may bear unkind comparison with Rudyard Kipling’s “Just So” stories, Vitruvius’s version of events none the less sounds believable on several counts. Unambiguous examples of petrifaction can be found in disparate architectural traditions, notably those of China, India, and Lycia, the latter being relatively close to the epicenter of Doric architecture in the Peloponnese. The seventh century B.C. was indeed a period of transition from predominantly timber structures to ones in stone. Models of houses and other types of building datable to between the eighth and sixth centuries are sometimes articulated in ways that could plausibly express the ends of timber members. Vitruvius’s theory also explains the basic character of Doric forms: brittle and prismatic, very much the product of the saw, the plane, and the chisel.

Indeed, the appeal of the petrification doctrine has persuaded many commentators to extend it to parts of Doric temples not explicitly treated by Vitruvius. Thus the guttae, the little conical stubs on the underside of the mutules, are the memory of timber pegs or dowels; the diminution in width toward the top of column shafts is a rationalization of the shape of tree trunks (cf. Vitr. 5.1.3); the concave flutes stylize the grooves made in the process of fashioning timber trunks into circular posts using an adze, and so forth. The literature on Greek architecture contains dozens of such speculations, a representative graphic summary being that by Josef Durm reproduced here (fig. 1).

The petrification doctrine remains popular despite significant obstacles, however. On detailed inspection only the mutules convince in terms of timber construction, corresponding well with rafter-ends in terms of position, rhythm, shape, and inclination. The most characteristic component of the Doric order is unquestionably the triglyph frieze, yet paradoxically it is precisely this feature that is the most difficult to reconcile with the petrification doctrine. By contrast with mutules, the physical configuration of triglyphs positively contradicts a timber origin. Triglyphs run around both ends and flanks of rectangular buildings, whereas constructional logic anticipates beams only on one or the other, and certainly not meeting on an arris at the corner. Triglyphs from the Archaic period are far too big and too frequently spaced to mimic beam-ends. Before the adoption in the Hellenistic period of horizontal tie-beams to cope with the lateral thrust generated by more substantial spans, the timberwork of Greek temples had just two main components: primary timbers, or purlins, running parallel to the ridge of the roof, and above these, secondary rafters sloping with the pitch of the roof.8

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1 Wesenberg 1986, 1996, esp. 2.
3 Durm 1910, fig. 233. For a review of the literature, see Howe 1985; Weickenmeier 1985, and for a recent endorsement of the beam-end theory, see Holmes 1995, 36–7; Korres 2002, 6.
4 This is a frequently voiced complaint. For some comparative measurements, see Holland 1917, esp. 142–6. Large cross beams were only needed in the interior (at less frequent intervals than that implied by the rhythm of triglyphs) to transfer load from the ridge beam, see Hodge 1960.
5 Before the Hellenistic period tie-beams may have seen some use in Etruria as early as 500 B.C., probably in a form that as yet did not exploit the full potential of the truss principle. This advance appears to have been essentially a local development, see Turfa and Steinhauer 1996, esp. 8–18 (the dimensions of the Capitoline temple at Rome, however, are likely to be far smaller than generally thought, see Stamper 1998–1999). For the alternative possibility that the truss was pioneered in Sicily, see Klein 1998.
Early peristyles were generally so narrow as to require rafters alone (and hence mutules when petrified?). What is more, all the timberwork associated with the roof typically lay above the level of the frieze.\(^9\)

Nor does there exist a convincing constructional rationale for the detailed resolution of the triglyph, with the canonic three chamfered verticals and horizontal capping piece. In part inspired by Vitruvius’s description of composite beams (\textit{trabes compactiles}) in Tuscan temples,\(^10\) one body of opinion judges the chamfered recesses to be the legacy of the joints between three slim beams.\(^11\) But where they survive, cuttings for beams are more or less square; ancient architects were evidently only vaguely or sporadically aware of the structural efficiency of beams with a rectangular section, and then only at a relatively late date, in Hellenistic or Roman times.\(^12\)

For these and other reasons there have been numerous attempts to trace the origin of the triglyph by applying the concept of petrification in ways that avoid the faults of Vitruvius’s specific model. Appeal has been made to remote ancestors in the shape of windows or window bars (a theory consonant with two passages by Euripides, but which Vitruvius explicitly refuted),\(^13\) structural stub-piers,\(^14\) and colonnettes associated with a clerestory system or even an entire second story.\(^15\) Another school of thought, most clearly formulated in the mid 19th century by Viollet-le-Duc, regards the tectonic character of the Doric vocabulary as a para-evolutionary response to building not in wood but rather in stone.\(^16\)

Most of the proposals just alluded to are frankly too fantastical to warrant countering in detail, and in any case this has been done in specialist literature.\(^17\) Many proposals are predicated on a lengthy developmental phase involving successive mutations and improvements. But from the 11th to the 7th centuries there is unlikely to have existed the social, cultural, and economic framework capable of sustaining the continuity that a para-evolutionary development demands. While it is true that archaeology now tends to show that the Greek “Dark Ages” were not as dark as was previously thought, it still shows that Doric emerged relatively suddenly, representing not the culmination of a gradual progress but a quantum leap. As J.J. Coulton observes, “earlier clay models of houses and temples show no more indication of the Doric order than any primitive building would,” while when they do arrive, “the forms making up the Doric order ap-

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\(^9\)This is another common complaint, see, e.g., Cook 1951, 51; Roux 1992, 155.

\(^10\)Vitr. 4.7.4.


\(^12\)Hodge 1960, 92–3; Coulton 1988, 147. Although tripartite beams in later stone temples do exist (e.g., the architrave of the Parthenon peristyle), this responded above all to the need to reduce the weight associated with this material.


\(^14\)Guadet 1909, fig. 242; Gullini 1974.

\(^15\)Zancani Montuoro 1940; Richard 1970; Beyer 1972; cf. Dakaris 1988, Mallwitz (1981, esp. 93–5) espouses a variant on this theme with his proposal that the peripteros originated as a sort of lean-to porch or veranda added on to a rectangular core.

peared ready developed.”¹⁸ Triglyphs or proto-triglyphs made of wood have been attributed to the temple of Poseidon at Isthmia and that of Apollo at Thermum, yet no physical evidence exists to show that these are not simply figments of the excavators’ imaginations.¹⁹ On the basis of the fragmentary remains recovered below the standing Temple E at Selinunte, simple stone projections in the frieze have been reconstructed for its predecessor (Temple E1). It is tempting to interpret these as monoglyphs, as it were, precursors of triglyphs proper, but the evidence is tenuous and the date not necessarily as early as the seventh-century one proposed by Giorgio Gullini; until adequate supporting documentation is published it is impossible to draw any definite lessons.²⁰

Given the absence of firm evidence consistent with an evolutionary development, there is growing support for the theory that, whether or not it was created in wood, the Doric order was invented or brought together in a relatively compact period of time, probably around the third quarter of the seventh century.²¹ After a phase of invention and experimentation emerged the core of what was later to become the canonid Doric vocabulary. This vocabulary, presumably, was then consolidated in a series of temples, which include the earliest known examples in the new style, those (of Hera?) at Monrepos, of Apollo at Aegina, and of Artemis on Corfu.²² The prime locus for this development is likely to have been the north-eastern Peloponnese, especially Corinth or Argos. Corinth is the favored candidate on account of its leadership in both the manufacture of roof tiles and in the technology of stone construction (easily worked soft stones are common in Corinthia). In addition, Pindar seems to attribute the city with the invention of the sculpted pediment, this being another key component of the monumental temple.²³

Alternatively, Vitruvius gives reason to identify the first Doric building as the Temple of Hera at her sanctuary near Argos,²⁴ although seventh-century Doric elements have yet to turn up in excavations there, except for a capital from another structure, the so-called north portico.²⁵

THEORIES OF INFLUENCE

If the objections cited undermine the petrification doctrine, at least in its most literal manifestations, the challenge is to find a better explanation for the “ready developed” Doric forms. One intriguing proposal sees in the scansion of triglyphs and metopes an offshoot of one of the most basic formulas of Geometric art: horizontal friezes punctuated by bands of vertical stripes framing decorative and perhaps figural or narrative scenes.²⁶ In fact pottery experts often call these bands “triglyphs” and the fields they contain “metopes.” In my assessment a predisposition to conceive of friezes as a series of orthogonal repetitive elements is indeed likely to have been inherited from Geometric practice, but by itself this seems insufficient to account for the particular configuration of the triglyph.

Other theories of influence presume that early Greek architects must have adapted already established architectural vocabularies. The chief candidates are the advanced building cultures of Mycenaean, the Near East, or Egypt, which the Greeks of the eighth and seventh centuries could either have rediscovered on their own soil, or have known from their now more extensive contacts abroad.²⁷ The Doric capital can convincingly be traced back to Mycenaean,²⁸ as can fluted shafts. The Orient was the probable source for motifs such as the palmette and the gorgon (which appear in some early metopes), the Aeolic capital,²⁹ and perhaps certain masonry techniques too.²⁰ On another tack, there is undeni-

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¹⁹ For Isthmia, see Bronner 1971; Gebhard and Hemans 1992; for recent research on Thermum, see Kuhn 1993; Papapostolou 1995.
²¹ Cook 1951, 1970; Howe 1985, esp. 370–2. Barletta (2001, 54–82, esp. 79–82) argues that different components of the order could have emerged piecemeal and that this need not have been complete until two or more decades into the sixth century.
²² For Monrepos documentation is still limited, see Schleif et al. 1939–1940, 75; Bookidis 1967, 4–5; Strom 1988, 187–9; Mertens 1989, 434–5. For Aegina, see Hofelder 1999, esp. 15–45. These two temples precede better known Doric buildings, including the Artemesion at Corfu, the Apollonion at Syracuse, and the old tholos and the monopteros at Delphi.

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²³ Pindar, Ol. 13.21–22; cf. Pliny, HN 35.151–152. In support of a decisive Corinthian contribution, see Cook 1951, 52; 1970, 19; Lawrence 1983, 125; Rhodes 1987; Østby 1997. For the possibility of a west Greek origin, see Howe 1985, 367–8.
²⁴ Vitruvius 4.1.3; for qualified recent support, see Østby 2000; Barletta 2001, 154. This option implies a slightly earlier date, the second quarter of the seventh century.
²⁶ Laum 1912; Cook 1951, 1970. For general accounts of this idiom, see Coldstream 1968, 1977; Schweitzer 1971.
²⁷ On Greek interest in Mycenaean monuments, see Coldstream 1976; Morris 1988; Antonacchi 1995.
²⁹ Wessenberg 1971, 63–86; Shiloh 1979; Betancourt 1977.
³⁰ Sharon 1987; Ratti 1993.
ably something in common between the massing of early Doric peristyles and those of pharaonic buildings such as the funerary temples at Luxor, and although shafts with convex flutes were more typical, some Egyptian examples have concave “Doric” ones. Having had champions as early as the 18th century, in recent years the Egyptian cause has been taken up again. In his overview of the problem, however, Erik Østby cogently concludes that the Greeks acquired from Egypt chiefly the aspiration to monumentality using stone, along with the certain consequences of a proportional and technical nature. But whatever the impact of pre- or non-Greek influence, once again the triglyph frieze is the hardest part of the Doric order to account for. Only the split-rosette Mycenaean frieze, as exemplified by that from the Treasury of Atreus, offers a compelling potential predecessor.

This is not the place to evaluate the extensive arguments in favor of petrification on the one hand and theories of influence on the other. Perhaps the solution lies not in any single theory, but rather a sort of melting pot into which went multiple ingredients—including petrification, constructive logic, pattern and influence, as well as other concerns—and out of which came a new synthesis. Yet the nature of this synthesis, which was of such importance for the future development of Western architecture, eludes us without some fresh insight. I suggest here that the tripod, an object of considerable symbolic importance for Greek religious and civic life, is the key to the specific configuration of the triglyph.

THE ORDERS AS SYMBOLIC FORM

The interpretation of the classical orders as symbolic form is hardly new; the idiosyncratic ideas penned by John Wood the Elder, the architect of so}

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51 Caylus 1756, esp. 308. The theory gained ground in the 1820s, when both Champollion and Sir Charles Barry drew Egyptian “proto-Doric” to the attention of a wider audience, the former apparently coining the term; see Howe 1985, 45; Barletta 2001, 18. 
53 Østby 2001; I thank Erik Østby for giving me this in manuscript form. On the indigenous character of the Greek temple, see also Ginouves 1989. 
54 For another split-rosette frieze from Tiryns, see Dörpfeld 1935, 1, Abb. 52, and Holland 1917, 126 for a list of examples. Cf. Bowen 1950; Ditlefsen 1985. 
55 I will be tackling this debate in greater depth elsewhere. For previous discussion, see Howe 1985; Weickenmeier 1985; and now Barletta 2001. 
56 Wood 1741. 

many fine set-pieces in Georgian Bath, are an early example. In spite of warnings to the contrary by specialists of antiquity, a recent wave of interest is manifest in several books by established architectural historians including John Onians, George Hersey, and Joseph Rykwert. As regards the triglyph, however, none of these authorities have much to say. Onians keeps silent on the subject and Rykwert accepts a variation of the beam-end theory; Hersey alone embraces this element within his central thesis, one based on the idea that etymology holds the key to meanings the orders acquired in antiquity. He sees this acquired meaning as rooted in the act of sacrifice, temples being assemblages of sacrificial victims and related paraphernalia. In particular Hersey reads the glyphs of the triglyph, which Vitruvius says the Greeks called meroi or thighs, as the thighbones of goats and oxen, or rather thrice-cloven thighbones since triglyphos can mean thrice-recessed, thrice-sculpted, thrice-cut. It is true that thighbones figure prominently in Homeric sacrifice, a fact that earlier had led Sandro Stucchi to propose that the triglyph friezes found on some altars might be interpreted as stylized bands of bunched thighbones. But would Greek architects and artists have transformed organic anatomy in such a geometrical fashion? Without some ancient representation of triglyph-like thighbones to bridge the gap, the idea fails to hold on substance.

The only scholar to invoke visual material bearing on a symbolic interpretation of the triglyph was Robert Demangel in his series of eight articles on the origins of Doric published between 1931 and 1949 (mostly in the Bulletin du Correspondance Hellénique). He developed a dual interpretation of the triglyph, one that overlaid the window theory discarded by Vitruvius with a symbolic intention. Demangel traced the triglyph back to Minoan, Egyptian, and Oriental images of portals and windows
framing sacred trees and/or sacred pillars (fig. 2). But none of the illustrations Demangel supplied presents a striking parallel with triglyphs.45

and a separate removable bowl or cauldron on top, and the so-called tripod-cauldron in which the three legs were integral with the vessel, usually being bonded to its perimeter using a variety of techniques, depending on the materials used. These included stone, terracotta, wood, and metal, of which bronze and gilded bronze (and sometimes solid silver or gold) were the most prestigious; composite materials were used too, notably stone or timber tripods covered with decorative bronze sheets.46 Tripod-stands were widespread in the Mediterranean from the Bronze Age down to Roman imperial times.47 Squat stone tripod-cauldrons datable as far back as the third millennium are known from the Near East.48 In Greece, however, metal was the material of choice for large-scale use—in terms of both number and size—of the cauldron form from the Geometric to the Hellenistic periods. These tripod-cauldrons are the prime focus of the present inquiry and are the intended subject when the word tripod is used by itself.49 An example from the Geometric period is illustrated in figure 3.

**TRIPOD FRIEZES**

Analogies between tripods and triglyphs appear in various guises; the most convenient starting point is the conception of regular friezes. Immediate connections are made by two architectural friezes of Hellenistic date, the first from the Monument of Lysicrates in Athens, and the second from a villa on the island of Samos. The very function of the first building was to display aloft on the crowning finial a (lost) bronze tripod prize awarded at one of the choregic competitions in Athens, which explains the presence of a run of stylized tripods disposed in pairs between the Corinthian capitals (fig. 4).50 These tripods have no chamfered elements as do triglyphs, and instead bear many features absent on triglyphs: the bowed cauldron, the disc-like handles on top of the cauldron, the lower horizontal bar and the lion-paw feet. There is yet considerable common ground, however: the straight, vertical, and regular arrangement of the legs of the individual

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45 There is, however, a tantalizing bridge in the shape of a seventh-century stone frieze from Chania, Crete, which features a tripartite vertical motif created by a standing female divinity framed by a temple portal. See Beyer 1976, Taf. 44.2; Felten 1984, 19, no. 1, Taf. 1.1. For portals framing betel motifs, see Di Vita 1998.
46 Stevens 1951; Touloupa 1991.
47 For Bronze Age tripod-stands, see Catling 1964, 1984; Matthäus 1985. For Archaic and Classical examples, see Riis 1998.
48 Buchholz 1963. For a pair of stone tripod-mortars in the museum at Thebes probably from the seventh century, see Pharaklas 1970.
50 The chief study of the building is Bauer 1977.
TRIPODS, TRIGLYPHS, AND THE ORIGIN OF THE DORIC FRIEZE

tripods, and their subordination to a decorative frieze at high level. By contrast, the frieze from Samos (fig. 5) consciously exploits the affinity between tripods and triglyphs; it is hard to be sure whether the objects in question are more one or the other. Is this essentially a Doric frieze, with the triglyphs rendered like tripods, or is it a tripod frieze infused with Doric qualities?

These examples are not valid guides to the rationale behind the invention of the Doric frieze around three centuries earlier. There are, after all, late Hellenistic triglyphs with a variety of superimposed motifs, so the Samos example might testify merely to the desire to relax and enrich established canons by means of such devices. The present task is to assemble parallels between triglyphs, tripods, and representations of tripods not too distant in time from the consolidation of the Doric order in the second half of the seventh century. In order to facilitate this task, as well as to address issues discussed in the conclusion, 100 different tripod representations are catalogued in the appendix.

Consider now the ancestor of the friezes just cited in an artistic topos disposing multiple tripod images, beginning with examples from the eighth century. Some show rows of tripods next to one another, without intervening elements, as in a frieze painted on the neck of an amphora in the Athens National Museum. Some show rows of tripods divided by groups of vertical bands or stripes, as in the case of a cup (fig. 6) and a kantharos from the same museum. A krater in Paris intermixes these two conditions. Then there are several vase fragments with two tripods placed side by side, as on part of a pithos found at Tenos. Since many later complete vases exist that depict two tripods (figs. 7–8), three (fig. 9), or even five as either closed groups or as parts of larger scenes, such pairs may have been self-sufficient. However, a longer run of tripods and a frieze-like treatment is probable for at least some earlier fragments.

The parallelism between triglyphs and the groups of vertical stripes so commonly used as frieze dividers in the Geometric period suggests that anything placed in between such stripes, such as the tripods illustrated in figure 6, must equate with metopal decoration. It might seem that tripods cannot have had connections to both metopes and triglyphs at the same time, but it is important to where they would seem to contradict a triglyph-tripod association. However, it is also possible that the architect knew of some sort of link (perhaps via a treatise?), and either misinterpreted it, or wished in some way to “play” with it. For a reconstruction of this frieze and its setting, see Fraisse and Moretti 1998. For a photograph, see Webb 1996, fig. 116.

For the range of Doric expression in this period, see Pensabene 1993; Ortolani 1997. Famous examples are the triglyphs with bull protomes belonging to the Stoa of Antigones at Delos, dating probably to the third quarter of the third century B.C. (see Webb 1996, 22), and those with applied ritual objects belonging to the propylon of Claudius Appius Pulcher at Eleusis (mid first century B.C.). A triglyph with a bouquet of poppies and crossed batons of myrtle, and another with a ceremonial vessel (plemachoe) have been built, along with accompanying metopes, into the 13th-century Little Metropolitan Church (Panayia Gorgoeikou) in Athens. For their attribution to the inner propylon to the Eleusinion, see Miles 1998, 89–91. Although these may be Hadrianic in date, they probably echo Hellenistic models. In addition the frieze of the Proskenion of the theater at Delos has tripod motifs used decoratively in the metopes of a Doric frieze, that is, in a position

52 For the range of Doric expression in this period, see Pensabene 1993; Ortolani 1997. Famous examples are the triglyphs with bull protomes belonging to the Stoa of Antigones at Delos, dating probably to the third quarter of the third century B.C. (see Webb 1996, 22), and those with applied ritual objects belonging to the propylon of Claudius Appius Pulcher at Eleusis (mid first century B.C.). A triglyph with a bouquet of poppies and crossed batons of myrtle, and another with a ceremonial vessel (plemachoe) have been built, along with accompanying metopes, into the 13th-century Little Metropolitan Church (Panayia Gorgoeikou) in Athens. For their attribution to the inner propylon to the Eleusinion, see Miles 1998, 89–91. Although these may be Hadrianic in date, they probably echo Hellenistic models. In addition the frieze of the Proskenion of the theater at Delos has tripod motifs used decoratively in the metopes of a Doric frieze, that is, in a position

54 Cat. no. 4; cf. Sakowski 1997, FR-3.
55 Cat. nos. 6, 7.
56 Cat. no. 1.
57 Cat. no. 22; cf. cat. no. 2.
58 Cat. no. 71, 70; cf. cat. nos. 27, 29, 34, 52, 53, 67, 71.
59 Cat. no. 31; cf. cat. no. 29, 35, 36.
60 Cat. no. 33.
61 See n. 52 for comments about the Delos proskenion frieze.
realize that eighth-century examples occur in non-
or pre-architectural contexts. At this early stage the
key innovation was the use of representations with-
in patterns that previously had been predominant-
ly abstract. As prestige objects with heroic associa-
tions, tripods were probably first chosen as metopal
subjects. When rendered in two dimensions, and
flattened out in keeping with prevailing modes of
abstraction, the individual legs became vertical
stripes, whereupon it may be presumed that some
artists grasped the idea of using the tripods them-
selves as scene dividers.62

Indeed, the number of tripod representations
that divide, frame, or beat out a rhythm increases in
the seventh century. This can be seen on a pitcher
(oinochoe) from Kerameikos, which is datable to
around the first quarter of the century (fig. 10).
Three robust tripods of the same size and design
take up the entire height of the main register. In
between them are motifs of varied character: a horse
head, a geometrical design, and a composition of
whorls and spirals. The notion of a triglyph-metope
alternation is apparent despite the distortions as-
associated with the curving profile of the vase.

More compelling architectural parallels are pro-
vided by three intriguing examples of tripod friez-
es, the first of which dates from the second half of
the seventh century. This frieze ran around the bel-
ly of a large relief vase (pithos) that now stands re-
constructed in the Archaeological Museum of Her-
aklion, Crete (fig. 11). The frieze shows riders on
horseback and chariots, along with subordinate fig-
ures and motifs, punctuated by stylized tripods fill-

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62 For discussions of approaches to abstraction and framing in this period, see Hurwit 1977; Benson 1982.
Fig. 6. Cat. no. 6. Geometric cup with frieze of tripods alternating with groups of vertical stripes. (Athens, National Museum, 3632 [874]. Neg. by the author)

Fig. 7. Cat. no. 71. Apollo in the Delphic shrine flanked by two tripods, one on the omphalos; the other on top of a pedestal or column. Attic red figure volute krater. (Ferrara, Museo Civico Archeologico, inv. no. 44894; museum neg.)
The possibility of cross-fertilization with architecture is raised by not just the formal analogy with the Doric frieze, but also the common ground between workshops producing pithoi and architectural decoration. Although the rather slack interval between the tripods in this example contrasts with the tight rhythm of the Doric frieze, the next examples display a notable convergence in this respect. A curious cylindrical vessel from Thasos dating probably to the first quarter of the sixth century shows stiff and robust tripods (fig. 12). These were created by the conceit of adding pillar-legs in between the wider legs—so here at the same time is a tripod-like object and a ring of three tripods framing figurative representations: a sphinx, a triton, and a hippocampus. As the projected elevation of this frieze shows (fig. 12), this time the proportions directly recall the Doric frieze. The same may be said of a terracotta slab from the island of Kythnos, now in the Louvre, which may be dated to the middle of the sixth century, or perhaps earlier (fig. 13). Its upper register depicts a single horseman as the contents of a “metope” framed by tripods. Its proportions are longer than the norm for architectural metopes, while those of the tripods are taller than the norm for triglyphs, but the differences are not so great as to undermine the obvious analogy. It is true that only one of the tripods and one of the riders is complete, but the adjacent incomplete but potentially identical elements hint at a repetitive frieze, as does the linear character of the moldings

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63 Simantoni-Bournia 1990.
64 For comparable artifacts, see Carlié 2000, 106 (no. 4), 137 (no. 7A).
65 Cat. no. 32. Mollard-Besques, however, proposed the second half of the century.
top and bottom. Just conceivably it may have belonged to a scheme of wall decoration given that the slab in question is flat. Even if it was a votive there is still a latent architectural analogy, for flat votive plaques were commonly fixed to the walls of the temples where they were dedicated.

The content of the metopai motifs on these artifacts bears distinct parallels with architectural schemes. The stylized mythological creatures on the Thasos kothon recall those of panels from Thermon, Olympia, and Kalydon, panels that probably functioned in a similar manner to metopes—whether or not they were in reality accompanied by triglyphs or proto-triglyphs.66 There is also a familial resemblance with early stone metopes, including ones that are datable to around the third decade of the sixth century from Temple “Y” at Selinunte.67 One shows a sphinx, as do the Thasos kothon; another shows Europa riding the bull, that is, a rider in profile not unlike the riders of the frieze from Kythnos.

The coming of the sixth century marks a decline in modular friezes in Greek art, as artists shifted toward freer compositions and progressively more realistic treatments of both inanimate and animate forms. In keeping with this general trend, multiple tripods in the same register begin to act less as scene dividers and more as integral parts of the scenes themselves. The beginning of the shift in this direction can be seen in an early black figure vase fragment from the Athenian Acropolis, which shows two tripods alternating with two piles of bowls and a freestanding column (fig. 14). It is possible that there was originally a longer sequence of tripods and bowls, but more likely it gave way to a foot, horse, or chariot race, in the manner of several later vases showing tripod prizes awaiting the victor.68

In the middle register of a dinos now in the Louvre (fig. 9) tripods alternate with standing men, but now in a looser distribution, for the tripods appear both singly and in a group of three.69 In a slightly later vase from Munich, datable to around the middle of the sixth century, a single tripod and a group of three tripods mark the beginning and end of a scene featuring a group of running warriors.70 Significantly, the tripods no longer occupy the full height of the register, signaling the fact that they have become objects in space, like the runners. With time artists make increasing use of receding planes to render spatial relationships, so that it becomes common for tripods to be shown in the background of activity taking place nearer to the observer, as in the case of the race shown on the lost krater formerly from Berlin depicting the funeral games of Pe- lias.71 Alternatively, pairs or groups of tripods came to be used not only to terminate race scenes, but also to fill up awkward spaces, as in a set of five of assorted heights that sit under the handle of a vase fragment from Taranto.72

In sum, representations of multiple tripods in painted or relief friezes pass from abstract and reg-

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66 Despite much speculation about their likely existence, triglyphs have not in fact been recovered from the temple of Apollo at Thermon or the Heraion at Olympia, nor indeed the temple of Poseidon at Isthmia. For the pinakes at Thermon, see Payne 1925–1926; Bookidis 1967, 166–76; for the bronze griffin panel from the Heraion, see Philipp 1994, 494–5; for the pinakes at Kalydon, see Dyggve 1948, 149–64, 236–9; Bookidis 1967, 162–5.


68 Cat nos. 26, 27, 29, 35, 36, 37.

69 Cat. no. 31. For comparanda, see Maul-Manderlartz 1990.

70 Cat. no. 35.

71 Cat. no. 36.

72 Cat. no. 33. Single tripods were also used to decorate the handles themselves, e.g., cat. no. 63.
Fig. 11. Cat. no. 23. Fragments of frieze running around the body of a pithos from Prinias, Crete, now in the National Museum, Heraklion. (AJA 5 [1901] pl. 14)

Fig. 12. Cat. no. 28. Terracotta tripod kothon from Thasos, with stylized tripods alternating with representations of fabulous beasts. (Athens, National Museum, inv. no. 17874; ht. 28 cm. Line drawing by the author; photo, museum neg.)
ular patterns in the eighth century to a looser treatment in the sixth century, as interest grew in spatial and figural representation. In the seventh century tripods begin to be used in ways that are arguably analogous to the “triglyphs” of linear friezes, and from the second half of this century to the early part of the sixth century—the period in which the monumental Doric vocabulary first appears—tripod and metope friezes are characterized by robust, structural tripods punctuating decorative fields or “metopes” that included mythological beasts and human riders.

The central leg is brought up to the top of the rim.73 The two side legs are rendered thinner, by virtue of being seen from an oblique angle, while the cauldron masks their tops, just as would be the case when viewing a real tripod. In the Louvre dinos a similar distinction is achieved by the use of inscribed lines (fig. 9). And although all the legs are shown similar in width, the turning outward of the lion paws distinguishes the lateral legs from the central one. A mixture of these devices was used for the vases just mentioned from Munich and Berlin, and many other sixth-century tripod representations.74 A greater sense of volume and realism came with supplementary details, including short-hand allusions to fixings, relief decoration, and variations in the angle at which the ring handles meet the rim of the cauldron (figs. 7, 8, 15, 16k).75 On occasions Classical, Hellenistic, and Roman artists employed perspectival recession of the secondary bracing rings (figs. 7, 17),76 or even an entire tripod, as a way of enhancing the three-dimensional effect.77

Returning to review the characteristics of physical bronze tripods, it is clear that their shape could vary extensively. Cauldrons could be deep or shallow; legs could be squat or slender, straight or tapering, with lion-paw feet or not. Also variable was the relationship between the size of the legs and that of the cauldron. There are capacious cauldrons supported on spindly legs (fig. 3), and compact cauldrons supported on fat legs bunched relative-

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73 Cat. no. 30; cf. cat. no. 40.
74 Cat. nos. 35, 36.
75 Cat. nos. 71, 70, 99, 39; cf. cat. nos. 73, 77, 80.
76 Cat. nos. 71, 85; cf. cat. nos. 73, 88, 89, 94.
77 Cat. nos. 74, 82, 86, 98.
ly close together. Representations of tripods vary even more since the physical range in shape is exaggerated by the effect of artistic interpretation, style, and technique (fig. 16). What is significant for the present argument is that the gamut of possibilities includes many that recall aspects of triglyph design. The primary components of tripod representations in the seventh and sixth centuries that invite specific comparisons with triglyphs are isolated below.

First, tripod representations almost invariably show one leg on the central axis, with the other two disposed symmetrically on either side.78

Second, this symmetry is not maintained in the vertical sense. In representations of tripods, as with triglyphs, the three vertical elements are joined together at the top but not at the bottom, where they rest either on a line or band equivalent to the ground or a platform (in the case of tripods) or on the architrave (in the case of triglyphs).

Third, tripod legs are sometimes shown with a bowed silhouette (fig. 16b)79 or tapered toward the ground (fig. 16m, o),80 but the majority are straight and vertical (as in the case of triglyphs). There are also a minority of representations with straight legs inclined inward toward the cauldron (fig. 16f, g, k, m),81 and indeed a few sets of early triglyphs display a comparable inward inclination, with the overall shape of the blocks being in effect trapezoidal rather than rectangular. Examples include what are probably the earliest known triglyphs, those from the Temple of Hera(?) at Monrepos on Corfu (fig. 18), and ones from Foce del Sele in Campania dating to around the middle of the sixth century.82 In addition, the sides of the Monrepos triglyphs are slightly bowed, rather like the tripod representation just mentioned (fig. 16b).

Fourth, in representations of tripods lion-paw feet become progressively more common over time, reflecting the same trend in their physical counterparts as well as a greater desire for realism (figs. 4, 8, 15, 16m, o, p, 17, 19). But most tripod representations up to the early sixth century show the legs terminating abruptly without any form of foot or molding (figs. 6, 10, 12, 14, 16a, c, f, g, h, l, n, 20), just as is the case for triglyphs.83

Fifth, realistic tripod representations call for a different treatment of the central leg (which is viewed frontally) and the lateral ones (which are viewed obliquely). As discussed earlier, this solution appears from the early sixth century onward (fig. 14), becoming the norm in the Classical and Hellenistic periods. It is not uncommon, however, for the legs to be rendered equal in width. This is especially true of relatively early representations (figs. 6, 10, 16a, c, e, g, h, j, o, 21),84 but is also seen in late ones, such as a Roman marble “copy” of a classical relief now in the Archaeological Museum.

Fig. 15. Cat. no. 99. Herakles attempts to steal the Delphic tripod from Apollo (whose arm holds one of the ring handles); note the equality in width between the middle and the side legs of the tripod. Marble relief, detail. (Piraeus Archaeological Museum, inv. no. 2118. Neg. by the author)

\[\text{\footnotesize 78 Occasionally tripods were shown with two legs, the third being omitted because it lay in a recessive plane further from the viewer, see cat. nos. 8, 57.}\]
\[\text{\footnotesize 79 Cat. no. 3. Cf. cat. nos. 16, 21, 27.}\]
\[\text{\footnotesize 80 Cat. nos. 45, 59; cf. cat. nos. 31, 72, 79, 91.}\]
\[\text{\footnotesize 81 Cat. nos. 14, 12, 39, 45. Cf. cat. no. 44.}\]
\[\text{\footnotesize 82 For Monrepos, see supra n. 22. For Foce del Sele, see Zan-}\]
\[\text{\footnotesize 83 Cf. cat. nos. 5, 18.}\]
\[\text{\footnotesize 84 Cf. cat. nos. 1, 4, 9, 19.}\]
at Piraeus depicting the struggle for the tripod between Apollo and Herakles (fig. 15). Despite the lack of realism, artists presumably judged the effect of an equal spacing to be preferable in formal terms. In addition, in some examples the legs are spaced significantly closer than would be the case in reality. This is especially evident in architectural contexts, as in the friezes from the Monument of Lysicrates (fig. 4). The struggle for the tripod between Apollo and Hercules shown on the Siphnian treasury pediment displays not only all these features, but chamfered legs too (figs. 21–22), just

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85 E.g., cat. nos. 2, 6, 96, 99.

86 Cat. no. 56. For the building, see Daux and Hansen 1987.
like the verticals of triglyphs. That this should occur in a stone relief—the typical medium for triglyphs—is a telling coincidence.

Sixth, in most tripod representations the cauldron had a curved underside, while a minority artistic convention showed the top of the cauldron bowed too in sympathy (fig. 16b, d). The cauldron, however, can be suppressed to a more or less straight capping piece. This is particularly noticeable in miniature work, as in the case of coins, and representations of representations, as when shield devices are depicted on vases (fig. 16n, p). Simplified cauldrons of this kind were fairly common in eighth-, seventh-, and sixth-century representations, and occasionally occur later. It is therefore possible to liken the flat capping piece of the typical triglyph to an abbreviated or heavily stylized cauldron.

Seventh, another feature of lifelike tripod representations is the depiction of the lateral legs partially concealed by the cauldron (figs. 7, 8, 14, 15, 17). But once again it was not uncommon to flatten reality, by showing the legs all in one plane. The cauldron might occupy the same plane as either the two outer legs (fig. 23) or all three (fig. 20), and even on occasions be placed behind all three legs, despite the fact that this contradicted reality (fig. 16n). In this process the cauldron,

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57 Cat. nos. 3, 10. For further examples, see cat. no. 8; Sakowski 1997, PF-1, PF-2, PF-7, PF-16, PF-20, SP-2, SP-3.

58 Cat. nos. 79, 80. For tripods on coins, see Anson 1911, I, pl. 17–25; Kraay 1976, pls. 33, 35, 36; Stazio 1987, 151–72, esp. 156–60.

59 Cat. nos. 46, 51; cf. cat. nos. 47, 49. For a list of tripod shield devices, see Sakowski 1997, 335–47.

60 Cat. nos. 4, 7, 11, 18, 21, 41, 45, 76.

61 Cat. nos. 71, 70, 30, 99, 85; cf. cat. nos. 31, 36, 64, 81.

62 Cat. nos. 76, 19; cf. cat. nos. 5, 8, 18, 45, 57, 49, 93, 96.

63 Cat. no. 46; cf. cat. nos. 60, 93.
prominent as it may be in actual tripods, is played down. Looking at a bronze sheet votive from the Heraion on Samos (fig. 16i) and a black-figure skyphos in the National Museum at Naples (fig. 16o), the silhouette of the whole strikes the eye—that is to say, a silhouette that is noticeably triglyph-like. In both cases the cauldron has been reduced to an incised line.\footnote{Cat. nos. 25, 59.}

Eighth, in tripod images the curved flares at the top of the legs can be pronounced, to the extent of meeting up and forming a positive arch, either at the top of the cauldron (fig. 16i)\footnote{Cat. nos. 46.} or underneath it (fig. 16i, l, m, o).\footnote{Cat. nos. 46.} This last arrangement goes against the logic of two-dimensional projection, since in real tripods the top of the legs aligns with the top of the cauldron. Once again, artists must
have been attracted by the formal qualities of this arrangement, and possibly by a feeling that in this way the cauldron did not appear to fall between the legs. It was both better supported visually and an uninterrupted whole. The effect is once again reminiscent of early triglyphs. Furthermore, it seems highly significant that each of the various types of arches that can be found on archaic triglyphs, semicircular (fig. 24), pointed, and ogive (fig. 18), all find correspondences in such tripod representations. Perhaps because it would have been relatively difficult to depict at small scales, the ogive form is the least common and the least obvious. Figure 19 shows a clear example, however: a tripod with a leg terminating at the top with reverse curves, each side being equivalent to one half of an ogive arch. On occasions too the overall proportions are not dissimilar, so that the visual effect of some early triglyphs with pronounced arches is broadly comparable with tripod representations like those illustrated in figure 16. It is next possible to identify details shared by triglyphs and actual bronze tripods, and in particular their legs. In cross-section these take up a variety of shapes, which experts have broken down into a series of types and sought to distinguish chronologically, primarily based on style. The great majority of profiles presented to the viewer a flat or nearly flat front face. This is true of both the solid-cast polygonal types (which tend to be relatively early) and the technically more advanced hollow-cast ones, principally “U,” “II,” and related shapes open at the back, and with the front often enriched by decoration. Solid-cast cross-sections are often roughly hexagonal, which is significant in that chamfered or beveled faces run away either side of the

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97 For other triglyphs with semicircular arches, see Mertens 1993, Taf. 47.1, 72.3, 72.6, 73.1, 73.6, 74.7, 75.2.
98 Triglyphs with pointed arches belong to the Artemision at Corfu and the Monopteros at Delphi; for other examples, see Mertens 1993, Taf. 74.2, 74.6, 74.8, 85.4.
99 Another set of triglyphs with ogive arches is known from Tegea, see Mertens 1993, 159, Taf. 75.5. While the recesses of the triglyphs of Temple C at Selinunte take up a pointed form, an ogive shape is nonetheless present in the outline of the borders.

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100 For representations of tripod legs ending in semicircular arcs, see cat. nos. 25, 42, 45, 59; for ones ending in pointed arcs: cat. nos. 38, 46, 60.
102 For drawings of the main profiles at Delphi, Olympia, and other sites, see Benton 1934–1935, fig. 7; Rolly 1977, pls. 1–6; Maass 1977, Abb. 1. For an overview of the main categories, see Strøm 1995, 40–50.
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front, as in the case of triglyph uprights. To judge by the largest collections of Geometric and Archaic tripods, those in the excavators’ storerooms at Olympia and Delphi (fig. 25), the hexagonal form was the most popular option for solid-cast tripods. Solid-cast tripods with chamfered legs were outmoded by the end of the eighth century, so the choice of this particular form by the sculptor of the Siphnian treasury pediment (530–520 B.C.) suggests that it conveyed a venerable or heroic character. Perhaps this type of profile was applied to triglyphs in part for similar reasons, in part out of appreciation of the consequent play of light and shadow.

The beveled faces just mentioned are often slightly concave, just as they are in different sets of early triglyphs from Metapontum (fig. 24). What is more, the front face of tripod legs sometimes have a central rib, and this too is a feature of more than one set of triglyphs from Metapontum, as well as a set from Sybaris. These central ribs typically terminate in a small cross-rib where the arches of the uprights begin, and precisely this detail may be found on several bronze tripod legs where they flare out at the top (e.g., fig. 26). In short, wherever early triglyphs present quirks that eventually were expunged from the Doric canon, these arguably respond to the detailing of bronze tripods.

Taken together, I contend that these various correspondences bear witness to a connection between triglyphs and tripods.

PROCESSES OF TRANSFORMATION

This claim provokes the following question: If a connection was indeed intended, why was it not made more obvious? What explains the absence on triglyphs of other features associated with tripods apart from those covered so far? In answering these points, it is vital to grasp the nature of artistic transformation that characterized the representation of objects in early Greek art. The transformations introduced into the representation of tripods in two dimensions have been discussed already, but their extent tended to be more pronounced when three dimensions came into play, especially where a change of materials was involved. For our present purposes the most relevant clues come from three-dimensional objects made of stone, terracotta, or of composite construction, which are either themselves tripods or related types of vessels, namely exaleiptra or tripod-kothons. Bronze tripods undoubtedly provided the direct or indirect source of inspiration for kothons, so it is significant that they too can lack the selfsame details that triglyphs lack.

Perhaps the most striking difference between triglyphs and bronze tripods or their representations is that the ring handles are absent on the former and almost invariably present on the latter. This omission can be imputed to a recognition of the structural feebleness of handles made of terracotta or stone. Terracotta tripods, whether tripod-stands or kothons, hardly ever have handles standing upright; in rare examples they are folded over.

103 This I estimate on the basis of personal inspection; I am grateful to the respective Greek, German, and French authorities for permission to handle this material.

104 For another photograph, see Barletta 1990, fig. 16; for other examples, see Mertens 1993, Taf. 72.7, 74.7, 85.4; Barletta 1990, 65.

105 Mertens 1993, Abb. 79.

106 Vertical center ribs also appear on representations of tripods, see cat. nos. 34, 61, 41, 65, 66, 71, 90, 93. Some tripod legs are decorated by geometric patterns in light relief (Rolley 1977, Pls. 29–34; Maass 1977, Abb. 1, 4; Touloupa 1991, figs. 13, 16, 17), including running wave patterns that appear on the capping piece of the triglyphs from the temple at Akrai. For this building, see Orsi 1933; Bernabò Brea 1986.

107 Kilinski 1990, 56.

108 A notable exception, a terracotta tripod-cauldron from a Protogeometric grave at Kerameikos, Athens, is both an early and a particularly literal copy of the bronze form, see Kübler 1959, 95, Taf. 63; Hurwit 1985, fig. 100.
down onto the top of the vessel (fig. 27), but usually they have no handles at all (figs. 12, 28, 29). These would have been prone to breakage, and for the same reason handles do not appear on stone tripods, including examples that probably date to the seventh century. This omission therefore testifies to an appreciation of the practicalities of using specific materials, a consideration that affected the process of transforming the bronze models from which these classes of object descended. Even where practicality was not directly pertinent, as in the case of the tripod-triglyph relief frieze from Samos (fig. 5), handles may have been judged antithetical to the sense of structural allusion that suited its architectural function.

Other characteristics of seventh- and sixth-century tripod-kothons are also of interest. Their proportions are dramatically different with respect to bronze tripods; kothons usually have broad legs, often to the extent that little or no light can be seen between them. Kothons typically have a strongly geometrical composition that declares a certain empathy with triglyph design. Their tops are typically flat, discounting any lid, sometimes rounded (fig. 27), and sometimes chamfered, as in the case of examples of contrasting overall shape: one now in Dresden (fig. 29), one now in Athens (fig. 28), and the one from Thasos already mentioned (fig. 12). In some examples the legs terminate in lion-paw feet as do bronze models, but this is only true of relatively late examples in both classes of object. The great majority of kothon legs end in simple fillets not unlike the fillets capping Doric architraves. Such transformations can be so radical as to make the connection with bronze tripods rather oblique, a case in point being the kothon from Thasos (fig. 12). Perhaps it was for this reason that explicit tripod representations were created from the device of the additional central pillars.
The other major difference between triglyphs and tripods is the absence in the former of gaps between the legs. There are, in fact, small gaps or recesses between the legs of some triglyphs from Magna Graecia, including those from Metapontum illustrated in figure 24. In effect, then, the profile of such triglyphs is similar in terms of morphology to the tripod shown in relief on the Siphnian treasury (fig. 22). The proportions may be fairly different (the chamfers of the latter are far from meeting one another), but this is arguably less significant that the morphological similarity. In both cases the reduction or absence of gaps responds to the adaptation of the three-dimensional bronze model into two-dimensional versions made of stone. Consider, too, the transformations involved in the fabrication of freestanding stone tripods. The use of this material called for relatively robust legs and stocky proportions, as can be seen in a variety of stone tripods, whether ones from the eastern Mediterranean dating to the Bronze Age, the Geometric period, the Hellenistic period (fig. 30), as well as examples of imperial Roman manufacture and related pieces of furniture like candelabra. Most instructive of all in the present context are a set of monumental tripods from the Athenian Acropolis, which may be dated to the seventh century. Not only are these made of poros, but their construction featured timber inserts and bronze sheathing, precisely the sort of amalgam that, with the addition of terracotta and mud-brick, characterized the construction of contemporary temples. It is significant that solidity, both in structural and visual terms, was obtained by the filling in of the gaps between the legs. What is more, the infill is created by broad chamfers between the frontal faces, as was done in the Hellenistic example illustrated in figure 30. So if indeed an architect of the seventh century had aimed to incorporate tripod-like features into the entablature, the chamfered recesses of the triglyph could plausibly have been created in the process. It might also be imagined that once the legs started to expand or fuse, the underside of the cauldron would start to diminish in its visual impact, as is apparent in tripod kothons (figs. 27, 28), or even disappear, as it almost seems to do on some tripod representations (figs. 16, 23).

To sum up, a series of direct parallels between tripods and early triglyphs have been identified: the three legs; the horizontal, but not vertical, symmetry; the capping piece; the chamfers of the legs, and the occasional concavity of the same; the connecting arches; the occasional ribs on the front of the legs; and the occasional stop-bars where the arches spring. Meanwhile, the presence on triglyphs of a strong capping band, together with the absence of ring handles and the almost complete lack of gaps between the legs, may be attributed to transformations that seventh-century designers judged necessary for architectural reliefs in stone, terracotta, or bronze sheet.

Should such affinities between tripods and triglyphs be admitted, this leads on to the question of explanation. Were architects and masons inspired primarily by the aesthetic effect of prestigious bronzework, or did they appropriate form with deliberate symbolic intent? To answer this question, the meaning of tripod imagery and its potential relevance for temple building are explored in the next section.

115 For further examples, see Mertens 1993, Taf. 73.1, 73.3, 73.6, 74.4
116 See Pharaklas 1970.
117 Stevens 1951; Touloupa 1991. Comparable examples of Hellenistic date surmounted the scena frons of the theater at Delos.
THE FUNCTION AND MEANING OF TRIPODS

Not forgetting similar objects as far afield as Britain and China, in the eastern Mediterranean tripods date back to the third millennium B.C., becoming widespread before the collapse of the Mycenaean world in the 12th century. Their root function was as mortars or cooking receptacles; unlike ones with a single central pillar or four legs, three-legged vessels find a stable purchase on uneven surfaces. Homer cites tripod-cauldrons for heating bathwater for Achilles, Hektor, and Odysseus,118 and for washing Patroclos’s corpse.119

Already in the Bronze Age a proportion of tripods began to transcend utilitarian roles, coming to be produced for ceremonial or ritual functions, and fabricated out of expensive materials, chiefly bronze. By the Geometric period evidence of tripods in a practical context is relatively scarce, not only in archaeological traces but also in textual references120 and artistic representations.121 The explanation for this mutation is elusive, but it may reflect an association with collective sacrificial meals, festivities, and games; iron spits (obeliskoi) were popular as dedicatory and funeral offerings for similar motives. The other reason probably had to do with the elevated value of bronze; large tripods were one of the main non-military consumers of the metal, and as such inherently precious objects.122 The early Greeks valued objects in terms of oxen, and sometimes iron spits, cauldrons, or tripods,123 although this is not to say that objects as big as the latter changed hands in the manner of coin.124 Yet in premonetary Greece tripods were certainly foremost among prestigious gifts that the aristocracy exchanged to register contracts of friendship, obligation, and alliance.125 Homer records tripods in such circumstances, while his and later references to tripods “untouched by fire” seem to confirm their rit-

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118 Iliad, 22.443 (Hektor); 23.40 (Achilles); Odyssey, 8.434–7, 10.359–361 (Odysseus). Another passage, Iliad, 23.702, cites “a tripod to stand upon the fire” offered as a prize for wrestling (between Aias and Idomeneus), which could imply either heating water or cooking. For selected references to tripods in literary sources, see Sakowski 1997, 21–7.

119 Iliad, 18.344–8.

120 See, e.g., Antiphanes, frag. 114.1; 249.2; 36.1; Orphica Lithica, 724.

121 Cat. nos. 57, 69. The so-called Northampton Amphora shows a Dionysian scene with satyrs, one of whom draws wine out of a bowl supported on a braced tripod stand, see Simon 1976, color pl. 17; Marangou et al. 1995, no. 17, 114–9.

122 Apart from the literature cited above in n. 49, see Rolley 1986, 61.

123 For the debate on the origin of this practice, see Parisi 1988, 253–65.


125 Finley 1977, esp. 64–6. Essays on this theme are collected in the volume Gifts to the Gods (Boreas 15); three contributions are especially relevant: Burkert 1987; Hägg 1987; Langdon 1987. See also Seaford 1994, esp. 195–6; Burkert 1996b, ch. 6, “The Reciprocity of Giving”; Sakowski 1997, 22–4. For the broader anthropological context, see Mauss 1990; Godelier 1996.
ual significance, even if the phrase could have signified "(as yet) unused" or "new." 126

On several occasions Homer tells of tripods offered as prizes for the winners of athletic, equestrian, or martial competition, in which the donor and the contestants include major protagonists in the Trojan wars (Achilles, Ajax, Idomeneus, Odysseus). 127 A popular motif in late Geometric and early Archaic art was a tripod flanked by two horses or riders (fig. 20), 128 another was a tripod accompanied by a single horse or rider. 129 Besides evoking a princely lifestyle by association, such images allude to the contesting and/or the winning of horse races. 130 Boxers or wrestlers competing for possession of a tripod is another staple of Greek art at this time (fig. 27), 131 while the popular struggle for the tripod between Apollo and Hercules took the same theme to a divine plane (figs. 15, 21). 132 As already noted, tripod prizes are frequently shown at the finish or in the background of foot, horse, or chariot races (fig. 9). 133

For the same reason tripods are associated with the events following such a victory. Victors and/or their stewards are shown carrying off tripod prizes (fig. 19), 134 or these are shown flanked by winged personifications of victory (nikai). 135 Another type of image depicts ritual preparatory to the consecration of tripods when their victors offered them up as gifts to the gods in sanctuaries, usually, but not always, those where the relevant contests were held (fig. 8). 136

There is abundant complementary archaeological evidence at Olympia, Delphi, and other sites where games were celebrated, and tripods won and subsequently dedicated. As Susan Langdon wrote, at sites like Olympia “bronze tripods bridge the two worlds of Homeric poetry and archaeological reality.” 137 Indeed, so many tripods have been found at Olympia that there cannot have been enough victors to go around, especially since the prizes for some events were crowns of laurel and other things apart from tripods. Many of them possibly were dedicated by individuals and political entities concerned to vaunt status and piety before an “international” audience. 138

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126 Iliad, 9.122; Pausanius, 4.32.1.4.
128 Cat. no. 19; cf. cat. nos. 9, 13, 20, 24.
129 Cat. nos. 13, 41; cf. cat. nos. 32, 84.
130 Rombos 1988; Maul-Manderlartz 1990.
131 Cat. nos. 5, 18, 21, 34, 38, 42, 54, 60, 61.
132 Cat. nos. 59, 99; cf. 68, 92, 96, 97. For discussion, see von Bothmer 1977; Schefold 1992, 153–8; Sakowski 1997, 26, 113–63.
133 Supra ns. 68, 69.
134 Cat. no. 43; cf. cat. nos. 39, 40, 50, 55, 58. For further discussion, see Scheibler 1988; Wilson Jones 2001a.
135 Cat. nos. 94, 95; cf. cat. no. 16.
136 Cat. no. 70; cf. cat. nos. 73, 77, 81. A scene showing celebrants advancing up the steps to an altar, one of them leading an animal victim, another carrying a tripod (cat. no. 62), may depict an earlier stage in the preparations for its dedication. On the various types of prizes for Greek contests, and the practice of offering them as votives, see Rouse 1902.
Tripods were also offered as prizes for musical, choregic, poetry, and theatrical competitions, and Hesiod makes proud mention of the time when he won a tripod at Chalcis and then dedicated it at the sanctuary of the Muses at Helicon. In Athens monumental tripod dedications eventually became so numerous that they overflowed the confines of sacred precincts, creating the “Street of Tripods” (Odos Tripodon today); the choregic Monument of Lysicrates (fig. 4) is only the most imposing survivor of what must have been a spectacular accumulation.

The tripod was one of Apollo’s principal symbols, especially of his Delphic manifestation (fig. 7), and it was on a tripod that Pythia and later Themis sat when uttering oracular pronouncements. Tripods also played a role in the oracle of Zeus at Dodona, and this similarly helps account for the quantities of them found at this remote but venerable sanctuary.

As noted earlier, tripods made of metal, ever a limited resource, were valuable. Metal tripods thus were frequently the vehicle that civic and military leaders chose for absorbing the “gods’ 10%,” the tithe due to them following a victory in war, or when some other prayer was answered that resulted in a surplus. Dedications of this sort were typically made by poleis and other collective bodies, or by kings and tyrants. Following victory at the battle of Himera in 480 B.C., the Sicilian tyrants Hiero and Gelon commissioned gold tripods to be set up at Delphi. It was in the form of an extraordinary tripod offering again at Delphi—a gold one supported by three gilded bronze serpents twisted into a tall column—that the Greeks elected to show their gratitude to the gods after they defeated the Persians at Plataea.

While bronze tripods were associated primarily with aristocracy, prestige, and wealth, at the other end of the economic scale may be found two-dimensional cutouts made from bronze sheets, like the example from Samos mentioned earlier (fig. 16i), and humble terracotta votive plaques with painted tripods, such as the one from Eleusis illustrated in figure 16f.

On account in part of the frequency with which they were dedicated in religious contexts, and in part of Homer’s mention of them in descriptions of Mount Olympus, tripods became identified with the divine sphere and the homes of the gods. Vase painters employed tripods to indicate sacred space in views of sanctuaries, often, but not always, those sacred to Apollo. Interestingly enough, tripods on columns sometimes appear in this role, or alter-
natively in the background of scenes with multiple divinities, a symbol of their home on Olympus or at the bottom of the sea (fig. 17).[^151]

**Temples and Tripods**

Greek temples had a variety of functions apart from that of being the conceptual house of a divinity, and the physical home of his or her cult statue. Their location and very purpose often answered to a venerated natural feature; they could be places for enacting ritual, for meeting or dining, or the seats of oracles and treasuries; they could be dedicated as thanksgiving, as atonement, or as the commemoration of a special event or a miracle[^152].

Let us put to one side existing interpretations of the triglyph in terms of construction or influence, and suppose for a moment that patrons and architects in the seventh century were concerned to find a fitting iconography for adorning temples. It is clear that the associations of tripod imagery accord with many aspects of temple function and meaning. As noted, tripods were identified with the celestial homes of the gods; temples, of course, were homes for the gods on earth. Tripods could be mementos of victory and equivalent to the god’s share of war booty; temples likewise could be just as much the fruit of war. There would have been an obvious logic in adopting tripod imagery for temples of Apollo, since it was one of his symbols. And since tripods were connected with oracles, it could make a fitting embellishment for buildings sheltering oracles. A further potential justification for tripod imagery would be on the outside of any structure that protected votives (which in so many sanctuaries included valuable bronze tripods). As sanctuaries burgeoned, special safe buildings—treasuries—were introduced to fulfill this purpose, one that was earlier served by temples[^153]. In his exhaustive study of Greek Iron Age architecture, Alexander Mazarakis Ainan explains the very emergence of autonomous temples in sanctuaries in part as a response to the need “to house (the most precious) votive offerings . . . in order to protect from being stolen, worn, or destroyed by natural causes.”[^154] A tripod frieze on early temples could have advertised their treasury function, since tripods were typically among the most valuable votives. But temple-treasuries were not just containers for votives—they were themselves votives. Walter Burkert argues co-

![Fig. 30. Stone tripod from the *proskenia* of the theater at Delos (third century). Note how the gaps between the legs of the tripod have been filled in. (Neg. by the author)](image)

gently that, above and in conjunction with the various functions mentioned previously, all temples were dedications to the gods. Typically they were the most visible and expensive offerings made by city-states, tyrants seeking to be identified with the same, and miscellaneous political or religious institutions[^155]. As the Greeks’ votive “par excellence,” the tripod presented itself as an ideal candidate for delivering such a message had it ever been intended, and a high level frieze is of course a paradigmatic locus for communicative display in classical architecture.

But while it may be instructive to contemplate the specific motivations that could have given rise to a tripod frieze, it is surely vain to privilege any one scenario at the expense of others on account of the very multivalency of tripod iconography[^156]. The tripod carried such a universal and diffuse sacred charge that it potentially suited virtually *any* Greek temple.

[^151]: Cat. nos. 75, 78, 82, 83, 85, 86, 87, 88, 89, 100.
[^156]: For an appreciation of the multiple overlapping connotations of the tripod, see Durand 1987, n. 8.
The iconographical parallels outlined above do not individually demonstrate a triglyph-tripod connection; they only potentially explain a connection established by the visual evidence presented in this article. The ramifications, however, are certainly intriguing. The possibility that the Doric frieze initially conveyed an intelligible and appropriate message helps answer two of the greatest puzzles surrounding the origin and early development of the Doric order: its sudden appearance in a “ready developed” form, and its remarkably rapid diffusion. Since it could well have been the fruit of a spontaneous invention, a tripod frieze would conflict less than does the petrification doctrine with the evidence contradicting an evolutionary development. It also sits better with another scenario evoked by Vitruvius’s statement that Doros, the mythical progenitor of the Dorians, “chanced” to use what was later called the Doric order at Hera’s temple in her sanctuary near Argos, and then in other temples in Achaea.\(^\text{157}\) The tripod imagery resolves the arbitrariness Vitruvius describes here, giving us the reason firstly for the choice of the Doric frieze over alternative solutions, and secondly its adoption by later temple builders. The fact that the triglyph derived from a real model helps explain why its form did not fluctuate more than it did. (Tetraglyphs and pentaglyphs do exist in Magna Graecia, but are very rare.\(^\text{158}\)) Moreover, the associations of tripods as prizes seems almost prophetic of the competitive character of temple building, as each sanctuary or polis sought to outdo each other in displaying the most effective showpieces. Moreover, the possibility that the form and shape of triglyphs referred back to an original model could explain why Greek architects resisted modifying them to overcome the vexatious corner problem. The conceptual and symbolic importance that the tripod connection conferred on the triglyph might even explain why its width was adopted as the basic module for designing Doric temples in the Classical period.\(^\text{159}\) The symbolic origins of the triglyph, however, appear to have been quickly forgotten (or ignored); the pentaglyphs from Locri point to a loss of meaning by the middle of the sixth century, while Vitruvius’s testimony shows that the whole issue had become a mystery probably by the fourth century and certainly by the second.

In presenting this hypothesis I do not champion symbolic interpretations of the orders as a question of principle; the proposed derivation of the triglyph lends no justification for symbolic readings for the rest of the Doric order. Nor do I offer this as the only possible reading of the triglyph. The available evidence, with its extensive lacunae, warns against being overly dogmatic. Instead, it is important to consider how this new interpretation can intersect with preceding ones. Perhaps—despite the objections noted earlier—triglyphs do echo beam-ends as Vitruvius suggested; the new hypothesis can be overlaid on the traditional one, explaining why beam-ends took the specific triglyph form. Likewise the tripod connection does not contradict the possibility that the Doric frieze was inspired by the genre of “triglyph and metope” friezes so common in Geometric art; once again, such a hypothesis is only elaborated and enriched. Furthermore, the tripod connection negates neither the possibility of a secondary Mycenaean influence for the conception of the frieze, nor a primary one for elements such as the Doric capital. Egyptian influence, too, remains plausible in terms of the overall ambitions and proportions of the stone Doric temple.

This article aims not to provide answers, but rather to raise questions. Is the tripod-triglyph connection a secondary and partly fortuitous phenomenon, the result of grafting artistic conventions borrowed from tripods onto proto-triglyphs that had acquired a tripartite form for other reasons? Or is its symbolic form the raison d’être for the very existence of the Doric frieze? Is it possible that an early temple had proto-triglyphs that resembled tripods more closely than do the triglyphs that happen to survive, a resemblance that ceded to later improvements in the aesthetic and tectonic aspects of design? What are the implications of all this for our understanding of the formative stages of Greek architecture and sacred space?

The evaluation of these questions, and the extent to which the tripod-triglyph connection can supplant or cohabit with other explanations for the Doric frieze, hangs on a detailed review of related aspects of seventh-century architecture on the one hand, and the spatial disposition of tripods in sanctuaries on the other. These are tasks to be confronted elsewhere,\(^\text{160}\) but here I conclude just with some brief observations that bear on the ideas broached in this article.

\(^{157}\) Vit. 4.1.3.
\(^{158}\) For terracotta tetrarhlyphs from Crotone, see Mertens 1993, Abb. 74; for limestone pentaglyphs from Locri, see Costamagna and Sabbione 1990, 239.

\(^{159}\) Wilson Jones 2001b.
\(^{160}\) Such questions are discussed in more depth in my forthcoming book on the origins of the orders, scheduled for publication by Yale University Press in 2003.
In the middle of the seventh century temple architecture was only beginning to make its mark, in the form of substantial, symmetrical structures built partly of stone, notably those at Argos, Corinth, Delphi, Isthmia, and Tegea.161 All these temples rise in sanctuaries; indeed, as Georges Roux has remarked, "l’architecture grecque est née dans les sanctuaires et pour les sanctuaires."162 Before the arrival of a temple, the chief constituents of sacred space were typically a boundary marking it off from its profane surroundings, a natural feature (spring, stream, rock, cave, or tree), an altar, and votives. By the eighth or seventh century, tripods were the most imposing and costly class of votive in many sanctuaries (large stone statuary appeared not much before the end of the seventh century, around the time of the stone temples themselves), which suggests that they could have offered lessons to architects and patrons looking for ways to instill temples with monumental and symbolic presence. It should be remembered that tripods were often set up on high and/or according to a clear compositional order: in rows and rings, as well as in matching pairs or groups of three, four, five, and—if myths are to be believed—in groups of 100.163

It is against such a background that the specific correspondences highlighted here among triglyphs, tripods, and temples begin to make sense. The communicative potential of classical architecture is typically concentrated in the device of a frieze, and it seems that in this the Doric temple is no exception. The iconography of the triglyph proclaimed perhaps the very nature of the Greek temple, a precious and enduring gift to the gods imbued with the spirit of competition, excellence, victory, and veneration. This new interpretation may not rule out other readings, but it does offer a better key to some of the more baffling aspects associated with the creation of the Doric frieze and its rapid attainment of canonic status.

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Appendix: Catalogue of Tripod Representations Cited

<table>
<thead>
<tr>
<th>Cat No.</th>
<th>Fig. No.</th>
<th>Identificationa</th>
<th>Medium /shapeb</th>
<th>Sakowski 1997</th>
<th>Other Referencesc</th>
<th>Context and Character of Tripod Representation</th>
<th>Guide Date</th>
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<td>1</td>
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<td>Paris, Musée Rodin</td>
<td>gKRA</td>
<td>PR-1 CVA 2, pl. 9.4; RMB, pl. 59b</td>
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<td>gKRA</td>
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<td>16b</td>
<td>London, private coll.</td>
<td>gKRA?</td>
<td>GE-1 BTN 104, 7, fig. 11b; Laser 1987, T80</td>
<td>2 T. and Dipylon shields; T. has bowed legs and cauldron</td>
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<td>4</td>
<td>–</td>
<td>Athens, NM 18130 ex. Empedocles coll.</td>
<td>gAMP</td>
<td>FR-4 BTN 105, 9, pl. 25.1; Laser 1987, fig. 31a</td>
<td>Frieze of 8 T.</td>
<td>730</td>
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<td>–</td>
<td>Olympia, B 1730 Tripod leg</td>
<td>brRel</td>
<td>KR-2 Offisch 3, pls. 62–63; Rolley 1986, fig. 51</td>
<td>Combatants grasp T.</td>
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<td>gCUP</td>
<td>FR-1 CVA 2, pl. 10.11; Borell 1978, pl. 14; BTN 103, 5; RMB 352</td>
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<td>gKAN</td>
<td>FR-2 BTN 105,10, pl. 26.3</td>
<td>Frieze of 6 T. alternating with stripes</td>
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<td>–</td>
<td>Fortetsa</td>
<td>gPT lid</td>
<td>GÖ-1 BTN 107, 19; AA 1933, figs. 20–21; Simon 1980, fig. 14</td>
<td>T. with bird and man; T. has 2 legs, bowed cauldron</td>
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161 Bergquist 1967; Tomlinson 1976. For a review of the subsequent bibliography for these and other sites, see Østby 1993.

162 Roux 1984, 153.

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<td>gPYX (frag.)</td>
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<td>BTN, pl. 26.2; Laurent 1901, fig. 4</td>
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<td>Athens, Acrop. 286</td>
<td>gAMP? (frag.)</td>
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<td>–</td>
<td>Pellegrini 1900, 46</td>
<td>Consecration of T. to Dionysos; Nikai prepare bull for sacrifice</td>
<td>–</td>
</tr>
<tr>
<td>78</td>
<td>–</td>
<td>Leiden, private coll.</td>
<td>rfPLA</td>
<td>–</td>
<td>BAD, 4615; LIMC: Asklepios 1; ARFV2, fig. 305</td>
<td>Presentation of Asklepios in front of T. on Ionic column</td>
<td>–</td>
</tr>
<tr>
<td>79</td>
<td>–</td>
<td>Croton, silver stater</td>
<td>–</td>
<td>–</td>
<td>Kraay 1976, pl. 36, 629; Carpenter 1991, fig. 104</td>
<td>Apollo shoots at Python between legs of massive T.</td>
<td>420</td>
</tr>
<tr>
<td>80</td>
<td>–</td>
<td>Kos, silver stater</td>
<td>–</td>
<td>–</td>
<td>AA.VV. 1989a, no. 207</td>
<td>Victorious discus thrower and T. prize</td>
<td>–</td>
</tr>
<tr>
<td>81</td>
<td>–</td>
<td>Athens, NM 16260</td>
<td>rfPEL</td>
<td>–</td>
<td>A&amp;D, fig. 24; LIMC: Nike 338</td>
<td>Consecration of T.; Nikai prepare bull for sacrifice</td>
<td>–</td>
</tr>
<tr>
<td>82</td>
<td>–</td>
<td>London, BM 1978.4.11.1 (E 498)</td>
<td>rfKBL</td>
<td>–</td>
<td>BAD, 217477; FRO, pl. 11; LIMC: Peirithoos 94</td>
<td>Herakles, Athena, and Peirithoos before T. on Doric column</td>
<td>410</td>
</tr>
<tr>
<td>83</td>
<td>–</td>
<td>San Antonio, MoA 85.102.2</td>
<td>rfKCA</td>
<td>–</td>
<td>Shapiro 1995, 188–9</td>
<td>Sacrifice to Apollo, in front of pair of T. on columns</td>
<td>–</td>
</tr>
<tr>
<td>84</td>
<td>–</td>
<td>Athens, NM 1733 [base by Bryaxis]</td>
<td>mbRel</td>
<td>–</td>
<td>AA.VV. 1989a, 205</td>
<td>Rider advances toward T. repeated on all four sides</td>
<td>–</td>
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<tr>
<td>85</td>
<td>17</td>
<td>Bologna, m 279 [Pellegrini 305]</td>
<td>rfKCA</td>
<td>–</td>
<td>Robertson 1992, pl. 52; Shapiro 1994, fig. 86</td>
<td>Amphitrite and Poseidon with Theseus; Tripods on columns</td>
<td>–</td>
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<tr>
<td>86</td>
<td>–</td>
<td>Naples, NM 81673 (Heydemann 3240)</td>
<td>rfKVO</td>
<td>–</td>
<td>FRGV, pl. 141; Green and Handley 1995, no. 5</td>
<td>Actors in company of Dionysos; T. on column</td>
<td>–</td>
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<tr>
<td>87</td>
<td>–</td>
<td>Athens, NM 12254</td>
<td>rfKBL</td>
<td>–</td>
<td>BAD, 260094; JdI 1917, 50, fig. 21; LIMC: Apollo 768d</td>
<td>Bacchanaulia with Dionysos; satyr in front of T. on Ionic column</td>
<td>–</td>
</tr>
<tr>
<td>88</td>
<td>–</td>
<td>Athens, NM 12253</td>
<td>rfKBL</td>
<td>–</td>
<td>BAD, 7954; LIMC: Apollo 769</td>
<td>Apollo and Dionysos recline in front of T. on foliate column</td>
<td>–</td>
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<tr>
<td>89</td>
<td>–</td>
<td>St. Petersburg, 33</td>
<td>rfKVO</td>
<td>–</td>
<td>FRO, 15.1; Durand 1987, fig. 44; Wilson Jones 2001b, fig. 4.4e</td>
<td>Herakles and attendants prepare for sacrifice; T. on column</td>
<td>400</td>
</tr>
<tr>
<td>Cat No.</td>
<td>Fig No.</td>
<td>Identificationᵃ</td>
<td>Medium / shapeᵇ</td>
<td>Sakowski 1997</td>
<td>Other Referencesᶜ</td>
<td>Context and Character of Tripod Representation</td>
<td>Guide Date</td>
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<td>90</td>
<td>–</td>
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<td>mbRel</td>
<td></td>
<td>LIMC Apollon 657</td>
<td>Apollo seated on T.; T. leg has central rib</td>
<td></td>
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<tr>
<td>91</td>
<td>–</td>
<td>–</td>
<td>rfKCA</td>
<td></td>
<td>FRGV, pl. 174; Trendall 1989, fig. 52</td>
<td>Temple of Apollo at Delphi, with cult statue and giant T.</td>
<td></td>
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<tr>
<td>92</td>
<td>–</td>
<td>–</td>
<td>KRA</td>
<td></td>
<td>Pugliese Carratelli 1990, fig. 110; Heydemann 1872</td>
<td>Struggle for the T., satirical scene, woman looks from window</td>
<td></td>
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<tr>
<td>93</td>
<td>–</td>
<td>–</td>
<td>mbRel</td>
<td></td>
<td>LIMC Apollon 66</td>
<td>Apollo seated on omphalos, with bow, palm, and T.</td>
<td></td>
</tr>
<tr>
<td>94</td>
<td>–</td>
<td>–</td>
<td>rfKCA</td>
<td></td>
<td>A&amp;D, fig. 29; LIMC Nike 116</td>
<td>Nikai decorating T.</td>
<td></td>
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<tr>
<td>95</td>
<td>–</td>
<td>–</td>
<td>rfOIN</td>
<td></td>
<td>FRO, 96</td>
<td>Nikai at T.</td>
<td></td>
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<tr>
<td>96</td>
<td>–</td>
<td>–</td>
<td>brRel</td>
<td></td>
<td>Carapanos 1878, pl. 16.1; LIMC Herakles 2956</td>
<td>Struggle for the T.</td>
<td>5th c.?</td>
</tr>
<tr>
<td>97</td>
<td>–</td>
<td>–</td>
<td>teRel</td>
<td></td>
<td>Strazzulla 1990, fig. 1</td>
<td>Struggle for the T.; T. has several bracing rings</td>
<td>30</td>
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<tr>
<td>98</td>
<td>–</td>
<td>–</td>
<td>fresco</td>
<td></td>
<td>Erhardt 1991, fig. 7</td>
<td>Architectural fantasy centered on a T. on pedestal</td>
<td></td>
</tr>
<tr>
<td>99</td>
<td>15</td>
<td>–</td>
<td>mbRel</td>
<td></td>
<td>Fuchs 1959, 187, no. 4, pl. 28b; LIMC Apollon 1030</td>
<td>Struggle for the T.</td>
<td>2nd c. A.D.</td>
</tr>
<tr>
<td>100</td>
<td>–</td>
<td>–</td>
<td>mbRel</td>
<td></td>
<td>Cain 1985, pl. 21.3; LIMC Apollon 39n</td>
<td>Dionysos and priestess at T. on pillar</td>
<td></td>
</tr>
</tbody>
</table>

ᵃ Museum abbreviations: AM, Archaeological Museum (generic); AntSlg, AntikenSammlungen; Ashm, Ashmolean Museum, Oxford; BM, British Museum, London; MFA, Museum of Fine Arts (generic); MGE, Museo Gregoriano Etrusco (Vatican); MoA, Museum of Art (generic); NM, National Museum (generic); StaatlMus, Staatliche Museen.
ᵇ Vases: g, Geometric period; c, Corinthian; bf, black-figure; rf, red-figure; ALA, Alabastron; AMP, Amphora; ARY, Aryballos; CUP, Cup or Kylix; DIN, Dinos; HYD, Hydria; KAN, Kantharos; KBL, Bell krater; KCA, Calyx krater; KCO, Column krater; KRA, Krater; KOT, Tripod kothon; KVO, Volute krater; LEK, Lekythos; LTR, Loutrophoros; OIN, Oinochoe; PAN, Panathenaic amphora; PEL, Pelike; PIT, Pithos; PX, Pyxis; SKY, Skyphos; STA, Stamnos (e.g., gAMP stands for a Geometric amphora, cARY for a Corinthian aryballos, and bfLEK a black-figure lekythos). Other types: brMld, Bronze mold; brRel, Bronze relief; mbRel, Marble relief; stRel, Stone relief; teRel, Terracotta relief.
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Tomb Cult on the Halikarnassos Peninsula

ANNE MARIE CARSTENS

Abstract

Investigated here is the ancient settlement at the village of Geris on the northwestern coast of the Halikarnassos peninsula. Both a fortification and a monumental tomb probably dating back to the fourth century B.C. are known at this site. The tomb is described as a princely tomb subject to ancestor or tomb cult, and is related both to the Mausolleion and other Karian chamber tombs. It is suggested that ancestor cult played an important role in the power structures of Archaic and Classical Karia and that these traditions constituted part of the ideological foundation of the Mausolleion. Furthermore, traditional views of the effects and consequences of the Maussollan synoikism for the settlement structures are challenged by a closer analysis of the archaeological remains at Geris.

For more than 35 years Danish archaeologists have been exploring ancient Halikarnassos. In 1966, Professor K. Jeppesen of the University of Aarhus initiated the Danish excavations at the Mausolleion. More than a century earlier, in the 1850s, the main goal for C.T. Newton’s expeditions was the search for good quality sculptures for the British Museum. The aim of the Danish excavations, however, was to acquire knowledge of the architecture of the Mausolleion in order to make its reconstruction possible. The study of the architecture and planning of late Classical Halikarnassos continues to be the main objective of the Danish Halikarnassos Project.

Since 1989, work in Bodrum has been carried out in collaboration with the Bodrum Museum of Underwater Archaeology, and the area of study has been widened to include other periods and aspects of the ancient city. Thus, from 1990 to 1993, a Late Roman domus was excavated in the western part of Halikarnassos, while Hellenistic remains have also provided important evidence of the position of the ancient town. In recent years, the study of ceramic materials and the possible local production of pottery in Hellenistic and Roman times has been emphasized. The late Classical period remains crucial, however, and the ancient city wall, which has been a focus of research of the Halikarnassos Project since 1998, probably represents the most extensive building activity of the Maussollan era.

Only occasionally the archaeology of the hinterlands of the Halikarnassos peninsula has been included in the Danish research. Since 1996, small-scale surveys on the peninsula west of Bodrum focusing on the sepulchral architecture have formed part of the fieldwork, serving as a basis for further settlement studies on the Halikarnassos peninsula.

The archaeology of the Halikarnassos peninsula has always been closely connected with ancient literary sources that described the indigenous people of Karia and the synoikism initiated by Maussollos in the 370s B.C. Early in his reign, Maussollos transferred the capital of Karia from inland Mylasa to coastal Halikarnassos, and in order to increase the size of the city six nearby towns were incorporated into the new Halikarnassos (fig. 1).

Both Pliny and Strabo describe this synoikism. Pliny mentions it only briefly, although he does name the towns involved, while Strabo includes a discussion of the people of Karia—the Karians and/
or Lelegians.\textsuperscript{11} He reflects on the Lelegians as being another, older name for the Karians, and he mentions various older sources describing the nature and origin of the Karians and where they may have settled. He explains that in Karia certain tombs and fortresses are called Lelegian and that there were eight Lelegian towns in the region of Halikarnassos, six of which were amalgamated to form Halikarnassos.

In the autumn of 1857, while awaiting the arrival of his scientific team in Bodrum, C.T. Newton undertook an exploration in the hinterlands of Bodrum.\textsuperscript{12} He examined some tombs built on the hills of Assarlâk in the southern part of the peninsula, and he identified the settlement as ancient Syange-la, one of the Lelegian towns mentioned by Strabo.\textsuperscript{13} Newton found the tombs peculiar and ascribed them to the indigenous population, the Lelegians. Thus the two main objectives for any future archaeological investigation of the Halikarnassos peninsula were set out: to identify the settlements listed by Pliny and Strabo, and to define the Lelegian culture in the archaeological remains.\textsuperscript{14}

**The Ancient Settlement at Geriş**

Thirty years later, in 1886, W.R. Paton excavated a series of tombs at Assarlâk, and the finds, belonging mainly to the Protogeometric period, were transferred to the British Museum.\textsuperscript{15} At the end of his campaign, in February 1887, he visited other ancient sites in the vicinity. A coastal site above the harbor village of Yalikavak in the northwestern part of the peninsula attracted his attention (fig. 2). On a ridge with three summits near the village of Geriş, Paton noticed the remains of a fortification and a monumental tomb.\textsuperscript{16}

**Tumuli Tombs**

The ancient site at Geriş is situated on a ridge running southeast to northwest that nearly reaches and characterizes the site as “the cradle, and down to the time of Mausolus, the home of the Leleges” (Paton 1887, 66). Forsdyke 1925, 211–5; Marshall 1911, 100–1; Walters 1899, 115–8.

\textsuperscript{11} Pliny, *NH* 5.107; Strabo, *Geography* 7.7.2, 13.1.58–9, 14.2.27; see also Carstens and Flensd-Jensen (forthcoming).

\textsuperscript{12} Newton 1863, 573–601.

\textsuperscript{13} Newton 1863, 583–8.

\textsuperscript{14} E.g., Paton and Myres 1896; Maiuri 1922; Bean and Cook 1955; Radt 1970; Varinlioğlu 1992.

\textsuperscript{15} Paton 1887. The article opens with a long quotation from Newton’s report of his expedition to Assarlâk in 1857 and characterizes the site as “the cradle, and down to the time of Mausolus, the home of the Leleges” (Paton 1887, 66). Forsdyke 1925, 211–5; Marshall 1911, 100–1; Walters 1899, 115–8.

\textsuperscript{16} A plan and a section of the chamber tomb were published later that year as an appendix to the Assarlâk publication. Paton 1887, 78–82, fig. 27–9.
the coastline, at which point the slope is rather steep (fig. 3). The modern village is built against the southernmost hilltop.17 An old pathway runs along the southwestern slope of the ridge. A large, level plain, cultivated with figs and grapes, is located between the two northwestern summits. Approximately 40 m before the plain, several tumuli tombs arranged in two terraces were built into the slope, the first approximately 10 m above the pathway. The lower row consists of three tombs, built up against each other. At least three more tombs are found on the next terrace a few meters eastward. These are still covered by soil and only visible through small holes either dug by pilferers or caused by erosion. The tombs are basically identical with a rectangular ground plan disappearing into the rounding of the corbelled dome that forms the covering.18 The walls are formed of unworked boulders, and the apex of the dome is covered by a very large flat stone, over 1 × 2 m.

The tumuli tombs are invisible in the landscape and there may be more tombs of similar construction in the area.19 It is impossible to date them, but the roofing technique seems identical with that found by Newton in some of the tombs at Assarlik.20 Another parallel may be the Protogeometric tomb at Dirmil/Gökcебel, which is circular in plan and covered by a dome or pyramid vault completely hidden in a hillside.21

The Fortifications

The summit in the middle can be reached from the central plain. Terrace walls of large unworked stones provide a level terrace ca. 5 m wide on the northeastern side. The remains of a small podium, 4 × 2 m, are preserved on this terrace. Varinlioğlu (1996, 161–3) suggests that a monumental chamber tomb may occupy the summit, but clearly the rock-crop here could never have allowed such a construction; more likely it served as a quarry for the Geriş settlement.

The tomb on the right has collapsed and is overgrown, but appears to be of the same dimensions as the one on the left: width 2.6 m; length 2.2 m; height 1.3 m (from present floor level). However, the best-preserved tomb in the middle is quite large: 3.1 m wide; 5.55 m long; 2 m high.

Paton (1887, 79) supplied the following description: “On the west side of the same hill are two tombs, the entrances of which lead out of a semicircular wall built into the face of the hill facing west. These tombs resemble in their construction the chambers in the Assarlik tumuli, the sides converging to the top, so as to support the covering stones. There are probably other tombs here, but the brushwood which covers the hill is quite impenetrable.”

20 The tombs investigated by Newton in 1857 are not identical with the tombs that Paton excavated in 1887, yet they must belong to the same general type, a built rectangular tomb covered by a corbelled vault (either two- or four-sided, forming a barrel or a pyramid vault) and hidden below a tumulus. Some of the tombs investigated by Newton were constructed in isodomic ashlar masonry, whereas Paton’s tombs were built in rubblework. Newton 1863, 580–6; Paton 1887, 67–8; Paton and Myres 1896, 243–5.

boulders in polygonal masonry can be followed in at least two levels along the whole northeastern slope (fig. 4). Presumably these originally formed the lower city wall. Silting and soil erosion within and uphill of the walls has covered the inner face and left the walls with the appearance of monumental terrace walls. Similar polygonal masonry filled with smaller rubble was used at several points in the city walls of Halikarnassos and Myndos, present-day Gümüşlük, both of which have traditionally been attributed to the Hekatomnid period of the fourth century B.C.

An ashlar wall built against the summit is visible from the northwest (fig. 5). This wall flanks the hilltop on the northwestern and southwestern sides, and there is a tower on the southwestern corner of the wall-framed hill (figs. 6–7). At the summit the ground is level and forms a plateau with a square tower in the southern corner, built in isodomic, bonded masonry (fig. 8). The corners of the tower are marginally drafted and the blocks are rusticated. At the corners a system of double headers forms a strengthened corner bond.

The walls around the summit represent two phases of construction: the walls themselves predate the tower built onto them. Parallels for the second phase, including the tower on the plateau, can be found in much Hekatomnid building, where rusticated hammer-dressed facades and marginally drafted corners are frequently employed. The double corner bond is used in the towers of the Halikarnassos city wall and can be seen in the fortification towers of Herakleia on Latmos, Latmos, Alabanda, tower 6 at Kaunos, and in St. Paul’s Prison in Ephesus. The city wall of Halikarnassos was most likely
constructed during the reign of Maussollos, and the fortification of Latmos also probably dates to the first half of the fourth century B.C.27 The fortification of Herakleia on Latmos may be Early Hellenistic, around 300 B.C., while the Ephesos tower, part of the Lysimachian wall, dates to the third century B.C. Thus, stylistic, technical, and historical data suggest that the later phase of the fortification of Geriş belongs to the fourth century B.C.28

The Chamber Tomb

The chamber tomb crowns the coastal summit (fig. 9). The tomb consists of a dromos, a stomion, and a burial chamber, built in the local gray-greenish andesite in carefully drafted ashlar masonry with corresponding courses.

The burial chamber is rectangular with a barrel vault ceiling (fig. 10). This vault consists of four corbelled courses and a fifth placed as a row of central cover stones (fig. 11). The curve of the barrel vault is here disjointed by a right angle, and the cover stones are completely flat without any concavity. Although the curve of the vault appears homogeneous and rounded, the two lower courses of the vault are cut as straight diagonals. The corners of the chamber do not correspond precisely with the corner bond of the masonry. Both the masonry and the shaping of the chamber, however, are carefully made and precisely drafted. The floor of the chamber consists of large rectangular blocks.29

The stomion is placed at the exact middle of the southern wall at a right angle. A large circular pivot


27 Pedersen 1994b, 223; Peschlow-Bindokat 1989, 75.

28 Karlsson (1994, 142, passim) has argued that an analysis of the historical context is indeed the most important tool for the dating of city walls.

29 One of the middle blocks was lifted up by thieves and was found in this position when Paton visited and described the tomb (Paton 1887, 81). At a later date the northern wall inside the chamber was damaged by a dynamite explosion, which resulted in a sizeable hole in the wall at floor level. More recently another such hole in the southeastern corner of the chamber also was created by an explosion. Sometime between June 1996 and August 1997 the outer doorframe was almost completely destroyed, and several blocks of the dromos walls have been pushed down into the dromos.
hole is cut into the outer of the two lintel blocks, but there is no corresponding pivot hole in the floor.\textsuperscript{30} A single turning door may have opened inward.\textsuperscript{31}

The dromos is placed in the axis of the chamber and stomion. The outer roofing block of the entrance continues out into the dromos and presumably the rest of the dromos was covered as well. The final extension has been found at the western wall, where a corner cutting in the pavement marks the end (fig. 12). The pavement of the dromos consists of large slabs almost as far as this corner, where it is replaced by a pavement made of smaller polygonal slabs. This pavement continues further downhill in the same direction as the dromos. There are no signs of a closing arrangement at the outer end of the dromos.

The roof blocks are visible on the top of the tomb above the entrance, and the heavy range of the corbelling is clearly marked. Originally a tumulus, the inner part consisting of boulders, covered the tomb.\textsuperscript{32} On top of this a layer of clayey soil was probably applied as a seal and the earthen tumulus surface was kept in place by a circular krepis wall, which can be followed all around the tomb (fig. 13). At the best-preserved sections, up to three courses of smaller blocks with a curved facade and a dexterous cutting are visible.

At a distance of 28 m from the krepis and concentric with the krepis wall, an impressive wall surrounds the hill (fig. 14). This wall is built of enormous blocks (up to approximately 1 $\times$ 2.5 m) with convex surfaces and a heavily rusticated irregular ashlar masonry. It surrounds the tomb on three sides, but the northwestern and northern slopes of the hill are far too steep to have borne such a wall (fig. 15). An entrance was found...
on axis with the dromos (fig. 16). The blocks facing this entrance are neatly cut, and a polygonal pavement was found in the opening. The huge wall seems to have been built partly as a terrace wall, partly as a freestanding wall, but in this case too, silting and erosion may have changed its appearance. This outer circular wall could be interpreted as the true krepis wall of the tumulus. The inner, smaller wall would then be explained as an internal retain-
ing wall keeping the fill of the tumulus in position. It is, however, difficult to imagine an only partly circumscribed krepis wall—what would have happened to the tumulus on the northwestern and northern slope where the wall is lacking? And why is the wall constructed as a two-faced wall and not a terrace wall?

I suggest that the outer wall was a clearly articulated marker of the tomb, defining the area belonging to the interred, comparable to the temenos wall of a sanctuary. The entrance with a paved path-way leading to the dromos indicates that the tomb could be visited between burials, and when entering the upper part of the hill, delimited by the huge wall, the visitor entered a sacred place.

The tomb was already practically empty when Paton visited Geri. As the tomb chamber is undecorated and technical details such as cramps are lacking, we are left without any obvious dating criteria. However, the ashlar masonry with corresponding courses, including an orthostate course, indi-

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33 Examples of such inner retaining walls have been frequently observed, e.g., the Salamis tumuli in Cyprus and the Phrygian great tumuli at Gordion. Karageorghis 1967, 122; Young 1981, 85–6.

34 Paton (1887, 81) found “a very small fragment of an Attic vase, probably of the fifth century, with the design in red and fine glaze” inside the tomb chamber.

35 It has been suggested that the corbelled barrel vault could be used as a terminus ante quem for the construction, an argument which would place the construction of the tomb in a period before the vault constructed with a keystone had been introduced in Greek architecture. In my view this is a false
cates that the main inspiration is to be found in Greek monumental architecture. Paton found resemblances with the vaulted tombs in Assarlik in the roof construction of the Geriş tomb, and speculated that the tomb dated back to the fifth century B.C. In particular he noted a typological relation between the ashlar tombs found by Newton and the Geriş chamber tomb (fig. 17). The chamber tomb at Geriş, a tomb from Yokusbaşı, and the Maussolleion

A late fourth-century B.C., or Early Hellenistic, chamber tomb found below the ancient settlement at Yokusbaşı near Halikarnassos is typologically related to the Geriş tomb, yet the two monuments are also distinct, not least in the decorative details. This tomb was found during construction work for a new highway between Bodrum and Miletus in 1975, and later it was rebuilt in the glacis of the Bodrum Museum.

The tomb consists of a dromos, an antechamber, a stomion, and the burial chamber (fig. 18). It is built in ashlar masonry in bluish limestone, but white marble blocks are also used randomly. In the inner burial chamber a plain sarcophagus of limestone with a gabled lid was placed on a base con-

Fig. 11. The western end wall of the tomb chamber. Note the angular set-off between the rounding of the lower part of the barrel vault and the topmost flat course.

clusion. The invention of the keystone vaulting may not have pushed the corbelled vault out of use. Carstens 1999b.

It is generally agreed that from the fourth century B.C. onward the local population in Karia was directly confronted with Greek architecture. (Hornblower 1982, 11: “This phenomenon, of a relative isolation in the Archaic and Classical periods—migrated by intermarriage between the Greeks and Karions, though hardly the still more depressed Lelegians—followed by a rapid Hellenization in the fourth century and later is a peculiar one.”) However, public architecture of the Samian Ionic type existed in Halikarnassos by the early fifth century B.C., and nothing suggests that Karia was isolated from the Greek or Aegean world until the late Classical period (Pedersen 1994a, 27–8). Archaic decorated pottery of the so-called Fikellura-style was produced in Mylasa during the sixth century B.C. (Cook 1999, Carstens forthcoming), and fifth-century B.C. Halikarnassos fostered both Herodotos, who was of a mixed Karian-Greek family, and his uncle Panyassis, important figures in Greek historiography.

Paton 1887, 81; Paton and Myres 1896, 246; see also Bean and Cook 1957, pl. 20d.

The ancient settlement of Yokuşbaşı: Bean and Cook 1955, 131. The tomb is published in summary in Jeppesen 2000, 169–74. We know very little of the surrounding topography of this specific tomb, but other Classical and Hellenistic tombs were excavated by Newton in the eastern part of Bodrum, and in 1989 a very rich cist tomb was found by the Bodrum Museum. Newton 1863, 333–41; Özet 1994. In 1995 Maria Berg Briese, the Danish Halikarnassos Project, and Mehmet Özgenc, Bodrum Museum, visited Yokuşbaşı. At the roadside, near the exit for Çiftlik, they noticed the covering stone of what was immediately identified as a Hellenistic tomb. I went there in June 1996 in order to confirm these observations, but in the meantime the road had been extended and the tomb had been lost, without the knowledge of the Bodrum Museum.
The burial chamber is rectangular and the walls are preserved in a total height of six courses. In the present northwest corner one block of the seventh course has been placed in position and as it has a concave profile, it may be interpreted as the beginning of a corbelled barrel vault arranged at an angle to the entrance as at Geriş. The floor is paved with large, almost quadrangular slabs of limestone joined by Π-shaped cramps. The same kind of cramp is visible in the topmost course and some of the cramps are preserved with the lead surrounding. The stomion, placed at the center of the southern wall, is rectangular. Double turning doors of white marble closed the entrance. A rectangular antechamber is located in front of the doors and the stomion, and a second entrance is present at the outer end of the antechamber. Replaced in position is a huge closing slab of green volcanic stone. In the rebuilding, the dromos has been placed at a sharp angle to the tomb, and it slopes steeply toward the tomb. Only four original blocks are built into the dromos; the rest are modern replacements.

The masonry of the tomb consists of carefully drafted ashlar. In particular the corners between the stomion and the tomb chamber have an angular drafting, and many blocks of the bottom course have a blank margin. Generally the masonry is carefully smoothed, but the marginally drafted ashlars have a slightly rough, pecked central surface. Five well-preserved rings of electron as well as a gem ring decorated with an antelope were found in the Yokusbaşı tomb. The ring is probably a work of the fourth century B.C. \(^{39}\)

Originally, the Yokusbaşı tomb was covered by a tumulus. The tomb consisted of a rectangular chamber covered by a corbelled barrel vault. The stomion was formed as a niche in the middle of one of the long walls of the chamber, and it was closed by a turning door. All these features are also found in the Geriş chamber tomb. The Yokusbaşı tomb has additional refinements, however. Most striking is the careful finish of the limestone and marble masonry, while the andesite blocks of the Geriş tomb are roughly pecked. While the plan of the Geriş tomb consists of the three elements, dromos, stomion, and chamber, the Yokusbaşı tomb is entered through the dromos, and the stomion and chamber are reached via an antechamber closed by a greenstone block. Precisely those elements, which are only seen in the Yokusbaşı tomb, are found in the Maussolleion tomb chamber. \(^{40}\)

The Maussolleion tomb chamber was approached by a broad monumental staircase, which led to a landing used for the placing of enormous sacrifices of raw meat. \(^{41}\) This sacrificial deposit was covered with a layer of stone protecting it from the earthen fill that later closed the stepped dromos. At the eastern end of the landing a closing block in green andesite was found, probably in situ, during the British excavations. \(^{42}\) It blocked the entrance to an antechamber, which again led to the stomion closed by a double marble door, which led to the tomb chamber proper. The tomb chamber was probably covered by a pyramid vault, which transferred the enormous weight of the upper building down into the foundations.

Both the Maussolleion chamber and the Yokusbaşı tomb were entered through an antechamber, closed by a greenstone block. The stomion was closed by double marble doors, in both tombs decorated with fillings framed by riveted panels. In the Maussolleion,

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\(^{39}\) Bodrum Museum no. 1.10.75. The gold ring is related to the Greco-Persian style as characterized by Boardman (1970, 303–27), notably the so-called mixed style group (Boardman 1970, pl. 942).

\(^{40}\) Jeppesen 2000, 63–104.

\(^{41}\) Højlund et al. 1981.

\(^{42}\) Newton 1863, 96–7.
the Yokuşbaşı tomb, and the Geriş tomb, the stomion was formed as a niche in the chamber, and all three tombs were presumably covered by corbelled roofs.

It is an intriguing notion that the Maussolleion tomb chamber was of a type already known in the Halikarnassos region, exemplified by the Geriş...
The tomb at Yokusbası is so similar in style to the Maussolleion tomb chamber that I would consider it to be an imitation. This theory is supported by both the stylistic dating criteria—the use of Π-shaped cramps of a type well known in late Classical Halikarnassos and the smoothed and delicate masonry—and the fact that the finds dated to the second half of the fourth century B.C. All three tombs were princely tombs, sepulchral monuments of the local dynasty in Geriş and Yokusbası, while the Maussolleion was the supreme royal monument—a monument of indisputable power.

TOMB CULT AND ANCESTOR CULT: STAGING AN ARISTOCRATIC TRADITION OF POWER

It is useful to consider cultic activities at both modest and monumental tombs as different levels of adoration or worship.44 Firstly, cultic activities may

Fig. 15. The outer wall on the east side

Fig. 16. The opening in the outer wall

43 Still, the dating of the Geriş tomb is insecure and mainly based on a stylistic consideration of the main features: the plan is not as complicated as the Maussolleion, the finish not as neat, yet, the material is also different and much rougher. Based on these stylistic criteria, the most logical and normal archaeological procedure would be to consider the chronological sequence as: Geriş, Maussolleion, Yokusbası.

44 Antonaccio (1995) has presented another division used in her study of the formation of Greek hero cult: (1) tomb cult, i.e., reuse of prehistoric tombs in the Early Iron Age, (2) hero cult, which may not necessarily take place at a tomb, and (3) cult of the dead, i.e., funerary customs. Protonotariou-Deilaki (1990, 69) also operates with separate rites during and after the funeral. In general, especially tomb cult, but also mortuary practices in the proto-historical and Archaic periods are better investigated in Bronze Age Aegean archaeology than in the historical periods. See, e.g., Hägg and Nordquist 1990; Cavanagh and Mee 1998, 103–36. Studies in mortuary practices of the proto-historical and Archaic periods are in particular concentrated on the Geometric burials on the Athenian Agora and the Archaic burials in the Kerameikos, see, e.g., Morris 1987, 1992; Whitley 1991; Houby-Nielsen 1995, 1998.
be performed at the funeral, for example, the pouring of a libation or sacrifice of a meal and the placement of personal belongings inside the tomb. Secondly, tomb cult may be performed as visits and sacrifices at the tomb some time after the funeral, for example, libations or other sacrifices on the tomb altar and mourning. Thirdly, there is the practice of hero or ancestor cult—difficult to separate from tomb cult other than as something more monumental.

The Maussolleion in Halikarnassos was a royal tomb and a monument of power. It overtly displayed the might and wealth of the Hekatomnids, as princely tombs had done in the Mediterranean region during the Archaic period in the seventh and sixth centuries B.C. It is doubtful whether the tomb was also regarded as a sacred monument, a place to worship the satrap, King Maussollos, as deified ruler, but clear references to sacral architecture and layout were incorporated throughout the construction. The monument had its sacred space, its temenos, on the terrace; it was entered through a propylon as in a sanctuary; and it was located in the midst of the town, next to the agora. Twice as grand as the terrace of the Mars temple, the Maussolleion complex dominated the city. The monument itself was an imitation of a peripteral podium temple and was lavishly decorated with relief sculpture, architectural moldings, and a coffered ceiling. Even if it was not a temple, it was presented like one—and Maussollos was the god to worship.

The massive and permanent setting evokes the idea that formalized cultic activities were indeed performed at the Maussolleion and that the monument was central in an ancestor or ruler cult. Unfortunately, the only archaeological evidence of funerary or tomb cult is the extraordinary raw meat sacrifice, so monumental that it indicates ongoing, large-scale tomb cult activities. A passage by Aulus Gellius (Noctes Atticae 10.18) relates that Artemisia consecrated the Maussolleion to the deified Maussollos and instituted an agon, a rhetoric competition where talented men praised the deeds of the late king. While Gellius is a much later source, the phrase of the deified ruler, in combination with the direct reference to sacral architecture in the total layout and construction of the Maussolleion complex, constitutes the hypothesis that the Maussolleion was in effect a temple for the Hekatomnid dynasty and the deified or godlike Maussollos. If the ruling dynasty buried its great entrepreneur inside such a powerful temple-like monument, who could then question that dynasty’s right to power? The monumental tomb answered any doubts about its legitimacy in its reference to the past—this is what we achieved before, and only great men are buried in great monuments.

I suggest that the Maussolleion modeled itself upon local tradition, not only in the architecture...
and plan of the burial chamber, but also in the ideological concept of the deified ruler as dynastic ancestor.\textsuperscript{49}

On the Halikarnassos peninsula another, much earlier, dynastic tomb towers above a natural harbor and crowns a peak, the Gebe Kilise, in the landscape on the northern shore above the village of Torba. The Gebe Kilise tomb is the high point of the so-called Lelegian tombs (fig. 19).\textsuperscript{50} Most likely, it is a work of the seventh century B.C., built in the most exquisite dry-stone, almost pseudo-isodomic, ashlar masonry.\textsuperscript{51} A tall and slender pyramidal dome forms the ceiling of the tomb chamber, totally invisible from the outside, where the top of the tomb appears as a huge rubble tumulus. The tumulus is kept in place by a profiled krepis placed on top of the vertical courses of the lower part of the tomb. The building is still visible from the coastal village below, and perhaps it was the tomb of the local dynasty in ancient Torba, of whom we know nothing, or perhaps it belonged to the inland settlement at Gökçeler.\textsuperscript{52} Either way the tomb was separated from both settlement and cemetery as an isolated monument, and it was meant to dominate the bay. Near the tomb a building complex was constructed perhaps during the fifth or fourth century B.C.\textsuperscript{53} Its close proximity to the tomb, however, suggests that it was a building associated with tomb cult performed at the tumulus.\textsuperscript{54}

The topography of the Gebe Kilise tomb is repeated in the Geriş chamber tomb. In both cases, however, only the setting of the tombs and the good workmanship presented in the buildings indicate that they were princely tombs—and evoke only a vague impression of the tombs as subjects of tomb cult or maybe ancestor cult.

\textsuperscript{49} The Persian hegemony was no less important in the way it inspired or even initiated the creation of the ruler cult in Hekatomnid Karia. The cultural relations between Karia and the Persian hegemony are complex and yet have only been superficially investigated; see, e.g., Hornblower 1982, 137–82.
\textsuperscript{50} Radt 1970, 219–23.
\textsuperscript{51} The Lelegian tumuli tombs were in use at least a couple of centuries from the Geometric period until the sixth century B.C. Radt 1970, 225.
\textsuperscript{52} Paton and Myres 1896, 212; Bean and Cook 1955, 123–8; Radt 1970, 215–36.
\textsuperscript{53} Radt 1970, 177, 195.
\textsuperscript{54} Radt (1970, 195) put forward a close parallel for the building type in a domestic shrine at Vouni on Cyprus.
Evidence of ancestor or hero cult is often this indirect or diffuse. However, at Belevi, northeast of Ephesos, an evident example of a monumental tomb subject to a hero cult, the Belevi tumulus, was excavated during the early 1970s. It is situated on a hill on the southern side of the Kaystros river valley opposite the marble quarry that provided building materials for the Artemision.\(^5\)

A krepis wall constructed in ashlar masonry of huge blocks, approximately 1.5 × 0.6 m, surrounds the tomb. This wall is some 65.4 m in diameter and the dromos has been hidden in the wall. No access to the tomb chamber was possible. A system of clay pipes was established for the offering of libations into the tomb. The libations took place on the top of the tumulus and the channels led the offerings down to the antechamber, where they were collected in a cavity. The Belevi tumulus was apparently constructed in the sixth century B.C., while a second building phase, detected by a join in the masonry of the krepis wall, was dated back to the fourth century B.C. Tomb cult was performed here from the sixth century B.C. until the fourth century A.D. It has been proposed that this is the tomb, or perhaps the cenotaph, of the herdsman Pixodaros, who first discovered the presence of marble north of the valley, opposite the tomb. Vitruvius tells that his “place” was visited each month and a sacrifice was offered.\(^6\)

As at Gebe Kilise, another building was found nearby. The excavator, S. Kasper, suggested that the building was connected with the cult performed at the tomb: “entweder als Unterkünfte für Adoranten bzw. Pilger, die zum Heroengrab kamen, oder auch als Bauhütten für die Steinleger und Steinmetzen, die den monumentalen Bau errichteten, oder aber nacheinander für beides gedient haben.”\(^7\)

Although there is no direct evidence of any cultic activities at the tomb at Geriş, the topographical setting of the tomb evokes the idea that cultic activities took place. The huge (temenos) wall surrounding the tomb hill and the access to the dromos indicated by the polygonal pavement at the entrance in the outer wall indicate that the tomb itself was accessible to worshippers and served as a sanctuary for an ancestor cult. This temenos wall is similar in style with the krepis wall of the Belevi tumulus: they are both constructed in gigantic ashlars (averaging more than 1.5 m in length and 0.6 m in height) with very rough pecked facades. Such masonry is otherwise unknown in Karia, and it is tempting to assume that the builders of the tomb at Geriş knew the Belevi tumulus, the famous heroön of Pixodaros.\(^8\)

Thus, I propose that the Geriş tomb was a dynastic tomb subject to ancestor cult, probably built sometime during the Classical period. It is, unfortunately, impossible to date it with further accuracy, but stylistically it seems reasonable to place the Geriş tomb later than the chamber tomb at Assarlik depicted in figure 17 (which is also undatable) and also later than the Belevi tumulus, but before the construction of the Maussolleion. That leaves us with a date sometime during the fifth or very early fourth century B.C.

The settlement at Geriş was probably earlier, as the tumuli and the lower city wall indicate, but the

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\(^6\) Vitruvius, De arch. 10.11.11–2.


\(^8\) The krepis wall of the Belevi tumulus was either repaired or finally completed in the fourth century B.C. (the second building phase) and a wild hypothesis would be that the masons employed in the construction of the Geriş tomb also participated in the Belevi tumulus repair.
fortification of the settlement was strengthened during the fourth century B.C., possibly in connection with the construction of the city wall at Halikarnassos. These late Classical activities imply a conflict with the traditionally accepted interpretation of a change of settlement patterns on the peninsula during the reign of Maussollos.

Geris in the Light of Maussollan Synoikism

Archaeological investigations in the Halikarnassian area have often sought to verify ancient literary sources describing the synoikism of Maussollos. A possible identification of those synoikized settlements has formed the basis of archaeological research conducted in the area since G.T. Newton, at times blindfolding archaeologists to other interpretations when the written word is regarded as unequivocal. This is not least the case of the surveys conducted by G.E. Bean and R.M. Cook in the 1950s. Often they stressed that the latest sherd found on the peninsula at a site which they identified as one of the synoikized towns, belonged to the Pre-Maussollan period, that is, no later than the first half of the fourth century B.C. But the tiles and sherds scattered around these settlements, and also at Geriš, may just as well belong to the Hellenistic period; for the majority of pottery finds the chronological frame is just as imprecise as it is for architectonic remains.

Late Classical walls, such as those that strengthened the fortification of Geriš, can be found at several of the peninsula sites, including Gürice, Assarlık, Gökçebel, and Gökçeler, which are all considered as settlements incorporated in the synoikism. Hornblower considered these additions: “A number of other ‘Lelegian’ sites had their fortifications strengthened in the fourth century, very probably by Mausolus. This may have been as part of a policing operation because synoikism was unpopular, or to serve as garrison posts against real or imagined threats from outside, or to intimidate the Greeks and Karians of the area—or perhaps just for show.” All four explanations indicate that people must have been situated in the area, both in order to man the towers, and to be either frightened by them or impressed by their magnificence.

Traditionally, synoikism has been understood as both a political and a physical act, that is, it involved both a handover of political and administrative power and a migration from the synoikized towns to Halikarnassos, resulting in the depopulation of the sites incorporated in the process. Bean and Cook clearly saw this migration as a permanent new settlement structure on the Halikarnassos peninsula, and considered any repopulation impossible in the period shortly after the reign of Maussollos (after the construction of the major buildings including the city wall, which demanded the large-scale enforcement of building workers).

The archaeological evidence calls into question this hasty conclusion and indicates that, while synoikism also should be understood as a physical act which supplied the workers needed for the creation of a new metropolis, this was possibly a temporary situation. Not only are the dates of pottery given by Bean and Cook questionable, but the reinforcement of the fortifications at many of the peninsula sites and the apparently continuous use of tombs and cemeteries also suggest that people soon moved back, and some never even moved away.

Southward along the coast from Geriš, protected by a small promontory, there is an ancient stone quarry, situated on the coast so that further transportation of the andesite stone could easily be arranged on rafts landing in the shallow water (fig. 20). There are remains of both polygonal and

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59 Such additions are found at many settlements in the Halikarnassos peninsula. They appear to form a widened defense system related to the Halikarnassos city wall. Carstens and Flensted-Jensen (forthcoming).
60 Bean and Cook 1955.
61 Bean and Cook 1955, 119. See, e.g., the remarks on Assarlık (Bean and Cook 1955, 118); Gürice (Bean and Cook 1955, 121); Göl (Bean and Cook 1955, 122); Geriš (Bean and Cook 1955, 119–90).
62 Newton (1863, 573–601) argued for an identification of Assarlık as Syangela, of Chifoot Kalesi [Çifit Kales] as Termera, and of Gül [Göl] as Karyanda. Paton and Myres (1896, 192–210) made the following identifications: Termera = Assarlık; Myndsos = Gümüşli [Giumushli]; Pedasa = Gökçeler [Ghiuk Chalar]; Telmessos = Kara Dağ; Karyanda = Göl [Ghiöl]; Termile = Dirmil/Gökçebel [Tremil]. Bean and Cook (1955, 143–65) made the following identifications: Myndsos = Erenmezarlık, the archaic Lelegian town later moved to: Gümüşli Syangela = Alâzeytin, the archaic Lelegian town later moved to: Theangela = above Etrim village; Termessa = Assarlık; Pedasa = Gökçeler; Telmissus = Gürice; Madnasa = Kara Dağ; Uranium = Burgaz, the site at Geriš; Side = Göl. See also Varinlioğlu 1992.
63 Hornblower 1982, 308.
64 Bean and Cook 1955, 169.
65 Rock-cut tombs probably belonging to the fourth century B.C. are found at Turgutreis, at the Pamyali point near Yalikavak, and at Türk bük K. Carstens 1999a.
ashlar-like walls on the small coastal plateau just above the quarry, and the many fragments of pottery and roof tiles show that quarry workers probably inhabited this site. Traces in the bedrock indicate an ancient road.

Again, it is impossible to date these structures with any particular accuracy. The visible remains (sherds, tiles, and walls) are similar to material found inside Halikarnassos from the Hellenistic period, but this does not preclude it belonging to the early fourth century B.C. as well.

With the synoikism and the creation of Halikarnassos as a capital with sanctuaries, new public buildings, a Maussolleion, and an impressive fortification, including new installations at a number of peninsula forts, the demand for building material must have been great. The andesite quarry below Geriş could supply good, homogenous, semi-hard andesite, and was located on the coast. It is impossible to find a better historical explanation for this quarry than the time of the Maussollan building program, contemporaneous with synoikism.66

In general, a reconstruction of the settlement patterns of the peninsula is difficult to present with certainty as long as the dating of the archaeological remains is so tentative. The dynastic tomb, subject to ancestor cult, which dominates the fertile landscape of Geriş may belong to the fifth century B.C. At that time a local aristocracy was in charge of a prosperous settlement and its hinterlands, the green valleys and the natural harbor near the quarry. Sometime in the 370s B.C. Maussollos moved his capital to Halikarnassos and sites like Geriş had to provide a labor force for the ambitious building program, which was turning Halikarnassos into a modern, rich, and impressive city. Perhaps shortly after, in the 360s B.C., the fortifications were improved, and the quarry may already have functioned as a small industrial settlement, shipping andesite to Halikarnassos, while the rich and fertile valleys produced a surplus, which was sold in the city. It is possible that the local community continued to exist in a modest and discreet manner while the men worked in Halikarnassos, or maybe the town was abandoned. Both ideological (the deified ruler) and architectonic elements (the sacred precinct) show that the Hekatomnid dynasty created its public identity, first and foremost by the construction of the Maussolleion, in a local cast. The recognition of the Persian satrap Maussollos and his family by the local Karions, including the local dynasties, is a vital key in the decipherment of the flourishing fourth-century B.C. Karia. I find it hard to believe that the local ruler at Geriş should have passed on his status to Maussollos and Halikarnassos and accepted a physical synoikism. Further systematic investigations of the archaeological remains on the Halikarnassos peninsula are needed, however, in order to determine the extent to which the settlement structure was altered and local power structures tolerated.

66 The same argument was rightly put forward by Bean and Cook (1955, 169) concerning the Koyunbaba quarry north of Gümüşlük.
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Regionaries-Type Insulae 2: Architectural/Residential Units at Rome

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Abstract

The architectural/residential unit (ARU) concept previously defined and elaborated for Ostia is here considered in light of the Roman evidence. I conclude that the ARU is the best candidate to be the archaeological correlate of the term *insula* in the Regionaries. This conclusion is drawn in light of (1) the weight of evidence from review of the documentary sources that points to or is compatible with the concept of the ARU; (2) statistical analysis of the figures given in the Regionaries that establishes that the catalogues probably report statistics that may echo reasonably reliable statistics and are not made up fantasies; (3) the results of geographic information systems (GIS) analysis of the space utilization implications of the Regionaries statistics in Region 12 of ancient Rome; and (4) consideration of the probable number of separate structures in ancient Rome compared with more recent preindustrial urban centers. Finally, the polysemic nature of residential terms in different languages may explain why there has been understandable controversy over the interpretation of the term *insula* as it occurs in the Regionaries. Work for the future suggested by this analysis includes investigating whether ARUs were commonly defined in association with staircases to upper floors, and how the nature of the urban fabric of ancient Rome may have differed from that of later Italian towns, which appear to show greater preponderance of residential configurations based on the row house.*

What did the city of ancient Rome look like? Much is known about the public architecture and configuration of public space (accepting that there are notable gaps in our knowledge even about those features). The residential dimension of the buildings and their spatial distribution (which would have constituted the majority of the structural fabric of the city), however, remain largely unknown. The key to reconstructing the character of residential life in the city requires that we combine various threads of evidence: the information of Roman urban archaeology outside of Rome, especially the Vesuvian cities and Ostia, the port of Rome; the evidence of the Severan Marble Plan of the city, executed at the beginning of the third century A.D.; and the rich written record of Roman life—literary and documentary, the latter including materials such as epigraphic sources and the juristic sources, as well as other surviving examples of items that appear to be “quasi-administrative,” for example, the Regionary Catalogues. These written sources introduce residential terminology that must be interpreted in light of the other categories of evidence, especially archaeological evidence. In my previous synthesis of evidence on residential configurations, I presented the results of a recent study of the division of urban space in the city of Ostia, based on the “architectural/residential unit” (hereafter ARU), a separate, architecturally self-enclosed unit that, whatever its function, can be designated as a possible residential unit because an individual (or household) could have lived in that particular unit.¹ The results of the study suggest that the ARU was the nuclear building block of the urban fabric of Roman city life, occupied by one household, however defined.²

The study addresses the terminological problem of the Regionaries (the fourth-century “Curiosum” and the “Notitia”)³—specifically, the meaning of the term *insula.*¹ The Regionaries report the numbers who speaks of residential units as “geschlossene Räume.” That notion is also very close to the legal notion of “private property” discussed below.

*¹ I would like to thank Paul Harvey and Robert Palmer for their assistance in providing the original impetus and continuing advice concerning this analysis. I would like to thank Craig Gibson and the two referees who provided useful insights and suggestions for both parts. Brian Lauthen counted the buildings in the Tempesta map, and Gwendolyn Gruber and Katharine Dale provided valuable research assistance. All remaining errors are my responsibility. As always, my wife, Andrea Lucia Piermarini Storey, provided constant support and encouragement.

² Interest in the Roman family and how it is perceived has grown enormously in recent years. Saller (1994) and Rawson and Weaver (1997) are particularly relevant sources with copious references.

³ Jordan 1970; Valentini and Zucchetti 1940; Nordh 1949; Hermansen 1978; Reynolds 1996.

¹ Richter 1885; Cuq 1916; Wotschitsky 1962; Castagnoli 1976; Guilhemet 1996; Coarelli 1997a; Lo Cascio 1997; Purcell 1999.
of urban features in the city of Rome and thus might provide the basis for a detailed reconstruction of the layout of the ancient city, especially if the term insula meant a freestanding building (alternative A). It is not clear, however, that the area of the city of Rome could have accommodated the given number of buildings.5 The other interpretation (alternative B) is to regard each insula in the Regionaries as some form of isolated unit (consequent upon the Latin meaning of the word, “island”), a closed off portion of a building or a suite of rooms such as an apartment—in essence, an ARU similar to those defined for Ostia. The conclusions of the Ostia study suggest that alternative B is the correct interpretation of the term insula as used in the Regionaries. This article aims to assess that conclusion in light of the evidence from Rome.

There are problems with the Regionaries, but their possible utility for illuminating the character of the ancient city is so high that “no good historian wants to give up evidence like this.”6 Nor should any good archaeologist, if the textual evidence can be shown to have some basis in physical reality. I argue, against the recent position of Arce,7 that despite the uncertainties of the textual data, the Regionaries do have some basis in reality.

This article, in analyzing the Regionaries statistics, also in part answers Guilhembet’s call (in his cartographic analysis of the Regionaries) to exploit the possibilities offered by study of the few statistics available for ancient Rome, and it raises issues for future consideration.8

First, I suggest that the most prevalent urban division in Roman thought was the street block. I maintain that later administrative language broke the street block into further divisions denoting those subdivisions using the same term (insula) for both block and division, with the latter units perhaps defined by the presence of a staircase.

Second, the controversy regarding Roman residential architectural terms may derive from the fact that the constituent structures of street blocks in ancient Roman cities were generally different from the typical configuration in later periods. In Medieval and later times, row houses, which were found in relatively small quantities in Roman period cities, came to dominate the Italian urban landscape. But when the later row house configurations have been used to discuss the ancient Roman situation, this has tended to make the fabric of a street block seem more clearly delineated structure by structure than may have been the case in ancient Roman times. Ancient Roman street blocks were likely a tangled mass of large and small structures,9 often difficult to separate into distinct individual structures, compared to the more regular divisions shown by the row houses of later periods.

After reviewing the background to the Regionaries and the history of the insula question in those documents, I present results of statistical analyses and geographic information systems (GIS) research and use these to interpret both the meaning of “insula” and the probable number of buildings in ancient Rome.

**BACKGROUND TO THE REGIONARIES**

The Regionaries, or Regionary Catalogues, are two documents from ancient Rome that provide lists of landmarks and summary statistics about features in the city of Rome arranged according to their location in the 14 regions of the city established by Augustus. The exact date of the Regionary documents is unknown, but the majority view is that they are fourth-century A.D. compilations. They may have been created during the latter days of the reign of Diocletian, just before A.D. 305, but more likely they were compiled during the reign of Constantine. One school of thought argues that the Curiosum is older; one holds that the Notitia is older.10

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5 E.g., Homo 1951, 642–3; Lot 1945, 35.
6 Harvey (1991), quote in original English manuscript, p. 7.
7 Arce 1999. See discussion below.
8 Guilhembet 1996, 18: “L’exploitation de Régionnaires est loin d’être épuisée et… la réalisation d’outils cartographiques synthétiques, au terme et au service de recherches topographiques par ailleurs florissantes, ne doit pas être négligée. Il constituera, espérons-nous, une incitation à rouvrir un champ d’investigation et à reprendre à frais nouveaux l’élaboration et la cartographie de statistiques relatives à la Rome antique.” Guilhembet’s conclusions suggest that the Regionaries statistics indicate that the domus (mansions of the wealthy) tend to concentrate in certain areas, especially away from the low-lying parts of the city that were sometimes flooded by the Tiber, while confirming what had been suggested previously: that the distribution of structure types throughout the city was generally heterogeneous (cf. Paoli 1963, 10–40). Reynolds (1996, 232–50) carried out statistical analysis using density plots for the items listed in the Regionaries. This work rises to the call of Guilhembet’s challenge, and Reynolds’s results are very much in consonance with those reported here.
9 As was the case with Region VI of Pompeii, see Grahame 1998, 162–71.
10 The conclusions of Merrill (1906) do not differ substantially from those of Chastagnol (1996) on the question of dating. Reynolds (1996, 211) brackets the two documents between A.D. 334 and A.D. 357, and chooses the Curiosum as the older of the two documents.
Both then claim that the younger is derived from the older. A third possibility exists that the two are parallel texts deriving independently from the same source.\textsuperscript{11} Whatever the case, their information seems to have been both collected and compiled during the fourth century.

The purpose of these lists is unknown. The information may have originated in the office of the Urban Prefect and was probably intended for administrative purposes. By the time the Regionaries came into use, the office of the Urban Prefect had evolved into that of "vice emperor."\textsuperscript{12} The Urban Prefect may have kept a register of all the locations of inhabitants for policing suspects, controlling fires, and efficiently organizing individuals for such administrative tasks as foodstuffs distributions. Thus, the Regionaries might ultimately have come from updates of the grain dole recipient lists originating during the administration of Julius Caesar.\textsuperscript{13} In the fourth century A.D., grain records were likely administered by the Prefect of the Grain Supply (\textit{annona}), but that officer was a subordinate of the Urban Prefect. It is also possible that the Regionaries served the purpose of tax enumeration, since Roman residences were first subjected to a vectigal (ground rent tax) at about the same time as the purported origin date of the documents.\textsuperscript{14}

Other such documents are known for other cities, notably Constantinople. The stated purpose of the \textit{Notitia Urbs Constantinopolitanae} was to display the beauty and happiness of the city, and was supposedly modeled after the Roman documents.\textsuperscript{15} These considerations suggest that the lists, in the form in which they have been transmitted, could have served as tourist guides to the city. The information given, however, is too sparse and unsystematically arranged to serve that purpose. The Regionaries do not list items in the topographical order that would aid a tourist starting out from some point in the city; there are significant omissions, and several prominent features are misplaced.\textsuperscript{16}

According to Nordh, the Regionaries lists fit into the periegesis tradition (literally an "internal guide"). Periegeses were Greco-Roman period literary descriptions illustrative of topography, natural phenomena, historical places, and works of art. Besides the Roman Regionaries and the Constantinopolitan Notitia, the periegesis tradition also produced a surviving Syriac notitia for both Rome and Alexandria.\textsuperscript{17}

The periegetic urban documents recognized a basic residential dichotomy between private houses (\textit{domus}) and something else, mostly insulae, meaning chiefly, but not perhaps exclusively, multiple unit properties for rent. (Constantinople’s Notitia is an exception because it records only domus.) The Alexandrine document distinguishes "courts" and "houses," almost certainly indicating the same dichotomy. The numbers given for those terms (6,000 courts and 24,000 houses) suggest a proportion for domus to multiple units of 1:4; the number of domus from

\begin{itemize}
  \item \textsuperscript{11} According to Hermansen (1978, 140–5), the language used suggests a date in the second or third century A.D., a view shared by no one else. Hermansen himself admitted that the spellings suggested a later date in the fourth century.
  \item \textsuperscript{12} Chastagnol 1960, 170–83, 459–63.
  \item \textsuperscript{13} On the possible role of the praefectus urbi, see Valentini and Zuchetti 1940, I, 67 and Chastagnol 1960, 368–9; grain dole updates, Suetonius \textit{Caesar} 41.2. See Robinson 1992, chs. 10, 12, and 13, with references on the provisions of peacekeeping issues regarding Rome and the role of the Urban Prefect. Reynolds (1996, 212) affirms that "city statistics . . . would seem naturally to fall under the purview of the prefect." Chastagnol (1997) recently summarized current views on the role of the Urban Prefect.
  \item \textsuperscript{14} Chastagnol 1960, 369; Robinson 1992, 6.
  \item \textsuperscript{15} The standard work on the Constantinopolitan Notitia remains Seeck 1962. Comments on the Constantinople document can be found in Valentini and Zuchetti 1940, I, 65, 67.
  \item \textsuperscript{16} Hermansen (1978, 136) advocated the tourist guide view, and again seems alone in maintaining it. R.E.A. Palmer (pers. comm. 1990) argued against this interpretation: "Would you buy a guidebook to Rome that, while lacking any topographical order, omits all the temples in the Largo Argentina but directs (or misdirects) you to the Insula of Felicles or the Colonnade of the Bean-dealers?" Boethius (1936) rejected the idea that the Regionaries information seemed to include only features near to each region’s boundaries, as had been suggested by a number of scholars. Boethius also denied as unconvincing Nordh’s idea that the Regionaries information (expressed in the typical form that Romans defined addresses known from the time of Cicero) was arranged in subregions following some kind of organizational or administrative reform of neighborhoods in the city by Diocletian. Seventy years later, the precise origin of the Regionaries remains shrouded in mystery. Reynolds’s recent argument, however, is very convincing (1996, 213–14): the Regionaries, as with the Severan Marble Plan of the city, were both intended to present a catalogue of Rome’s magnificence using great quantities of detailed information that clearly originated in administrative records. They were a complementary pair, the Severan Plan being the visual component to the verbal description found in the Regionaries.
  \item \textsuperscript{17} Nordh 1949, 60–1; other comments on periegesis: Boethius 1936; Valentini and Zuchetti 1940, I, 67; Battaglia 1986, XIII, 31; Syriac version of Rome: Nordh 1949, 42–6; Syriac notitia for Alexandria: Fraser 1951.
\end{itemize}
Constantinople (4,388) also suggests that courts are domus. The ratio for the Roman documents is 1:26, low in comparison.\(^{18}\)

**The Meaning of Insula in the Regionaries**

Despite their probable internal consistency (demonstrated below), the data of the Regionaries are problematic because no ancient source explicitly explains the peculiar usage of the term insula in the Regionaries. Furthermore, little is known about the data collection procedures of the office of the Urban Prefect (and its predecessor institutions).\(^{19}\) Scholarly opinion about the meaning of insula in the Regionaries has oscillated since the 1800s.\(^{20}\) Around the turn of the 20th century, scholars such as Lanciani, Richter, and others agreed that the term in the Regionaries could not refer to buildings. Later, Calza, Lugli, and Carcopino reacted to that view, arguing that the single structure interpretation could in fact work. Now, Hermansen, Chastagnol, and others\(^{21}\) have reverted to the previous view, while Lo Cascio has reasserted that the natural meaning of insula is “building.”\(^{22}\) He asserted, however, that it need not mean only “apartment building.” The beauty of Lo Cascio’s suggestion is that insula could mean a building, and I understand him to mean any building, taking in a great variation in size, from water distribution features (lacus) perhaps 10 m\(^2\) up to domus mansions anywhere from 350 to 3000 m\(^2\).\(^{23}\) As long as his meaning includes this large range of structural features that fit seamlessly into the fabric of a city block of continuous structures, many sharing party walls—in essence having the features of the ARUs delineated in the previous study (even if not used primarily for residence)—Lo Cascio’s view so qualified is here endorsed, and is tested in the GIS analysis presented later. Indeed, it is convenient at this point to add to Lo Cascio’s suggestion the comment of Boethius:\(^{24}\) “It is typical of the Roman system . . . that the workshops, the typical tabernae . . . for trade, handicraft and also proletarian living were spread all over the town. In addition, in Rome upper stories were added, accessible by direct staircases. These insulae . . . can be safely traced back to the third century B.C.” (emphasis mine).

I suggest that perhaps the key to the definition of insulae in the Regionaries is precisely the presence of this “direct staircase” (i.e., one that is no more than one doorway removed from a public place, or, in plan analysis, an access pattern of “level 1” or perhaps a few of “level 2”). Staircases are marked ubiquitously on the fragments of the Severan Marble Plan. The presence of interior staircases in tabernae and even the internal staircases to the upper floor around the atrium of domus might have been considered requisite to the delineation of separate units, insulae.\(^{25}\)

Although the interpretation of the meaning of insula as a separate building seemed obvious to much discussed procedure focused on male Roman citizen household heads carried out quinquennially by the censor, but a house-to-house property and inhabitant count in which information was provided by building owners, not individual household heads.

\(^{18}\) Alexandria terminology, Fraser 1951, 107, n. 7. The Roman ratio was calculated from the data as set out in Homo 1951, 541, 638–9.

\(^{19}\) Nicolet (1987, 1–25; 1991) has discussed some of the issues of urban census and cadastral record keeping. His conclusions run against what he termed the “primitivist” assumption that the Roman administrative bureaucracy was undeveloped and grew in ad hoc fashion under the principate (cf. Garsney and Saller 1987). Specifically, he maintained that Roman urban recordkeeping tallied the population at the house-to-house level. According to Nicolet, the level of detail is set out in the *Tabula Heracleensis* (29–30 and passim) and reflects the practice of detailed documentation from Julius Caesar to the Severan Marble Plan and the Regionaries (Nicolet 1991, 156–63). Reynolds (1996, 28–9, 42–5), with regard to the Severan Marble Plan, provided useful commentary on the urban survey tradition, the mensae aedificiorum and their likely procedures, and how their work was transferred from parchment into the marble medium of the plan. It is equally likely that similar survey information was used to produce the Regionaries, so these considerations are probably as close as we will get to reconstructing the information-gathering procedures. Lo Cascio (1997) has added significantly to this picture, especially in a recent major study of the *reensus*. This was a census-like procedure that was not individual-by-individual, as was the well known and
many scholars, there are also many who have suggested that the term is used in the Regionaries to describe an isolated unit, similar to the ARU. Hermansen, after examining the alternatives, summarized the concept of insula as a self-contained unit constructed on its own area and distinct from neighboring units.

Moving beyond the strictly architectural associations of the term, Guilhembet endorsed Coarelli’s argument that the best definition of insula was some form of “private property.” Lo Cascio maintained, on the basis of the use of the term in certain juristic passages, that the term acted as a catch-all for every type of private structure, functioning something like the following in the Regionaries: “[this Region] contains the following totals: [blank] total buildings (insulae) to wit or viz.: [so many] mansions (domus), [so many, etc.] warehouses (horrea), private baths (balnea), water distribution points (lacus), bakeries (pistrina).” Although Lo Cascio’s suggestion is a most ingenious solution, the problem remains that the total number of insulae, understood as separate buildings, still appears to be too large, if not for the whole city, certainly region by region as reported, thereby calling all the Regionaries’ statistics into question.

The Coarelli-Guilhembet suggestion of “private property” (if widely interpreted and essentially a legal term) seems a fruitful proposal, and reflects what scant trace of consensus can be gleaned in the literature on the question. In most other definitions, insulae are considered to be entities that could be divided into cenacula (apartments), which could be further divided into domestic function rooms with names familiar from the private townhouse domus, although the common practice of indiscriminately applying terms from the domus to other types of residential units is now under attack.

Three treatments of the term insula in the literature have extensively quoted the documentary evidence: those of Cuq, Wotschitsky, and Coarelli.

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26 Various suggested meanings of insula, other than that of separate structure, include: shop (Dureux de la Malle 1971); hearth (Kahnstedt 1913); apartment (Cuq 1916); floor in a multi-story house (Gerkan 1940); Richter 1885; multiple dwelling (Packer 1971); entrance door, or door opening—equal to modern Italian “vano” (Homo 1933); “foco,” “doorway” (Castiglioni 1884); “cadastral unit” for taxation purposes (Lugli 1941/1942); “apartment/étage” (Chastagnol 1960). See Maier 1954 for further commentary on these alternatives.

27 Hermansen 1978, 130. Reynolds (1996, 144), by contrast, returns to the interpretation of the term as a separate building and not an apartment or any other kind of multiple unit. Purcell (1999, 151) simply states: “by the time of the [Regionary] Catalogues insula no longer refers to a free-standing block of many dwelling-units, but to the individual units.”

28 Guilhembet’s (1996) analysis of the distribution of insulae argues against the understanding of that feature as a separate structure; cf. Coarelli 1997a.

29 Lo Cascio (1997, 61–2) cites Digest 48.8.2.3 as the essential source. That passage speaks of an insula publica, which could only mean a building of some sort. Lo Cascio’s interpretation provides a solution to the insula numbers and space problems for the Regionaries (n. 5). If the meaning of insula is a generic term for building and includes public buildings, the 3,480 insulae (buildings) figure cited for Region 8, the Forum, does not seem as far-fetched than if the term meant only apartment buildings. It is true that his suggestion has the merit of reducing the total area needed to account for the number of structures for each region because some of the named functional structures are small. For example, Rome’s water distribution points (lacus) were probably similar to those found in Ostia (e.g., see Meiggs 1973, 93, pl. 13b). These features might well have been called insulae based on the analogy of funerary enclosures styled by the same term (CIL 6.8511, 6.109250). Because domus, horrea, balnea, and pistrina could all be substantial structures, however, the basic problem still remains that too many structures are enumerated for the area available in many of the regions of the city. Other solutions (e.g., McKay 1975), which suggest that the high insulae numbers in the Regionaries showed that Roman cities were full of domus that had been broken up into rental units, much like modern Italian pensioni, encounter the same problem. The term domus is used separately in the Regionaries and 1,790 of them distributed throughout the regions, must still be accounted for in the space of the city.

30 Several recent analyses stress that problem: Wallace-Hadrill 1994; Allison 1994; Grahame 1997. The latter is a good summary (146): “The traditional practice of using the literary sources to identify certain social identities and practices and then map them onto the physical remains, in order to explain their form and function, is more problematic than is usually thought. Firstly, this practice of labeling is limited in that it is not possible to describe all the spaces within the house according to traditional Latin terminology. In addition, we have to assume that the conventional text-based nomenclature, when applied to specific spaces, is a reliable guide both to the social identities of the persons who habitually occupied them and to practices routinely carried out in them. Finally, this method does not allow us to resolve the spatial structure of any house in such a way as to account adequately for the actual pattern of relations present within it.” As necessary as these caveats may be, there is no need to go to the other extreme and deny the terminology any useful function as a guide. Brown (1986) demonstrated that room terminology and floor drawings from surveys can be reconciled and that room function can be determined intuitively from sizes, locations, and outside accessibility of rooms, especially with the assistance of room content inventories. The Roman evidence is less complete than the London material Brown used, but the potential comparability for analysis is demonstrated by use of the same models from Hillier and Hanson (1984), cf. n. 25.

31 Cuq 1916; Wotschitsky 1962; Coarelli 1997a.
The first and perhaps fullest treatment was that of Cuq, who asserted that scholars have confounded the meaning of domus (a privately owned house occupied by the proprietor) and insula (a rental house) so that both indicated a structure. Cuq’s suggestion was that an insula was an ensemble of rooms that made up a distinct apartment; they were physically blocked off within a larger structure, forming an isolated unit, an island.  

Cuq supported his arguments with quotations from, and comments on, the grammarians and juristic texts. He presented a convincing case that the term insula took on an administrative meaning distinct from the colloquial meaning of rental house. This new meaning was essentially synonymous with the word cenaculum (apartment) in terms of a rented habitational property, but could also refer to other rental properties in self-enclosed groups of rooms used for other purposes: storage, marketing, baths, and even schools.  

Both Wotschitsky and Coarelli, in their literature reviews, emphasized that the term insula did not refer to one distinct type of architectural feature throughout the five centuries (first century B.C. to fifth century A.D.) of its occurrence in documentary sources. Wotschitsky concluded that, originally, insula and taberna had been synonymous, with a later congruence of insula and domus, while Castiglioni reviewed the question subsequently and concluded that the single residence as opposed to single structure made the most sense.  

A likely scenario to explain these trends in ancient usage is that first, the term insula referred to a street block (Vitr. De Arch. 1.6.8). Then, insula came to be thought of as a building that looked like what we call a large apartment block such as the Insula of Felices (Tertullian Adversus Valentinianos 7.1–3; also listed in the Regionaries, both Curiosum and Notitia in Region 9) or the Ara Coeli Insula still standing at the foot of the Capitoline Hill. A reasonably strong case can be made that almost all documented occurrences of the term insula in an architectural context translated as “apartment house” or “separate building” in fact mean a street block, not a specific structure. Insula thus referred to separate multiple properties distinguishable in the continuous fabric of a street block. Eventually, the idea of partitioning residences into divisions that would have been called partes and portiones came into use (e.g., Ulpian, Digest 17.2.52.10), and this was an official designation (perhaps based on the presence of a staircase) alongside the surviving meaning of an insula as multiple unit block. Thus there was a “small unit” correlate (official) at the same time as the larger building correlate “block” (everyday parlance) to the term.

Resolution of these problems may lie in the need to distinguish the character of city blocks in ancient Rome, as illustrated by the remains of Ostia, versus the way city blocks looked in later Medieval to present Romano-Italian cities. As Boethius set out, one of the most important types of residence in apartment buildings, with the former serving as crucial building blocks of the latter.

Wotschitsky 1962; Castagnoli 1976. DeLaine (2000, 175) makes the important point that the domus/insulae dichotomy is perhaps overemphasized by modern investigators and that the ancient Romans may not have made as much of the difference: “While this is a differentiation which is found in both the ancient literary sources and the legal codes, it is a distinction which was not universally held; Cicero, for example, uses domus and insula indiscriminately. This makes the widely held corollary to the domus/insula dichotomy—that domus therefore necessarily equals high status and insula low status—hard to justify.” My comments on “luxury apartment” in Part 1 (Storey 2001, esp. 392, 397) should be modified in light of DeLaine’s convincing analysis of the domus-like qualities of some Ostian apartments as stages for social status display.

For the Ara Coeli Insula, see Muñoz 1930, 30–1, 45–52, tav. XVI, XVII, XVIII; Packer 1968, 1969. The phrase “Insula of Felices” meaning a street block (no doubt a massive one of many different units in this case) is consistent with its use in the Tertullian passage and well-attested by the examples of “insula of [proprietor’s name]” inscriptions from Pompeii (CIL 4.138, 4429) and Rome (CIL 6.67, 29791, 33893)—almost all certainly meaning “street block.”

ancient Roman cities that eventually came to dominate residential architecture after the Roman era was the row house. The row houses made up one continuous, unbroken structural fabric in rectangular or long and narrow street blocks, as can be seen in Rome today, and developed into the dominant residential configuration in Medieval times, as is clear from many of the maps reproduced in Frutaz. These row houses can be thought of as either separate structures (each like an insula) or as separate units in the block fabric. As is clear from the remains at Ostia, the fabric of most street blocks was broken up into units in a fashion different from these row houses, although they are present in Ostia. The numbers of ancient units, in some cases, can be similar to the number of row house divisions seen later when the population density became exceptionally crowded and the row houses were smaller and more compactly packed into each street block.

Coarelli noted that the assumption that insula represented “una definizione univoca” was in error because of the “polesemicità” of the term. Wotschitsky, Castagnoli, and Coarelli present the strongest case that the term insula referred to either a separate structure or a separate unit within a structure. I previously analyzed the relatively complete ruins of Ostia and concluded that the latter interpretation is the proper referent for the term. The following Roman evidence appears to be compatible with this interpretation.

One implicit reason for that definition is that a registration of the rentable units possessed by property owners would have been of the greatest utility to the administrative bodies responsible for order in the city. A house-to-house registration, vicatim (neighborhood-by-neighborhood) per dominos insularum (through the landlords of blocks) was probably a common function of city administration—perhaps instituted by Julius Caesar, probably predating him, as thought by both Nicolet and Lo Cascio. Police and fire-control functions, voting right, and census functions were all well served by a property-by-property enumeration rather than a simple structure count.

The laws of injury and compensation (as they developed from the mid second to early third century A.D.) concerning objects thrown from the upper floors of houses provide further support for the argument of separate units as opposed to separate structures. Roman law held accountable only the person responsible for breaking the law, not the property owners or other inhabitants of the building, unless the offender could not be identified; in such a case, all individuals in the unit responsible were liable. Considering that many units likely faced a side away from the street, enumerating each isolated apartment unit as opposed to entire structures would make this law much more understandable. Penalties for abrogation of the law seem strict; no doubt, enforcement was very difficult. The desire to document the number of inhabitants and their domicile may have arisen from these types of legal concerns, and the results of that kind of documentation may be echoed, even if only very faintly, in the Regionaries statistics.

Amid the details of this complex linguistic controversy, the basic issue continues to be whether the term insula referred to either a separate structure or a separate unit within a structure. I previously analyzed the relatively complete ruins of Ostia and concluded that the latter interpretation is the proper referent for the term. The following Roman evidence appears to be compatible with this interpretation.

**Statistical Analysis**

Statistical analysis is used here to assess whether the numbers given in the Regionaries mean anything, given the checkered history of their generation, transmission, and survival. Moreover, Arce recently argued that, because these catalogues are part of a literary tradition of city panegyric in a context of fierce inter-city competition, it is possible that the statistics contained in the Regionaries were simply made up to make the city appear

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57 Frutaz 1962.
58 Coarelli 1997a, 97–8.
59 Varro Lingua Latina 5.22; Paul, Festus, Flaccus DeSignificatu Verborum (Lindsay) 5.14–5.
62 The most crucial statistics in the Regionaries are: vici, 423 (Curiosum) 424 (Notitia); insulae, 46,602 (Curiosum and Notitia); domus, 1,790 (Curiosum and Notitia); horrea, 290 (Curiosum and Notitia); balnea, 856 (Curiosum and Notitia); lacus, 1,352 (Curiosum and Notitia); pistrina, 254 (Curiosum and Notitia); lupanariae (brothels), 46 (Curiosum) 45 (Notitia); latrinae publicae (public latrines), 144 (Curiosum and Notitia).
more magnificent. The former part of that argument can easily be conceded, without necessitating acceptance of the latter part of it. The Regionaries could well be a privately produced, unofficial document, but that does not mean that the numbers given must therefore be false or incorrect. The data still may have come from an official source.

Arce suggests that because these periegetic documents do not look like a clearly census/cadastral document, such as Berlin Papyrus 16365 from Egypt, they cannot be administrative documents. But information from an official administrative source could have been reported in a private document. For example, the Severan Marble Plan of Rome was publicly displayed, and official statistics about numbers of houses may also have been reasonably easy to obtain from an administrative entity such as the office of the Urban Prefect. Finally, conceding all potential distortions to the statistics given in the documents, is it not at least possible that the figures echo an official source?

If the numbers were fabricated, what principles of falsification or exaggeration were used? How would one know to make up plausible statistics? Why are 254 bakeries, 856 bath establishments, 1,790 domus, and 290 warehouses plausible false quantities? Is the information more plausible if the falsifier knows that numbers of apartments should be much greater than the number of private houses and fakes the numbers accordingly? If it can be shown that the statistics have some consistency, the argument that they are fakes becomes unlikely.

Statistical analysis of the figures in these documents is used here to check for internal consistency. I created a database of the numbers from four sources: (1) the Roman Curiosum, with 14 cases, one for each of the 14 regions of the city, for each variable (the features listed in n. 42); (2) the Roman Notitia (again, 14 cases for each variable); (3) the Notitia of Constantinople (14 cases of each variable, for the 14 regions of that city); and (4) the Syriac version of the Alexandrine Notitia (with 5 cases for each variable). I ran regression analyses both within documents and for the same feature across the documents in order to assess the degree of relatedness between the figures—one index of internal consistency.

In regression analysis, a two-dimensional graph is plotted with an independent variable on the x-axis and a dependent variable on the y-axis. An independent variable is one that is treated as if its magnitude was not a function of some other variable, whereas a dependent variable is treated as if its magnitude depends on or is derived from another. The resulting scatter of points of the plot is then statistically measured for goodness-of-fit to a straight line. When the change in magnitude of one variable is matched in quantity exactly by the change in the other variable, the association of data points conforms to a mathematical function that keeps all data points for the independent and dependent variables on a straight diagonal line. That case corresponds to ideal perfect correlation and suggests very close association between the variables that may be causal in nature, but is not necessarily so. In other words, the behavior of the independent variable may cause the behavior of the dependent variable, but this cannot be asserted by the statistics alone. Correlation does not prove causality; other lines of evidence must be consulted to determine if there is a causal connection. In any event, if the slope of the line rises to the right, the corre-
Regression analysis was run on a number of variable combinations: for example, one of the simplest tests was regressing the number of insulae (the dependent variable) in the Curiosum onto the number of domus (the independent variable). An R-squared statistic (a percentage expressing how much of the data conform to the mathematical function) of 38.4% resulted. Thus the numbers of insulae in that document were about 40% “explained” by the number of domus.

Several variable combinations were tried, mostly variables deemed likely associated with the number of dwellings, such as the number of horrea (warehouses), pistrina (bakeries), balnea (private baths), and lacus (water distribution points). Some results of the regressions are presented in table 1. In general, the larger the number of variables, the greater the R-squared statistic, which is the expected result in multiple regression. Nevertheless, the R-squared statistic was surprisingly high in most cases in table 1, which indicates that the numbers of items of different functions “co-vary” in a closely related fashion. That is, for example, the same numbers of bakeries and water distribution points will serve roughly the same number of residences and businesses.

The most successful regression model for the Roman Curiosum was a regression of the number of insulae (dependent variable) on seven other (independent) variables (again, 14 numbers for each variable, one for each region): vici (neighborhoods), domus, horrea, balnea, pistrina, lacus, and pedes (the number of running Roman feet of circumference for each region). This regression model showed that 93.5% of the variance in the insulae figures was explained by those seven variables. It is very unlikely that such a result would occur if the numbers were completely falsified. The conclusion follows that the figures for the categories in the Regionaries show

table 1. Regression Analyses Results of Rome Curiosum Statistics

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Independent Variable(s)</th>
<th>R-Squared Statistic (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insulae</td>
<td>Bakeries</td>
<td>0.1</td>
</tr>
<tr>
<td>Insulae</td>
<td>Warehouses</td>
<td>4.4</td>
</tr>
<tr>
<td>Insulae</td>
<td>Circumference</td>
<td>11.3</td>
</tr>
<tr>
<td>Insulae</td>
<td>Neighborhoods</td>
<td>23.5</td>
</tr>
<tr>
<td>Insulae</td>
<td>Neighborhoods and circumferenc</td>
<td>24.3</td>
</tr>
<tr>
<td>Insulae</td>
<td>Water points</td>
<td>27.7</td>
</tr>
<tr>
<td>Insulae</td>
<td>Domus</td>
<td>38.4</td>
</tr>
<tr>
<td>Insulae</td>
<td>Neighborhoods and domus</td>
<td>45.7</td>
</tr>
<tr>
<td>Insulae</td>
<td>Baths</td>
<td>45.8</td>
</tr>
<tr>
<td>Insulae</td>
<td>Domus and warehouses</td>
<td>49.5</td>
</tr>
<tr>
<td>Insulae</td>
<td>Bakeries and water points</td>
<td>50.5</td>
</tr>
<tr>
<td>Insulae</td>
<td>Baths, bakeries, and water points</td>
<td>61.0</td>
</tr>
<tr>
<td>Insulae</td>
<td>Domus, warehouses, and baths</td>
<td>69.7</td>
</tr>
<tr>
<td>Insulae</td>
<td>Domus, warehouses, baths, and bakeries</td>
<td>83.0</td>
</tr>
<tr>
<td>Insulae</td>
<td>Domus, warehouses, baths, bakeries, and water points</td>
<td>90.4</td>
</tr>
<tr>
<td>Insulae</td>
<td>Neighborhoods, domus, warehouses, baths, bakeries, water points, circumference</td>
<td>93.5</td>
</tr>
</tbody>
</table>

The 14 numbers, one for each region (for both insulae and domus), were taken from Nordh 1949, using the lower alternative readings from the manuscripts simply as a matter of caution and for consistency. Guilhembet (1996, 11–12) discussed the problems with the insulae statistics as they have come down to us in both the Curiosum and the Notitia. His solution, different from my decision to use simply the lowest alternative, was to decide which alternatives had the best manuscript justification. However, he stated that all corrections were arbitrary and did not significantly affect results ("Toute correction paraissant arbitraire … ces variations n’affectant pas le résultat cartographique final"). Reynolds (1996, 211) simply used the Curiosum figures on the grounds that the Curiosum is the older document.
some internal consistency and are therefore meaningful.  

If the results of this mathematical procedure are not convincing, a more visually compelling model may demonstrate that the Regionaries figures accurately reflect some statistics about the ancient city. A common model of urban population densities assumes a uniform density gradient, a reasonably predictable relation of declining population densities with increasing distance from the central core of the city, at least in studies of modern Western urban centers. This decline seems to occur as a negative exponential function in a cone-like fashion, and it seemed true from 1801 to the present in cities ranging from Los Angeles to Budapest.  

Most Western cities have falling central densities, falling density gradients, and decreasing compactness and crowding. In non-Western cultures, however, this pattern does not seem to hold because some non-Western cities experience increasing core densities, constant density gradients from core to periphery, and increasing overcrowding coupled with similar compactness core to periphery with little peripheral expansion. Calcutta, India, from 1881 to 1951, for example, increased in its central population density and maintained an even density gradient from core to periphery, thus maintaining a generally constant degree of compactness. Unlike Western cities, where typically the poor live in the center and the wealthy in the suburbs, in non-Western cities the situation is often reversed.

The degree of crowding in the center of either Western or non-Western cities is also a function of the age, character, and size of typical occupation lots. Rome is simply assumed to have had the Western-style falling density. That view partially results from Beloch’s study of the demographic profiles of Rome and Naples in the 1880s, which did seem to show trends that follow the Western pattern.  

Berry and Horton’s analysis indicated that one of the few reliable relations between density and other urban characteristics is that smaller cities are more compact than larger ones. Therefore, ancient Rome, being much smaller than virtually every major modern city, would probably have had a higher than modern average density. Furthermore, we know that many of the richest and most powerful individuals resided at the city center, so Rome almost certainly resembled to a greater degree non-Western modern cities in this respect.

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48 Coarelli (1997a, 95) was at pains, though without evidence of this sort, to assert the internal reliability of the Regionaries statistics. Reynolds (1996, 232–50) does succeed in statistically demonstrating the internal reliability of the Regionaries statistics, thus vindicating both Coarelli and this current analysis. Any use of Roman statistics, however, must acknowledge Scheidel 1996, cf. Duncan-Jones 1994, 16–9. Scheidel argues convincingly that virtually all such statistics are tainted by a heavy cultural tendency toward the use of conventional figures. Repetition of figures is particularly suspect: e.g., Julius Caesar (Suetonius Caesar 41.3) and Augustus (Res Gestae 15) both are attributed to have dealt with largesse recipients of 320,000; both Tiberius (Suetonius Gaius 37.3) and Antoninus Pius (Dio 74.8.3) left 2.7 billion sesterces budgetary surpluses; the constant appearance of 400,000 looks suspiciously as if the meaning is just “a lot.” The Regionaries are plagued by similar features. Regions 3 and 4 both have 2,757 insulae in both Curiosum and Notitia; Regions 12 and 13 both have 2,487. Bearing that factor in mind and despite all their faults, the Regionaries seem as close to official administrative record keeping from ancient Rome as anything else we possess. Nicolet (1987, 1991), Virlouvet (1995, 1997), Lo Ciascio (1997) and others have demonstrated convincingly in the last two decades that Roman record keeping was as comprehensive and assiduous as many a modern state. Though probably true, almost none of our evidence comes from the actual administrative archives but is reported from second hand, non-administrative (and often politically-motivated) sources. The Regionaries and the Severan Marble Plan are likely to be among our least removed sources, but the Regionaries are at several removes; the breviarium summaries, for example, are clearly later than the material compiled for each region (Guilhembet 1996, 11, citing Valentini and Zucchetti 1940), and give a total insulae sum (46,200) different than that found by adding the individual insulae figures for each region (40,897 Curiosum [one region missing] or 44,300 Notitia). Nevertheless, these figures could derive from an official source.

49 Originally called a “negative exponential ratio,” it was first discovered in 1892 but was largely forgotten until 1951 (Clark 1967, 339–52). Reynolds (1996, 247) clearly recognizes this characteristic, which he uses to ground his density plots, but he does not use the term “density gradient,” opting instead for “bulls-eye central population density pattern.”


52 In a study of 531 preindustrial and modern cities I demonstrated (Storey 1997a, 1997b) that the mean area of 425 preindustrial cities was only 6.63 km² (the median area was only 1.6 km²). The mean area of 106 modern cities was 807 km² (median area 331 km²). Rome’s roughly 14 km² made it large in area for a preindustrial city, but tiny compared to a modern city. Thus Rome was compact and dense. However, Ostia was barely 70 hectares, much smaller than Rome, with a consequent relevant difference in the degree of crowding between the capital and its seaport, as discussed in Part 1. The implication of these factors is that, perhaps counterintuitively, Rome was probably not as densely crowded a city as its own seaport, Ostia, although Rome no doubt possessed higher “spot densities”—small areas of very high population density (Storey 1992)—scattered over its much larger territory than Ostia.
Some investigators, however, suggest that the Western pattern may be more pervasive than previously thought. Mills and Tan argued that the negative exponential urban density function “comes off remarkably well when confronted with data from profoundly different countries.” These conclusions refer to cities in developing countries except in Africa, Southeast Asia, and the former Communist bloc because there were no data available. Until those regions are included in the sample, it is impossible to say whether the Western pattern can or cannot be upheld as universally applicable.

Figure 1 plots the density of the domus and insulae per hectare combined figures from the Regionaries for each region, on the grounds that the two statistics, whatever they mean, do indicate residential features. The domus/hectare and insulae/hectare ration statistics are also given individually. Region 8 (Forum) and Region 10 (Palatine), the residential and administrative heart of the city, possessed the highest densities of domus and insulae. The fall-off in the statistics seems to indicate a density gradient resembling the Western pattern. This distribution demonstrates that the Regionaries statistics are meaningful reflections of the ancient residential reality (as already suggested by the regression analysis), because the city most likely had a standard falling density gradient, accurately represented by the Regionary numbers.

GIS approach to the insula question

Geographic information systems (GIS) modeling provides one avenue of further research into the Roman insula/Ostian ARU connection. This modeling can be accomplished by taking a region of ancient Rome and “housing” it with appropriately sized residential plots to see what kind of distribution is produced—one that suggests insula as a separate structure or as an ARU. Archaeological data from Roman sites in Italy (especially Pompeii and Ostia, supplemented by the less copious Roman evidence) suggest a range of structure sizes, including houses and apartment buildings as well as other specialty-function structures, to assess the utilization of space for the available area of any particular region of Rome. Assessment of area availability for residence has been attempted previously by several scholars using planimetric readings from published maps.

Some recent work on the issue of density gradients focuses on explaining individual case variations in terms of parameters such as housing demand or employment, e.g., Skaburskis (1989); Crampton (1991). An important result of this recent work is the suggestion that the cone-like declining density model is oversimplified and needs refinement, generally in the sense that cities are not monocentric with single high density locales from which density begins its fall off. There are subcenters of high density, which complicate the model and create an irregular density gradient. There is a need to envision scattered locales of high density to acknowledge and account for the complications to be expected in a real-life application of the density gradient function.

55 Chiefly Giuseppe Lugli and Armin Von Gerkan, both in the 1940s: Lugli in Calza et al. (1941); Gerkan (1940, 1943, 1949). There are not inconsiderable discrepancies in their measurements. According to the AutoCAD version of Region 12 (fig. 2), the area covered by the Baths of Caracalla, measured via its outermost perimeter, is 100,400 m². According to Gerkan it was 137,000 m²; Lugli put the figure at 140,000 m². DeLaine’s (1997) comprehensive study of the Baths of Caracalla gives many dimensions but does not include her measure equivalent to the outline measured by the computer in this analysis. However, her diagram (1997, 18, fig. 3) can roughly be estimated to give an area of between 110,000 and 115,000 m², so it is likely that the lower figure, based on the more recent maps, is preferable. But that the errors may not be of overall significance is indicated by consideration of the measures of the perimeter for Region 12. The AutoCAD measured size [perimeter] of Region 12 is 3,829.4 m. The Roman figure is 12,000 times 0.2957 [Roman foot metric equivalent] or 3,548.4 m. The exact size of each region is not known, but the figures are sufficiently close to confirm that the overall scale of analysis is correct.
Probably the region was sufficiently damaged by the flood so as the region’s reputation as an elite housing neighborhood. “gentrification” in the first three centuries A.D. resulting in The text is discussed by Harvey (1990, 349–50). Coarelli area of Region 12, especially its namesake, the Piscina Publica. in October/November 54 B.C., which seriously damaged the nus Minor.” Cicero (Qfr. 25.8) reports a major flood of the Tiber the topography of this region [12], especially of the Aventi-

Fig. 2. AutoCAD map of Region 12 of Rome. Numbers refer to items listed in the Regionary Catalogues, numerically in the order given. 1, Area Radicaria “Zone of Our Roots” [public row of temples and dedications]; 2, Via Nova “New Street” [wide boulevard to the Baths of Caracalla]; 3, Fortuna Mammosa “Fortune of the Large Breasts” [shrine or altar to that goddess]; 4, Isis Athenodoria “The Isis of Athenodorus” [statue of Isis by Athenodorus of Rhodes]; 5, Aedes Bonae deae subsaxanae “Temple of the Good Goddess beneath Remus’ Rock” [chief shrine of this goddess in Rome]; 6, Clivus defini “Street of the Dolphin” [street from the Via Nova to the Porta Naevia]; 7, Thermae Antoninianae “Baths of Caracalla”; 8, Domus Septem Parthorum “The 7 Parthian Houses” [a shrine? or houses given to friends by Septimius Severus]; 9, Campus Lanatarius “Field of the Wool Market”; 10, Domus Cilium “House of Cilo” [opulent private residence of Lucius Fabius Cilo, prefect of the city, A.D. 203/204, under the church of Santa Balbina]; 11, Cohort. IIII vigillum “Barrack of Cohort 4 of the Fire-Brigade”; 12, Domus Cornificiae “House of Cornificia” [private residence of sister or daughter of Marcus Aurelius]; 13, Privata Hadriani “Private Residence of Hadrian” [house of Hadrian before he became emperor]. (After Scagnetti and Grande 1979)

That procedure is a form of spatial analysis that can be more rapidly and accurately carried out with modern computer mapping tools. Analysis using ArcCAD 14 (a GIS tool developed by the Environmental Systems Research Institute [ESRI] interfacing with AutoDesk’s AutoCAD version 14) was carried out on Region 12, Piscina Publica. This region was chosen because of its comparative lack of extensive public architecture (the only major public feature in this region was the Baths of Caracalla, which is still standing today), although space for known features that stood in the region has been provided for. A great deal of space in the region was available for residential architecture. The map of Region 12 (fig. 2) shows the known or conjectural locations of all the items listed in the Regionaries, marked by number. The crucial statistics are 2,487 insulae and 113 domus in Region 12—either, 2,600 separate residential structures or 2,600 separate ARUs, plus a host of other public and specialty structures and features.

GIS studies are used to answer five basic questions about geographic information: (1) Location—what exists at a particular place? (2) Conditions—where are certain conditions satisfied? (3) Trends—what has changed over time? (4) Patterns—what spatial patterns exist? (5) Modeling—what if, or how do, certain hypothetical conditions affect the situation? The first step in the present analysis uses conditions tests and modeling. Not all of Region 12 was available for residences, but most of the region is unknown, so it is possible to assume that most of the area could hypothetically be filled with residences. To account for space that could not be used, parcel polygons available for residential configurations were constructed. Figure 3 shows the basic polygon map of the Region, listing the locations of major features taking up space that could not be used for ordinary habitation. I say “ordinary” because some of these features were famous domus of the elite, and although technically residential, they did occupy space inefficiently in the to require rebuilding, and it became a place of favored elite residence, although the impact of the building of the massive Baths of Caracalla on the neighborhood is unclear. Given this history of occupation in the region, its heavily residential character makes it ideal for the GIS analysis carried out here.

In reality, the locations and dimensions of the features listed are considerably conjectural. 1, Baths of Caracalla: there is no doubt about the location and approximate size of this structure; 2, Area Splenis: according to Richardson (1992, 37), this was a shrine to the divinity Splen, located near the boundary line between Regions 1 and 12, with some possible connection to the church of SS. Nereo ed Achille, across the modern street from the Baths of Caracalla; 3, Area Radicaria: Richardson (1992, 33) notes that the name is found on a fragment of the Severan Marble Plan (Carrettoni et al. 1960, pl. 15; Rodriguez-Almeida 1981, pl. 1) and was a zone of temples just outside the Porta Capena similar to the Largo Argentina, deriving its name presumably from radix and thus referring somehow to a “roots,” hence the possible alternative meaning “zone of our roots.”
sense that high density multiple residence structures could not therefore occupy those grounds. The distribution of these polygons is suggestive in another way: could these polygons be approximations of the number of vici, the 265 or more defined neighborhoods of the ancient city? There are

According to Steinby (1993–2000), the *Lexicon Topographicum Urbis Romae* (hereafter *LTUR*) 1:119–20, the name derives from radius, a stick used in grain measurement thus associating the area with customs checks; 4 and 5, unidentified remains, probably residential, featured in the map by Scagnetti and Grande (1979), but also visible in Lanciani (1988), tavole XXXV and XLI; 6, Bona Dea Subsaxana and Templum Sancti Silvani Salutaris with Ara Iuppiter Ilicius: the area dedicated to these features is perhaps larger than that warranted by the existing remains, but *LTUR* 1, 149 suggests the proximity of all these shrines; 7, Domus Cilonis: the remains of this house have long been known (Richardson 1992, 124); 8, Domus Septem Parthorum: the precise nature of this feature is unknown, especially as to how many structures are involved (one, two, or seven) but ample space has been left for this complex as well as possibly including the Domus of C. Sabucius Maior Caecilianus (*LTUR* 2:152–3, 173, 176); 9, Horti Servillianai: leaving space for this feature is somewhat controversial because Richardson (1992, 204) denies that its location can be even tentatively established;
26 polygons, and the number of vici for the region was 17.\textsuperscript{60} With only a small adjustment to the arrangement and distribution of my model polygons—by combining small contiguous polygons—my model would easily match the vici figure.

The residential polygons aimed to utilize the maximum space possible for residences, although it is possible that the space discounted from availability because of occupation by special features may be too much in one or two cases. Even the slopes of the hill (the Aventinus Minor—“lesser Aventine”) were assumed to have been available, although it is a common problem that some areas of the hills of Rome were not suitable for structures of any kind. The configuration proposed here simply allows for the maximum utilization of space for residences, no matter how small or how precariously placed.

In order to test Lo Cascio’s interpretation of the term insula as a building of varied function, we need to identify the sizes of general structures common to each region of the city. That will allow the use of a modeling statistic with which to construct configurations to see whether they are more like buildings or more like ARUs. Because residences are the most numerous functional type of structure in the Regionary Catalogues, the modeling statistic should be on the order of the size of residences. The typical sizes of mansions and apartment houses are derived from the archaeology of Pompeii and Ostia, where the survival of general function structures is much more complete than for Rome. The Roman evidence, although not providing as large a number of available or reconstructible examples from archaeological traces, has also been taken into consideration.

There is no agreement on the average size of Roman apartment houses. Packer arrived at an average size of 239 m\textsuperscript{2} for the 73 existing apartment blocks in Ostia.\textsuperscript{61} Lugli,\textsuperscript{62} using the size of apartment blocks in the 19th- and early 20th-century urban configurations of the cities of north and central Italy rather than the sparse archaeological data from Rome, argued that the typical apartment block size was about 216 m\textsuperscript{2}. Von Gerkan offered the smallest size in the literature, arguing that apartment houses were about 156 m\textsuperscript{2}.\textsuperscript{63}

The data on domus from Pompeii and Herculaneum presented by Wallace-Hadrill\textsuperscript{64} suggest that 273 m\textsuperscript{2} is an average size for the mansion houses in those two communities. From the existing evidence for Roman domus, the average size of domus plots is 2,716 m\textsuperscript{2}.\textsuperscript{65} So we have three multiple residence building sizes of 156 m\textsuperscript{2}, 216 m\textsuperscript{2}, and 239 m\textsuperscript{2}, plus

\textsuperscript{60} Jordan 1970, 2, 561.
\textsuperscript{61} Packer 1971.
\textsuperscript{62} Lugli 1941/1942.
\textsuperscript{63} Gerkan 1940, 1943, 1949. The known structural remains in and around Rome are extensive, systematically documented starting with Lanciani’s (1988) Forma Urbis Romae, supplemented by a century of specialist reports appearing with great frequency. A number of these structural traces could well be insulae in the sense of freestanding apartment houses, which could be compared to their counterparts in Ostia and the Vesuvian cities. The difficulty is that the majority of these kinds of remains are of problematic interpretation. One relevant example is the remains reported from the Caput Africae on the Caelian hill (Pavolini 1988). Interesting remains covering several centuries have come to light. Two structural remains identified as insulae are mapped. For the Flavian period, these two insulae as mapped (Pavolini 1988, 101, fig. 4) are about 407 m\textsuperscript{2} (insula nord) and 516 m\textsuperscript{2} (insula sud). The middle empire configuration looks even larger. The problem is that it is not clear that these remains are obvious examples of freestanding insulae apartment blocks. This case constitutes an excellent illustration of the uncertainty whether these are apartment buildings or street blocks with a variable mix of ARUs. Another case is a structure along the Via S. Paolo all Regola (Quilici 1990), of two stories in ancient times, expanding to three or more in the Medieval period. A map of the greatest extent of the remains identifiable for Constantinian times (Quilici 1990, 402, fig. 177) covers an area possibly as large as over 2,660 m\textsuperscript{2}. The complex certainly included storerooms, but it is not clear to what extent this complex too might consist of a mix of ARUs in the structural fabric of a street block.

Consequently, the insula model statistics (156 m\textsuperscript{2} or 220 m\textsuperscript{2}) do not take these specific cases into account directly. However, this large size, if an accurate reflection of typical residence sizes in ancient Rome is accounted for in the second model of 720 m\textsuperscript{2} for the large domus of Rome.

\textsuperscript{64} Wallace-Hadrill (1994, 81, table 4.2) defined four quartiles of domus sizes in Pompeii and Herculaneum. Just over half of his sample of 292 (117) houses included examples smaller than 170 m\textsuperscript{2}.

\textsuperscript{65} As compiled in LTUR 2:391–426, figs. 7–67. Only 15 examples (excluding the large imperial domus complexes, which skew the sample) from that collection of mapped domus remains from Rome provided usable data (in that scales were provided). The average size is 2,716 m\textsuperscript{2}. The smallest Roman domus in this sample was 263 m\textsuperscript{2} and the largest was 9,530 m\textsuperscript{2}. The average size and range are much larger in the Roman examples than the samples from Pompeii, Herculaneum, and Ostia. It seems that from this evidence the largest domus in Rome were much larger than those found in other Roman cities. It is also probably in part an accident of survival that only the largest examples in the city were the ones whose remains can still be traced today, and so are known and recorded. Also, the areal measurements included all mapped remains, no matter how isolated and separate from other remains, so that the actual buildings might have been smaller than this procedure suggests. Reynolds (1996, 172) argued from the evidence of the Severan Marble Plan that domus sizes in Rome were probably smaller than their counterparts in the Vesuvian cities because of the excessive crowding in Rome. The data presented here suggest otherwise, but the issue is by no means settled.
two domus averages, 273 m$^2$ and 2,716 m$^2$. The resulting average is 720 m$^2$ for a residential plot. But the result for Rome is so anomalous compared to the others that, whether or not Roman domus were actually that much larger than their counterparts elsewhere, it might be better to include a lower estimate of domus size. The problem with the Roman evidence is that, by its very nature, it probably points to the larger variety of domus (the mansions of the top elite in the city) and that not many of the 1,790 domus reported in the Regionaries were typically of this size. Without the Roman evidence, the average residential block is 220 m$^2$.\textsuperscript{66}

It thus seemed advisable to run the GIS model using two statistics. Gerkan’s figure (156 m$^2$) was used because it functions as a compromise figure that could be typical for an apartment building, a small domus, or a large shop and workshop size to include buildings of specialty function included by Lo Cascio’s definition. The figure is also small enough to allow generous totals for the maximum number of residential parcels to occupy the available space. It is also close enough to the 220 m$^2$ residential block average so that any result from the 156 m$^2$ statistic would be similar in scale to what would result from analysis based on the 220 m$^2$ figure derived from the best excavated examples from Pompeii and Ostia. A 720 m$^2$ run block size was carried out in conformity with the Roman evidence, although this size is so large that it will not represent many structures that are covered by Lo Cascio’s definition, but does conform to the evidence that Roman residential plots of the fourth century A.D. were larger than their Ostian counterparts of the second century A.D.

Polygons were constructed for each model; that is, the Gerkan-statistic (156 m$^2$) and the large-domus statistic (720 m$^2$) were applied to the available space of the defined residential parcels.\textsuperscript{67} The two series of polygons were then overlaid and information was produced regarding their degree of overlap. The displaying and subsequent tabulation of this procedure gives a distribution of all possible residential plots to be fit into the available space, both those of the target statistic and all others trimmed to fit every centimeter of space.

Plots of the parcels and target statistics (figs. 4–5) show the results visually. The statistical output (tables 2–3) from the plot (reporting item fit in the polygons) complement the visual results. For the run based on the Gerkan-statistic of 156 m$^2$ the results are as follows: 3,134 separate polygons (representing a residential space) were fit into the available space in Region 12. This is much greater than the 2,600 insulae and domus totals listed in the Regionaries. The average size of these plots, however, was only 116 m$^2$, and only 1,756 (56%) separate residential plots of about the size of the target statistic, 156–158 m$^2$, could fit into the modeling space available for residences. Many of these were much smaller than 110 m$^2$ (1,043 or 33.3%), representing only portions of possible overlaid examples fitting into the parcel polygons. A substantial percentage of modeled plots were less than 50 m$^2$ (588 or 18.8%), a size that would barely be viable as a separate structure, even given the generous range

\textsuperscript{66} Purcell (1999, 150) rightly notes that the Roman domus of the fourth century A.D. were tending to become quite large. This factor considered alone suggests that the Regionaries insulae were ARUs—a notion supported by the results of the large-domus 720 m$^2$ statistic model discussed below.

\textsuperscript{67} ArcCAD follows normal GIS procedures, which have names that are words used in common discourse but have very specialized meanings in GIS analysis. For example, the first step is \textit{theme} definition. Themes are classes of the same map features that have associated data sets. The kind of feature that can make up a theme is an entity such as a neighborhood. In this case, all the neighborhoods of Region 12 constitute a theme, made up of enclosed polygons, based on the Scagnetti and Grande (1979) map. The associated data sets are built from the map itself, or from nonspatial sources, such as a census list of the inhabitants of a neighborhood (which we do not have in this case). Computer maps are based on arcs. Arcs have directions and left and right sides, connect at nodes, and surround an area to define polygons. The computer maps must be cleaned of errors of overlap or lack of connecting nodes for the mathematical procedure to function properly. The data made from the map itself go into a database that is called a \textit{coverage} (in which all the locational and attribute data—the spatial coordinates of the features built up from arcs—are taken straight from the digital map). To carry out any spatial analysis task, the digital map must be subjected to a procedure called the building of \textit{topology}. Topology is the explicit definition of spatial relationships according to mathematical procedures. Its function is to provide a database list of spatial relationships by defining them as lists of features such as areas within a border. Themes for neighborhoods (polygons of residential space) and test statistic themes (polygons of regular sizes representing house plots) were cleaned and built. In the spatial analysis, the data of two themes are manipulated to produce an output that represents an intersection between the spatial characteristics of the two themes. The spatial analysis procedure applied was polygon overlay through \textit{identity}, a procedure which uses one theme as a template (in this case, residential polygons, defined according to the space made available by known topographical boundaries and streets in the source map of the region [Scagnetti and Grande 1979]) and includes whole examples of the overlaid polygons, and adds (by trimming) any portions (no matter how small) of polygons from the overlaid polygons (house plots) that fall within the boundaries of the template polygon (neighborhoods). The name of the procedure derives from its function to produce a result that represents what proportion of the two layers of polygons occupies the identical space.
of structure sizes allowed by Lo Cascio’s suggestion. Table 2 gives a distribution of polygon sizes for this test statistic.

The results for the run based on the large-domus 720 m² statistic were only 955 separate plots in the available space with a mean size of 374.4 m². That figure is a far cry from the 2,600 in the Regionaries. In this case, 432 plots or 45.2% of examples were smaller than the mean plot size. Only 242 (25.3%) of examples were in the range of the target statistic, 718–720 m². Interestingly, 384 (38.1%), considerably greater than the range of the target statistic, fell in the range of the Gerkan and Pompeii and Ostia targets of 156 and 220 m², suggesting that the residential plot size in the 200 m² range seems to possess an internal logic that is easily seen as a central tendency for utilization of space in the modeled available space. That is, residential buildings of about 200 m² may be easily viable and commonly producible in conformity with the constraints of European preindustrial architectural technology. Table 3 gives the distribution for this house plot size.

These GIS analyses proved to be a good way of approximating the mix of residential plot sizes that would have characterized the residential neighborhoods of Rome. If figures 4 and 5 seem mechanical in displaying squares uniformly across the landscape, they may nevertheless accurately represent the reality of deeply buried (as in far from regular streets) residential configurations described vividly by Dupont.68

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68 Dupont (1992, 143–5, “The City as Labyrinth”) describes late Republican Rome, but her description could also refer to Imperial Rome: “All the shops were in the main street, the rest of the quarter forming a maze of alleys, covered passages, culs-de-sac and steps in which any stranger would immediately get lost. Before long one might no longer be sure whether one was in a street where a fuller had hung his washing out to dry or if one had strayed into the backyard of his workshop. Overnight someone might close off what had been a public passage and built a house on it. . . . With luck, one might stumble through the backyards of one quarter and come out safe and sound on another shopping street” (quote, 145).
The modeling results are particularly useful in throwing light on the concept of the term insula in the Regionaries, whether it was a separate structure on the order of the size of a domus, a separate structure possessing a wide range of sizes as suggested by Lo Cascio, or an ARU similar to those defined for Ostia in Part 1. The fact that only 1,756 Gerkan-sized plots (156 m²)⁶⁹ and only 242 domus-sized plots (720 m², including the high Roman average domus size) could be fit into the available space argues against the domus-sized separate structure correlate for insula as used in the Regionaries.

These results seem to support Lo Cascio’s poly-functional separate structure suggestion; the variety of plot sizes could be a reflection of the possible different function structures. However, one-fifth of the plots are small, less than 50 m². If we were to combine a number of the full-size plots (156–158 m²) to form the larger structures that would be found in a Roman urban landscape, the total of separate structures would decrease dramatically, making the result less compatible with the numbers given in the Regionaries.

Regarded as separate structures, the modeled plots (using the Gerkan results) do not make

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⁶⁹ An earlier version of the analysis of Region 12 offered here (Storey 1996) was based on residential space polygons that left no space for known features—only the Baths of Caracalla space was eliminated from consideration. That analysis gave a result of 1,886 plots of the 156–158 m² size with an average of 134 m². The frequency of plots smaller than the average plot size was 598, or 31.7%. The similarity of results between the earlier run and that presented here suggests that no great error has been introduced by setting aside space to account for known architectural features in Region 12. Whether virtually all the space was available for residences, or whether a certain amount of space is arbitrarily set aside for known features, the results do not support the idea that the Regionaries’ 2,600 residential plots treated as standard-sized Roman residential separate structures could have fit into the available area of the region.
sense compared with the Roman urban fabric of the best comparable example, Ostia. Large numbers of 10, 20, 30, and up to 130 m² separate buildings do not exist in the ruins of Ostia or Pompeii. There are, however, numerous examples of enclosed units within the structural fabric of the blocks of both those cities that are in the range of those sizes—the Ostian ARUs and all other apartment-like units.

The GIS results conform to previous results, found with planimetric readings or other methods: if understood as domus-sized separate buildings, then the number of insulae in the Regionaries could not fit in the available space of the Augustan regions. Such results might be possible, however, by admitting for ancient Rome a high proportion of very small structures not usually found in the Vesuvian cities and Ostia—a scenario that is by no means impossible. The only caveat with that possibility is that the evidence of the Severan Marble Plan does not support it. The configurations seen there resemble the archaeological configurations in Ostia, at least to the extent that the many tiny structures do not appear on the fragments of that map of Rome.

The numbers, moreover, seem to make most sense as apartment-like entities. The Ostian ARUs as defined in my previous study expand the definition of insulae from solely apartments to multi-functional enclosed units, easily understood as parcels of legally private property.

Of course, the unknown factor, and one ignored in the two-dimensional world of GIS maps (although three-dimensional analysis is possible), is the vertical dimension—the height of the buildings. This question has been touched on in Part 1. The problem is that we do not know the typical height of buildings in ancient Rome. I stress “typical” because there has been much focus on the tall buildings, such as the Ara Coeli Insula and the Insula of Felicles (the heights of both structures are unknown: only incomplete traces exist of the former, and no trace remains of the latter), but no systematic (not anecdotal) analysis of the estimated average heights of building in the ancient city exists.

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Table 2. Distribution of Gerkan-Statistic GIS Overlay Polygons

<table>
<thead>
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<th>Square Meter Range</th>
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</thead>
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<tr>
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<tr>
<td>10</td>
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<td>160</td>
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Table 3. Distribution of Large Domus-Statistic GIS Overlay Polygons

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<tr>
<td>800</td>
<td>242</td>
</tr>
<tr>
<td>Total</td>
<td>955</td>
</tr>
</tbody>
</table>

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In Part 1 of this article (Storey 2001, 396–9), I suggested that Ostia should have been more compact than Rome, according to Fletcher’s criteria (1995). The resolution of this apparent contradiction is the reflection that Rome’s uneven topography as opposed to Ostia’s flat terrain is likely to have required the building of much more irregularly shaped structures than in Ostia, due to the necessity of dealing with hill slopes. The result this situation is likely to produce is a configuration characterized by smaller, more irregular structures than those seen generally in the urban archaeology of Pompeii, Herculaneum, and Ostia. On the other hand, we have evidence that some Roman structural configurations were much larger than Ostia’s (ns. 63, 65, 66). The greater area of Rome allowed for a greater range of structural sizes. Overall, Ostia as a whole was more compact and densely populated (in people and buildings) than Rome, even though some of Ostia’s buildings may have been larger, more regular in plan, and more evenly spaced than Rome’s.

In Part 1 (Storey 2001, 390, n. 9, and passim), I discuss the issue of whether Ostia and Rome are close analogues. In general the Severan Marble Plan does support the argument of the architectural similarity of the two communities. Reynolds, while noting some specific differences between configurations in Ostia and Rome (1996, 144), generally supports the view that there are important similarities.


Pedroni (1992) has, in any case, perhaps shown the way toward an answer to the question of typical building height by arguing convincingly that distinctive staircase marks on the
The results of the GIS analyses need to be considered in light of the upper floors that no doubt existed in the ancient buildings. Upper floors are only a factor, however, if one assumes the interpretation of insula as something other than a separate structure. Each insula, if treated as a separate building, represents only a two-dimensional space on the ground. If the upper floors are treated as separate entities to count, then it must be conceded that the term insula denoted some kind of unit within the fabric of a structure, not a separate structure. This is precisely the distinction that Gerkan considered when he suggested that the typical occupied area of an apartment house was 468 m² but covered only 156 m² of ground space—three floors each with a footprint of 156 m². In essence, Gerkan thought that the Regionary term insula was a type of ARU. Reasonably attractive and functional single apartments can be found in the buildings at Ostia, and no doubt, many ARUs were of this character and size. Adding complete versions for all the Gerkan-statistic model polygons in the first GIS analysis (fig. 4) would easily produce the 2,600 residences implied by the Regionary statistics for Region 12. But they need not all have the same ground level area. Combinations of smaller and larger structures, broken down into 360 public buildings, 9,549 private houses, 715 production loci, and 6,860 shops and stalls. Wietersheim concluded that the number of inhabited buildings for both cities would thus have been on the order of 12,000 to 14,000. Roman building sizes known from archaeological examples are roughly comparable to their successors in the cities of preindustrial Europe (we have noted the tendency toward buildings of about 200 m²). A general rule might be that cities of about 10 km² (large by preindustrial standards) contained 10,000 to 15,000 separate sizable structures, or 10–15 per hectare, in agreement with the results of the analysis for Ostia in Part 1 of this study.

The Berlin census figures, however, indicate that the administrative entity of Berlin was only 1.27 "geographische Quadratmeilen" in extent (4.36 km²), considerably smaller than the area of ancient Rome. Such a small urban area is a problem for the attempt to fit 16,924 separate buildings on the order of 200 m² each. In fact, it would require the squeezing in of 38 buildings per hectare. Such a figure would seem, at first glance, comparable to the 44 insulae per hectare found in the Regionaries, leading us to conclude that the term insula in the Regionaries did signify separate structures. Ancient Rome’s 14–18 km² area (whether measured as the extent within the Walls of Aurelian, or the likely larger area of the Augustan Regions) is three to four times greater than Berlin’s 4.36 km². Multiplying the 16,924 by three or four yields between 50,000 and 70,000 structures. Furthermore, each hectare of Berlin could have accommodated 38 structures of 263 m², and each hectare of Rome could have held 44 structures of 227 m². But the problem remains of realistically fitting the requisite number of Roman structures in the available space, even though theoretically there is enough room for them. Neither figure for Rome or Berlin takes account of other uses of space besides the residential structures. It is especially a problem that the area for streets is left out of account.

Given that the German term “Privat Wohnhaus” in the census means any separate residence (not legislation we know was passed about them (Strabo 5.3.7; Tacitus Annals 15.43; Ps. Aurelius Victor Trajan 13.13).

74 Gerkan 1940, 157–64.
75 Wietersheim 1856, 1:262–3.
76 These figures can be found in Statistischen Bureau zu Berlin (1855, 4).
77 See n. 52 and Storey 1992, 107, table 4.1.
necessarily a separate building\textsuperscript{29}) and that workshops, shops, and stalls represent a high proportion of registered entities, it is reasonable to conclude that the 1852 Berlin census counted ARUs exactly in analogous fashion to the method of their delineation in Ostia and Rome as argued in both parts of this analysis.

This makes sense in light of census data for England and Wales of 1851 (Census of England and Wales 1852). It was noted at the time that the word “house” in England commonly denoted a separate structure, in contrast to practice on the continent in Germany, France, or Italy. The data for London gave counts of houses as separate structures, and the number of houses per hectare was just over 10.\textsuperscript{80}

A final piece of supporting evidence for Rome comes from counting the structures on a map of 17th-century Rome. Antonio Tempesta’s 1673 map edited by Giovanni Giacomo De Rossi\textsuperscript{81} was examined with a 10-power loupe magnifier. There were 8,420 residential structures, 123 churches, 73 public structures, and 42 palazzi, for a grand total of 8,658 buildings, or 6.25 buildings per hectare within the line of the Aurelian Walls. This result, although lower than the postulated 10–15 per hectare and the Ostia result, supports the suggestion here that the ancient city contained between 10,000 and 15,000 structures. The total number of structures in ancient Rome was clearly greater than during the 17th century of Tempesta’s map. The city was also clearly larger during the period of growth in the latter 19th century when the size of the city came to resemble once again its greatest extent in antiquity.

CONCLUSIONS

The results of this research suggest several conclusions: first, the term insulae in the Regionaries (a semi-official context with a specialized meaning) does not mean a “separate building” as understood for ancient Roman cities of the Italian heartland such as Rome, Pompeii, Herculaneum, and Ostia. In essence, this analysis supports previous scholars who maintained that insulae in the Regionaries must mean various units within buildings rather than the buildings themselves.

The idea of the insulae as separate structures may originate partly from a tendency to identify the configuration of ancient Roman cities as identical with that of Italian cities of the later Medieval and more recent eras. The problem may be the overwhelming preponderance of row houses in post-Roman Italian urbanism, contrasted with their lower frequency during Roman times. The manner in which units were delineated in the ancient Roman epoch is different from the block-after-block of row houses strung together more commonly found in later periods. However, the number of separate units in the ancient context and the number of later row houses per street block can be of a similar order of magnitude, especially in particularly dense-populated contexts when the row houses became smaller and more tightly compacted. That is why study of post-Roman cadastral unit distribution seems to produce numbers equivalent to those resulting from the process of internal block division carried out in this analysis.\textsuperscript{82} That situation may be partly responsible for the common explanation of the insula term as a separate structure.

Another reason for the separate structure view is the shifting meaning between contexts. The common understanding of the term in everyday parlance continues to be “apartment house” or some kind of “multiple residence unit.” The suggestion has been made here that most of the textual occurrences of the term that have been interpreted this way are more correctly interpreted as “street block” in the structural fabric of which a multiple number of separate units were discernible.\textsuperscript{83}

\textsuperscript{29} Grimm and Grimm 1960, 1220–1, certainly is compatible with the view that the term in the 19th century (an 1854 dictionary) was a general term for residence and did not necessarily mean a separate structure.

\textsuperscript{80} See the introductory commentary in the Census of England and Wales 1852, xxxiv–xlv. C.G. Carus, physician to the King of Saxony, published observations on the differences between English housing and that of the Continent (xxx–xxxv); census figures from 1835–1836 Paris are also cited, indicating that most residences in the Continental census of the mid-19th century enumerated people in residences that constituted only parts of separate structures, not separate structures themselves. In the 1881 Census of Italy, urban records (e.g., Rome and Naples) count population in “appartamenti” (apartments) and “stanze occupata” (occupied apartments and rooms—Ministero di Agricoltura, Industria e Commercio, Direzione della Statistica 1883). For the 1851 census of London, the number of houses (separate buildings) and other institutional buildings was 10.4 per hectare. Thus, 1852 Berlin of enumerated units (probably the equivalent of ARUs) was comparable to Rome’s distribution of insulae in the Regionaries (also probably ARUs), while 1851 London’s enumerated separate buildings were comparable in number to buildings in Ostia.

\textsuperscript{30} Fratz 1902, 3, map C160 1–12, pls. 365–76.

\textsuperscript{82} As reviewed esp. in Part 1 (Storey 2001, 397, n. 34).

\textsuperscript{83} According to the Oxford English Dictionary (hereafter OED, 22 August 2001), the word “block” is ambiguous in English almost exactly to the degree that it is in Latin. It can mean an isolated “street block” (a meaning more common in North America than it is in the United Kingdom), or it can mean a simple separate structure, as in a “block of flats” (apartments—a usage mostly confined to the United Kingdom and areas of the Commonwealth outside of North America).
juxtaposition of domus and insulae thus functioned as a term of equivalence—that is, both represent residences constituted in “blocks” isolated by surrounding space in accordance with definitions going all the way back to the Twelve Tables, although most tourists to Pompeii and Ostia know insula only as “street block.” (The test polygons in the GIS analysis conformed to these criteria. The metric equivalent of about 2½ Roman feet separated the overlay polygons.)

The term insulae used in official contexts, at least by the fourth century, meant units within the structural fabric of street blocks. They were parcels of private property (Coarelli and Guilhembet), and the term functioned as a kind of catch-all term for a wide range of architectural units (Lo Cascio and Storey, here). It has also been here suggested that the presence of a staircase, especially one close to public space, was an easy way for the unit to be identified. The ubiquity of staircase markers on the fragments of the Severan Marble Plan may support these suggestions.

The issue with the term insula in Latin is similar to that of English usage of the term “house.” The Regionaries do not define the term insula. The introduction to the London census, on the other hand, explains what is meant by “house.” In the recent Anglo-Saxon world, the term “house” usually denotes a separate structure. In other times, places, and languages, however, the term was equivalent to “residence” and could denote only part of a structure occupied by one family or tenant. So the term “house” can mean apartment (part of a building) or a separate structure, exactly as the term insula could ambiguously mean both.84

In the long history of the debate on the meaning of the term insula in the Regionaries, Guido Calza strongly defended the idea that insulae must be separate buildings. In criticizing the arguments of Cuq, who was arguing for a concept of insula very close to that of the ARU argued here, Calza agreed that administrative enumeration of individual apartments would have been very useful for census purposes but claimed that city officials would only have been interested in individual buildings and not the units included in the structure; therefore, no source proved administrative enumeration of apartment units.85

Calza claimed that a use of the word insula in administrative language at variance with the everyday meaning of the word was very unlikely because administrative language is of maximum precision.86 Aside from the manifest weakness of that argument, there is a refusal to grant that administrative and vernacular registers of discourse can often be distinct. Calza’s insistence on the reality of administrative precision should be contrasted with the more pragmatic—almost humble—approach of the officials carrying out the 19th-century censuses of England and Wales.

Noting the difficulties of what constituted a “house” (especially in the differences in dialect between England and Scotland), those census-takers admitted that “in certain exceptional cases, the difficulty of defining ‘what constitutes a distinct house’ was considered insuperable . . . and in the earlier Censuses it was left to ‘those who made the Return’ to decide.” They conclude, “The definition of ‘house’ in the Census Abstracts was laid down, it is perhaps scarcely necessary to say, only for the guidance of the enumerators.”87 Here, the officials take it for granted that the terms used by laypersons and census officials can differ and cause confusion; they take pains to clarify what they mean by a term. It is surely the case that the ancient Roman officials faced the same challenges, and the confusion we have been bequeathed in the term insula as it occurs in the Regionaries is an understandable one that has recurring down through the ages of urban census enumeration.

84 “Even a source considered as reliable as Vitruvius was subject to this ambiguity. In one passage (6.7.3) certainly and probably in another (6.7.4), Vitruvius uses domus in a context that unquestionably refers to a suite of rooms within a larger house structure. The best translation for the usage in these passages is probably “apartment.”

85 Calza 1917; Cuq 1916. Calza is not correct about this. The Severan Marble Plan is detailed down to the level of apartment units, and even lower: “every citizen’s bedroom and back closet was on display here” (Reynolds 1996, 133), so this is clearly one source that enumerated apartment units. The Regionaries probably did too.

86 Census of England and Wales 1852, quotes from xxxvii and xxxviii.


Archeology in Jordan, 2001 Season

STEPHEN H. SAVAGE, KURT ZAMORA, AND DONALD R. KELLER

The 2001 edition of the “Archeology in Jordan” newsletter presents short reports on recent excavations and archaeological projects in the Hashemite Kingdom of Jordan (fig. 1). General projects and surveys are presented first, followed by excavation reports organized geographically, from north to south.

We would like to thank the Department of Antiquities of Jordan, its Director, Dr. Fawwaz al-Khraysheh, and his staff for their continued efforts and support on behalf of all those who are committed to understanding and preserving the cultural heritage of Jordan. Publication of this year’s “Archeology in Jordan” newsletter was once again made possible in part by contributions from the Jordan Society and the American Center of Oriental Research.

General Projects and Surveys

Online Satellite Imagery and Digital Data of Jordan. Stephen H. Savage (shsavage@asu.edu), Arizona State University, reports:

The National Imagery and Mapping Agency (NIMA) has made DOI 10 satellite images available to the general public. DOI 10 is an unclassified seamless dataset of orthophotos made from rectified grayscale aerial images. The images are delivered in GeoTiff format and are in decimal degrees (World Geographic System [WGS] 1984). They are positionally-correct images suitable for placing in terrain visualization and image backgrounds in GIS programs. Other data in decimal degrees (WGS 1984) can be overlaid in their correct position. A series of 39 image tiles that cover Jordan, Israel, and parts of their neighbors are available at http://archaeology.asu.edu/Jordan/index.html. From the home page, press the “Satellite Pix” button on the left side of the screen. This section includes a full-scale sample of an image, the license agreement (which allows unrestricted distribution), and a map of the coverage area, which you can click on to download individual tiles. Each tile covers one degree of longitude and one-half degree of latitude, and the files are approximately 45–60 megabytes in size. Images can be tiled, and scripts, available from ESRI, can be used to clip out regions of interest from one or more tiles and saved as smaller, georeferenced images.

GIS coverages from the 1:1,000,000 scale Digital Chart of the World can also be downloaded by clicking on a second map. A variety of topographic, hydrological, and settlement data are included in these coverages, and they can be displayed directly on top of the satellite image tiles.

Wadi al-Kafrein Survey. Niveen Kamal and Mohammad Waheeb (m-waheeb@elmaghtas.com), DAJ, report:

Recent archaeological fieldwork, conducted by a team from the DAJ, uncovered a Byzantine church at the northern edge of Wadi al-Kafrein. The church is located 500 m southwest from Tell al-Kafrein and ca. 5 km west of the Baptism site. The site measures 1000 m² and was being used as a cemetery. In order not to disturb the tombs, the project only included salvage excavations and material documentation.

Historically, the site was visited by pilgrims as far back as the third century and much later by the archaeologist Nelson Glueck. The site was not explored again, however, until the Cultural Resources Management Team from the DAJ undertook an emergency survey of the Baptism area in 1998. The purpose of this survey and limited excavation was to protect the archaeological sites, many of which are endangered by natural, agricultural, and human activities.

The church measures 20.15 (east–west) × 13.80 (north–south) m and appears to be rectangular in shape. Most of the outer walls are buried under the tombs. Although most of the sandstone ashlars were robbed, the cement bed layers of the foundations remain. Walls found in the western part of the church may have once formed rooms for religious or secular use. Excavation also uncovered some pil-
Fig. 1. Sites and projects in Jordan in the 2001 season
lar foundations, probably used to support the roof, which was washed away in antiquity. Also uncovered was a beautiful mosaic floor, decorated with geometrical and floral designs. Unfortunately, part of the mosaic floor, including some of its inscription, was destroyed by modern tomb construction.

The church’s water system includes a roofed cistern and a water channel located near the eastern wall of the church. The rectangular-shaped cistern measures 3.3 × 1.9 m and was fed by the water channel. This channel was constructed of a reddish-colored limestone and collected water from Wadi al-Kafrein. The length of the channel could not be followed because banana groves surrounded the site.

Much of the recovered material dates to the Byzantine period; however, some pottery sherds date back earlier to the Roman and Chalcolithic periods. It is not surprising that these earlier periods are represented, given the church’s close proximity to Tell al-Kafrein.

The Moab Archaeological Resource Survey. Stephen H. Savage (shsavage@asu.edu), Arizona State University, reports:

The Moab Archaeological Resource Survey (MARS) was established to collect settlement, archaeological, and environmental data from the western part of the Madaba Plain in the highlands of central Jordan. Fieldwork in 2001 concentrated on completing the mapping and documentation of the dolmen field at al-Murayghat (AM) begun last year. Test units at Khirbet Qarn al-Qubish (KQ) were placed across the gateway and in the midden. We documented 24 additional dolmens at AM, bringing the total to 100. All the dolmens are located in direct view of the “shrine” on the central hill at AM. The dolmens typically have a back, sides, and top (fig. 2) and are built directly on bedrock. Many are still intact; few had soil inside. A small, basalt mortar fragment was found near Dolmen 92; however, the dolmen had collapsed, and the original association with the artifact was undetermined. The date of the dolmens remains uncertain. While the preponderance of EB I sherds from the surface survey points to an EB I date, a Chalcolithic date cannot be ruled out because some sherds and lithics from the central site date to that period. AM is a unique Chalcolithic/Early Bronze Age ceremonial site. Because of its rarity and clear importance to the Chalcolithic/EB ceremonial system, AM is a site of special significance and should be preserved. Unfortunately, the continued operation of a large gravel quarry located immediately to the north endangers the site.

At KQ, unit 385/475 was placed over the south end of the north gate tower and the gateway, on the northeast side of the site. This excavation revealed that (1) the gate towers are solid structures, founded on soil, not bedrock, and built and filled with earth and rubble course-by-course; (2) the towers

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2 Savage et al. 2001, 433, fig. 4.

3 Savage et al. 2001, 432, fig. 3.
date to the EB III (ca. 2600–2200 B.C.), probably early in the period; (3) a flagstone pavement was placed in the entrance between the two gate towers (fig. 3) and later repaired; (4) both entry phases date to the EB III, but after the towers; (5) no subsequent occupation of the area occurred, and the area was covered with post-abandonment deposition by the Roman/Byzantine period; and (6) use of the site in the Roman/Byzantine period was confined to agricultural/pastoral pursuits.

Unit 263/460 was placed on the western slope inside a terrace wall. We collected over 4,000 sherds (217 diagnostics), 2,615 g of bone, 15 g of charcoal, 6,410 g of lithic material, and 42 g of seeds from the 2 m² unit. The ceramics show that the upper strata of the midden formed during the EB III. The lowest levels contained numerous EB I sherds, including a fragment of a gray/black burnished juglet, found lying on bedrock at the base of the midden. Several highly fired sherds with gray fabric were recovered from the lower levels; they are similar to metallic ware, but are thicker. These sherds have affinities with pottery types from further north and west. Therefore, even though KQ was a rather small agricultural settlement, it was clearly part of a larger regional exchange system.

Field examination of faunal remains and seeds points to a mixed economy of pastoralism and farming, supplemented by hunting and fishing. Ovicaprids dominate the faunal assemblage, but bird and fish bones are present. Seeds are mostly olive pits, with a few grape seeds and some charred wheat. The olive seeds indicate a fairly long occupation of the site and suggest a stable system of land tenure in KQ society. Seeds from several midden and gateway loci have been submitted for radiocarbon dating.

Karak Resources Project. David R. Berge, John I. Lawlor, Grand Rapids Baptist Seminary, and John M. Wade, Emmanuel School of Religion, report:

The Karak Resources Project conducted a fourth season of fieldwork in June and July 2001, including excavation at Khirbat al-Mudaybi, regional survey, and geological and ethnographic studies. At Mudaybi, excavation in fields A and B was expanded, but work in field C was discontinued. A new field, field D, was opened in the site’s northwestern quadrant.

In field A, two new squares were opened, and excavation continued in square I3. The basic phasing reported for the 1999 excavation, “Iron Age II through the Late Islamic period,” was refined. In I3, an Iron II surface was identified in a room created by the site’s east–west perimeter wall, an abutting north–south wall, and an interior east–west wall (with a doorway), which ran parallel to the perimeter wall and bonded into the aforementioned north–south wall. More information about the original Iron II construction and more recent Islamic occupation of Mudaybi was sought in a newly opened adjacent square, square J3. Another new square, square H5, revealed Middle or Late Islamic architecture, which seems to relate to

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1 Savage et al. 2001, 432, fig. 3.
structures investigated during previous seasons in square I5.

In field B, the eastern gate complex (which probably dates to the eighth century B.C.E.) was investigated further by opening three new squares and by continuing work in four previously excavated squares. The southern half of the four-chambered gate and portions of the two northern pier walls have been uncovered, along with lintels, volute capitals, and a flagstone pavement outside the gate threshold. Within the gate complex, excavation in five squares has revealed a crude surface, on which burnt debris and rock tumble collapsed. Bedrock protrudes through this surface, even in the gate passageway. The nature of this surface and a scarcity of artifacts strongly suggest that the Iron II gate was hardly used, if ever completed. It appears that both of the gate’s northern chambers were blocked up (fig. 4). In addition to uncovering the typical four-chambered gate plan, excavation revealed that a wall bonded to the southwestern corner of the gate complex and extended to the south at least 8 m, but its function is unclear. The removal of a balk between two previously excavated squares exposed a doorway in the eastern wall of a large Byzantine-Islamic building complex that covers the center of Mudaybi’. This doorway was blocked up in the Late Islamic period.

Three squares (E4, E5, and F5) were opened in the new field, field D. Each square revealed Iron II architectural remains just below the modern surface, which included a scattering of Byzantine and Islamic sherds. Although other squares at Mudaybi’ yielded some evidence of domestic activities, field D is located well inside the Iron II perimeter walls, and its artifacts indicate that this was a domestic area. Square E4’s main feature was a large room with walls preserved over 1 m in height (fig. 5). The pottery assemblage found on a cobbled floor included bowls and jars, all from Iron Age II. This cobbled room of E4 and a smaller storeroom in square E5 shared a common wall. The storeroom contained one large storage jar and several smaller vessels, all crushed when the building’s wall collapsed. East of this E5 storeroom was a courtyard that contained a tabun, 70 perforated clay balls/loom weights, and numerous sherds and animal bones. Near the tabun, a well-preserved lamp with a concave base was found. Square F5, opened late in the season, revealed that the walls of the E5 building complex continued toward the east.

Fig. 4. The Iron Age II gate complex in field B of Khirbat al-Mudaybi’, looking south, with projecting gate towers, upright jamb, and threshold on the left; southern gate chambers in the upper part of the photo; and the blocked northern gate chambers in the foreground, running parallel to meter stick. The Byzantine-Islamic building complex with blocked doorway is on the right. (Reuben G. Bullard, Jr.)
**Tafila-Busayra Archaeological Survey.** Burton MacDonald (bmacdonal@stfx.ca), St. Francis Xavier University, reports:

During the 1999 and 2000 seasons of the Tafila-Busayra Archaeological Survey (TBAS), team members surveyed ("sherded"), described, and plotted on maps 290 sites. Seventy-five of these were major architectural sites. Also among the surveyed sites were a number of “circular enclosures” that appear to be seasonal camps. These 75-plus sites date, on the basis of the sherds and lithics collected, from the Chalcolithic to the Late Islamic periods.

The goal for the 2001 season was to draw as many of the above mentioned major architectural sites and “circular enclosures” as possible, given several limitations. Team members could not feasibly draw entire villages in the allotted time, so only one or two structures at village sites were drawn. Conversely, at many of the architectural sites, it was not possible to find a structure of which a convincing drawing could be made. Moreover, sites where work was under way or had been completed were not considered because this would be an infringement upon the rights of the individuals in charge of those sites. In deciding which sites to draw, TBAS team members chose samples from the various topographical zones and site types.

As a result of this season’s work, TBAS team members completed 42 drawings at 36 sites (table 1). Two drawings were done at 6 of these 36 sites (table 2). In addition, team members took measurements at Site 141, Jurf ad-Darawish Castellum. It was not possible to draw this site because of erosion and silting. The intention is to publish the drawings in the final report on the project.

**Da`Janiya Hinterland Survey Project.** John Rucker (jdr1066@yahoo.com), University of Missouri, Columbia, reports:

The Roman fort at Da`Janiya, located about 40 km north of Ma’an, just west of the Desert Highway, was built ca. A.D. 300. It is the largest fortification on the Roman *limes* between the two legionary forts at Lejjun and Udruh. The fort at Da`Janiya is an anomaly, because, at just over 100 × 100 m, it covers over four times the extent of the typical castellum in Jordan. Some prior test excavations were completed within the fort itself, limited to establishing the date of construction, but no surveys of the surrounding area were conducted before this project. This survey was conducted with the support of an ACOR-CAORC fellowship.

This project was originally envisioned as a small, intensive archaeological survey around the fort. Realities of site type and density required a broader
The watchtowers fell into two distinct types. The highest peaks (and several similar peaks north of the survey area) were surmounted by very large, well-made stone towers; they were the only sites where Nabataean painted fine ware pottery was found. One of these contained a rock-cut chamber in the peak beneath the tower. The less substantial peaks in the survey area had smaller, less well-made structures; these sites did not have Nabataean fine ware pottery.

Two separate ancient roads, running north–south, were found within the survey area. One of these was a section of the Via Nova Traiana, first recorded by Thomsen in 1917. Somewhat surprisingly, no significant settlements around the fort itself were found, and the fort was not directly connected to, nor was it in a position to guard any of the ancient roadways in the area. Thomsen recorded a Roman road with milestones running from Jurfd-Darawish directly to the fort at DaJaniya in 1917; however, no trace of this road was found during this survey.

Almost all the larger sites in the survey area were multiperiod sites, situated in locations that originally had natural caves/cisterns. Most notable among these were Khirbet Qannas and Hudeira, which were large agricultural settlements west of DaJaniya. Both sites also had large water catchment systems (originally based around natural caves and sinkholes) and large associated cemeteries. The ancient cemeteries in the survey area, almost with-
out exception, had been extensively and recently robbed.

These findings allow some limited field conclusions. The fort at Da’Janiya was probably placed at the very edge of the agricultural zone. The difference in watchtower type and the distribution of the pottery suggests a difference in strategy of control between the Nabataean and Roman/Byzantine periods in this area. Further conclusions await more detailed analysis of the pottery and lithic material.

EXCAVATIONS

Tell Ya’amun. Charles N. Hunton, II and Dolores L. Burke (dthurke@arkansas.net), University of Arkansas, report:

Beginning with the 1999 season (mid June to early August) and continuing through 2000 and 2001, participants in the joint Arkansas-Yarmouk bioarchaeological field school conducted excavations at the site of Ya’amun, Hashemite Kingdom of Jordan Department of Antiquities site no. 2320.019. The field school is a cooperative effort of the King Fahd Middle East Studies Program of the University of Arkansas and the Institute of Archaeology and Anthropology of Yarmouk University.

The site is located approximately 25 km south of Irbid and 3 km southwest of the village of Na’ayima; ceramic analysis indicates continuous occupation from the Early Bronze to Islamic periods. Work at the site is taking place in five major areas: the tell and Necropoli 1, 2, 3, and 4. This report deals with the tell and focuses on what is believed to be a Bronze Age settlement.

The 1999 discovery of Bronze Age tombs in Necropolis 1 prompted a surface survey of the tell that confirmed the presence of extensive Bronze Age occupation. A robber pit located on the northeast corner of the tell exposed standing walls and a cistern. Two 5 × 5 m squares were opened here during the 2000 and 2001 excavation seasons. At least two architectural phases are evident from these two squares, which contain three partially excavated rooms, referred to as the north, south, and middle rooms (fig. 6).

Phase 1 walls are constructed of cobbles and boulders stacked in single row courses on limestone bedrock. The west wall of the north and middle rooms is finely constructed with very large boulders. Two doorways were located, one leading into the south room and the other leading from the middle to south room. Both doors were sealed with blocking stones before the structure was abandoned and filled with rubble. Phase 1 walls currently stand about 1.7 m high and may date to the late Middle Bronze Age. The exposed walls in the profile of the robber pit and the cistern may also be phase 1.

![Fig. 6. The three rooms, facing south, at Khirbet al-Mudaybi'. The north room is in the foreground with the circular storage pit; the middle room shows the sealed doorway into the south room.](image-url)
Phase 2 architecture is defined primarily by the east wall (fig. 7) of the north and middle, and possibly south, rooms. This is a double wall running north–south that is constructed of parallel courses of cobbles and boulders. A circular stone-lined storage pit in the north room may also belong to this phase, which may date to the Late Bronze/Early Iron I period. Phase 2 walls are more massive but less meticulously built walls that stand about 60 cm high and are constructed above phase 1 rubble. The excavation of these three rooms has produced 1,551 sherds consisting of 80.3% Late Bronze, 15.0% Middle Bronze, and 4.7% other periods. The excavated area is on a lower apron of the tell and is clearly affected by slope wash; therefore, secure dating must await attributions for the scarab and cylinder seal recovered. In addition to those objects, the excavation has produced a number of glass, carnelian, shell, and stone beads and shell pendants; flints and iron fragments; numerous stone objects including a mortar with pestle indentation, limestone and basalt bowls, and grinding stones; and Late Bronze lamp pieces. Excavated objects match sequences recorded from the tombs on the site.

Jerash. Ina Kehrberg (inakehrberg@hotmail.com) and John Manley, CBRL, report:

In October of 2000, the authors examined the foundations of the west Gerasa city wall north of the South Theatre.\(^5\) Interesting results from this project led CBRL’s Jerash City Walls Project (JCWP) to examine the wall foundations at other points along the enclosure wall.

The results of the September–October 2001 season were richer than anticipated; the first find was not a foundation trench but a sealed hypogean tomb discovered under the foundation of the city wall. The entrance to this single chamber shaft tomb was closed by irregular blocks, which hid the single burial, perhaps of a young female. The ceramics (fig. 8), gold leaf pectoral, and other objects in the chamber, and the ceramic sherds in the dromos fill, indicate a date in the Late Hellenistic period of the late second or early first century B.C. This date is confirmed by one Hellenistic coin found at the feet of the deceased. The singularity of the pottery camels (fig. 9) and bull models seems beyond Hellenistic Gerasa or Antioch on the Chrysorhoas as it was known then. After initial inquiries and first scanning of publications, no parallels to these ves-

sels seem apparent in Jordan for this or later periods. Inquiries further afield may prove more fruitful, perhaps in contemporary Gulf countries such as Bahrain. There are suggestions of possible Ptolemaic Egyptian influences, not only because of superficially shared political climates, but also with regard to contemporary funerary rituals.

The main aim of the project, however, was to examine the stratification of the city wall, which was done for the “tomb trench” west of the North Gate between towers 46 and 47 and two further soundings closer to the North Gate. All three trenches revealed that the foundations of the city wall depended on the topography of the terrain. Trench/wall 100 was founded on the rock-cut upper strata of the tomb; several deposits of soil sealed the tomb structure and provided secure dating material. Trench/wall 200 showed a trench cut into the “Jerash soil” in order to place three courses of foundation blocks founded on natural sloping bedrock. Trench/wall 300 was founded on 8 courses of foundation wall, which was also cut into Jerash soil. The soil depth is a result of the deep wadi bed in the latter area; we placed the trench there in order to investigate the stratigraphy for the foundations when bedrock was not available. The cuts of the foundation trenches for 200 and 300 were clearly visible.

The good quantity and variety of pottery and the coins from 100, 200, and 300 provide a clear date not later than early in the second century A.D., with deposits into which the foundation trenches were cut clearly dating earlier in the first centuries B.C. and A.D. The general terrain, where examined, shows remarkable homogeneity, well sealed below the modern, disturbed surface.

The results have been particularly interesting since they confirm the findings of the city wall

Fig. 8. Ceramic evidence from Jerash Tomb JCWP01.100/109

Fig. 9. Camel vessel from Jerash Tomb JCWP01.100/109
trench north of the South Theatre (see above). The foundation trench for the city wall in that location was also cut into a dense layer of first-century B.C. and A.D. deposits, which consisted of a kiln waste dump. Detailed studies of the first excavation (South Theatre trench) and this JCWP 2001 season are in preparation, and they will be published together.

Wadi al-Kharrar. Mohammad Waheeb (m-waheeb@elmaghtas.com), DAJ, reports:

Not reported last year was the discovery of a fourth church located at the Baptism site in Wadi al-Kharrar. This fourth church, or more likely chapel, given its small size, is located approximately 15 m east of the third church and less than 200 m east of the Jordan River (fig. 10). Measuring 4 × 6 m, the chapel is built of well-cut sandstone ashlars that were possibly brought from the Wadi Hesban area during the Byzantine period. Most of the chapel’s south side is gone, probably damaged by erosion caused by flooding of the Jordan River and the John the Baptist Spring. The apse and north side, however, are well preserved.

The chapel’s floor and walls were plastered. A Corinthian marble capital was used in the pavement of the apse area. No mosaic floor remains or significant artifacts were found during excavation; however, some pottery sherds, marble fragments, and bones were recovered. The pottery sherds date to the Byzantine and Early Islamic periods.

Beneath the chapel is an intact stone foundation platform, constructed of well-cut sandstone ashlars. It appears that it was designed for structural support against possible flooding. Another solid stone platform was found 3.5 m east of the chapel’s foundation platform. Both platforms still stand at a considerable height from the ground bed. Two layers of white plaster covered the walls of the foundation, probably to prevent seepage. Several Greek inscriptions and crosses were incised on the plaster.

Adjacent to the western side of the chapel and north of the second foundation, the team cleared three tombs that contained a boy, an adult man, and an old man. The simple cyst tombs were at the same level of the chapel.

Excavations also revealed a walled staircase that links the chapel and second foundation platform to the three churches built on top of each other. The staircase was paved with black marble, and the width of each of the 22 steps that were found was 2.5 m. The north wall of the staircase remains in situ; however, the south wall was destroyed and mostly washed away. Several crosses and Greek letters were found on the north wall.

Tall Hisban. Øystein S. LaBianca (labianca@andrews.edu), Andrews University, and Bethany J. Walker, Oklahoma State University, report:

The Madaba Plains Project conducted field research at Tall Hisban during May and June of 2001. The site, which is located in the Transjordanian
highlands northeast of the Dead Sea, presents researchers with a unique opportunity to examine the intersection of urban officialdom with rural communities. The main goal of the 2001 field season was to shed light on these interactions from the Islamic conquest to the present.

The political role of Hisban during the Umayyad and Abbasid periods was illustrated clearly for the first time this season. Excavations of the 1970s, while providing some evidence of early Islamic occupation in the form of tabuns and pottery, left the impression that these periods were ones of abatement in the settlement history of the site. In 2001, excavations uncovered two rooms in field N, in the northwest corner of the tell. This is the first Umayyad-period architecture identified at Hisban. The rooms, built against the Hellenistic fortification wall and close to the northern sally gate, attest to continued occupation of the tell well after the Islamic conquests. After an earthquake in the mid-seventh century A.D., which was responsible for the collapse of the stone barrel vaults, the structure was reoccupied and used into the Abbasid period. Fine Umayyad wares and imported Abbasid “splash” wares were found, indicating that Hisban was connected politically and economically to Damascus and Baghdad.

During the 2001 season, as well as the 1998 season, most of what is believed to be the residence of the Belqa governor during the Mamluk period was excavated. The residence proper consists of a series of rooms around a paved, open courtyard flanked by a private bathhouse and protected by a reinforced, rectangular tower. On the south side of this complex is a large, barrel-vaulted storeroom full of sugar jars, glazed wares with military-style inscriptions, and javelin points. There is evidence of earthquake collapse and fire for the mid-14th-century destruction that preserved the contents of the store. The storeroom and bathhouse provided the best evidence for the ways in which Hisban was a center for official exploitation of the rural hinterland. A large quantity of imported glazed wares, in addition to locally made handmade jars and bowls, attests to this rural center’s connection to larger markets. The bathhouse, not attested at any citadel anywhere else in the Mamluk state, may have been used by the governor to entertain local tribal leaders, much in the style of the Mamluk state, which was used, however, as a seasonal burial ground by the Adwan. The Adwan cemetery of the 19th century was uncovered in the remains of the vaulted Mamluk storeroom in the 1998 and 2001 seasons.

The Pioneer period was one of renewed settlement and market-oriented agriculture. Architectural and ethnohistorical investigations of the fortified farmhouse (qasr) located in the present-day village of Hisban have shed light on the history of the village for this era. Leen Fahkouy, a professor in the Department of Architecture of the University of Jordan, the Madaba Plains Project devised six successive cultural periods into which we are subdividing these centuries: the post-Mamluk (1500–1520); Early Ottoman (1520–1600); Aceramic Tribal (1600–1850); Pioneer (1850–1920); Mandate (1920–1940); and Hashemite (1940–present).

The post-Mamluk period is characterized by whole-scale withdrawal from Transjordan by a Mamluk Sultan beset with economic and political problems in Cairo. With the withdrawal of the Egyptian garrisons, villagers had no defense against marauding tribesmen and gradually abandoned their homes for a seminomadic lifestyle. Hisban’s tell was also abandoned at this point. When the Ottomans took Transjordan from the Mamluk state in 1516, their immediate concern was to regarrison strategic points and rebuild a tax-collecting apparatus. There is some evidence on Hisban’s tell for squat-ter occupation of the Mamluk ruins in this period.

By the end of the 16th century, Istanbul had tired of its defensive responsibilities in Transjordan and withdrew its forces and economic support, leaving administration (such as it existed) in local hands. Once again, villagers abandoned their homes and began to live in caves. While there is no evidence of reoccupation of the tell in this period, caves around the tell were occupied on a seasonal basis. The tell was used, however, as a seasonal burial ground by the Adwan. The Adwan cemetery of the 19th century was uncovered in the remains of the vaulted Mamluk storeroom in the 1998 and 2001 seasons.

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As in previous seasons, work has continued on restoring ruins from the Islamic and earlier centuries. In efforts to protect and present Hisban to the local public and to foreign visitors, our team has collaborated with the Ministry of Tourism and Antiquities, the newly appointed governor of Hisban, the village mayor, the Hisban schools, and the families of the local workmen.

Wadi ath-Thamad. P.M. Michèle Daviau (mdavia uwaterloo.ca), Wilfrid Laurier University, reports:

The fifth season of excavation at Khirbat al-Mudayna was conducted from 1 July to 8 August 2001.
At Khirbat al-Mudayna, work begun during the first four seasons (1996–1999) continued in the area of the North Gate (B100, directed by R. Chadwick) and in Temple 149 (directed by M. Steiner). Additional exposure of the Nabataean Building (B800, directed by L. Foley) was concentrated in the rooms along the north outer wall. Salvage excavation of Shrine Site WT #13, directed by L. Foley, was carried out from 2–12 July as part of the Regional Survey. The survey team, directed by Prof. C.M. Foley, continued the documentation of sites found in previous seasons and located a Yarmukian village (7,500 B.P.) on the north bank of Wadi ath-Thamad.

The Nabataean–Early Roman Settlement

Building 700 is an open reservoir that was used during the first century and later remodeled and used as a domestic or storage building. Two tasks remained unfinished at the start of the season: examination of the construction of the plaster floor and the final clearance of debris that covered material from the final use phase. Examination of the floor was undertaken between two of the central piers, which supported double arches that roofed the building in its final phase. The fill between piers 8 and 9 was removed in order to check the stratigraphic relationship of the floor (L13:23) and the piers. It was clear that both the piers and the fill between them had been put in position on the plastered floor. Under the floor itself, there were several layers of cobble-sized stone, packed with brown clay. Against the south wall, there was a row of wall stones that protruded in header and stretcher fashion from the face of the wall, marking the position of layer two of support stones for the plaster floor.

With the removal of a balk that ran up to the north wall of the reservoir, an oven was uncovered, along with early Roman pottery smashed in place beside it. The oven was built over the layer of plaster that served as a repair to the original plastered floor. The oven itself consisted of a ceramic liner, packed with clay on the exterior. With the completion of these probes, work in Building 700 was finished.

Buildings 800 and 802, located to the north of the reservoir, date to the same period. Four seasons of excavation have unearthed a complex structure known as the Nabataean house-villa. Framed by perimeter walls, the southern complex consists of two major buildings, Building 800 in the east and Building 802 in the west. These two buildings are surrounded by a perimeter wall and contain more than eight well-built rooms with arched roofs that support a second floor over B800. The integrated arches in both buildings, the flagstone floor in B800, and finely wrought doorjams and thresholds attest to the luxuriousness of this structure. The western and northern perimeter walls, W8016 and W8017, are as substantial as the walls surrounding B800. Last season’s excavation of one complete room (R811) revealed a simple 3 m² room with a beaten earth surface, which one entered through a 1.05 m long 2-stepped threshold. The simple doorjamb suggests that it supported a small door. The finds in this room do not indicate its exact purpose. Basalt grinders, which appear to have been ceiling collapse, attest to a domestic function on the second story. Clearing more rooms to floor surface in 2001 revealed three additional rooms along the north wall of the complex and two ovens in the central courtyard.

The Iron Age Town

The Iron Age town at Khirbat al-Mudayna crowns a steep hill overlooking the wadi. Previous excavation revealed a casemate wall that surrounded the site and was pierced by a six-chambered gate. A courtyard and a late Iron II temple, with limestone altars, lay inside the town, immediately south of the gate. Evidence in the gate rooms and in the central road of the gate suggests it was stormed and burned in the seventh century B.C.

Work to the south of the temple in 2001 revealed a building (B200) divided into three parallel rooms by two rows of pillars. Stone basins were found between each pair of pillars (fig. 11). Both the pillars and the basins were covered with several coats of plaster, suggesting industrial activity. Excavation in the central room uncovered fallen, burned roof beams; another shaft altar used to burn incense that was inscribed on one side with a stylized lotus;loom weights; and an ivory spindle.

Excavations continued outside the north entrance of the gate. On the east side, a bench and small plaza were uncovered in front of the eastern tower. A stone niche with two standing stones was found perpendicular to the bench. Evidence for an earlier stratum was uncovered below the level of the plastered forecourt to the north of the main entrance. A series of round, stone storage silos formed a tight cluster that was supported on the steeply sloping bedrock by earthen fills packed with fieldstones. The silos were ca. 4 m in diameter and 2.5 m deep.

At the opposite end of the site from the gate, a trench was dug across the inner and outer casemate walls and down the slope to a ditch that encircles the walled town. The trench contained evi-
dence for the construction of the fortification system in the form of a glacis of crushed limestone and plaster. At the base of the glacis, a dry moat was cut out of the bedrock at a place where the bedrock drops naturally. Further probes in the 2002 season will investigate the glacis on the north side, where the slope has a different formation because of the position of the gate.

**Petra. The Petra Garden Feasibility Study.** Leigh-Ann Bedal (lbedal@yahoo.com), reports:

In July 2001, a feasibility study was carried out in an area of Petra’s city center that was identified as a garden and pool complex during a 1998 survey and excavation. The goal of the two-week feasibility study was to identify the major components and layout of the garden terrace, located north of the monumental swimming pool, and to determine the degree of its preservation using ground-penetrating radar (GPR) in combination with auger tests (for stratigraphy and soil morphology) and stratigraphic excavation (fig. 12).

During the first three days, GPR survey was carried out over approximately three-quarters of the earthen terrace (65 × 53 m) using a subsurface interface radar (SIR)-2000 system with a 400 MHz antenna. Data were collected on a 50 cm grid for maximum illumination of subsurface features, with reliable readings to the depth of 3.5 m. The resulting data were displayed on a monitor in the form of vertical profiles in which major architectural features were immediately identified. The spatial relationship of these features was further illuminated with the production of horizontal amplitude slices of the terrace’s subsurface. The GPR results revealed that the earthen terrace is mostly unbuilt upon, but with a series of stone structures laid out along its central north–south axis and another major stone structure along the eastern border. In addition, a number of smaller, less defined features in various locations and depths across the site were detected.

Three features stood out as of primary interest to the goals and scope of the feasibility study for further investigation through excavation. Two of these appeared in the GPR as solid stone structures—one located at the center of the terrace, the second 12 m to the south, just north of the pool’s monumental east–west wall. Excavations in trenches 2 (center) and 5 (south) revealed the lower courses of two stone platforms, each packed with rubble.

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and faced with sandstone ashlars. The central platform is roughly square, measuring 3.67 × 3.85 m, with a small limestone basin with a drainage hole resting against its southern face (fig. 13). Stone conduits emerging from a water diversion tank (*castellum*) in the pool’s east–west wall lead to the southern platform, suggesting its function as a hydraulic installation, perhaps a basin or fountain.

The third area of investigation revealed by the GPR was a broken rectangular outline of stone, oriented along the terrace’s central axis a few meters south of the northern retaining wall. In order to disqualify any chance that the perceived wall lines were linear anomalies, a 25 cm grid was laid out at a 45° angle to the site’s major axis for a detailed GPR study. The resulting data clearly showed a stone rectangle (8.5 × 11 m) buried just below the surface. Trenches 6 and 8 exposed sections of foundation walls in the southeast and northwest corners of this feature, referred to here as the “North Building.” Although its function or date could not be determined from this limited exposure, the building’s alignment and central orientation with the site’s other major architectural elements suggest that it was an important garden feature.

In addition to providing a map of the stone structures on the terrace, the GPR survey indicated open areas where we might search for remnants of the garden soils. Vertical profiles showed laminated surfaces to the east of the North Building. Using soil cores and excavations, three surfaces were detected that have characteristics consistent with cul-

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Fig. 12. Plan of the Petra Garden and Pool Complex at the end of the 2001 season. (F. Ishaqat and L. Bedal)
tivated soils—mottling and a high content of charcoal bits and pottery sherds. The uppermost soil represents present-day agricultural use by the local Bedouin. The lower two soil strata are each likely candidates for the garden surface of the Classical period. Characterization analyses will aid in establishing the morphology of soil units. Future excavations will involve horizontal exposure of each of these strata in the hopes of identifying subtle features, such as tree pits and earthen irrigation channels, that cannot be easily detected in vertical soundings.

Underlying the lowermost cultivated stratum in trench 6 was an oval stone-lined pit (1.5 m long). Pottery sherds found within the pit are consistent with a first-century B.C.E. date. The pit is oriented perpendicular to a bold oblique stone line that is visible in the GPR data, located 10 m to the north and below the level of the North Building (1.2–2.4 m below the surface). It is likely that these deeper features are associated with houses dated to the third–first centuries B.C.E. that were buried by the construction of the garden terrace.7 The discovery of features belonging to the site’s pre-garden phase offers promise for future clarification of the chronological development of Petra’s city center.

Petra. North Ridge Project. Patricia M. Bikai and Megan Perry, ACOR (acor@go.com.jo), report:

Excavations on the North Ridge at Petra were conducted from 25 March through 3 May 2001. Work concentrated on the Blue Chapel Complex that lies between the Ridge Church and the Petra Church (fig. 14).

The two objectives this season were to determine the function of Building 1, and to complete the excavation of the lower area (Building 2). In order to achieve the first objective, a north–south trench was excavated in the center of Building 1. Although this trench revealed further information about the activities of the post-Byzantine occupants of the area, it did not clarify the use of the building in the Byzantine era. The trench and associated work revealed a number of secondary north–south walls across the building. Those walls may indicate that the structure was divided into small areas during the Byzantine era. Such construction leads the excavators to speculate that it may have had some communal function, perhaps as housing for persons from the religious sector, that is, it may have been part of a monastery or hostel. The relationship between Buildings 1 and 2 is still not clear. The only entrance into Building 2 appears to be down a staircase from Building 1 or from a passageway that may run between the two buildings. In the latter case, the two buildings had separate functions. In the former, they are one unit. It is hoped that a few small probes in the future will clarify this.

Excavation continued in Building 2 and is now almost complete. Three architectural units were previously defined for this building: the Blue Chapel to the east; the central unit with a hallway opening into a room to the south and the staircase to the north; and the large rectangular room to the west. This rectangular room contains four short columns (reused from the Temple of the Winged Lions) that, together with eight pilasters on the walls, supported the ceiling. An elaborate drainage system suggests that the central part of the room was open. The project architect believes that both the western room and the central block had second stories. Evidence for a second story was in fact found in the central block in the form of large sandstone slabs that would have formed the ceiling for the staircase area, the hall, and the south room. Excavation of the hall revealed that it had a vaulted ceiling constructed of stones recut from Nabataean capitals and other architectural materials.

Excavation in the chapel was completed. The north apse was found to be centered on a niche accessed by three steps. The center of the niche contained a reliquary, emptied in antiquity. Excavation near the pulpit yielded more fragments of its blue marble surround. Two radiocarbon dates each provide a date of A.D. 511 (one ± 30, the other ± 50) for the construction of the chapel. All excavation areas continued to yield remains of the post-
Byzantine occupants of the site. Their major archaeologically visible activities appear to have been scavenging and looting of the many tombs that occur in the bedrock of the North Ridge. In Building 1, they had systematically lifted the stone paving of that building to reach bedrock. A large cache of glass found in the south room of Building 2 may indicate that the occupants also collected raw materials, as likewise discovered at the Petra Church. These occupants probably ceased their activities in much of the complex after the earthquake that brought down the colonnade in the chapel. Based on a radiocarbon date of bone found immediately under a collapsed chapel column (1290 B.P. = A.D. 711 ± 30), the earthquake of A.D. 749/50 is likely the one that caused the most damage. After that event, occupation seems to have continued, particularly in the hallway, the west room, and probably Building 1, perhaps even into the Mamluk period.

**Petra. The Great Temple.** Martha Sharp Joukowsky (Martha_Joukowsky@Brown.edu), Brown University, reports:

The Brown University team conducted its ninth season of excavation at the Petra Great Temple (fig. 15) from June to August 2001. This season helped clarify the architecture of the precinct. Earlier excavations in the West Propylaeum had uncovered elephant-headed capitals from the Lower Temenos, and this season, the first completely preserved elephant-headed capital was found. Continuing excavations in the West Propylaeum also revealed double limestone betyls found in a niche (fig. 16). These sacred aniconic representations of Nabataean deities are approximately 50 cm high, 21 cm wide, and 9 cm thick. A test trench confirmed that the earliest wall of the Propylaeum was the terrace wall separating the precinct from the Colonnaded Street.

Excavations below the west triple colonnade of the Lower Temenos were also undertaken in the cryptoporticus to a depth of 6 m, where limestone flooring was found in an excellent state of preservation. In the Upper Temenos, a chapel with frescoed walls, hexagonal pavement, and an empty cult niche was revealed as part of the installation of the south perimeter wall. Excavations in the Upper Temenos east also uncovered a subterranean cistern measuring 8.5 × 7.8 m. It was partially excavat-
ed by a test trench to its original depth of 5.88 m from its roof; it would have once held 390 m² of water. Above this cistern was a bedrock chamber with a chiseled out bedrock basin and an oven. Considerable amounts of Nabataean ceramics were found associated with these features.

The partially collapsed east perimeter wall arch was removed, and excavations continued below it. A small room with high arched niches and the later installation of an oven and trough were found. Additionally, a substantial cache of Nabataean utilitarian wares was found associated with the oven.

The only large project remaining in the Great Temple, which has now been completely excavated, was to clear the south corridor of collapsed debris. Removal of this debris revealed the exquisite stucco embellishments of the entire corridor wall. Most surprising here was the recovery of two massive sculpted stucco lions, which must have been positioned opposite each other above the central doorway leading into the corridor.

Besides the artifacts mentioned above, we recovered 26 coins, 10 catalogued lamps, 42 more elephant head components, 14 bone pins, 1 bone spatula, and a small limestone sculpture of a youthful male (15.84 cm in height) with his torso, right leg, and part of his left forearm. Another sculpture consists of a marble base from a small statue with a booted foot trimmed with a panther head. In the stucco catalogue were 11 fragments with graffiti or with gold overlay. These items were added to our databases, and various marble artifacts and architectural elements were sampled for testing to determine their origins.

Excavations also continued at the Small Temple, where approximately 430 marble fragments inscribed in Greek and Latin were recovered. The dimensions of this edifice were also redefined. Tentative conclusions suggest that this edifice might have served as a Roman imperial cult building.

Petra. The Obodas Chapel. Laïla Nehmé (Nehme.Ouzoulias@wanadoo.fr), Centre National de la Recherche Scientifique, reports:

The first season of excavation at the Obodas Chapel took place between 24 April and 20 May 2001. The team consisted of Laïla Nehmé (director), Steve Glisoni (archaeologist), and Mehdi Abdelaziz (epigraphist). First discovered in 1862 by Jacques Ehni, the Obodas Chapel is a rock-cut sanctuary located in the Nmayr area of Petra, ca. 1.7 km southeast of Qasr al-Bint.8

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The chapel is a wide open chamber, 6 m wide × 12.5 m deep, with finely dressed walls. A large section of rock above the chapel’s opening is dressed, presumably to form the back wall of an upper room, the front and side walls of which are built in masonry. The ceiling at the front of the room is 0.75 m higher than the ceiling at the back, and a four-line Nabataean inscription, *CIS* 2.354, is carved on the vertical area between the two ceilings. This inscription is a dedication of a statue of Obodas and is dated to the 29th year of Aretas IV (A.D. 20). There are also several groups of three holes, arranged in triangles, that form a row in the upper part of the back wall. They were probably used to attach decorative elements (made of stucco?) and are well attested elsewhere in Petra. A niche, ca. 0.9 × 1.85 m, is located 0.9 m above the floor in the center of the back wall.

Two soundings were made inside the chapel proper, one directly below the niche and one in the front part of the chamber (fig. 17). They revealed that this was not an ordinary chapel but a *triclinium*, a room with three benches carved out of the rock walls, one on each side and one at the back. The length of the side benches, 11.45 m, makes it one of the largest of the 40 triclinia known so far in Petra. The back bench, however, is only 6 m long, which means the triclinium is almost twice as long as it is wide, a proportion attested nowhere else in Petra.

The head of a statue, carved in sandstone, was discovered face down in front of the back bench (fig. 18). Its lower part is unfortunately damaged. A bust, discovered in front of the chapel, may belong to the same statue, but there is a gap between the two parts. The dimensions of both the head and the bust are compatible with those of the niche, and it is possible that this is part of the Obodas statue mentioned in the inscription. From his curly hair he appears to have been portrayed as a young god. Until now this deity has been known only from epigraphic and literary sources, and this would be the first time a representation of him has been found. The statue most probably stood in the niche, where the members of the *symposium* of Obodas who met in the triclinium could worship it.

The sounding at the front of the chamber found mainly destruction layers containing fragments of sandstone slabs, probably from the floor of the upper room, some column drums, and a small capital.

Also this season, a long wall, part of which was visible prior to excavation, was completely cleared. It was a diversion wall built to protect the religious installations from water runoff. The construction technique is very rough, and it was probably built in a hurry.

Fig. 16. The betyls in situ at the Great Temple. (A.A.W. Joukowsky)
We also discovered a small room ca. 40 m to the northwest of the chapel. Although it is in bad shape and part of the ceiling has collapsed, enough remains for it to be identified as a *biclinium*, a room with two benches, comparable to the 15 known roofed biclinia in Petra. A 2.5 × 3.40 m rectangular structure built in masonry, located 40 m north of the chapel, was also cleared. This structure was not founded on bedrock but on sand, and its function remains obscure.

In addition, all visible monuments on the terrace in front of the Obodas Chapel were planned and photographed, and some of them will be explored during the next season. These include two niches,9 another "chapel,"10 a room almost completely filled with sand,11 a cistern,12 and two ablation basins.13 The readings of the 133 Nabataean graffiti have been checked, and the inscriptions will be published together with the results of the excavation after the 2002 season.

It is now necessary to reconsider the working hypothesis, according to which the ca. 30 rock-cut chambers in Petra containing at least one cultic element such as a betyl or an altar, have been interpreted as "chapels." Based on data collected this season, at least a certain number of them are in fact triclinia.

During the forthcoming season, the front part of the chapel will be cleared in order to confirm whether or not there was an upper story and to determine the function of the space and structures in front of the triclinium (courtyard, portico?). We will also attempt to reach the ancient ground level in the passage leading to the terrace, and will try to

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11 Dalman 1908, no. 296.
12 Dalman 1908, no. 297.
13 Dalman 1908, no. 298.
find more evidence of a possible gateway or arch in the middle of this passage. We hope that soundings in room no. 291 will reveal whether or not it is a triclinium. This information is crucial to understanding how Nabataean religious space worked and whether an-Nmayr is better compared to Al-Madras or to a sanctuary such as Qattâr ad-Dayr. Increased amounts of pottery should refine the dating of the Obodas Chapel. The pottery discovered in both soundings in 2001 dates mainly to the first and beginning of the second century A.D.

Jabal Harûn. Jaakko Frösén (frosen@cc.helsinki.fi) and Zbigniew T. Fiema (Zbigniew.Fiema@helsinki.fi), University of Helsinki, report:

The Jabal Harûn Project (FJHP), sponsored by the University of Helsinki and the Academy of Finland, carried out its fourth fieldwork season in September 2001. The 15-member team included archaeologists, cartographers, conservators, and students. The excavation site is a large, ruined architectural complex located on a plateau below the summit of Jabal Harûn (Mountain of Aaron) near Petra in southern Jordan. According to Jewish, Christian, and Islamic traditions, the mountain is the burial place of Aaron, Moses’ brother. The 2001 excavations concentrated on the western area of the site, which is considered to have been a Byzantine monastic/pilgrimage center dedicated to St. Aaron. The project’s survey team did not participate in the 2001 season, but continued its research program in Helsinki.

Excavation work was conducted in two trenches, one of which (trench O) is located at the highest point on the site. This trench is also adjacent to the monumental structure filled up with stones, which was excavated in 2000. Trench O yielded well-preserved remains of a room with three arches (fig. 19). The room features several phases of occupation, from the Nabataean through the Late Byzantine periods, including two major destruction episodes. The main architectural parts were reconstructed after each destruction, including two levels of a plastered floor. It is now apparent that while the room in trench O and the adjacent structure originated in the Nabataean period, the intentional filling up of the latter must have occurred during the later phases of occupation at the site, and not during the Nabataean period, as previously assumed.

Excavation of the other trench (P) yielded the remains of a room with two arches, which was probably occupied during the Byzantine and Early Islamic periods. Initially, the central part of the room was occupied by a round, low platform built of flat stones, of which one quarter was exposed (fig. 20). Most probably, the platform functioned as a base...
for a basalt-made, rotating grain mill, the upper part of which was found nearby. At the beginning of the latest phase of occupation, a large, stone piled structure was built against the southern face of the northern wall and on top of the round platform. The function of this installation is unknown; it might have been a supportive buttress or a platform for some special purpose.

Directly south of the room, a narrow space was excavated that yielded the well-stratified remains of an extensive midden. It contained large quantities of fish scales and bones (primarily Scaridae, or parrot fish), often in the matrix of very ashy soil and associated with the sherds of cooking pots. The midden was probably used in the later phases of occupation in the adjacent room. The overwhelming predominance of fish scales and bones in the midden is expected in the monastic/pilgrimage context, but a detailed analysis of this material may detect specific patterns and variations in the dietary practices at the site. Meanwhile, the preliminary examination of the material indicates that it relates to the food preparation activities, and not to the actual consumption, which must have taken place somewhere else at the site. The discovery of the rotating grain mill indicates that the flour was produced at the site. Apparently, the St. Aaron monastery had its own food production and processing base, as is expected in the case of a coenobium-type monastery.

**Wadi Araba Earthquake Project.** Tina M. Niemi (NIEMI@unkc.edu), University of Missouri-Kansas City, reports:

The 2001 season of the Wadi Araba Earthquake Project was conducted at Qasr Tilah and Aqaba during May. The main goal of this season was to define and date archaeological structures that have been offset by earthquake motion along the fault in order to constrain the location and magnitude of known historical earthquakes. Our investigations concentrated on two archaeological sites, Qasr Tilah and Islamic Ayla in Jordan, that appear to be traversed by an active strand of the Dead Sea transform fault. Three different methodologies were utilized: (1) archaeological excavation, (2) magnetometer and ground-penetrating radar surveys, and (3) geologic subsurface probes. The research team included four senior staff representing three universities in the United States (Dr. Lee Slater from University of Missouri-Kansas City, Dr. Bruce Harrison from New Mexico Institute of Mining and Technology, and Dr. Janet Brashler from Grand Valley State University), as well as undergraduate and graduate students from the University of Missouri-Kansas City. The project was funded by the National Science Foundation and the University of Missouri-Kansas City. The results of this season will be published in a future report.
State University) and Dr. Mohammad Atallah from Yarmouk University in Jordan. Dr. Tina Niemi directed the project. The National Geographic Society provided funding for the field research.

Three exploratory archaeological trenches were excavated at Qasr Tilah in the area to the west and slightly south of the birkeh designated area A. Trenches were located in hopes of sectioning deposits affected by past earthquakes that contained archaeological features and deposits. Area A.1, situated to the south side of the birkeh, produced evidence of the exact location of the main, strike-slip fault and a secondary zone of fracturing. Both faults are primarily within natural geologic strata. With the exception of a series of large stones that may have been related to a terrace or water control mechanism, there was relatively little cultural material present in the strata.

Area A.2 was located due west of the birkeh at a point where surface evidence of an aqueduct channel disappeared. Area A.2 revealed that the aqueduct running directly west from the birkeh appears to take a southeast turn and proceed toward the wadi. It is clear that the southeast-oriented aqueduct was affected by at least one and possibly several earthquakes. Evidence for this includes several cracks located in the wall and floor of the aqueduct as well as subsidence and slope in a direction opposite to the original water flow. A portion of the wall was broken away and moved toward the interior of the aqueduct. The floor at the southernmost excavated portion of the aqueduct was lower than the juncture of this section with the east–west oriented section indicating subsidence on the upper end of the aqueduct. Additional evidence for rebuilding or maintenance of the aqueduct that may or may not be related to past earthquakes is evident in two different layers of plaster, as well as the rocks that cap the aqueduct. There was insufficient time to trace the aqueduct to the fault to determine the amount of lateral offset. This is one key issue that will be addressed in a future field season.

Area A.3 was excavated to determine if the east–west aqueduct continued to the birkeh and was perhaps related to an earlier construction. After surface debris consisting of vandal’s rubble and tumble from the outer wall of the birkeh was removed, a series of rectangular stones were identified as cover stones of a burial. The burial was placed in an east–west orientation in a cist tomb with stone-slab walls making up the western half of the tomb and top. The burial contained a perfectly articulat-
ed skeleton, which suggested that the majority of the burial has not been disturbed by any earthquake events. Only the footstones appear to be dislodged. Blocks from the birkeh wall clearly cover the cist tomb. The apparent lack of major disturbance within the tomb is potentially significant given the position of the birkeh, and the fact that a part of the birkeh wall immediately east of the burial failed at some time perhaps after the earthquake and after the burial was in the ground. The spatial and temporal relationships between the burial, aqueduct, and birkeh are provocative and warrant additional research.

A subsurface geologic probe excavated north of the seventh-century A.D. birkeh exposed a 3 m wide zone of upward branching fault splays. The stratigraphic record revealed evidence for at least two and as many as five earthquakes in the section. The most recent earthquake clearly cuts through sedimentary layers full of mortar, charcoal, building blocks, and other tumble debris from the collapse of the birkeh. These data indicate that there is at least one earthquake that postdates the collapse of the birkeh wall. It also indicates that the 2–2.5 m offset of the northwestern birkeh corner occurred in at least two earthquakes.

Several earthquakes are known from historical records to have occurred in the vicinity of the southern Dead Sea, Kerak, and Wadi Araba. These include the earthquakes of A.D. 31, 363, 659/60, 1068, 1212, 1293, and 1456–1459. At this time, we do not have enough age control to assign any of the known historical earthquakes to this section of the fault. Radiocarbon samples from key stratigraphic horizons were collected and should enable us to date the individual seismic events identified in the trenches. Further excavation and trenching at the Qasr Tilah site is needed to fully document the earthquake history along this section of the Wadi Araba fault.

In Aqaba, ongoing archaeological excavations of the Early Islamic walled city of Ayla by Department of Antiquities representative Ms. Salson Fakri continue to uncover collapsed walls. It is clear that the city wall has sustained earthquake damage from shaking and liquefaction (such as tilting and slumping and subsequent repair). However, in order to verify the hypothesis that the walls of Islamic Ayla are offset because of primary earthquake fault rupture (as proposed by Professor Donald Whitcomb of the Oriental Institute at the University of Chicago), we conducted GPR and Total Station topographic surveys, and excavation along the northern city wall. The archaeological excavation and geophysical surveys were both inconclusive as to whether the ancient site of Islamic Ayla is traversed by an active fault. The high level of cultural noise, which can obscure geological signatures, complicates the use of geophysical methods in this urban environment. We successfully delimited the active fault farther to the northeast within the modern city of Aqaba using GPR. It is plausible that the fault projects through Ayla. Additional work is needed in order to find direct physical evidence of the fault or a fault offset at Ayla.

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REVIEW ARTICLES

Synthesizing the Paleolithic

JOHN J. SHEA


For many archaeologists the term “Paleolithic” evokes long lists of stone tool types leavened only by the explosion of cave art during the peak of the Last Glaciation. This is a shame, because the Paleolithic period encompasses momentous events in human evolution. It begins more than 2.5 million years ago with a diverse array of early hominid species and culminates with the global dominion of modern humans. The Pleistocene Epoch (1.7 million to 12,500 years ago), during which the bulk of the Paleolithic drama played out, was a period of wide and frequent climate changes. Ice Age humans lived in a “lost world” that we only know indirectly, through archaeology.

Europe’s peninsular shape and its proximity to the Arctic Circle during Pleistocene glacial periods probably made this continent a peripheral zone of human habitation compared to Africa and South Asia. Nevertheless, the historical priority of Paleolithic research in Europe has created a richer archaeological record on this continent than in any other region. For much of the 20th century, the structure of the European Paleolithic was the model for the Paleolithic in the rest of the world. As research in other regions has begun to catch up to Europe, the truly unique features of the European Paleolithic record are becoming ever more apparent. Three new books, reviewed here, present a provocative synthesis and fresh perspectives on the Paleolithic of Europe.

The first work to be considered is Clive Gamble’s The Palaeolithic Societies of Europe. This book is a successor to Gamble’s impressive synthesis The Palaeolithic Settlement of Europe.1 Whereas Settlement placed the Paleolithic record in its ecogeographic context, emphasizing intraregional variability in settlement history, the new volume, Societies, has a more ambitious goal, that of modeling changes in hominid social behavior through the Pleistocene. As Gamble notes in his introductory chapter, Paleolithic archaeologists have tended to avoid the problem of reconstructing social behavior. Gamble asserts that social networks were the principal adaptive structure for Pleistocene humans. Structural properties of these networks can be deduced from the location and structure of well-preserved archaeological sites, spatial patterning of raw material transfers, and the complexity of artifact production sequences (chaines opératoires).

Evidence from the earliest phase of human settlement, 500,000–300,000 years ago (the Lower Paleolithic), suggests relatively small, temporary social networks. Archaeological sites from this time range, such as Notarchirico, Hoxne, and Isernia La Pineta, are palimpsests of numerous short-term occupations. Stone tools consist of locally available raw materials, and many appear to have been made on the spot for immediate use. Patterns of stylistic variation in Lower Paleolithic artifact designs largely reflect accommodations to local lithic raw material variation. Gamble interprets such sites as “encounters” between hominids and resources. Those rare sites with internal spatial structure, such as Bilzingsleben, are seen as informal “gatherrings,” places where local resources, such as food, shade, and water, brought hominids into proximity with one another and at which grooming and other social interactions occurred. Gamble asserts that Lower Paleolithic human social networks did not extend beyond copresence at these temporary aggregations. This model of Lower Paleolithic social behavior is strikingly similar to that documented among chimpanzees.2

The period 300,000–60,000 (or Middle Paleolithic) witnessed the emergence of the Neandertals, uniquely European hominids who were physiologically adapted to cold conditions. The Neandertals’ archaeological record suggests an intensification of social networks. This intensification is reflected in “taskscapes,” sites where humans gathered and performed a variety of activities at the same time. Examples of such sites include Maastricht-Belevedere, Lazaret Cave, and Biache-St. Vaast. Neandertal taskscapes were provisioned from a wide range of lithic raw material sources, suggesting

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1Gamble 1986.

2Goodall 1986.
they formed near intersections of habitual pathways across the landscape. Selectivity in lithic raw material choice and in the choice of prime-age animal prey both reflect increased effort and attention to activities with social implications. The strongest evidence for the extension of social networks lies in regional patterns in Levallois core reduction strategies. These patterns suggest the presence of technological “traditions,” presumably ones transmitted among individuals at aggregation sites. What is, for us, striking by its absence from such sites is evidence for permanence of occupation and evidence for the use of exosomatic symbols to facilitate interactions among socially distant individuals. Correlations between primate brain size and social group size suggest that Neandertal social groups should have been as large as those of modern humans (typically about 150 individuals). Gamble’s explanation for this is to postulate “quasi-effective” social networks, networks whose complexity is constrained by social proximity, or the probability of future encounters within local and regional networks.

This model of Neandertal social networks is by itself somewhat unconvincing. For Neandertal social networks to persist in a quasi-effective state for more than a hundred thousand years, there would have had to have been powerful directional selective forces suppressing improvements in their effectiveness. Modern humans colonized many harsh environments by using extensive alliance networks reinforced through exosomatic symbol systems. If there was so great an adaptive and evolutionary windfall to be reaped by extending those networks to larger regional populations, why did the Neandertals not develop such strategies themselves? Gamble does not adequately explain this conundrum.

An extension of social networks through time and space appears in the archaeological record of the period 60,000–21,000 B.P. (broadly encompassing the later phases of the Middle Paleolithic, various Transitional complexes, and the early Upper Paleolithic). Archaeological sites feature evidence for prolonged occupation and internal functional differentiation (houses, storage pits, knapping areas). Carved bone, antler, ivory, and stone artifacts whose functions were either wholly or partly symbolic proliferate. Indeed, detailed analyses of both lithic and osseous industries reveal patterns of interregional variation, much like those observed for the Middle Paleolithic, but with a more fine-grained pattern of variation in time and space. Gamble interprets these changes as social networks being “released from proximity,” that is, humans using exosomatic symbols. The extension of these networks is shown in the increasing distances over which raw materials were transported by early Upper Paleolithic humans. Dolni Vestonice, a site with elaborate dwelling and storage structures, a rich lithic and bone tool industry, complex mortuary features, and evidence for ceramic pyrotechnology (fully 18,000 years before the earliest pottery appears in Europe) provides clear evidence for this recognizable modern pattern of human behavior in the Upper Paleolithic.

If there is a weakness in these later chapters, it is a failure to grapple with increasing evidence for demographic discontinuity across the Middle–Upper Paleolithic transition. Although the rehabilitation of Neandertals’ image during the latter half of the 20th century has made them increasingly acceptable as human ancestors, evidence for demographic continuity between Neandertal and Upper Paleolithic modern human (Cro-Magnon) populations is weak. There are few areas where prolonged geographic overlap between Neandertals and Cro-Magnons can be demonstrated, and much less evidence for cultural contact. Many of the skeletal morphologies claimed as evidence for interbreeding are open to widely divergent interpretations. Most seriously, however, analyses of fossil DNA indicate a wide and geologically ancient divergence. Neandertals’ and modern humans’ last common ancestor apparently lived more than 500,000 years ago, long before the origin of the Neandertals, much less the Middle–Upper Paleolithic transition. Throughout Europe and Western Asia, wherever dating and fossil evidence are sufficient, Neandertal and early modern human occupations have a “vicarious” distribution. That is, they do not overlap, but rather alternate with each other through time. Such a distribution is more congruent with rival species competing for the same ecological niche than it is with a mosaic of human populations with sustained levels of gene flow between them. If we accept the argument that Neandertals were not modern human ancestors, then we must also consider that Neandertal social adaptations may reflect physiological and ecological factors that differ from those factors influencing early modern human behavior. Models of European Paleolithic social evolution may have to seek the origin of Upper Paleolithic society not so much in Europe among the later Neandertals, but rather in Southern Asia and Africa among early modern human adaptations.

The other two volumes reviewed here, Roebroeks and Gamble’s *The Middle Palaeolithic Occupation of Europe* and Roebroeks et al.’s *Hunters of the Golden Age* are the second and third volumes resulting from European Science Foundation workshops on Paleolithic occupation of Europe.

*The Middle Palaeolithic Occupation of Europe* is a region-by-region survey of the period roughly 200,000–30,000 B.P. The major thematic issues raised in this book include the nature of the Middle Paleolithic in Europe, the relationship between habitat and settlement patterns, and the complexity of Neandertal adaptations. The distinctiveness of the Middle Paleolithic in Europe has long been a point of archaeological debate. In Southwest Asia and Africa, there is a marked

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technological break around 250,000–200,000 B.P., at which time large bifacially flaked handaxes and allied core tools decline in frequency. These core tools are replaced in lithic assemblages by flake products of prepared core techniques (Levallois flakes and, less commonly, prismatic, prismatic blades). Cold woodlands and steps seem to have been the favored biotopes for Neandertal habitation, though the limits of their adaptive abilities remain unclear owing to sea level rise, erosion, and other geological factors.

Understanding the Middle Paleolithic way of life has long been complicated by the weaknesses of analogical comparisons. Studies explicitly equating Middle Paleolithic tools or assemblages with those of recent humans have not moved archaeologists closer to the strategic ecological factors underlying the Middle Paleolithic archaeological records. Several of the contributions to *Middle Palaeolithic*, however, appear to be moving in a productive direction. Kolen’s paper, in particular, refines our models of Middle Paleolithic sites, suggesting they are palimpsests, repeatedly visited sites from which resources (personnel and equipment) were brought to bear on the surrounding landscape. In a sense, these sites were more like modern day hardware stores than the basecamps of hunter-gatherers. Several studies point toward Neandertals’ selectivity in resource use, in focusing on prime-age large mammal prey and in preferentially transporting better quality lithic materials (e.g., Gaudzinski and Feblot-Augustins). Further evidence is presented for Neandertal ecological “intensification” in artificial structures at numerous sites (e.g., Kolen, Mussi).

For a book whose title encompasses all of Europe, geographic coverage retains a traditional bias toward the western part of that continent and toward lower elevations. Recent research has vastly expanded our knowledge of Middle Paleolithic adaptations in the Crimean Peninsula and the Caucasus Range, but these areas are not represented in this volume. Their absence is regrettable because they reveal Neandertals’ strategies for coping with the altitudinal frontier of their habitat. The East European Middle Paleolithic is also increasingly seen as crucial in understanding the modern human dispersal into Europe.

Roebroeks et al.’s *Hunters of the Golden Age* focuses specifically on the Middle Upper Paleolithic, ca. 30,000–20,000 B.P. This period encompasses that later phase of the Würm Interpleniaglacial and the early phase of the Last Glacial Maximum. The sense in which this period can be considered a “Golden Age” is in the ecogeographic breadth of human adaptation, technological sophistication, and human health. The ecological underpinning of the Middle Upper Paleolithic is the Mammoth Steppe. As described in Guthrie’s contribution, this biotope stretched from Western Europe, across Siberia, to the plains of North America and featured a rich plant and animal community. Many of the larger herbivores, such as horse, mammoth, reindeer, and bison, would have migrated seasonally across the steppe. Predictable game movements encourage both territoriality and cooperative alliance networks among hunter-gatherers. It is likely that these ecological circumstances encouraged the formation of “megasites,” large sites with freestanding architecture, storage facilities, and complex mortuary ritual. The florescence of art during this period (Clottes) has also been linked hypothetically to concerns about “social geography,” about smaller groups’ membership in larger regional alliance networks.

Evidence for such alliance networks is seen among the increasing regional diversification of stone and bone tool industries. Early Upper Paleolithic Aurignacian and later Upper Paleolithic Magdalenian and Epigravettian complexes exhibit remarkable continuities across vast expanses of the European continent. In contrast, the Middle Upper Paleolithic presents a complex mosaic of regionally distinct assemblage groups. The relatively brief duration and pronounced regional variation of Mid-Upper Paleolithic Gravettian and Pavlovian assemblages is, for this reviewer at least, the first time that the European record preserves evidence for social networks analogous to the archaeological cultures of the Postglacial period.

The long-standing notion that Paleolithic cultures were, in some metaphoric sense, impoverished relative to their more recent counterparts is effectively refuted by the catalogue of complex stone and bone tools, ceramics, and textiles, whose presence is affirmed by clay impressions. Nor, as Soffer’s and Mussi’s contributions to this volume make clear, is such technological complexity an artifact cobbled together from sites scattered widely across the landscape. Rather, all these technological achievements appear together as part of a single, unified adaptive complex. Similarities in artistic representation (most clearly among the so-called Venus figurines), found at sites on the shores of the Mediterranean to central Siberia suggest technical knowledge underlying Mid-Upper Paleolithic cultural variability may have been shared broadly across an enormous span of geography.

The effectiveness of these technologies and social networks in buffering Upper Paleolithic humans from environmental stresses can be seen most clearly in their physical remains (Churchill et al.). Mid-Upper Paleolithic humans retained the long limbs of their tropical ancestors even though they were living in cold climates. Evidence for frequent bouts of starvation, common among Neandertals and even among many post-Paleolithic populations, is relatively rare.

To appreciate the achievements of European society between 20,000–30,000 years ago, one must understand that they took place during a period of marked climatic instability and, eventually, deterioration. Variation in later Pleistocene climate in Europe appears to reflect a complex interplay of orbital, atmospheric, and oceanic factors. The marine oxygen isotope and Greenland ice core evidence for these climatic fluctuations suggest they were

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8 Marks and Chabai 1998.
9 Hoffecker 1999.
10 Kelly 1995.
more frequent and of considerably greater magnitude than those of the last 10,000 years. The resumption of such secular variation in the near future (a certainty, given the prominent role of orbital forcing) will be a formidable challenge to civilization. That our ancestors successfully faced such circumstances and survived provides hope for the future of humanity.

As a group, these three books are all essential reading for Paleolithic archaeologists, especially those who work in Europe and the Near East. Yet there are important differences among them. The Palaeolithic Societies of Europe presents a cohesive and provocative approach to Pleistocene human social organization, a battery of testable hypotheses, and fresh insights into the behavior of Paleolithic Europeans. This being said, Societies is difficult to use as a stand-alone textbook. I have twice used Societies as a principal text in an upper level course in European Paleolithic archaeology at a large American research university. Each time, there was a chorus of complaints about the difficult prose in the first three chapters. The later chapters, dealing as they do with more tangible issues, posed fewer difficulties. As luck would have it, Middle Palaeolithic Occupation of Europe became available during the second course offering. It was very helpful in presenting clear and focused overviews, particularly for regions where the bulk of the primary literature is not available in English. Hunters of the Golden Age will work well in a similar role.

If there are trends to be discerned among these works, the first is that the days of Paleolithic archaeologists ignoring hominid social behavior are fast drawing to a close. The emphasis of Societies on social networks as principal adaptive instruments, in particular, makes it relatively easy to relate issues in Paleolithic research to the larger anthropological debates about social organization. I predict that one of Societies’ lasting effects will be an improved dialogue between Paleolithic archaeologists and our colleagues in social anthropology and primatology, many of whom are grappling with the same issues, albeit in very different contexts. Where all of the works reviewed here could go further is in greater integration of behavioral evidence from the physical anthropological record as well. This is somewhat more successfully done in Hunters of the Golden Age than in The Middle Palaeolithic Occupation of Europe and Palaeolithic Societies of Europe. A second discernable trend among these books is increasing integration of evidence from countries whose scientists formerly worked apart from each other in separate research traditions. The benefits of this trend can only accrue.

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Glass Is Hot

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Recent years have seen an outburst of exhibitions devoted solely to ancient glass with handsomely illustrated catalogues.¹ The Association Internationale pour l’Histoire du Verre (AIHV, founded in 1959) recently held its 15th international congress.² The Italian committee of the AIHV sponsors the publication of glass collections in Italy.³ Similarly, the Association Française pour l’Archéologie du Verre (AFAV, founded in 1986) organizes international conferences and supports numerous publications.⁴ In 2001 the Greek Institute of Materials Sciences NCSR Demokritos organized an international conference in Rhodes, “Vitrum-Hyalos-Glass.”⁵

Leading topics include regional studies, furnace and glassworking technologies, the identification of glass production sites and glass composition, and the role of trade in ancient glass technology and consumption. While research still focuses on western Europe, scholars are now devoting attention to the eastern Mediterranean, and Japanese museums have discovered the attraction of ancient glass.⁶ Classical and Hellenistic Greece is rapidly evolving as a major player in the history of glass: in addition to volumes by Nenna and Triandaphyllides,⁷ a volume on the early Classical and early Hellenistic colorless glass from Macedonia is nearing completion.⁸ As G.D. Weinberg predicted, “Greece did indeed have a place in the development of this craft. A rich field for study awaits investigation.”⁹

The growing interest of young scholars is also evident. Four recent publications are based on Ph.D. dissertations.¹⁰ Glass studies no longer concern only chronological typologies, but now also address ancient technology, economy, trade, daily life, and cultural exchange. Today, glass is a truly hot topic.

This review article summarizes the current state of ancient glass studies published since 1998 in four categories of foreign-language books: catalogues raisonnés, exhibition catalogues, excavation reports, and special topics.

CATALOGUES RAISONNÉS

Corpus delle Collezioni Archeologici del Vetro nel Veneto (CCAVV), Volumes 3–6

The Giunta Regionale di Veneto, under auspices of the Italian Committee of the AIHV, aims to publish all ancient glass in the Veneto. Findspots and contexts of many objects are unknown, and since the authors are often not glass specialists, their technical attributions and classifications may mislead nonspecialists.

Nine volumes are planned with the same format: vessels and objects are arranged alphabetically by shape; the end of each volume includes a standardized glossary with an English translation (illustrated with numerous drawings in CCAVV).¹¹ Each volume begins with a short history of the collection and a general introduction to the shapes. Each object is documented by a black and white photograph; unusual objects and tomb groups are often presented in color. Volumes 5 and 6¹² also include profile drawings of complex objects.

Bibliographical references focus on parallels from north Italy, an important region in early glassblowing. Already the volumes have yielded unexpected insights. The material in museums near the Adriatic coast at Adria¹³ and at Murano (which safeguards much of the glass excavated on the Croatian coast opposite)¹⁴ seems more varied than in other collections. All six volumes contain a large amount of early imperial blown glass (first to mid second centuries C.E.) and document the near disappearance of later luxury glass.

The urban cemeteries at Padova¹⁵ yielded common glass unguentaria and cinerary urns, but graves in the rich farmland surrounding the city produced more varied finds. A tomb at Vigorovea dated to the second half of the first century C.E. had an exceptionally fine assortment of glass (color pl. XXIV), including a blue cantharus with handles made from twisted rods (no. 292) and the earliest documented mold-blown double head-shaped bottle (no. 234). A late Roman bowl excavated in Concordia¹⁶ was cut with a superb scene of Daniel in the lion’s den in the most prestigious workshop of late antiquity.¹⁷ The collections in and around Rovigo preserve several unguentaria with coin stamps on the underside (nos. 76, 127, 128).

The collections in Verona¹⁸ include high quality mold-blown vessels (nos. 321, 322, 384, 393, 513) and finely ribbed Rippenschale bowls, three of which are of common, natural bluish green glass but lack the added thread decoration (nos. 400–2). The collections also include several late Roman, gold-glass vessels (medallions, nos.

¹ E.g., Foy and Nenna 2001; Klein 1999; Massabò 2000; Roffia 2000; Commune di Milano 1998.
⁵ Papers in press.
⁸ D. Ignatiadou (in prep.)
¹² Toniolo 2000.
¹³ Bonomi 1996.
¹⁴ Ravagnan 1994.
¹⁶ CCAVV 4, Larese and Zerbinati 1998, no. 146.
¹⁷ See also Rottloff 2000.
¹⁸ CCAVV 5, Facchini 1999.
gests (47) that they were blown into a dip mold (Vorform) and expanded, but all the examples I have seen (in Trier) are almost certainly tooled.

The second half of the first and early second century saw a range of beaker and cup shapes, including an imported appliqué signed by Amarantus probably from Burgundy. Mold-blown square bottles were frequent grave gifts, which, when reused, could function as cinerary urns. Similarly reused were square jars, cylindrical and polygonal bottles, and several types of bulbous jars. Cinerary urns made specifically for burials were also common. From the early second century on, most of the glass used in Mainz originated in the Rhineland.

Colorless (decolorized) glass was common in the second and third centuries. A characteristic shape, the cylindrical cup with a heat-rounded rim and applied base coil dates to the second half of the second and first half of the third century; it comes predominately from habitation areas as do most glasses of this period. Other finds include mold-blown, natural bluish green bottles shaped like a grape bunch and a fragment of yellow and green mosaic glass. Several sarcophagi thought to date from the third century (burial assemblages nos. 42–45) contained bulbous glass jugs with a distinctive type of pinched chain handle suggesting local manufacture.

Vessels with applied snake-thread decoration, well known from graves at Cologne, are surprisingly rare in Mainz and come only from late second- to third-century habitation sites. By contrast, glass appears to be less common at habitation sites between the late third and mid fourth centuries. Nevertheless, much glass tableware is preserved because it was customary to bury the deceased with a drinking service; the vessels are usually natural green. Spherical flasks with a funnel mouth rising directly from the body are so abundant that they seem to be characteristic of late Roman Mainz.

Some of the shapes originating in the late third century were still in vogue in the second half of the fourth and early fifth centuries, but were then tinted olive green. A few fragments of luxury wares were found in the center of the modern city: one with cut decoration (no. 1351), another a tiny late Roman fragment that preserves the lower part of a human figure cut out of gold foil encased between two layers of clear glass (no. 1357: Zwischengoldglas). The majority of the glasses dated to the late fourth–early fifth centuries comes from cemeteries a short distance from the city. A grave associated with the last phase of Roman occupation, in the first half of the fifth century, produced one of the earliest footed, bell-shaped beakers.

Among the unusual vessel shapes I note a rare polychrome omphalos bowl (no. 175), two candlestick unguentaria with stamps on the bottom: PATRIMONI (no. 998) and PATRIUS (burial no. 33, pl. 80), a conical beaker with gilt decoration and inscription VITAM TIBI QUA SCIS QUID SIT BONUM (no. 381), a translucent dichroic beaker inscribed SIMPLICI ZESES (no. 382), a mold-blown, double head-shaped, footed bottle (no. 1182), a flask within a flask (burial no. 58, pl. 93), and several

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20 CCAVV6, Toniolo 2000.
vessels with cut decoration and inscribed [FE]LIX VIVAS, PVER MISCE T VE[, CVRRE PVER M (nos. 939, 945, 974), and two bowls of the Wint-Hill Group, engraved with figural scenes of a boar hunt (nos. 213, 940).

The excellent drawings were inked by the author herself. Especially commendable is her method of indicating the material of the objects (following the guidelines of the Römisch-Germanisches Zentralmuseum, Mainz). A novelty is the author’s creation of her own color chart, necessary because the book has few color photos. Written by a newcomer to ancient glass studies, the catalogue of Roman glass vessels from Mainz is an impressive opus.

Simon-Hiernard 2000

Dominique Simon-Hiernard describes 474 pieces of Roman glass in the Museum Sainte-Croix at Poitiers, most unearthed in the Poitou in the 19th century. With an eye to detail, the author places the glass objects in their cultural context, writing, as it were, the history of Roman glass from the point of view of what reached and eventually was produced in a region far removed from the center of the empire. After the introduction come 20 pages of color illustrations (not referenced in the catalogue entries). The catalogue proper is divided into four parts: storage vessels, tableware, toiletries, and varia. Each entry or group of entries is preceded by a short discussion of the context and type, and a list of comparisons. Form tables, a bibliography, an index of place names and findspots, and a concise glossary complete this volume.

Significantly, the collection is almost entirely made up of regional finds: 35% from funerary contexts, and 65% (mostly fragments) from habitation sites. The funerary role of glass was threefold. Cinerary urns were often reused domestic vessels like the fragmentary ones found in local habitation sites. As part of funerary rites in so-called bustum burials, glass fragments belonging to one vessel might be placed outside a sarcophagus and inside near different parts of the body. In the second century, the ritual breaking of sacrificial grave gifts was widely practiced in Gaul. As containers for scented oils dispensed in the tomb, glass unguentaria appear in cremations and in inhumations from the beginning of the first century C.E. In the course of the third century this practice becomes obsolete in the Poitou and elsewhere in northwest Europe, gradually replaced by gifts of tableware. By the fourth century, unguentaria are no longer found in tombs. Glass fragments are relatively rare in domestic contexts because of the practice of collecting old glass for recycling. Among the 800 fragments of glass excavated from domestic contexts the most common shape is the ribbed bowl.

Although the pre-Roman population was familiar with glass jewelry, it is rare in Poitiers. The catalogue includes fragments of just one Celtic bracelet, while two beads mentioned in the archives cannot be located. The Roman conquest introduced the inhabitants to the delights of vessel glass. Three delicate, blown vessels of translucent, deep blue glass (nos. 194, 200, 288) were excavated from a wealthy tomb at Antran belonging to the very first years of the first century C.E., when trade with the Mediterranean was just beginning. The other contemporary valuable tombs in the region exhibit a range of metal vessels, but no glass vessels, and tombs of only slightly later date produced only ordinary glass unguentaria. The nearby military camp at Aulnay, occupied briefly under Augustus and Tiberius, suggests the army may have played a role in spreading the taste for glass; the glass vessels excavated at the camp, as yet unpublished, are significant.

The vessel shapes excavated in Poitiers and vicinity are similar to those used elsewhere in northwest Europe, but certain shapes occur more frequently than others, for example, 29 ribbed bowls, a leading form of the first century C.E., 18 twisted rods, 19 square jars, 9 cinerary urns with handles (first–second centuries), 13 square and 10 cylindrical bottles (first–third centuries), 32 cylindrical bowls (a leading form in the second–third centuries), 7 mold-blown, grape bunch flasks (second–third centuries), and 15 spherical bottles (third–fourth centuries).

Some glassware was imported, including all first century vessels. The ribbed bowls (nos. 156–185), a striped reticella or lacework bowl (no. 186), a carinated bowl (no. 194), and a polychrome threaded unguentarium (no. 288) probably came from north Italy. The twisted rods, however, are thought to have been made in workshops near the border with Gallia Cisalpina (modern Switzerland). Trade relations between the Poitou and northern Gaul (Normandy, Picardy) commenced in the Flavian period, and solidified in the second century; they supplied the population with rectangular bottles and mold-blown barrel-shaped bottles. From the Rhineland came mostly tableware: vessels with blue dots (nos. 102, 211), an engraved plate (no. 191), engraved hemispherical bowls (nos. 216–218), snake-thread vessels (nos. 227, 228, 230), mold-blown double head-shaped vessels (nos. 325, 326), and grape bunch flasks (nos. 329, 330).

There is also evidence for local glass production, for example, cinerary urns with X-shaped handles (nos. 54–56) and jugs with trefoil mouths (nos. 39–46). Other vessels with a limited distribution are medium-sized bulbous jars with very thick lower bodies (nos. 1–4), cylindrical beakers (nos. 237, 238), as well as three square jars (nos. 23–25) and a square bottle carrying the same base molding with the letters CNAIO (or CVAIO) in the four corners. No physical remains of a glass workshop have been excavated in the Poitou, but from nearby Sanxay come several crucibles coated on the inside with a layer of bluish green glass (nos. 432–460), and at Saintes, farther south, are the remains of two glassblowing workshops active already in the second half of the first century.

While profile drawings of the glass should have been in outline, and the drawings of grave contexts would have been more useful if they had indicated the material of the objects (see above, Harter 1999), the numerous maps are helpful to those not familiar with the area. This museum catalogue is exemplary for shedding light on the Roman glass industry in one particular region.

21 The exhibition catalogue (Klein 1999) illustrates many of the objects in color.
Arveiller and Nenna 2000

The first catalogue of the Louvre’s glass holdings comes from two well known glass scholars: Véronique Arveiller and Marie-Dominique Nenna. Dedicated to the core-formed and mold-formed vessels made between the seventh century B.C.E. and the first century C.E., the Louvre catalogue is the latest in a series of important studies of glass predating the invention of blowing.22 A second volume, on the blown glass in the Louvre, is currently in preparation. With the exception of the Syro-Palestinian glasses in the former de Clercq collection,23 the glass holdings of the Louvre have remained largely unpublished. The present catalogue of 277 vessels includes 173 core-formed vessels, 21 mold-formed polychrome vessels, 74 mold-formed monochrome vessels, and 9 other vessels. The numerous recorded findspots indicate the collection’s wide geographical area and are useful for recognizing regional styles. Several vessels recently have been associated with Hellenistic workshops in Rhodes and Macedonia (e.g., gilt and painted lidded bowls, nos. 197–200).

A short introduction provides the current state of research on early glass. The chapter on core-formed vessels discusses individual shapes; the chapters on mold-formed vessels are subdivided by chronology. Admirable for their thorough documentation and careful annotation, these discussions include much of the data assembled in Nenna’s 1999 volume on the glass from Delos.

Miho Museum 2001

The catalogue of the Miho Museum documents 200 glass vessels and objects collected by the Shumei Family Foundation. The book is divided into two chapters, of which the first documents early ancient, Roman, and early Islamic glasses ranging from the mid second millennium B.C.E. to the 10th century C.E. Each piece is illustrated in color. I note several rare or unique objects: an opaque grayish blue, three-dimensional head of a pharaoh (no. 15)24 a horizontally ribbed “Achaemenid” animal-head cup (no. 59)25 and a grayish blue lagynos (no. 64).25 The second chapter is devoted to glass in ancient China from the fifth century B.C.E. to the first century C.E. In addition to beads and other small objects it includes an unusual inlaid, cylindrical blue glass beaker (no. 189).26

EXHIBITION CATALOGUES

Comune di Milano 1998

This volume accompanies the 1993 exhibition in Milan in connection with the 14th congress of the AIHV.28 Following an introductory essay on the history of glass in Lombardy by C. Maccabruni, the catalogue documents a wealth of glasses from Roman graves in Milan and vicinity. Especially useful are the illustrations documenting all finds from each grave. Two private collections of Roman glass are appended: the Personeni collection29 and the Marangoni Maffeii collection. The last chapter focuses on the “Roman” glass created between ca. 1950 and 1990 by the Venetian glass artist Archimede Seguso.30

Klein 1999

This volume contains a collection of essays for another exhibition. Following a general introduction by M.J. Klein (1–20) and an essay on Roman wall painting by H. Lavagne (21–4), F. Naumann Steckner discusses Roman depictions of glass vessels in wall painting (25–33). G. Harter focuses on the use of glass vessels in the Roman kitchen (34–40), while E. Welker is concerned with the vessels’ handles (50–6). A two-handled cylindrical bottle from Hohen-Stülen engraved with Dionysiac scenes is the subject of three contributions by K. Broschat, M.J. Klein and D. Zobel-Klein, and G. Harter (57–77). Two contributions are devoted to Roman storage bottles: A. Rottloff discusses square bottles (41–9) and A.-B. Follmann-Schulz reports on the exciting remains of glass furnaces in the Hambacher Forst, which produced mold-blown, barrel-shaped bottles with base marks mentioning ECVA (106–12). S. Fünfschilling (78–90) and D. Zobel-Klein (91–105) discuss late Roman flasks and jugs. Hunting scenes engraved on glasses of the Wint-Hill Group and late Roman glasses with colored dots and thread application are the subjects of R. Gogräfe (113–28) and M.J. Klein (129–42) respectively. The last contribution, by H. Riecke, presents late 19th-century historicizing copies of Roman glass vessels created in the firm of Ludwig Felmer in Mainz (143–54).

Massabò 2000

Originally planned to coincide with the 14th AIHV congress in Venice and Milan in the fall of 1998, the exhibition “Magiche trasparenze” actually opened a year later. It featured about 100 glass vessels illustrating the full range of Roman shapes current between the first and third centuries in Liguria, the majority from well-documented excavations at Albenga (ancient Albingaenum). A special attraction of the exhibition is the juxtaposition of glass objects with contemporary objects of metal and pottery in similar shapes. An unusual vessel is a curious cylindrical shallow dish of natural greenish glass with a sturdy glass rod (handle?) rising vertically from the center of the bowl (no. 77). The exhibition’s highlight is a magnificent plate of strongly colored blue glass, engraved with two Erotes in the center (no. 136: 145–56). Found in a tomb assigned to the late first or early second century, the plate is a very early example of Roman figural cutting.

The scholarly essays contain much information not usually found in an exhibition catalogue. Three intro-

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22 E.g., Grose 1989; Stern and Schluck-Nolte 1994.
23 de Ridder 1909.
29 See also Roffia 2000.
30 See also Massabò 2000.
duce the history and archaeology of the city (G. Menella and B. Massabò, 19–34), the role of Liguria with relation to other parts of the world (L. Taborelli, 35–44), and Roman glassblowing techniques and production (M. Sterrini, 45–54). The catalogue itself has four sections, each accompanied by an essay: F. Paolucci focuses on tablewares (55–62), and G. De Tommaso discusses unguent and scent bottles (115–22), jewelry (137–40), and gaming pieces (142). C. Maccabruni provides an overview of glass in Liguria. A major part of the catalogue is devoted to the contexts of the glass finds (177–232) with drawings of the contexts (pls. 1–29), of comparanda (pls. 30–36), and of all the glass objects exhibited (pls. 37–43). The last chapter, by F. Seguso, focuses on the “Roman” glass blown by Archimede Suguso (as does the last chapter of Comune di Milano 1998, above). An extensive bibliography completes this lavishly illustrated volume.

Roffia 2000

This volume highlights the Personeni collection, a private collection recently donated to the Civiche Raccolte Archeologiche di Milano. It consists almost entirely of glass objects acquired on the antiquities market in Turkey during the 1960s. Most of the vessels are late Roman blown shapes typical of the eastern Mediterranean. In addition to the 112 glass objects in the Personeni collection, the author discusses six shallow bowls excavated at Capernaum, in Israel and sent to Milan for preservation. These belong to a group of 14 glass vessels dating to the late first–early second centuries that were found in one room of a Roman building.

Foy and Nenna 2001

Conceived by two well known scholars, Daniele Foy and M.-D. Nenna, the exhibition “Tout feu, tout sable” was accompanied by an international colloquium on glass trade and commerce from the sixth century B.C.E. to the eighth century C.E. (papers in press). The exhibit was ambitious; over 350 objects document and illustrate the role of glass in southeast France. Furnaces, crucibles, tools, and waste from glassworking have been excavated (21–98), and chunks of raw glass and glass vessels have been rescued from shipwrecks (99–120). Most of the glass vessels come from tombs, mostly dating from the first and early second centuries. In some cases it is possible to recognize regional shapes.

The authors have also sifted through the storerooms of numerous museums in Languedoc, Provence, Corsica, and the Rhone valley. The result is a wealth of unpublished material presented in three chapters: the technology of ancient glass, trade and commerce, and the glass vessels from southeast France.

EXCAVATION REPORTS

Nenna 1999

Delos 37 is the first volume devoted entirely to glass artifacts in any series of excavation reports published by an archaeological school active in Greece. Most of the finds date to the late Hellenistic period (late second and early first centuries B.C.E.). Part I is devoted to the glass vessels, part II to the glass objects. Part III places the finds in a broad technological, typological, historical, and commercial context.

Nenna is the first to systematically cull epigraphical and papyrological sources for ancient Greek glass terminology (7–29); she kindly allowed me to read her dissertation, which enabled me to develop different interpretations of some terms.

Part I, subdivided into five chapters, is by far the largest. Twenty fragments of core-formed vessels date to the late Archaic and Classical periods; the rest is late Hellenistic (mid second to end of first century B.C.E.). The vessels come from habitation sites and from votive deposits in the sanctuaries. Similarities in the distribution maps of Hellenistic core-formed bottles (pl. 39) and contemporary monochrome mold-formed vessels (pl. 41) suggest that workshops on the Syro-Palestinian coast produced both types of vessels.

Mold-formed, polychrome luxury ware (reticella, mosaic, and striped) made its first appearance toward the end of the third century B.C.E. Most of the Delian material, over 700 mold-formed, monochrome vessels, comes from houses erected in the late second century and destroyed or abandoned in 88 or 69 B.C.E., thus confirming the date provided by the Antikythera shipwreck. The significance of the finds from Delos lies both in their quantity (Delos has produced more fragments from this period than all other sites combined) and in their variety; they thus provide new evidence for the distribution of these mold-formed, monochrome vessels that circulated predominantly in the eastern Mediterranean. The most common shape is the grooved bowl. Many fragments are opaque (55 pale blue, 3 red); the rest is in the usual translucent colors. In addition to the ubiquitous conical and hemispherical grooved bowls, there were 55 fluted bowls, of which 23 are decorated with petal motifs. Fragments of plates, pyxides, and skyphoi are also present.

As a result of the island’s weak economy after the events of 88 and 69 B.C.E. the typical mold-formed wares of the first century B.C.E. are much less common. The Delian material provides persuasive evidence that broad, shallow eastern Mediterranean bowls with “short close-set ribs concentrated around the middle of the body”33 circulated on the island in the second quarter of the first century B.C.E.

Blown vessel glass is not well represented: only 120 fragments have been found. They date predominantly from the first two centuries C.E. and the early Christian period (fourth–fifth centuries C.E.). Among the finds is a square bottle base marked “Euporianos” in Greek.

Part II is devoted to glass objects. The discovery of prefabricated manufacturing elements such as polychrome mosaic canes, of defects, and of wasters at three sites on the island indicate the presence of small-scale local glass

31 Roffia 1993.
33 See also Trowbridge 1930.
34 Stern 1999.
35 Assigned to the first half of the first century C.E. by Grose (1989, 246).
industries actively producing beads and small ornaments in the late Hellenistic period. Eye beads inlaid with slices of overlay canes (bicolor mosaic canes) recall those produced in a bead workshop in Rhodes in the late third to early second century B.C.E., but most of the other types coincide with the island’s main period of prosperity in the late second and early first centuries: striped beads, bicolor beads, and variously shaped monochrome beads.

Most of the imported objects are pendants. Two small tooled heads and a large number of phallus pendants were made on a mandril. Other pendants in the round have a seam around the edge: they were cast in a two-part mold. They depict various deities (Harpocrates, Hecate, Cybele, Baubo) as well as theater masks, a grape bunch, and the head of an African. Pendants of this type are found all over the eastern Mediterranean. The Delian finds provide the first evidence for dating them in the late second to early first century B.C.E.

Glass knucklebones (astragaloi), likewise made in two-part molds, have a longer production period, beginning in the mid third century B.C.E. Habitation sites on Delos produced 46 examples; tombs on Rheneia produced others. Most are made of translucent colored glass, two are colorless, and a few are opaque (six yellow, four blue, and two green). Over 700 glass “buttons” of various shapes, colors, and sizes were found (ringstones, gaming pieces, decoration for furniture, clothing, and metal and pottery vessels).

Part III addresses production, trade, and customers. In general, the presence of a glass workshop may be indicated by the presence of raw ingredients such as sand, na- tron, and shells, or raw glass in ingots or chunks; a firing furnace or an annealing furnace (for slow cooling); crucibles coated with an actual layer of glass (not just a vitri- fied surface); tools such as molds and tongs; prefabricated elements such as monochrome and polychrome canes, tubes, and glass disks; and defects, production waste, and cullet for recycling. The evidence on Delos consists of chunks of raw glass, production waste, and prefabricated elements for use in bead making. There is no evidence for the production of glass vessels.

The evidence for glassmaking elsewhere in the Classical and Hellenistic periods is based on literary sources, as well as the testimony from papyri and inscriptions (assembled here for the first time) and from archaeological excavations. The archaeological evidence is usually from small workshops producing beads and ornaments for a local clientele. The Syro-Palestinian and Egyptian workshops that produced luxury ware for export have not yet been identified. Cargoes rescued from several shipwrecks dated to the Hellenistic period provide evidence for trade in raw glass as well as in finished vessels, but how this material circulated is difficult to interpret.

Glass vessels are relatively rare until the end of the second century. The Delos finds indicate that this situation changed drastically in the late second century B.C.E. when every house on Delos had glass vessels. Imports from the eastern Mediterranean and from Egypt were sold at four locations that also sold pottery vessels. The glass bead workshops probably doubled as points of retail. Delos is the only site outside Athens where epigraphical evidence confirms donations of glass vessels in temples. There are no inventory lists and temple deposits dating to the late second and early first centuries B.C.E., so that it remains unknown whether glass donations increased when glass became more common in daily life.

The first of two appendices lists the finds spots of glass objects in Delos, the second provides the results of 17 chemical analyses executed by E. Mirtsou and M. Kessissoglou in the laboratory of the Archaeological Museum at Thessaloniki. The drawings of vessels are excellent, but the photographs lack contrast and the objects have been cut out individually. The absence of drawings of the beads makes it difficult to understand their shape and manufacturing techniques. Several items that, from their description, seem to be significant for the history of glass have not been illustrated (e.g., a large glass platter with traces of a bronze mount, and two balance scales [152]). In spite of these editorial imperfections *Délos* is a milestone in the research of ancient glass and provides the basic material for future research on Classical and Hellenistic glass production.

**Amrein 2001**

The glass workshop uncovered in 1989–1990 during rescue excavations in Avenches, Switzerland produced four, small, circular furnaces productive between the years 40 and 70 C.E. and over 15,000 fragments of glass (raw glass, manufacturing waste, and fragmentary ves- sels). There are no indications for the production of raw glass, which was apparently made elsewhere and imported, as was customary throughout antiquity. All the glass shows identical shades of transparent bluish green, green, blue, amber yellow, and purplish pink. Based on the manufacturing waste, the author has reconstructed the outer diameters of early iron blow pipes (11–15 mm) and has identified tool marks resulting from jacks and the solid iron rod (the precursor of a pontil) for applying handles and threads, but not yet for reattaching the vessel to heat finish its mouth. The workshop produced free blown and mold-blown wares in common early Roman shapes and small bottles coated on the interior with a thin layer of lead.

The drawings and color photographs help the reader visualize the processes described. An up-to-date annotated list of excavated Roman glassblowing furnaces, a discussion of the chemical elements found in Roman glass, and tables presenting analyses of fragments from Avenches complete this exemplary volume.

**SPECIAL TOPICS**

**Dussart 1998**

*Le verre en Jordanie et en Syrie du sud* focuses on the ancient glass of the region considered by many to have played a crucial role in the history of glassmaking. The book presents a typological study of fragments found

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36 Triandaphyllides 2000; Weinberg 1969.
during recent excavations, supplemented by complete vessels from museums at Bosra in Syria and at Amman and Kerak in Jordan. The material spans the late Hellenistic period (second–first centuries B.C.E.) to the end of the Ummayad dynasty in 750 C.E.

Dussart’s open alphanumeric typology is based on morphological features. She distinguishes two basic categories: (A) mold-formed vessels, and (B) blown vessels. Category A, the bowl, is subdivided by decoration. Category B is huge: 15 shapes defined by function (bowls, cups, bottles), further subdivided by profile and rim finish. Elegant charts illustrate the typological system. The bulk of the volume (49–184) is taken up by a catalogue of items arranged typologically.

The material is too diverse and spans too broad a chronological range for the typology to be meaningful. The volume, however, is handsomely edited, has a useful summary (ch. 1) of the archaeological data, and is lavishly illustrated with the author’s own charts, plans, maps, and profile drawings.

Sennequier et al. 1998

The political and economic significance of circus games in ancient Rome is well known. A family of mold-blown glass cups known collectively as Sports Cups ("verres à scènes de spectacles," or "Zirkusbecher") provides important information on Roman spectator sports in the first century C.E., a period when iconographical evidence is much less abundant than in the third and fourth centuries. The cups show four types of scenes in relief: chariot races (circenses), gladiator fights (munera), hunts (venations), and athletes.

The cups are attested predominantly in the western provinces, but the iconography points to games offered in the city of Rome and many cups are inscribed with the names of sports heroes known from literary and epigraphic sources. In the 1980s Ludwig Berger initiated the publication of a corpus of Sports Cups with a survey of 73 fragments in Switzerland.37 The second volume, by G. Sennequier, documents 100 fragments found in France. A.-B. Follmann-Schulz is preparing an inventory of the finds from Germany and the Benelux countries. Ten types (A–J) have been identified, many of which occur in several variations, here named “molds.”38 Each “mold” is described in detail, and the findspots of fragments in France and Switzerland are listed. Essays discuss games in first-century Rome, and the distribution, contexts, dates, and colors of the vessels found in France. A catalogue of individual finds follows, many published here for the first time.

Lierke 1999

Ten years ago Rosemarie Lierke first proposed that some ancient glass vessels were hot-formed on a potter’s wheel: spiral reticella bowls, one of the polychrome Helenistic luxury wares, were made by coiling a glass thread directly around an upside down mold placed on a slowly rotating potter’s wheel. Since then she has regularly startled the scholarly establishment by demonstrating that other types of vessels were likewise made on a potter’s wheel: ribbed bowls, cameo-glass vessels, cage cups. Now Lierke’s collected observations are gathered in one lavishly illustrated book. Some scholars consider many of her proposals highly controversial, while others, including myself, find her arguments convincing. Lierke also writes extremely well; her book on ancient glass pottery is as fascinating as any story of suspense.

Triandaphyllides 2000

Hot-formed glass vessels of the late Classical and early Hellenistic periods are the subject of the first volume of Triandaphyllides’ ambitious project to publish all the evidence for glassmaking and glassworking from ancient Rhodes. An English summary is included (191–201). Chapter 1 focuses on the archaeological evidence in Rhodes for primary glass production (the making of raw glass from its basic ingredients) and secondary production (the making of objects). No furnaces have been found, but he cites “deposits of quartz sand, calcium materials, glass frits and raw glass” in a complex of rock-cut tanks and cisterns as evidence for primary glassmaking in the fourth to early third centuries B.C.E. If so, the common opinion that all raw glass was made in the Syro-Palestinian littoral and Egypt may require reevaluation.

A secondary workshop in Rhodes produced beads in the late third and early second century B.C.E.; it will be the subject of a second volume.39 There is some evidence that the glassworkers colored the raw glass themselves. Five pottery disks are thought to be unique evidence for the hot-forming of vessels on a potter’s wheel.40 Similar disks, however, have been excavated at several bead-making sites, including a fourth- to early third-century glass workshop at Kerkouane, Tunisia.41

Chapters 2–5 discuss various aspects of the relationship between so-called Achaemenid glass vessels and Rhodian glassworking traditions; the second part of the book includes two catalogues. The first catalogue (Corpus 1, nos. 1–23) presents luxury hot-formed transparent glass vessels, mostly plates and bowls (also an alabastron and a small footed, salt-cellar-like bowl) from early fourth- to early third-century cemeteries. Each vessel is illustrated in color and accompanied by drawings both of profiles and of the decorations. Several shallow bowls carry a crudely cut floral decoration, probably a local imitation of Achaemenid vessels. The second catalogue (Corpus 2, nos. 1–75) presents the hot-formed transparent luxury vessels in Achaemenid tradition excavated outside the island of Rhodes. Among the more unusual shapes are two glass bowls from Macedonia, each with three feet shaped like shells (nos. 52, 53), and a glass

38 I prefer the term “series” (Stern 1995, 30) since more than one physical mold could produce objects with identical scenes.
39 In the meantime, see Weinberg 1969, 143–51.
40 See also Lierke 1999.
41 Nenna 1999, 67.
psyker excavated at Akrai Trichonitis on the Greek mainland (no. 75). A map and two folding tables illustrating the two corpora accompany this complete survey; the bibliography is completely up-to-date.

**Nenna 2000**

AAEV’s 12th annual conference in 1997 focused on ancient and Medieval glass workshops, production and trade, and the connections between primary workshops producing raw glass and secondary workshops producing objects. Chemical analyses and their interpretations play an important role because the homogeneity in the composition of glass throughout the Roman empire can be explained in various ways: the transportation of raw ingredients, such as sand and natron, the transportation of chunks of raw glass, or recycling. Carefully arranged and edited, these studies are essential for the inner workings of ancient glass production.

The discovery of 17 tank furnaces at Bet Eliezer in Israel sheds new light on the mass production of raw glass in the late Byzantine–early Islamic period. One secondary workshop in the center of Bet She’an (ancient Scythopolis) is well preserved and doubled as a point of retail (Y. Gorin-Rosen, 49–63). The glassmakers at Bet Eliezer produced a soda-lime-silica glass made with natron and charged their furnaces in batches. The composition of the glass is matched by eighth-century glass vessels from Ramla. The glasses from Israel differ in their composition not only from those of Egypt, but also from much Roman glass of western Europe (I.C. Dussart, 91–6). An analysis of first-century C.E. glass artifacts excavated at Qumran, Israel compares Roman glass from western Europe (A. Aerts et al., 113–21).

Surveys in Lower Egypt have brought to light four sites of primary glass production, two in the Wadi Natrun and two on the shore of Lake Mariut. Chemical analyses show clear differences from Roman glass, supporting the hypothesis that most of the raw glass in western Roman Europe came from the Syro-Palestinian coast (contra Free-stone et al. 65–83). The evidence for secondary glass workshops in Graeco-Roman Egypt is based on archaeological remains, ancient literature, and papyrological sources (M.-D. Nenna et al. 97–112).

The Roman glass workshops of western Europe are commoner and much better documented than those of the eastern Mediterranean. A workshop recently excavated at Cesson-Sévigné near Rennes, France produced glass in the late third or early fourth century in three circular furnaces. The remains included clay cones covered with remains of glass and clay curved elements similar to those excavated at the first-century glass workshops at Avenches and at Saintes in southwest France. Associated with the furnaces were several enigmatic structures with hardened, dark red floors containing drippings of molten glass similar to first-century remains excavated near Bonn (D. Pouille and F. Labaune, 125–46).

D. Foy (147–70) traces the evolution of glass production from Roman urban workshops in southern Gaul, which relied on imported raw glass, to the Middle Ages when glasshouses controlled the entire production cycle from the mixing of raw ingredients to the manufacturing of artifacts. The archaeological identification of early Medieval glasshouses (ninth to 11th centuries) remains problematic.

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BOOK REVIEWS


Julian Henderson is one of the leading experts in the study of scientific instrumental analysis applied to archaeological materials. His research focuses on glass and materials production from Iron Age Britain and Europe to Early Medieval Europe and Islamic Syria. He is the Director of the Raqqa (Syria) Ancient Industry Project and Editor of the Journal of Archaeological Science.

His book (also see J. Henderson, ed., Scientific Analysis in Archaeology [Oxford 1989]) is not merely devoted to a broad investigation of the main inorganic materials of archaeological interest and the related extractive and production technologies. It also offers an up-to-date description of materials exploitation and manufacturing in both prehistoric and historic periods, placed in a corresponding cultural and technological framework. The aim of the book is to establish fertile connections between scientific and archaeological research and recognize a common integrated context for these often separated worlds within which found artifacts can be properly and fruitfully analyzed.

As clearly stated in the book’s last pages (ch. 7, “Archaeological Science and the Way Forward,” 324–6), the intent of the author is to contribute to what appears to be the “last major development and challenge for archaeological science,” a “holistic approach” representing the most powerful result of “the interaction of otherwise discrete disciplines.” This is expected to lead to the further refinement of the mutual interplay between science and archaeology and to a “significant enrichment of archaeological study.”

After the Introduction (ch. 1), a preliminary chapter (2, “Techniques of Scientific Analysis”) is devoted to the description of the main experimental techniques for chemical and structural investigation of archaeological inorganic materials. This section focuses in particular on spectroscopic analytical methods: X-ray diffraction, neutron activation and isotopic analysis, electron probe microanalysis, scanning electron microscopy, and particle induced X-ray emission.

Subsequent chapters treat four materials almost exhaustively: glass (ch. 3, 24–108), ceramics (ch. 4, 109–207), metals (ch. 5, 208–96) and stone (ch. 6, 297–317). These chapters have identical structures: at the beginning, a summary of the chemical and physical identification of the material, followed by a description of how it is possible to obtain, select, and refine the raw substance. Where appropriate, a key is offered to the chemical strategies and physical rationale permitting a produced artifact to be transformed, in particular through heat treatment, to optimize its technological properties. Additionally, selected examples of the recognized main raw sources of the past are discussed and the development of the productive technology is outlined, as through the observed improvement of kilns and the construction of furnaces. In the final part of each of these chapters an extensive section is devoted to the presentation of typical case studies.

In the pages dedicated to glass the analysis is broadly extended. It ranges in time from “the origins of glass and its early production in the Mediterranean and Mesopotamia” (52–9) to the “seventeenth-century glass production in Europe” (90–8), with a special section on “early Medieval glass in Europe: the continuation of a Roman tradition?” (67–76). Examination of glass manufacture subsequently moves to the Euphrates, “the rise of the Abbasids and glass production in early Islamic Syria” (76–90). Evidence is presented for the glass industry under the Abbasids caliphate from about 750 A.D., when the center of power shifted to Baghdad.

For the broad field of ceramics production, the Greek, Roman, and Mediterranean production is disregarded in favor of less common case studies—classical details have to be found elsewhere: for example, M. Pollard and C. Heron (Archaeological Chemistry [Cambridge 1996] 134–44) and Z. Goffer (Archaeological Chemistry [Wiley 1980] 124–31).

Henderson’s bent for unconventional choices in his case studies is confirmed in the part devoted to metals. These are well presented in his useful “scientific study of copper and bronze in Europe” (248–61), which is flanked by the even more interesting “early copper production in Wadi Feinan, Jordan” (241–5) and “early copper and copper alloy production in Thailand” (262–70). “Technological innovation and the case of iron” (270–3) introduces “the production of iron in Iron Age Britain” (273–81). The final paragraph of “the chemical characterization of precious metals” (282–5) lacks a satisfactory discussion of coins, considering the technical properties of minting, and the possibility to extract direct information on economics and trade routes.

The chapter on stone, central to the book’s objective, includes a study of “obsidian research” (305–15). Obsidian emerges as a paradigmatic material; it forms during volcanic eruptions as a naturally occurring glass and has been used to obtain sharp-edged tools for over 30,000 years. Its chemical homogeneity, ensuing from a naturally rapid solidification, permits clear recognition of patterns of sources and trade. Even an estimate can be made for the economic value obsidian could have had before the Copper Age in northern Italy (310–14). Competitive trading is estimated for the materials originating from the Italian islands of Palmarola, Lipari, and Sardinia, based on the different mechanical properties as well as on the propor-
tion of the numbers of lithic objects at a site respective to its distance from source ores. Further case studies for stone, “answering archaeological questions through the scientific analysis of flint” (301–5) and “stone axe studies” (317–9) are presented within the same interpretative frame. “The origin and transportation of the bluestones of Stonehenge” (315–7) includes a summary of past scientific studies on Stonehenge from 1878.

This is an ambitious book even within the poor landscape of texts devoted to archaeometry. Its importance relies partly in the encyclopedic collection of references for the study of ancient artifacts in inorganic materials, especially for studies before the 19th century, and partly in the wealth of unconventional but appropriate case studies. These demonstrate how a range of different technical approaches can be integrated with archaeology. For new and original applications of investigation techniques in genetics and biochemistry see M. Jones, The Molecule Hunt (London 2001).

Henderson provides plentiful suggestions for more deeply integrated studies within appropriate cultural, chronological, and geographical frameworks, sure to please both material scientists and archaeologists well specialized in archaeometry. But thanks to his didactic goals and wide perspective the book will also be appreciated by scholars without a specific background in solid state physics.

Such a multiplicity of goals, however, leads to some unevenness. For example, the introduction on the analytical techniques of materials investigation and the opening paragraphs focused on the physical aspects of the materials behavior contain only the essentials, but these are not entirely suitable for a clear comprehension of the interrelated mechanical, structural, and chemical properties of glass, ceramics, metals, and stone. Other sources have to be consulted, like U. Leute’s Archaeometry: An Introduction to Physical Methods in Archaeology and the History of Art (Weinheim 1987) and M. Tite’s Methods of Physical Examination in Archaeology (London 1972).

The topics treated in this book obviously reflect the author’s interests and experiences; thus glass and ceramics are more extensively treated than metals and stone. Especially missed are discussions of marble in chapter 6, and also of pigments, inorganic materials with important archaeological significance.

Nevertheless, The Science and Archaeology of Materials, a book oscillating between materials science and archaeology, provides an important contribution in the construction of a solid, traceable database that will help in further steps toward new archaeological perspectives. The selected case studies are remarkable accomplishments, good field examples for future discussions.

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Paleoethnobotany traditionally describes analyses of seeds and fruits, wood, and pollen. Occasionally, however, the application of innovative technologies and methodologies gives new life to the field, supplementing and enhancing standard practices and enabling specialists to identify plants in a different way. For more than a decade, Jon Hather has worked to fill a huge gap in paleoethnobotany—the identification of charred remains of vegetative storage organs such as roots and tubers. Until very recently, virtually all such remains had been considered unidentifiable, in spite of the fact that they are fairly common on archaeological sites. In Archaeological Parenchyma, Hather introduces an innovative new approach to paleoethnobotany, one that he has been developing for nearly a decade. His earlier work, An Archaeological Guide to Root and Tuber Identification, Vol. 1, Europe and South West Asia (Oxford 1993) consisted of a laboratory guide for the identification of vegetative storage parenchyma, and presented nearly 600 photographs, comparing sections of fresh parenchyma with that which had been charred under controlled laboratory conditions. He included detailed descriptions of the anatomy and morphology of the fresh tissue, and the manner in which the tissue had been affected by the charring process. Archaeological Parenchyma is a natural companion to this volume and should be used alongside it, for he applies a standard paleoethnobotanical technique—microscopic analysis of charred plant remains—to plant material that until now had been virtually ignored in paleoethnobotany. His method has far reaching implications for Old World and New World archaeology alike, and can be applied even to very small fragments of roots and tubers.

Hather makes it very clear that Archaeological Parenchyma is not intended for the novice. Instead, it is aimed at the archaeobotanist with some knowledge of plant anatomy (4). He refers the reader who wishes a more extensive background in plant anatomy to five sources: A.D. Bell, Plant Form: An Illustrated Guide to Flowering Plant Morphology (Oxford 1991); K. Esau, Plant Anatomy (New York 1965); A. Fahn, Plant Anatomy, 4th ed. (London 1995); J.D. Mauseth, Plant Anatomy (California 1988); and P. Rudall, Anatomy of Flowering Plants, 2nd ed. (Cambridge 1992). In addition, a six-page glossary located at the end of Hather’s text provides brief but useful identifications of anatomical terms, from abaxial to xylem.

Archaeological Parenchyma is divided into eight chapters. The first three chapters present background information on the anatomy and morphology of vegetative tissue, and constitute a valuable review of terminology and the relationships among the various types of plant tissue. In chapter 1, Hather presents the main purpose of the book, which is to provide for archaeologists a description of the morphological and anatomical characteristics that can be used in the identification of charred vegetative storage parenchyma (2). This chapter includes a review of the anatomy of vegetative soft tissue, including the three main tissue types in vegetative storage
organs—parenchyma, sclerenchyma, and the vascular tissues, xylem and phloem—along with a description of the structure and function of each. Chapter 2, devoted mainly to the gross morphology of plants, includes a convenient historical overview describing how botanists of the 19th and 20th centuries coined and used various anatomical terms. The overview is particularly useful, since lack of standardization in terminology has lead to inconsistency in usage and duplication of meaning, a problem still affecting botanists to this day. Surface morphology, including detachment scars, buds, prickles, and spines, is described in chapter 3.

The lengthiest chapter, chapter 4, focuses on the nature of parenchymous tissue, its position relative to vascular tissue, and the manner in which parenchyma is preserved archaeologically. Excellent light and scanning electron micrographs complement the text, illustrating transverse and tangential longitudinal sections of parenchyma cells of various sizes and shapes, intercellular spaces, and cell inclusions such as starch grains and crystals. Hather compares fresh with charred archaeological parenchyma, and describes the effects of the charring process on morphology.

In several places Hather comments on the limitations of using parenchyma cells alone for plant identification, emphasizing that taxonomic identification generally depends not only on the characteristics of parenchyma, but also on the characteristics of vascular tissues (47, 73). For this reason, he devotes two chapters to vascular tissue. Chapters 5 and 6 describe the structure and organization of vascular tissues in stems (ch. 5) and roots (ch. 6). Chapter 7 is devoted to the anatomy of sclerenchyma—a mechanical tissue that typically functions as support, protective, or defensive tissue.

Arguably the most valuable chapter of the text for the archaeobotanist is chapter 8, which focuses on practical methods for handling and identifying parenchyma. Here Hather reviews the taphonomic processes that result in the formation of an archaeological assemblage. In this context, he discusses sampling and recovery methods, the locations in which archaeological parenchyma is most likely to be preserved, and the benefits of dry sieving versus water flotation. Hather also presents the basics of sample preparation both for light and for scanning electron microscopy (SEM). He even provides sample data sheets for use in analyzing archaeological material as well as in making a reference collection. He refers throughout the text to the importance of the reference collection, emphasizing that, as in every branch of paleoethnobotany, correct taxonomic identifications depend on the quality of the collection and the variety of specimens contained therein. The advice he gives for making a reference collection is useful, clearly reflecting years of experience. While generally not as thorough as one finds in D. Pearsall’s Palaeoethnobotany: A Handbook of Procedures, 2nd ed. (San Diego 2000), Hather’s focus on root and tuber preparation and preservation, a topic which has been virtually ignored, makes it extremely valuable.

Replete with photomicrographs and diagrams, the photography is one of the strengths of this book. More than 200 images provide an outstanding supplement, some chapters having more pages devoted to photographs than to text. The photographs provide clarity for the sometimes-subtle distinguishing features of anatomy and morphology. Still, there are places in the text that would benefit from more photographs—for example, a diagnostic feature from two different angles, or the morphology of certain features in a wider variety of taxa.

Hather’s techniques will undoubtedly open new doors in archaeology, and are certain to result in a better understanding of how people in ancient cultures used plants and interacted with their environments. But his book remains just an introduction, and more work is needed in this area. The fact that nearly a third of the photographs of charred archaeological parenchyma are labeled “unidentified” demonstrates this plainly. The study of archaeological parenchyma is very promising, however, and this reviewer hopes to see a second volume that would further elucidate the characteristics of parenchyma. A section devoted to practical advice, describing the access one requires to laboratory facilities and to herbaria, the equipment one requires, the timetable and costs involved, all drawn from Hather’s personal experiences, would add an interesting dimension, perhaps serving as a conclusion. While we wait for volume two, however, there is little doubt that Archaeological Parenchyma will become an invaluable resource for archaeobotanists and graduate students in the classroom as well as in the field laboratory, and deserves to find its way onto the shelves of university libraries.

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This book compiles a number of diverse studies arranged in three parts, titled “Exploration” (geophysical prospecting), “Environments,” and “Resources” as indicated by the subtitle of the book. The volume is not aimed at students or the uninitiated in the subdiscipline of geoarchaeology. It contains some highly technical and problem-specific research reports that require a background in basic geology, mineralogy, geophysics, and geochemistry.

The book begins with a well-rounded introduction by Pollard giving a brief history of geoarchaeology and then a short description of the papers included within the volume under the three main topical headings. Within this introduction Pollard makes a clear statement about the philosophy behind the volume when he cites Donahue (1986) in his first editorial for the journal Geoarchaeology, “an interface involves two-way interaction, so that research making use of archaeological data to expand geologic interpretation and understanding is just as valuable as the reverse.” Whereas many studies in geoarchae-
ology concentrate on problems defined by archaeology, this work focuses primarily on geological research problems within historical and archaeological contexts.

The three papers within “Exploration” test methods for geophysical prospecting and remote sensing in new types of archaeological contexts. Vernon et al. use fluxgate gradiometry and magnetic susceptibility to test the different kinds of information obtainable from Medieval lead and iron smelting sites in Britain. They demonstrate techniques for distinguishing readings from furnace locations that differ from those obtained from slag deposits. They also explore new ways to distinguish between iron and lead smelting sites by their distinctive magnetic susceptibility signatures. Murdie et al. address the problem of vertical resolution in remote sensing at archaeological sites. They explore the use of Euler deconvolution methods on magnetic gradiometry data to determine the depth of a Romano-British villa. They found this to be a quick and easy technique of mapping subsurface feature depths with reliable results. The final paper in this section, by Cuss and Styles, is also concerned with depth and remote sensing. It reports on a successful attempt to map a series of rockcut tunnels built in the early 19th century under a portion of the town of Liverpool. In this case study the researchers used a high resolution microgravity technique and demonstrated the value of remote sensing even under a densely built urban setting.

Within “Environment,” Latham et al. report on a taphonomic study at the Australopithecine cave site of Makapansgat in South Africa. Here they address the problem of correlation between the strata in the cave and the environments of deposition. They present a convincing argument for sediment deposition in ephemeral pools rather than as a result of an underground water table, and identify areas of the cave with intact stratigraphy that are likely locales for paleomagnetic sampling. The chapter by Tipping et al. is a nice study of the extent that pollen grains can be mixed throughout a podsol soil profile. It is a useful study to those scholars interested in the integrity of paleobotanical samples in a soil profile, showing how much mixing of pollen can occur in organic horizons. However, the authors do not make an attempt to link their study with archaeological questions. Thordyn-craft et al. test alluvial sediments for chemical traces left by intervals of tin mining activity in Dartmoor. Using this technique they were able to show how episodes of mining in the catchment area coincide with historical records of mining activity.

Most of the chapters in this book fall within the category of “Resources.” In the first contribution, Young and Thomas used mineralogical analysis and trace-element geochemistry to source iron ores from a shipwreck off the coast of southwest Britain. They neatly tie their results to historical records suggesting that the unlikely locale for the ship, seemingly transporting ores to an ore-producing region, had a plausible explanation in the light of historical factors. Lazenath and Mercier deal with a similar problem of the historical implications of sourcing geological resources. They identify historical connections evident from the sources of granite ballasts reused in Medieval building construction. This approach allows them to reconstruct trade routes by sea between Donegal and Falmouth in Great Britain, and La Rochelle, France. Millard’s chapter investigates the chemical processes involved in the manufacturing of alum in the 17th and 18th centuries in North Yorkshire. He used both magnetic susceptibility to detect the burning of shale and energy dispersive X-ray fluorescence to characterize the elements of the waste deposits compared with fresh shale. Millard concluded that magnetic susceptibility was a more useful technique for identifying alum manufacturing processes. Budd et al. experiment with zinc isotope fractionation in brass metal in an attempt to identify ancient and historical brass-making techniques. Their results were inconclusive but suggest that higher resolution measurements might be more successful. Thomas and Young’s second paper in this volume is again concerned with the sourcing of ore used in iron smelting, but this time they investigate the problem of sourcing the original ore from slag deposits. They propose a graphing solution to the problem using concentrations of rare earth elements. The authors model the relationships between the ore, the composition of furnace linings, and contaminations from charcoal. This technique was used successfully on a Roman ironworking site in southern Britain, but should be widely applicable in other iron-working contexts as well. In the final chapter, Zaykov et al. explore the use and trade of stone materials and metals in Bronze and Iron Age sites in the southern Urals. They examine the possible quarry sites for the stones, review information suggesting the location of prehistoric copper mines, and present results of geochemical analyses on the composition of copper and bronze artifacts, as well as the minerals formed by their corrosion.

Most of the chapters in this book report on the results of highly specialized geological studies. The majority are located in Britain, and most are concerned with mining and mineral extraction. The book is very useful for those professional geoarchaeologists and archaeologists who are interested in selecting appropriate techniques for geophysical prospecting around archaeological sites, sourcing of mineral resources, and examining the by-products of artifact corrosion.

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This is a well-produced and highly readable collection of essays that comes at a time when the archaeology of human response to natural disasters (for want of a better
BOOK REVIEWS

The book under review deals with a range of natural disasters in a variety of different locales, over a variety of periods. All of the authors have addressed four major themes in the course of their contributions, namely “the character of the precipitating phenomena,” “the quality of the environmental events as they directly affect human societies,” “the structure of the affected society,” and “the form of social response to environmental stress.” This seems to me to be an admirable research agenda. I fail to see, however, how this will facilitate the editors’ chief hopes of identifying “some general pattern in the response to catastrophic.” It strikes me that response will be linked to the variables of “organizational complexity, geographic context, range of subsistence resources, cultural configuration and the intensity and range of environmental disruption,” which they list as being phenomena that they hope to better understand through the case studies.

What each case study highlights is that these phenomena are variable and highly dependent on context. As a result, when we explore the impact of famine on people and their response to it in 19th-century India, we surely cannot compare it with the response to El Niño of human groups on the coast of Peru in the 15th century A.D. Simply put, we are not comparing like with like here, and this is my one complaint against the book. The book does contribute a series of high-quality, well-researched case studies, important in their own right, and nearly all have an individual contribution to make to the debate surrounding the theme of the volume.

While the paper by Runnels on the contribution of regional surveys to our understanding of soil erosion in prehistoric Greece was, I feel, a massive glimpse of the obvious, I was particularly impressed with the work of Kathleen Morrison on drought and famine during the period of the British Raj in southern India. For me this was one of the strongest contributions in the volume. Her exemplary piece linked the differing social responses and perceptions of both colonized and colonizer to circumstances and natural effects and to their political manipulation; she presents a serious contribution to famine studies within a post-colonial framework of debate.

By the same token, chapters 8 to 13 all hung together as an interesting exposition on the Americas. Again though, what struck me with great force was the variability of human response to natural disaster. The scale and duration of the disruptive episodes themselves and the level of social organization within the different communities affected were the most important features in all cases that predicated the social responses.

Michael Moseley’s final chapter attempts to pull the various strands of the book together and, more importantly, to draw out the important contribution that archaeological studies of human response to disaster might have for our own responses to similar situations in the future. This I think is a crucial point. Archaeology is well suited to point up the possible array of responses to certain types of incident in societies at different levels of cultural, social, and political organization. At this level we could, and probably should, find convergence with current work on risk, natural hazards, and people’s responses (see, e.g., Blaikie et al., At Risk [London 1994]). Moseley suggests that this has not been the case because archaeologists have been put off such an approach by allegations of determinism in the past.

If so, this is a cop-out. As Moseley says, archaeologists should offer insights into how the impact of disasters can be mitigated—not in the almost formulaic way the editors wanted to achieve but in ways that vary according to context, as archaeology can demonstrate. As the old Russian proverb has it, “Dwell on the past and you’ll lose an eye—forget the past and you’ll lose both eyes.”

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Since the early 1980s, when the subject first appeared in print in the United States, there has been a virtual flood of publications dealing with some aspect of gender configurations as documented in the archaeological record. Given that the embedded nature of gender in all aspects of past culture systems was virtually ignored before this watershed was reached, the current spate of studies is a positive development. Not quite so positive is the fact that, in spite of the greatly expanded number of publications now available on this topic, an archaeology of gender still eludes us. The continued “ghettoization” of gender as a subject somehow separate from conventional archaeological analysis continues in the form of themed publications, many, as in this case, the product of conferences also dedicated specifically to the subject of gender in archaeological analysis. I have been involved in organizing and publishing such conferences myself, and am not pointing the finger here—I support the production of a solid body of scholarly work dedicated to acknowledging gender as a variable in archaeological in-
terpretation. Nevertheless, an effort to normalize gender analysis in archaeology has to be the next step, and it is from this perspective that I commend Alison Rautman, the editor of Reading the Body, for not flagging the volume by the use of the term gender in the title. I hope that at some point in the not too distant future edited volumes such as this one that are dedicated to the archaeology of gender will no longer be necessary.

This volume represents a selection of papers from the Fourth Gender and Archaeology Conference held at Michigan State University in October of 1996. The conference theme was “Diverse Approaches to the Study of Gender in Antiquity,” and one of the stated goals was to bridge the divide between classical and anthropological archaeological research through the lens of gender analysis. The book is divided into two main sections, one dealing with mortuary approaches to gender (five chapters), the other, much longer section (nine chapters) focusing on representations of gender in various media and cross-cultural contexts. There are also two introductory chapters, by Alison Rautman and Lauren Talalay, and by Lynn Meskell.

The chapters on the mortuary correlates of gender vary widely in their approaches. S. Hollimon’s discussion of sex, health, and gender roles among the Arikara of the northern Plains is based on anthropological evidence from osteological remains, and ethnographic and historical accounts of gender configurations among indigenous groups. The running head for this chapter is misleading, since Hollimon does not focus on Arikara women’s labor, but examines a range of paleopathological indicators for diet, warfare, and stress-related trauma resulting from repetitive movement and demographic patterns. J. Peterson’s chapter addresses the “agent-centered perspective on the transition to domestic economies” (39) from a gender perspective by analyzing the muscoskeletal stress markers (MSM) on human bone from the southern Levant during the Early Bronze Age as domesticated species become more important and work patterns change. This is a nicely crafted study supported by solid data. M. Becker examines dental prosthetics and how they can offer a window into the lives of women in southern Etruria, including trade patterns, marriage alliances, and how the body itself can be used to map gender and status in ways that are archaeologically and osteologically recoverable. B. Crass’s contribution on Inuit burial traditions is a complex and in some ways confounding study—gender differences in this society seem loosely marked, and task differentiation is fluid. At the same time, gender ideology as represented in ethnographic studies is highly codified. S. Savage’s chapter presents a statistical analysis of mortuary data relevant to the status of women in predynastic Egypt. The emphasis on an early, formative period and on a large demographic sample contribute to our understanding of Egyptian gender configurations, which have not traditionally been the subject of systematic study. His chapter nicely complements that by A. Macy Roth in the second part of the volume on ancient Egyptian beliefs about conception and fertility as represented in various media.

Representations of the human form are treated in part 2, including S. German’s stylistic analysis of female and male images on seals and sealings in the Late Bronze Age Aegean. While the stylistic discussion of these images is interesting, more information on the distribution, context, function, and audience of these seals and seal impressions would have made this a stronger paper. M. Lee’s chapter on representations of gender in Minoan dress made some interesting points, but it would have benefited from references to classic gender studies. E. Brumfiel’s work, for example, would have supported Lee’s conclusions regarding the requirement that women produce and supply textiles to the Minoan palace centers. Illustrations would have been helpful in T. Niven’s article, which looks at how facial expressions and gestures in Greek art can be used to inform gender ideology.

A. Kehoe’s contribution to the volume, a discussion of representations of Mississippian women weavers in the larger context of women’s textile work and its symbolic significance, is articulate and poetic. It should serve as an impetus to others working in the Americas who may be able to make similar connections. M. Beck’s chapter on female figurines in the European Upper Paleolithic is, like Kehoe’s contribution, as much a sociohistorical critique as a study of the material in question. B. Shaffer, K. Gardner, and J. Powell explore prehistoric and ethnographic Pueblo gender roles through the analysis of Mimbres pottery motifs. They acknowledge the virtual impossibility of interpreting gender roles in Mimbres society in the absence of “self-documented, explicit depictions” (149). K. Hays-Gilpin’s study on sex and gender in ancient southwestern visual arts covers some of the same ground, but includes a wider range of media and a broader geographic area.

S. Pollock and R. Bernbeck’s discussion of gender ideologies in ancient Mesopotamia is one of the more theoretically sophisticated contributions to the volume, which makes it much easier to evaluate their conclusions. They combine a rigorous, processually-oriented statistical study with a more postprocessual, cognitive interpretive approach, and as a result produce a useful synthesis.

Overall, this is a valuable addition to the growing corpus of archaeological gender studies, as well as a contribution to the anthropological subfield that views the body as an arena for gender performance on many levels.

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As Western society’s focus has moved from production, often expressed in environmental archaeological circles as “subsistence,” to consumption, it is perhaps significant
that this book concentrates on one of the ultimate expressions of consumption, the feast. It is edited by two key thinkers on the importance of feasting in archaeological contexts, and brings together, in one book, a synthetic consideration of the importance of feasting behavior, a series of ethnographic case studies, together with some archaeological applications. The bulk of this book is more ethnographic than archaeological, but where the "archaeological" in the title holds best is in the potential it offers archaeologists to understand social relations in the past.

The anthropology and sociology of food is not a new subject, of course, as indicated in the oft-cited "good to think" quote from Lévi-Strauss in the title of the introductory chapter. Dietler and Hayden consider that feasts are undertheorized, however, which, in part, explains the emphasis on ethnographic case studies and the fact that a number of the contributors—as well as the editors—offer definitions. Most definitions start by attempting to clarify where everyday meals end and feasts begin, but we are clearly discussing continuums here rather than strictly delineated events. This is exemplified in the range of case studies presented in this volume, each of which highlights particular aspects and occasions marked by these "unusual" meals. In their theorizing, Hayden emphasizes the ecological aspect, with the stronger tendency to categorize (ch. 2), whereas Dietler emphasizes the political and contingent, strongly influenced by Bourdieu's ideas of power through practice (ch. 3). Thus, where Hayden considers the ability to organize and distribute a feast akin to biological success, Dietler gives higher priority to feasts as symbolic representations and a form of ritual activity (see ch. 1).

Most of the chapters, in both the ethnographic and archaeological sections, apply an overt social evolutionary terminology, arguably more in line with the analytical approach of Hayden than Dietler. They are united, however, in viewing feasting behavior as a practice of major importance and as a mechanism for the development of socioeconomic inequality. In this way, Feasts is an elegant extension of ideas associated with gift exchange, notably reciprocal obligation (Dietler, 73–5). Gifts motivate and reward, as well as allowing for the continual confirmation and/or renegotiation of social relations. Thus feasting behavior is linked with mobilizing labor (Dietler and Herbig, ch. 9), investing surpluses (Hayden, ch. 2), social solidarity (Clarke, ch. 5) or equilibrium (DeBoer, ch. 8), the creation of social prestige and political power (Perodie, ch. 7), and the reinforcement of political power (Dietler's "patron-role feasts," ch. 3). These are not mutually exclusive categories, and both Clarke and Brown (ch. 13), for example, note solidarity and self-aggrandizement as explanations in their case studies. Dietler (ch. 3), under the heading of "commensal politics," separates empowering feasts, patron-role feasts, and diacritical feasts (where style and taste become important).

There is some concern with distinguishing the occasions that feasts may indicate. Feasting behavior occurs at a range of different times and to acknowledge a number of events, from rites of passage such as the approach of marriageability in women (DeBoer, ch. 8), to marriage and death (e.g., Clarke, Perodie) where plays for power are often greatest, to ceremonial events linked with seasonal cycles (Kelly, ch. 12, Brown), to celebrations of victory in warfare (Schmandt-Besserat, ch. 14). Wiessner (ch. 4) attempts to separate sacred from secular, but often the sacred and the secular are intertwined (Brown, Schmandt-Besserat). Dietler emphasizes the experiential nature of feasting, which usually involves "singing, dancing, inebriation, [and] oratorical displays" (Dietler, p. 4). Developing from this, Brown and Schmandt-Besserat, in their case studies, find the terms fiesta and festival more appropriate, or even, in the case of the contemporary North American feast, "party" (Wilson and Rathje, ch. 15). Interestingly, there is less conspicuous generosity exhibited at the modern North American examples discussed by Wilson and Rathje, a behavior they link with industrialization and urbanization.

The ethnographic case studies demonstrate that meat, intoxicating substances, and quantity of food are key components of feasts. Thus, it is not surprising that the main archaeological case studies use animal bones (Junker and Kelly in their Philippine and Mississippian case studies) and serving and preparation vessels as their main forms of material evidence (Brown in a Mayan example, as well as Kelly). Brown and Knight (ch. 11, for Woodland period mounds in the southeastern United States) also demonstrate how spatial differentiation may be informative. The archaeological case studies serve to emphasize the importance of integrating different lines of evidence: hearths, pots, structures, animal and plant species, exotic raw materials, imported pottery, more and bigger vessels, to name a few. Hayden offers a useful summary of the many kinds of potential evidence for feasting (table 2.1). The archaeological case studies presented in Feasts are strengthened by good ethnographic and ethnohistoric data available for the same regions. On a slightly different tack and in a somewhat different region from the rest, Schmandt-Besserat considers what can be understood from Near Eastern art and economic texts. The similarity between the representation of an African Luo feast (Dietler, fig. 3.3) with elders drinking from large communal pots through long straws and the seal impressions from Ur (fig. 14.5) is striking. Although not an archaeological case study, Wiessner digs deep into Enga historical traditions to trace the types and development of feasting in Papua New Guinea, showing how different values are associated with material goods through time. Similarly, Kirch (ch. 6) analyzes ethnohistoric, ethnographic, and archaeological sources to depict very different forms of feasting in "classic" Polynesian chiefdoms.

The case studies in Feasts come from Africa, Southeast Asia, Polynesia, and the Americas, with one from the Near East. The geographic emphasis reflects the fact that this book derives from a Society for American Archaeology (SAA) symposium and that all the contributors are based in North America. Europe is omitted, as the editors note. Dietler has previously published extensively on feasting in relation to European prehistory, however. The omission of a European example is disappointing to this reviewer as it may mean that Feasts is less likely to be "consumed" and referred to by colleagues in Europe than it should be.

In Feasts Dietler and Hayden have made a great strength of their different approaches and have brought together...
a stimulating group of papers, providing much to challenge and trigger further discussion. As well as the further exploration of feasting in specific archaeological case studies, some potential future lines of enquiry referred to by the editors involve the relationships between feasting and gender and feasting and warfare. It is clear that Feasts owes much to the well-established literature on gift-giving: the relationship between giving food, immediately consumed, and gifts of longer duration could be developed further. To conclude, the editors have orchestrated a successful feast, which deserves to be reciprocated in due course, and it is likely that the editors expect interest on their investment.

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The notion of an “archaeology of music” (or “music archaeology,” as equivalent to the German term Musikarchäologie) might at first seem paradoxical. After all, if archaeology is concerned with the study of objects, while music is, of all the arts, the most transitory and least material, how can there be such a thing as an archaeology of music? In attempting to explain this apparent paradox, Ellen Hickmann writes in her introduction to the first volume that music archaeology is “concerned with learning what music and music-making meant to early music cultures by directing our attention first to the musical artifacts themselves... Thus, the approach towards the material remains is always our first step.” So it seems that music archaeology is not so much an archaeology of music itself (as Hickmann acknowledges: “Yet melodies and rhythms are lost forever [except in rare cases]”) as it is the application of archaeological method to specific cultural and anthropological objects of music and music-making.

We also learn from Hickmann’s introduction that music archaeology is essentially interdisciplinary, “achieved optimally in cooperation with musicologists, organologists and archaeologists, using the methods of both [sic] fields.” Of course, a number of individual scholars, beginning especially in the 18th century, independently pursued the study of very ancient musical cultures, but it was not until the 20th century that scholars began to seriously consider the advantages of joining together to form an official Study Group on Music Archaeology (SGMA). The first steps were taken at the remarkable meeting of the International Musicological Society in Berkeley in 1977, which included a roundtable on “Music and Archaeology.” A few years later, the study group was formally recognized in 1983 by the International Council for Traditional Music (in 1997, the SGMA became an independent entity). In subsequent years, a series of conferences and published proceedings emerged, full references to which appear in the bibliography following Hickmann’s introduction (although she certainly does not claim credit in her introduction, I might add here that the organization and success of these conferences owes much to her vision and energy). Now, as is attested by the two volumes under review, the field of music archaeology is well established and flourishing (for further general information on the field and as preparation for those readers not familiar with the field, I recommend Hickmann’s article “Archaeomusicology” in S. Sadie, ed., New Grove Dictionary of Music and Musicians 1 [London 2001] 848–54).

The first volume, Stringed Instruments in Archaeological Context, contains the papers presented at the eighth symposium of the SGMA held in Limassol (Cyprus) in August 1996, as well as a few papers from other conferences; the second volume, Music Archaeology of Early Metal Ages, includes the papers from the first symposium of the newly independent International SGMA held at Kloster Michaelstein (Blankenburg, Germany) in May 1998. The second volume is dedicated to the memory of Hans Hickmann (1908–1968), a specialist in Egyptian music and, together with his teacher Curt Sachs, one of the foremost archaeomusicological pioneers. In addition to the archaeological articles, volume 2 accordingly includes two tributes to Hans Hickmann, both of which present not only an overview of the scholar’s work, as is usual in pieces of
this sort, but also charming personal anecdotes that capture his warm, witty, and humane personality.

In a short review, there is no way to provide a critical examination of some 58 separate articles employing a wide range of methodologies applied to subjects as diverse as, for example, the acoustics of the *carnyx* (a lip-vibrated aerophone common among the Celts) and the development of ancient Mesopotamian terminology for music and musical instruments. Instead, I shall try to provide some sense of the presentation of the articles, the ways in which the various methodologies are employed, the groupings and interrelationships of the articles, and the types of conclusions drawn by the authors.

The first volume is much more narrowly focused, concentrating entirely on stringed instruments. One group of articles (by Braun, Brentjes, and Lawergren) concentrates on the shape, construction, and significance of angular or bow-shaped harps; a second (by Malinowski, Meshkeris, Rashid, Seidel, and Vassilieva) considers a more generalized family of stringed instruments, including those plucked with the fingertips and those played with some sort of plectrum or bow; a third is largely concerned with general representations of musical instruments and music-making in rock art (by Dubey-Pathak, Meshkeris, and Rudolph); a fourth treats specific technical problems such as the stringing and fretting of Egyptian lutes (Eichmann) and an analysis of the famous cuneiform tuning tablet, CBS 10996 (Smith and Kilmer). One article deals essentially with wind instruments, although passing mention is made of the lute and the harp (Kloner and Braun’s “Hellenistic Painted Tombs at Marisa”); and one or two are primarily conceptual (Brentjes’s “Musikant, Schamane oder Befehlshaber?” and Otte’s “Regards sur la musique paléolithique”).

In general, the articles in volume 1 are brief, no doubt reflecting their original role as papers read at a conference. All of them provide fairly detailed descriptions of the objects under examination, and the descriptions are supported by very generous illustrations in the form of photographs, tracings, tables and graphs, and occasional musical notation. Each article concludes with a useful bibliography, and several also include helpful summaries of the material. Most of the articles are in English (11); three are in German; and one is in French. The prose, with a few exceptions, is primarily descriptive, clear, and suitably restrained.

The second volume is arranged in eight sections corresponding to the seven regions (or “fields,” the last two of which are designated VIIa and VIIb) established for the symposium: the Far East-Southeast Asia, Central Asia-Caucasus, the Near East-Anatolia, Latin America-Africa (this group seems rather contrived), Egypt-Aegean, Greek Antiquity-Rome, Bronze Age-Hallstatt-Celts, and Regional Developments in Europe. The section devoted to each of these areas begins with an introductory paper, intended to summarize the evolution of the technology of metalworking and its correlation with musical life. In some cases (Africa and the Far East), a correlation can be confirmed, while in others (Central Asia, Egypt, and Greece and Rome), the correlation is vague. The best example of the kind of interdisciplinary cooperation that Hickmann envisioned is surely demonstrated by the articles on the Celtic carnyx: the articles describe the archaeological assembling of the fragments and the ways in which the missing fragments could be conjectured (Hunter), the construction of the first replica (Crecel), the various ways in which the replica could be played by an experienced modern brass-player (Kenny), and the acoustics of the instrument (Campbell and MacGillivray).

While most of the articles deal with archaeological objects, a few are primarily philological (Delattre on the fourth book of Philodemus’s *treatise on music*, a particularly problematic treatise because it survives only in a severely damaged papyrus, the subject of a new reconstruction by Delattre; and Vassilieva on musical terminology in Pahlavi writings) or try to relate the testimony of literary texts to musical objects. A particularly good example of this latter approach is A.D. Kilmer’s “Continuity and Change in the Ancient Mesopotamian Terminology for Music and Musical Instruments,” which attempts to clarify Sumero-Akkadian terms for particular stringed instruments, as well as considering the names of the strings themselves and the role of the octave in theories of tuning.

Some of the articles apply iconographic evidence to organological problems with significant new conclusions. In particular, Psaroudakes’ “The Arm-Crossbar Junction of the Classical Hellenic Kithara” provides a challenging refutation of the most important modern reconstructions by Roberts, Paquette, Maas/Snyder, Bélis, and Lawergren. On the other hand, Byrne’s “Understanding the Aulos” ignores a great deal of the scholarship pertaining to the aulos, especially where the reed is concerned, and offers a number of poorly informed observations about musical notation in general, its relationship to the “tuning of lyres by rotations around the yoke” and to a certain type of aulos, and the new theory (it is hardly correct to say “it has been concluded”) that its conventional pitch is too high.

Most of the characteristics noted in the first volume apply to the second as well: the articles are brief, provide fairly detailed descriptions, and are once again supported by generous illustrations. Each article concludes with a bibliography (some more useful than others), and some include summaries of the material. The language and style of the articles is less even in this volume, but this is doubtless because of the fact that the papers were originally prepared, according to the foreword, in 16 different languages, and were then apparently translated into German or English, the two languages used in the second volume (translators’ names appear in only a few cases, however). According to the editors, “the English and German texts provided by non-native writers required serious revision, and often needed to be completely re-written.” The editors also observe that “lack of acquaintance with recent literature and research theory . . . existed for many of our colleagues who had been long cut off from the scientific community and who were thus not up to date.” It is difficult to know what to make of this observation, unless it is intended as an explanation for the fact that there is a certain unevenness throughout the volumes, there are some minor typographic and technical errors, and some of the articles are more scholarly than others.
Nevertheless, with a very few exceptions, the articles are like those in the first volume, useful and clear.

The second volume also includes a CD-ROM with the entire contents of both volumes in individual PDF files, linked to two separate PDF files of the table of contents for each volume (inexplicably, the table of contents for volume 6 is MUSIKA-2.PDF, while that for volume 7 is MUSIKA-1.PDF). In addition, the CD-ROM includes an INFO.TXT file that very briefly explains the contents of the CD-ROM, according to which the CD-ROM is also supposed to contain a version of Acrobat Reader for both Windows and MacOS. Unfortunately, the CD-ROM seems to have been created in ISO-9660 (rather than a hybrid) format and as neither version of the files in the ACRO-BA–2 directory contains a resource fork, Mac users will need to acquire a copy of Acrobat Reader elsewhere in order to make use of the CD. With Acrobat Reader properly installed, it is possible to open either of the table of contents files, and clicking on the title of the article or the page number will cause the appropriate article to open. The individual PDF files of each article display, of course, the articles and accompanying tables and illustrations exactly as they appear in the printed volumes. With the CD, the reader can easily search the individual articles, and to some extent, this takes the place of an index, since none is included in either volume. Nevertheless, since there is not a single PDF file for each volume, it is neither possible to display or to search the entire volume on the CD; rather, each article must be displayed or searched individually.

At the end of her introduction, E. Hickmann remarks, “It is perhaps in this latter subject—the relationship between technological sophistication (or lack thereof), social structure, and the development of music—that future music-archaeological research should direct itself, for it is a discussion that is far from being concluded.” This is an assessment with which I think no scholar of early musical cultures—whether musicologist or archaeologist, professional or amateur—will certainly want to agree. The second volume also includes a CD-ROM with the entire contents of both volumes in individual PDF files, and heritage studies.


This new edition of Archaeological Displays and the Public reflects the rapidly growing interest in the representation of the past. The book is useful in the sense that it conveys new areas of concern in museum display and the presentation of sites. New papers address the role of cultural tourism in the creation of heritage attractions and the importance of visitor research in museum display. What stands out in this revised edition is the new focus on audience and reception in museum and heritage studies.

As McManus notes in her introduction, the issue of how archaeologists communicate the results of their work to the public is not just a straightforward matter, where the professionals filter their findings down to the “wider public.” Rather, the practice of presenting the past raises all sorts of questions and issues concerning the nature of archaeological enquiry itself. Thus it is important to reflect on how our representations serve to structure knowledge of the past and influence our academic interpretations. For too long the topic of representation has been marginalized from intellectual debate and relegated to the area of heritage or public archaeology, which scholars naively assume has little to contribute to mainstream discourse.

Among the new contributions are Richard’s paper on cultural tourism and the shift toward more proactive forms of cultural consumption. He argues that it is fundamental for museums to become more aware of the needs of their visitors in order to compete in the market. This demands new approaches, such as being more creative in the development of narratives that appeal to the visitor. Furthermore, he notes the need to make room for visitors to develop their own interpretations. Similarly, Macdonald’s chapter on how university museums can adapt to the changing needs of visitors emphasizes the need for more audience research so as to make collections more accessible. The research on visitors carried out in her study reveals the potential of these front-end evaluations for the creation of new displays.

Other papers in the volume worth mentioning are Pardo’s paper on strategies for creating a visitor-friendly site. Although his 12 “guiding principles” are a little repetitive, there is much of value here; we learn how important it is to assess not only the intellectual but the personal impact on the visitor in order to improve the quality of their experience. Specht and MacLulich’s chapter remains an excellent discussion on the importance of collaboration with communities whose heritage is being presented in museums. As they point out, the collaborative process must underlie all aspects of the display design process to produce positive results; the concepts at the heart of the exhibition and the messages that are given derive then from true dialogue rather than ad hoc, tokenistic consultation. Finally, Sanson’s contribution is a sound review of reenactment and the role it plays in the presentation of sites. Despite the proliferation of reenactment societies there has been very little discussion about their contribution to the understanding of the past, and the complex nature of their role as interpreters.

Archaeological Displays and the Public is a useful text for teaching museum studies and archaeological and anthropological courses. Not only does it convey some of the recent thinking on the subject of representing the past, it also provides useful guidance in the form of strategies for improving our presentation methods. My main criti-
cism is that one of the best chapters from the original edition (Cotton and Wood’s chapters on displaying prehistory) was left out of this new version.

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This manual of aerial photography for archaeology is intended by its authors both as a text for those who teach the subject and to introduce field archaeologists to the benefits especially of photogrammetry (the use of stereo photography to measure the relative position and elevation of objects for producing topographic maps and plans). Both authors are active in photogrammetry and hold teaching and research positions in the department of Cultural Heritage at the University of Lecce. With the exception of a few photographs made elsewhere, the many fine aerial illustrations are all of Italian sites: thus while the book should be most useful to specialists in ancient Italy, the many photogrammetric techniques and methods discussed would have universal application.

A short introduction (ch. 1) warns that rapid urbanization with its pillage and destruction of the archaeological landscape is in a race against the improvement and more widespread use of technologies that could identify, evaluate, and thus protect archaeological sites. Conceding that the political will is lacking to invest in the best and most expensive techniques, the authors recommend a mid-range of cost and thus of precision in photogrammetry as the only practical course. Chapter 2 is a systematic review of the methods used and benefits gained from producing and examining aerial images. Since much photo interpretation consists of looking at images composed of only the faintest variations in tone and color, it is important not to read into them preconceptions either conscious or unconscious. Thus one should go back and forth regularly, in a kind of dialectic, between studying the photograph and walking the field, to gain and verify information. However useful the study of single photographs may be, given the obvious benefit of a high vantage point, stereo viewing is best. It returns depth and volume to objects, shows elevations and depressions in the landscape, and allows identification, especially with “exaggerated stereo,” of archaeological anomalies that exist only in very low relief. Molehills become mountains. Stereo plotting adds contour lines, producing topographic maps. Traditionally, the simplest way to produce a specialized map or plan had been to cover an aerial photograph with a sheet of plastic material and trace the elements characterizing the landscape, but the invention of the computer, and the substitution of digital scanning for photography, has now coupled photogrammetry with remote sensing. One can detect the authors’ growing excitement (or is it the reader’s?) as they discuss the new sensors. They begin with the “digitizing of gray,” as in black and white aerial negatives; where the human eye can distinguish about 10 tones between black and white, the computer is able to identify more than 200. Thus shapes that previously went undetected are now apparent in homogenous shades of gray, and more recently of color also. And because the most advanced imaging scanners are in satellites, their reach is now global.

With multispectral scanners, a spectral signature can be assigned to any substance or condition of interest; then a computer sorts out the information sought and makes it available as an image. Further remote sensing methods discussed include thermography (infrared), with the ability to detect, from satellite altitudes of 1000 m, temperature differences of a tenth of a degree, useful in revealing subsurface ruins; ground-penetrating radar (which uses electromagnetic emission and its return from the target to create an image) is now most helpful to archaeologists where the popular radar sled is dragged across the ground. Satellite applications for archaeology are few at present, but as sensors are refined (in Landsat, Spot, etc.), resolution in available cartography may reach an acceptable level of 1:100,000 or 1:500,000. The authors look forward to vastly improved resolutions when such sensors are flown less expensively, and more commonly, down at mapping plane level.

Chapters 3 and 4 review, with some repetition, the history of photography, of aerial photography, and then the developments in photogrammetric plotting, up through machines with complex systems of levers, to the latest fully digitized electronic equipment.

Chapter 5 presents a comprehensive method for analyzing photographs, recording first impressions, and resolving questions. The eye must be alert to subtle “markings,” patterns seen in vegetation, melting snow or frost, ground humidity, or soil composition, indicating what lies underground. Shadow markings, when the slanting sun is near the horizon, can reveal the slightest undulations in ground level, bringing to light in a farmer’s plowed field a Medieval village or a Roman villa. Subsoil foundations or buried roads make the soil above dryer, showing sparser, lighter vegetation, while covered-over ditches or pits are damper, growing more dense, darker vegetation.

In chapter 6 the authors present examples from their own completed projects in photogrammetry. Photographs, both aerial and at ground level, and many in color, combine with elegantly finished, often color-coded, plans, maps, and relief models, to present and reconstruct 10 ancient sites. Chapter 7 gives the many Italian sources of aerial photographs, in libraries, archives, agencies, and institutes. With characteristic thoroughness, the authors include 13 pages of laws, by royal decree in 1929, that apply to the control and distribution of aerial photographs. The concluding bibliography is impressive, furnishing 12 pages of conveniently organized sources in books and articles.

This work invites comparison with D.N. Riley’s Air Photography and Archaeology (Philadelphia 1987). Riley, writing as a pilot and aerial photographer with 40 years experience flying in Europe and the Middle East, covers much
the same ground, perhaps in less detail. He is especially good in his chapter “How Sites Show,” illustrated with 23 pages of well-chosen photographs, mostly his own. Writing 15 years ago, he too saw the future potential for archaeological remote sensing. Piccareta and Ceraudo bring that future closer.

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This welcome volume provides an exhaustive account of late Mycenaean seals made of steatite, fluorite, and pressed glass—a fascinating but poorly understood aspect of Aegean glyptic. Unlike Crete, where roughly 25% of neopalatial seals were made of soft local stones, only hard stones and precious metals were employed in Early Mycenaean workshops. Clearly the genesis and spread of soft stone seals during LH IIIA-B/C has social ramifications, as does the decline and apparent cessation of hard stone output toward the end of LH IIIA2. J.G. Younger, who originally defined the so-called Mainland Popular (MP) Group of steatite seals, saw them largely as the possessions of the “humble” (Kadmos 26 [1987] 65–71). New discoveries, especially outside the Mycenaean heartland, now make a systematic study all the more germane.

Dickers’s book is based on her 1992 doctoral dissertation, largely undertaken at the Marburg headquarters of the Corpus der minoischen und mykenischen Siegel (CMS). This valuable center houses impressions of most Aegean glyptic. Unlike Crete, where roughly 25% of neopalatial seals were made of soft local stones, only hard stones and precious metals were employed in Early Mycenaean workshops. Clearly the genesis and spread of soft stone seals during LH IIIA-B/C has social ramifications, as does the decline and apparent cessation of hard stone output toward the end of LH IIIA2. J.G. Younger, who originally defined the so-called Mainland Popular (MP) Group of steatite seals, saw them largely as the possessions of the “humble” (Kadmos 26 [1987] 65–71). New discoveries, especially outside the Mycenaean heartland, now make a systematic study all the more germane.

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kowska in three versions, none correct; W.-D. Niemeyer), and omissions (W.A. McDonald and N.C. Wilkie, Excavations at Nichoria in Southwest Greece 2 [Minneapolis 1992]). But turning a doctoral dissertation into a book is a mammoth job and too often nowadays editorial input is minimal. These minor blemishes do not detract from the overall achievement: Dickers should be thanked for providing us with an important tool for future research.

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Herod the Great’s kingship lasted from 40 to 4 B.C. During these 37 years he developed an almost obsessive building activity, resulting in a number of private, public, religious, military, and secular constructions. Single monuments or specific groups of monuments, such as palaces, among the buildings ascribed to Herod the Great have been the object of numerous studies during the past. Recently several books, in addition to the one under review, have been published, focusing on the same general subject, the building program and the building policy of Herod: D.W. Roller, The Building Program of Herod the Great (Berkeley and Los Angeles 1998; reviews by B. Burrell and E. Netzer, JRA 12 [1999] 705–15; K. Fittschen, Gnomon 73 [2001] 180–3); S. Japp, Die Baupolitik Herodes’ des Grossen (Rahden 2000); and K. Fittschen and G. Foerster, eds., Judaea and the Graeco-Roman World in the Time of Herod (Göttingen 1996)—also see the review article, “Out-Heroding Herod” by B. Burrell, AJA 106 (2002) 107–10.

Lichtenberger’s book is the result of his M.A. thesis, not many of which see the light of publication in the form of a monograph. The book is subdivided in four main parts. The first part consists of the introduction, explaining the goals and the methods of the work as well as briefly outlining the historical background and the state of research. The second part consists of a detailed discussion of 15 different buildings within Judaea, some more projects that are discussed in less detail, and an account of Herod’s building activities outside Judaea. It clearly forms the main part of the book, both in terms of size and the density of information. The third part summarizes the chronological phases of Herod’s constructions and gives a comparative analysis of Flavius Josephus’s description of the king’s building activities. Part 4 presents a short synthesis.

Submitted in 1998 and published in 1999, the book is up-to-date; Lichtenberger cites the works of Roller 1998 and N. Kokkinos, The Herodian Dynasty (Sheffield 1998) several times and mentions S. Japp’s study that was still in preparation at the time when his work was published. Japp, however, does not mention Lichtenberger and seems not to use Roller or Kokkinos—her thesis was submitted in 1996, the manuscript was updated in the spring of 1999, and published in 2000.

Whereas most other approaches to such a topic use a functional subdivision of the buildings (e.g., secular vs. religious and private vs. public), as does Japp, Lichtenberger follows, as far as the archaeological and historical evidence allows, a chronological progression of the buildings discussed in part 2: the first complex to be dealt with is the fortress Alexandreion, ca. 37 B.C. according to Josephus, while the last one is a poorly documented monument related to the tomb of King David set up around 10 (also see the helpful table in Burrell and Netzer 1999, 708, fig. 2).

Lichtenberger’s analyses of the different buildings reveals a detailed knowledge of the published reports that allows a concise picture to be drawn of Herod as a builder. The king adapted hellenistic and oriental features in his palaces, not only demonstrating wealth and luxury, such as the huge peristyle courtyards, but also featuring his “control” of nature that had to be “dominated” and integrated in his buildings, an aspect that later was prominently used by Nero in his domus aurea or by Hadrian in his villa at Tivoli. A second aspect is a strong orientation toward Roman, and especially Augustan, building activities, thus emphasizing his loyalty: the secret access from his palace in Jerusalem to the temple (cf. the underground access from Augustus’s house on the Palatine to the temple of Apollo), the direct connection between the temple for Augustus and the palace of Herod at Samaria-Sebaste, even the name of Samaria-Sebaste (Sebastos, Greek for Augustus), his naming of the palace in Jerusalem after Marc Antony (built probably before 31 B.C.), and his naming of several minor constructions after princes and princesses of Augustus’s family. Similarly, he used pumice imported from Pozzuoli for the construction of the harbor at Caesarea Maritima, perhaps built by Italian engineers. Finally, in contrast to his Roman leanings, Herod paid respect toward traditional Jewish architecture with his gigantic project, the new temple in Jerusalem.

While the buildings analyzed by Lichtenberger are Herodian beyond doubt, especially since they are referred to by Josephus, our main source for Herodian building activities, the ascription of individual architectural elements to Herod as builder is not always convincing. For example, heart-shaped columns in the angles of peristyles are not a defining criterion for a Herodian style. Heart-shaped columns in the angles of peristyles can already be found in the palace of Demetrias, Thessaly, dated around 200 B.C. (F. Marzolf, “Der Palast von Demetrias,” in W. Hoepfner and G. Brands, eds., Basilica [Mainz 1996] 148–63, esp. 158–60), and occur again in the “Palazzo delle colonne” in Ptolemais in the Cyrenaica (G. Pesce, Il “Palazzo delle colonne” [Rome 1950] pls. 1 and 11). It is generally believed that this element was taken over from Asia Minor and was especially successful in Ptolemaic architecture (H. Lauter, Die Architektur des Hellenismus [Darmstadt 1986] 255), which would be the source for its
appearance in Judaea. It is, therefore, not surprising that it is attested on other monuments, surely not related to Herod, such as the so-called complex of Absalom and Josaphat, the monolith of Zacharias, and the “pillar” of Absalom, all funeral monuments at Jerusalem (see S. Bonato, “Aspects de l’hellénisation de la Judée,” Kölnbh 32 [1999] 7–31).

Lichtenberg’s analyses would be useful in determining how influential Rome was in the architecture of both client and nonclient kingdoms, a subject that Lichtenberger only occasionally takes up. His detailed account of the building program of Herod the Great, a Roman client king par excellence, would be a promising start for comparing his works with those of other kings strongly dependent on the goodwill of the Roman imperial family and governors (see D.M. Jacobson, “Three Roman Client Kings: Herod of Judaea, Archelaus of Cappadocia and Juba of Mauretania,” PEQ 133 [2001] 22–58; for contemporaneous Numidian architecture, see F. Rakob, “Numidische Königsarchitektur,” in H.G. Horn and Ch.B. Rüger, eds., Die Numider [Bonn and Cologne 1979] 119–71, and M. Coltelloni-Trannoy, Le royaume de Maurétanie [Paris 1997]). Similarly, it would be tempting to search for similarities and differences between the building activities of Herod and those of his immediate neighbors, not so dependent on Rome, in order to gauge the real impact of Rome’s political influence on local architecture. The best opportunity for such a parallel study is offered by the Nabataean kingdom, independent until A.D. 106 (see S.G. Schmid, “The Nabataeans,” in B. MacDonald, R. Adams, and P. Bienkowski, eds., The Archaeology of Jordan [Sheffield 2001] 367–426).

However, these opportunities for further research do not detract from the solid groundwork of Lichtenberger’s study, which remains satisfying and inspiring.

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**Sculture di metallo da Nisa: Cultura greca e cultura iranica in Partia, by Antonio Invernizzi.**


Old Nisa (anciently Mithradatkert) in modern Turkmenistan was first substantially excavated by the Soviets from the 1930s to 1950s and has been more recently revisited, from 1990 onward, by a joint Italian-Turkmen expedition. The site has been long recognized as a stronghold of the Arsacid rulers during the formation of the Parthian empire. Some of Old Nisa’s artistic finds, most notably a group of carved ivory rhyta, have been the subject of intense interest, but others have received more fleeting attention. In this volume, Antonio Invernizzi, director of the Old Nisa excavations, seeks to remedy the situation by focusing on small-scale metal sculpture uncovered in the earlier excavations—freestanding and relief, in bronze and in gilt silver—granting the objects a thorough study augmented by fine color photography.

The organization of the book is straightforward, with a chapter devoted to each of the primary objects: statuettes of Athena, Eros, an eagle, a centaur, a sphinx, a siren, and a griffin; a bronze disk with deer protome; a disk with lion protome; a decorative frieze from a shield, and a parade axe. Two additional chapters discuss other metal and terracotta fragments. Almost everything in the volume was discovered in the so-called Square House, a building which at some point in its history began to serve as a repository for discarded, albeit precious, objects. (The ivory rhyta and some strongly hellenizing marble female figures were also found here, although they are not a focus of this text.) The metal objects all date from the Late Hellenistic period, and thus provide insight into the tastes of the early Parthian court.

Particularly commendable is Invernizzi’s careful attempt to present a balanced picture of the wide range of artistic influences in Central Asia, to be neither fully Hellenocentric nor fully Iranocentric in his approach. In this he captures the essence of the Arsacids; one need only think of Mithradates I (reigned 171–138 B.C.), who used the Greek language on his coinage but a title, “great king,” reminiscent of Achaemenid Persia. While Invernizzi hypothesizes a resident workshop of Greek artists in Old Nisa responsible for most of the objects (other scholars have considered them imports), in his painstaking stylistic and iconographical analyses he makes comparisons to both Mediterranean and Central Asian works of art, tracking the reception of Greek motifs among Eastern cultures. Fortunately numerous photographs and line drawings allow readers to make their own comparisons, although in many cases they are directed to hard-to-find Russian publications instead.

In the most noteworthy parts of the volume, Invernizzi highlights the specifically Central Asian context of the works; thus he includes a discussion of Athena in Asia and at Nisa, and of Eros in the Arsacid court. Special mention should be made of the bronze disk with deer protome, which Invernizzi relates to the nomadic art of the steppes, the ultimate origin of the Arsacid dynasty. The reader therefore emerges not only with a concentrated knowledge of the Nisan objects, but a broader view of Central Asian art and culture.

The archaeology of Central Asia has gained increased emphasis in recent decades, as the field of Hellenistic studies itself continues to grow. Current world events will likely draw further attention to this area and its cultural heritage. Invernizzi’s scholarship, and the work of his team in Turkmenistan, stand as models for future exploration and study.

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The Oxus temple stands as one of the most important monuments of the Hellenistic Far East. The book makes a major contribution to the study of Bactria by changing our conceptions of its architecture, art, and religion within the backdrop of the Achaemenid and Hellenistic period, as well as its influence in the post-Hellenistic epoch. The volume is composed of three sections. In part 1 (chs. 1–3), the site is treated archaeologically with a detailed discussion of its architecture, stratigraphy, and its associations with the Oxus Treasure and the city of Ai Khanoum in northern Afghanistan. Part 2 (chs. 4–6) traces the origin and tradition of what the authors identify as Iranian and eastern Hellenistic fire temples, while part 3 (ch. 7) reconstructs the religious life practiced at the temple. Two appendices complement the book: P.P. Kerzum and A.P. Kerzum present a regional study of the site’s geomorphology and paleoecology (375–92), and the late E. V. Zeimal provides an inventory of coins found each year at Takhti-Sangin (393–404). A list of the tables (469–73), a summary (488–97), and the contents are in English. The second volume will be devoted to Bactrian weaponry within a Greek and Near Eastern context.

The ancient Bactrian city of Takhti-Sangin in southern Tajikistan is situated at the confluence of the rivers Vaxš and Pyandž, where they form the Oxus (Amu Darya) proper. The city is located on the third terrace of the Vaxš, covering an expanse of 2 km × 250–300 m. Between 1976 and 1991, Litvinsky and Pichikian conducted excavations on the city’s rectangular citadel where the temple was discovered. Graeco-Bactrian and early Kushan coins found at the site indicate that the temple flourished in the Hellenistic period, although it dates from the end of the fourth or the beginning of the third century B.C. to the end of the second or beginning of the third century A.D. Its treasury contained more than 8,000 coins and votive objects (ivory, bronze, clay, and alabaster) with few of them in gold or silver. Unfortunately, much of the inventory has yet to be published. The authors conjecture that the treasury had been transferred from an earlier, though still undetected, Achaemenid temple (373).

The temple’s plan is symmetrical, measuring 51 × 51 m. A propylaeum opens onto an enclosed temenos (courtyard), containing a stone pedestal (perhaps for the statue of a deity), Hellenistic column bases, and fire altars. At the far end of the temenos is a rectangular triple cella that is divided into three equally squared sections. The central portion and main entrance to the temple is an eight-columned ayvān (portico), which is flanked on either side by two sections, each of which consists of corridors, an altar room, and two other rooms. The authors have identified both altar rooms as atashgahs composed of a central sacrificial altar and four smaller ones in the corners containing ash and charcoal (97–113). The ayvān led to a four-columned central hall with a stepped plinth, reserved for a cult statue, in whose floors were bothroi (pits) and favissae (deep trenches) for storing offerings. Two short corridors at angles border the central hall opening to longer ones behind it that are parallel to each other. At some point, the corridors were used as treasuries, and pits were dug into their floors, as with the ayvān, for placing ashes. The atashgahs and the depositories of sacred ash have led Litvinsky and Pichikian to conclude that the entire complex was a fire temple, the first known such example in the pre-Sasanian period (296–8). Unlike others, however, with only one atashgah, the Oxus temple has two, one in each of its wings.

The temple’s location at the river Oxus symbolically represents the birth of its waters and was personified in the form of the water god “Oxus” (a Greek transliteration of the Iranian Vaxš), as well as ancillary deities. Yet materials gleaned from the excavations at the temple have uncovered a society in which the inhabitants practiced a local brand of a Bactrian religion that had adopted Near Eastern, especially Achaemenid, and Hellenistic artistic and architectural traditions. In this respect, the art of the temple, like temples found in the city of Ai Khanoum, provides much insight into the nature of monumental and applied art in Hellenistic Bactria. The establishment of Macedonian political power stimulated Hellenistic art and culture in Bactria after 329 B.C. as did the foundation of new Hellenistic poleis and fortresses that architecturally were influenced by local and eastern traditions. Bactria’s incorporation into the Seleucid realm, followed by its independence as a Graeco-Bactrian kingdom in the mid third century B.C., allowed contacts with the Mediterranean world to be maintained and occasionally intensified by waves of Greek colonists.

The temple’s construction and building techniques embody traditions dating from the Bactrian Bronze Age, which were fused with those from the Near East and enriched by Hellenistic architecture. The Oxus temple embodies the classical form of the Bactrian fire temple whereby its compositional and architectural principles played a decisive role in the evolution of fire temple architecture not only in Bactria, but also elsewhere in Central Asia, including Parthia, Choresmia, and Sogdiana.

Throughout the Achaemenid and Hellenistic periods, literary sources linked Bactria with Zoroastrianism. The most famous of the finds from this temple is a small votive altar with a stone pedestal topped by a standing bronze statue of Silenus-Marsyas, playing an aulos. The votive contains a Greek inscription on its pedestal: “Atrosókēs dedicated his votive present to Oxus” (305). The name of the donor is Bactrian. In addition, there are other Hellenistic altars and sculptures with Greek inscriptions. The authors propose that the materials from the temple indicate coexistence between various water and fire cults alongside local and Hellenistic altars (327–8). Although no temple has ever been found that exactly parallels the Oxus temple, there are temples with similar elements found in Bactria and Sogdiana dating from the beginning of the second millennium B.C. As to the temple’s deity(s), the authors assign one atashgah for the worship of Oxus = Vaxš, while that of the other remains uncertain, although they cautiously propose that it may have been dedicated to Aryan-Sūrā Anāhītā (354–5).

A comparison of this temple with other Iranian fire temples at Susa, Persepolis, and Kūhi-Khwaṅa has enabled
the authors to date them to the fifth and fourth centuries B.C. (215–6, 224, 238). In this regard, the plan of the Oxus temple resembles a Near Eastern style, yet its columns and altars bear Greek and Achaemenid influence, while stone altars in front of the temple are of a purely Hellenistic type resembling those used in Hellenistic cults. Like other Hellenistic temples at Ai Khaneum, and in southern Bactria and Seleucid Mesopotamia, the Oxus temple contains a compositional pattern that originated in Bronze Age Syria and Mesopotamia.

Since the temple yielded so few objects of gold or silver, the authors propose that the temple’s priests, perhaps fearing a nomadic invasion, buried a large quantity of gold and silver on the banks of the river Vaxš between Takhti-Sangin and Takhti-Kobad. Between 1875 and 1885, the river eroded its banks, unveiling this ancient treasure to local people. Subsequently, the majority of the objects were deposited in the British Museum, where, known as the “Oxus Treasure,” they remain today. Thus the authors identify the Oxus temple as the origin of the Oxus Treasure. They also conjecture that throughout the temple’s existence, the priests may well have enjoyed significant economic, political, and military authority (33–6).

The temple’s remains present a number of social and historical implications about the nature of Hellenism in Central Asia. The interaction between the social and economic spheres of Greeks and Bactrians led to the synthesis of a multidimensional cultural and historical phenomenon that is commonly termed “Greco-Bactrian.” While this brand of hellenization was uneven depending upon place and circumstance in which Hellenism spread, the Oxus temple at Takhti-Sangin reveals that this process was isomorphic and the qualitative internal transformation of the Greek and Bactrian elements was essentially a hybrid admixture (369). Herein lies the significance of the analysis by Litvinsky and Pichikian of the Oxus temple, for it elucidates the degree to which Hellenism affected the development of Central Asian civilization.

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The history of excavation at the Athena sanctuary at Miletos is long and complicated. Since 1903 it has recurrently been a focus point of the German excavations there. The first excavations took place from 1903 to 1908, but were not published until 1925, when Armin von Gerkan presented a survey of the sanctuary and suggested a reconstruction of the later temple (Kalabaktepe, Athenatempel und Umgebung [Verlag von Schoetz und Parrhys-


Not until now have all the results from the several excavations, including the old excavation diaries, been analyzed and a complete outline of the history of the sanctuary and the temple been possible. This is the task that Winfried Held has tackled in the present monograph, based on his 1994 dissertation. Following a brief history of research (3–4), he presents the excavations results chronologically, as if everything had been cleared at one time (5–33). The complicated excavations are described clearly and meticulously. Larger section drawings, especially of the earliest remains, are missing (e.g., a large section both north–south and east–west of the state plan, fig. 5), and the sections that are included often are not marked precisely on the plan drawings. In the complex presentation of the evidence of both the earlier and the later temple and their topographical relationship, it would have been useful to include a reconstruction drawing, like fig. 43, where all phases are summarized, as a supplement to the impressive yet confusing state plan, fig. 17.

The first part of the publication, the excavation results, is substantial and demands intense reading. It forms the solid foundation of the second and main part, the reconstruction and interpretation of these excavations (35–94). Indeed, this publication combines the strength of the great German tradition of meticulous registration and specialized architectural studies with a well-argued reconstruction of the sanctuary, both architecturally (35–94) and historically (179–84).

Originally the sanctuary consisted of a little shrine (“Kultmal”), possibly the shelter of a cult statue and at least some of its votive offerings. This shrine was established in the first half of the eighth century B.C., but the earliest temple building was not constructed until the first quarter of the sixth century. This date is supported by the stratigraphy and finds, but Held also includes a well-considered historical argument, suggesting that the older temple was erected in gratitude for Miletos’s independence from the Lydian king, achieved by the tyrant Thrasyboulos. Held also includes a study of early Ionic architecture and the relations between the Cycladic islands and the Ionian cities, complete with ample references to a wide range of detailed studies. Included also is a consideration of the older temple’s function as a treasury, when the primary cult image probably still rested in the Kultmal.

The finds are treated in an excellent and useful catalogue (95–177); little has survived, however, both because of the Persian destruction of the city in 494 B.C. and also because of the turbulent history of research, interrupted by two World Wars and the Greek-Turkish conflict of 1919–1922. Nonetheless, the finds indicate that cult activities declined remarkably in the second half of the sixth century B.C. Held connects this with the extraordinary building activities at Didyma, which to
a large extend must have included heavy funding from the city of Miletos. The hypothesis is that all the resources were spent on the sanctuary of Apollo and his new and impressive dipteros, and that Apollo took over as the main deity of Miletos.

The Persians sacked Miletos in 494 B.C. and the Athena sanctuary was desecrated, but after the Ionians regained Miletos in 479 B.C., the construction of a new Athena temple and terrace complex began. As part of a new city plan, a large terrace was laid out and a unique Ionic temple built. Focus once more was on the old Athena sanctuary inside the city of Miletos, while the Apollo sanctuary at Didyma was only sporadically repaired—at Didyma the organization of the cult was shattered, the priests were Persian captives, and the oracle was silent.

The archaeological remains of this later Athena temple are sparse: only the foundations were found during the early excavations, and three decorated architectural members were attributed to it. Held presents a new reconstruction of the later temple: pseudo-dipteral (six by nine) with in-antis porches (fig. 49). Although this layout implies that the cela walls were adjusted to the peristyles in a Doric manner, it well suits the extant foundations (in contrast to both Mallwitz’s and von Gerkan’s reconstructions). Both proportion and the introduction of Doric elements find good parallels in later fourth-century Karian architecture, notably at Labraunda. The position of the now dismantled “Kultmal” is located in Held’s hypothetical reconstruction in the southwestern corner of the inner dipteros.

Similar insecure ascriptions pertain to the three architectural members: a fragmentary Ionic capital, and an Ionic cyma and ovolo. Held examines the three fragments, gives possible reconstructions, original dimensions, and stylistic dates. He concludes that the capital may have belonged to the later temple, but the Ionic cyma and the ovolo would probably be too small for it. Again closing arguments contain an historical outline that concludes this well-argued publication.

After Held finished his manuscript in May 1998, finds excavated from a well in 1995–1996 southwest of the Athena sanctuary were published by W.-D. Niemeier (“Die Zierde Ionien,” AA [1999] 373–413) and B.F. Weber (“Die Bauteile des Athenatempels in Milet,” AA [1999] 415–38). The well contained Late Archaic pottery and a fragment of an Ionic cyma, probably part of the same molding as the long known corner-piece first published by von Gerkan in 1925 (1, 8, 68). Both Weber and Niemeier argue for a Late Archaic date for the later temple to which they assume that the cyma belonged prior to the Persian destruction of 494 B.C. Neither scholar, however, presents a formal analysis for assigning the Archaic cyma to the later temple, and there is thus no reason for diverging from a Classical date for it. Even so, regardless of the cyma fragment, it is to his credit that Held’s historical analyses remain unaffected.

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The Göttlingen Collection also comprises some interesting figural scenes. Particularly welcome are the publications of the following: a Corinthian flat-bottomed aryballos (Hu538e, pl. 5, 4–7) that depicts a scene including padded dancers, a rider, and an unusual “bull” scratching itself on the back with its teeth. On the “bull” there is an inscription reading “Larinos.” Animal depictions uncommon to the ordinary Corinthian repertory can also be seen on an aryballos (Hu 539e, pl. 2, 13–16) depicting a lion-bird, and on a kotyle (Hu 537, pl. 18, 1–3) decorated with a frieze of swans walking in line. Finally, a bucchero aryballos (Acc. inv. III 24, pl. 29, 3–8) carries the well-known scene of two anthropically placed lions each carrying a human leg in the mouth.

The material has been put firmly within the current field of research with relevant older and newer literature cited under each entry. Comparative material has been treated thoroughly, but I would like to add Copenhagen, National Museum inv. Chr. VIII 885 (CVA Denmark 2, pl. 90, 2) to the comparanda for the so-called bird-cup (F 995, pl. 17, 2, 4, 6) since it seems a closer parallel.

Observations on vase painters and groups include both discussions on already existing attributions as well as new ones. Those interested in the full Corinthian style will benefit from the present study that attributes new vases to various vase painters such as the Kalauria Painter, the Otterlo Painter, and the Pegasus Painter. I am not entirely certain about the attribution of fragment Hu 539e (pl. 11, 3) to the Transitional Painter of Vatican 73; the face of the panther is different from his usual style and the preservation of the fragment prevents a comparison with other motifs. References to major works on vase painting are cited, including the indispensable work of Dehl-von Kaenel, Die archaische Keramik aus dem Malophoros-Heiligtum in Selinus (Berlin 1995); however, a reference to the study of J.L. Benson, Die Geschichte der korinthischen Vasen (Basel 1953) is curiously absent, despite his fundamental role as a pioneer in this field.

Of the Etruscan pottery four black-figured vase (Hu 749a-Hu 749d, pl. 40, 2–4; 41, 1–3; 42, 1–4, 5–6), hitherto unpublished, should be mentioned. The authors attribute them to an unnamed painter that has some similarities with the followers of the Micali Painter. The fragments of about five other black-figured vases (Hu 749e, Hu 749f, pl. 43, 1; 45, 5) are also interesting. The authors identify them as works of the Jerusalem Painter and include in the text of pl. 43, 1 a valuable list of recent attributions to this painter. The examples from the volume given here are important because systematic studies in late Etruscan black-figure are limited, and the present work has advanced research in this area.

The overall impression of this CVA volume is that of a thorough and up-to-date work, and scholars interested in these fields should not hesitate making it a future source of reference.

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In his 1902 essay published on the occasion of the first exposition of the newly reconstructed Pergamene Altar in Berlin, Guillaume Apollinaire expressed his awe by pronouncing it “a poem in stone” and by making the unfair statement that “just by contemplating the cutters of Pergamon some men may yet become sculptors in Germany . . . because the Germans have absolutely no idea about what sculpture is.” Ever since its discovery, this breathtaking monument has exercised an enormous influence on our perception of Hellenistic history and art, appealing in our modern era to a very different audience than the one originally intended. Our sources do not enlighten us on the dates of its construction and dedication, its purpose, honoree, or its impact on artistic developments. Its sculpture has not been published in its entirety, and its reconstruction is fiercely debated. Yet the Pergamene Altar has cast a shadow over ancient sculpture and iconography and has seriously influenced the way we look at art (Ridgway, Hellenistic Sculpture 2:19–102). Over the last hundred years an enormous bibliography on Pergamene “baroque” and its presumed influence was generated, and many theories have been proposed, some of which were based on unsound arguments composed of hypothetical premises and consequently shaky conclusions. As a result, our perception of ancient art was seriously distorted by the addition of speculation, even fantasy, onto the existing factual framework.

The articles of the volume under review here are the result of collaboration among leading Hellenistic historians and archaeologists. They deal with two important Hellenistic and Roman sculptures that scholars often link closely together: the Gigantomachy and Telephos friezes from the Pergamene Altar and the Odysseus groups from Sperlonga. The result is a spectacular and much-needed dialogue that reviews and updates the scholarship; deals with issues of iconography, authorship, and date; mercifully separates fact from fiction; and proposes innovative approaches in the study of Hellenistic and Roman artistic developments.

Gruen’s essay defines the historical setting by offering an overview of how the Attalids of Pergamon became masters in cultivating an international image, by constructing their self-conceptualization in order to legitimize themselves as the Greek dynasty par excellence. In this context the establishment of a new state mythology and the sponsoring of building projects fit perfectly into Attalid foreign policy, which generally aimed at consolidating and expanding the kingdom. Of particular interest is Gruen’s discussion of the Trojan legend as a point of convergence between the Romans and the Attalids following the conclusion of their fateful relationship that ended as a one-way dependency of Pergamon on Rome in the second century. He next observes that some of the newly-constructed mythological interconnections, linking the Roman legendary forefather Aeneas to the
sons of the Attalid fictitious patriarch Telephos, can be
found in Lykophron’s unpalatable poem entitled “Alex-
andra.” In an article that appeared simultaneously with
Gruen’s, this reviewer argued that the “Alexandra” is act-
ually a product of Attalid dynastic propaganda directed
at Flaminius and is probably dated between 196–194 B.C.
Stewart’s article on the Great Altar constitutes a par-
ticularly valuable account of the facts about that much-
discussed monument. He cautiously reviews the various
theories that have been proposed regarding its date, pur-
pose, and reconstruction. His conclusions are negative:
the results of studies in quest of a date for the Altar’s
context pottery are sadly inconclusive (see Rotroff, AJA
are also problematic, for they have incidentally led two
scholars to propose two different restorations. The puz-
zing apsidal building encased in its foundations remains
an enigma. Any reconstruction of its pitifully fragment-
ary dedicatory inscription must remain an exercise in speculation. Scholars are still debating on whether this
was an altar or a heroön. If an altar, was it dedicated to
Zeus, Athena, both of them, or all the gods? Was the
monument conceived and built by Eumenes II or Attalos
II after 188 B.C., and was it ever completed? Of particular
importance is Stewart’s sensible reconstruction of the
sacrificial altar’s cornice as a display of enemy spoils rath-
er than a base of yet another copy of the infamous “Less-
er Attalid Dedication.”
Sturgeon’s essay focuses on luxury architecture as a re-
flection of political and religious power in Anatolia from
the fourth century B.C. to the Roman period. She places
the Pergamene Altar in the context of elaborate architec-
tural types that served multiple functions, while their over-
whelming amounts of sculptural decoration conveyed var-
ied meanings and expressed political power. The follow-
ing monuments are presented in some detail: the Nereid
Monument from Xanthos; the mausolea of Halikarnassos
and Belevi; the tombs at Gölbäşi-Trysa and Lykian
Limyra; the altars of Athena at Priene, Artemis Leuko-
phyrene at Magnesia, and Pergamon; and the Roman the-
aters of Aphrodisias, Corinth, and Hierapolis. Sturgeon’s
iconographical analysis of the Pergamene Altar leads her
to identify Zeus as the honoree and to conclude that sculp-
ture played a defining role in conveying the monument’s
rich dynamic and propagandistic overtones.

Ridgway moves from Pergamon to the grotto at Sper-
longa that has been associated with the emperor Tiberi-
us and has yielded large amounts of fragmentary sculp-
ture, much of which is still unpublished and under pains-
taking study. The grotto itself and its adjacent complex
of rooms and corridors also remain unpublished, which
renders the interpretation of the finds all the more dif-
ficult. Ridgway next reviews the facts and various pro-
posed interpretations. Scholarly interest has mostly
focused on four sculptural groupings in varying states of
preservation: Odysseus blinding Polyphemos, Skylla rav-
aging sailors, Odysseus and Diomedes carrying off the
Palladian, and a copy of the Pasquino group. To compli-
cate matters, a stone tablet from the grotto preserves the
signatures of the three Rhodian sculptors that Pliny men-
tions as the makers of a Laokoon. This discovery has nat-
urally triggered endless discussions on the origins, prov-
enance, and date of the groups. Ridgway rightly prefers
to associate them with an Italian, rather than Greek,
tradition and to caution against dating them on the basis
of style, since scholars tend to omit the transformations
of aesthetic expression from their discussions.
Moreno and Andreac, who have worked extensively
on the Sperlonga finds, have both associated them with
Hellenistic originals; the former considers them Rhodi-
ian and dates them to 226–166 B.C., while the latter has
pronounced them to be the source of inspiration for the
Pergamon Altar! Since many scholars have considered
the Pergamene monument to be a Rhodian work, Pollitt
next examines the merit of this theory. A careful analysis
of the term “school” and of the literary, epigraphical, and
archaeological evidence on the artistic production of
Hellenistic Rhodes leads to the only possible conclusion:
no valid argument can be made in support of the exist-
ence of a Rhodian sculptural school, since all premises
proposed are false, “a kind of visionary scenario [creat-
ed] out of hints and hypothesis” (105).

In her study Weis tries to make sense of the limited
evidence that has been made available to scholars study-
ing the Sperlonga sculptures. She points out that a num-
ber of problems hinder their reconstruction and inter-
pretation: the four heroic groups are fragmentary, large-
ly restored by Andreac and Conticello on the basis of
comparison with representations in the minor arts; their
findspot is sadly unknown; and scholars have limited their
discussion of the grotto’s sculptural program on the basis
of the four known groups. Weis next suggests that Fausti-
nus Felix’s epigram on the sculptures that was carved on
the grotto’s walls in late antiquity possibly hints at a Ver-
gilian characterization of the mythological scenes. Final-
ly, Weis favors a date in the middle of the Julio-Claudian
period for the sculptures based on their carving style.
Green next offers a response to the preceding papers
that builds on their largely negative results. From his
fascinating essay this reviewer singles out one important
point that he makes: the lack of evidence unfortunately
tempers scholars to succumb to a notorious academic falla-
cy, believing that all surviving evidence is interrelated
and cohesive rather than representative of random piec-
es of a puzzle that we will probably never be able to put
together in its entirety.
The last three essays move away from the monuments
under study. Marszal’s essay is a thought-provoking, espe-
cially timely summary on the representation of Gauls in
antiquity. Rather than attribute every surviving sculpture
to a presumed Attalid “School of Pergamon” and agonize
about distributing “Roman copies of Hellenistic originals”
on three Pergamene bases, he adopts a more sensible
approach. He reviews the literary, epigraphical, and ar-
chaeological evidence and tries to make sense of various
figures of barbarians that were represented through the
Roman period. He rightly observes that Attalid propa-
ganda often misrepresented the Gauls, who also served
as loyal mercenaries, while the Pergamenes did not spon-
sor as many victory monuments featuring defeated Gauls
as scholars believe. Of particular value is his plausible
reconstruction of the “Long Base” from Pergamon (fig.
76). It should be stressed that the Attalids were not the
only ones to score victories over the Gauls or set up victory
monuments. Scholars have lately focused on the sculp-

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tural commemoration of Gallic victories by other powers, including Ptolemaic Egypt, and Barbantani recently made a case for the association of two fragmentary elegiac poems preserved on papyri, with Ptolemaic battles. Significantly, the second poem (SH 958) uses the same association of the Galatians and the Persians at Marathon (490 B.C.) that was used as a theme in Attalos I’s propaganda (Barbantani, Phàtis Nikephoros: Frammenti di elegia encomiastica nell’età delle guerre galatiche [Milan 2001]).

Steingräber explores the issue of Pergamene influences on contemporary Etruscan art by examining the iconography and style of a number of Etruscan monuments and artifacts. Of particular interest to this scholar are representations of the myths of Telephos and of Odysseus, as well as Galatomachies that he believes were in vogue in the second century B.C. The study of Attalid influence on the Romans and their mythographical tradition deserves to be further pursued, and important studies have appeared by Hardie (Vergil’s Aeneid [Oxford 1986]) and Kuttner (HSCP 97 [1995] 157–78). Steingräber has amassed an impressive amount of material and makes important observations about problems related to Etruscan art. This reviewer is not convinced, however, that he proves his case, since he often argues in favor of iconographic similarities between Etruscan and Pergamene works based on sculptures that have been attributed to the “Lesser Attalid Group.” This attribution is tentative at best, and based on recently resurfaced archaeological evidence, Stewart’s forthcoming work on Attalos I’s dedication on the Athenian Akropolis must be a major source of information. De Grummond’s response to the two last papers wraps up the book. Of particular value is her dialogue with Steingräber, especially her plausible contextualization of representations of the Skylla myth in early Etruscan art. The same situation can be observed with regard to representations of Galatomachies and Gigantomachies which, evidence suggests, developed iconographically in Hellenistic Italy, independent of the East. In conclusion, De Grummond prefers not to seek the basic unifying element at Sperlonga in the work of one author, but rather associates the sculptures with a specific topography centering around the west coast of Italy and Sicily.

One cannot stress enough the importance of this richly illustrated and well-documented collection of essays for our understanding of Hellenistic Pergamon and beyond. Its authors do not claim to have tackled the insurmountable problems associated with the monuments under consideration, but they offer the hard facts and suggest a most sensible approach to the study of exceptionally difficult topics. It should remain the first book on Pergamon and Sperlonga to consult for many years to come.

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Cult statues existed everywhere in the Hellenistic Greek world but few originals survive, even in part; those that do give a tantalizing glimpse into what must have been a visually rich experience for the ancient worshipper, particularly one who traveled. We know the names of many Hellenistic sculptors—both bright lights, such as Damophon, Eukleides, Phyromachos, and Telesinos, and lesser luminaries, including Menandros, Kanachos, and Kallon—sculptors who were known in antiquity, though only a handful of works directly attributable to them can be identified now.

Damaskos tackles this tough material in his dissertation, completed in 1996/1997 at Freien Universität Berlin and presented here in a revision finished in 1998. His introduction sets out his definitions of "cult statue" (an ἄγαλµα placed on a specially created base and connected with cultic activity [1]) and the goals and limitations of this study. The author distinguishes between statues of divinities and those of deified rulers, and arranges his study accordingly, beginning with the former, which are presented geographically and occupy about two-thirds of the text, then turning to the latter, described chronologically. One break in this plan is a chapter inserted between the cult images of deities on the mainland and those on the islands; this special chapter is devoted to the cult images of Damophon (also arranged geographically) followed by an excursus on Damophon’s work on the islands of Leuke and Kythnos. The body of the text is followed by an appendix concerning the social status of individual Hellenistic sculptors and a brief conclusion. A list of “Dubia,” a list of illustrations, an index of ancient sources (literary, epigraphical, numismatic), a general subject index, and 16 black and white illustrations conclude the book.

The author methodically documents the literary and archaeological evidence for Hellenistic cult statues of divinities and of the Diadochoi and Antigonids, the Seleukids, the Attalids (who were worshipped at Pergamon long after the end of their dynasty), individual rulers, and late Hellenistic citizens (e.g., Diodoros Pasparos of the first century B.C.E. at Pergamon) throughout the Greek mainland, islands, and Asie Minor. True to dissertation format, the text meticulously details previous scholarship on this subject with amplification in the copious and lengthy notes.

Damaskos often must rely heavily on excavation reports and photographs, which he has carefully read, sorted, and synthesized here. He deftly sifts through and assembles the evidence, a daunting task since much of the material evidence is fragmentary, often absent, or poorly published; and many of the objects lie in store-rooms, have vanished since their excavation, or have not received—and in some unfortunate instances, will never receive—full publication. For each example, the author describes the physical evidence for the cult statue itself (usually fragmentary and often no longer extant) and its setting (description of remains, condition, dimensions, materials, and findspot); examines related written evi-
Dame (inscriptions and literary); and explores various issues and problems. Damaskos offers detailed discussion of the identification, dating, and history of various sanctuaries, structures, and cult statues; the original placement of statues; patronage; reconstructions of cult statues based on coins; Roman statues and other comparanda; the relationship of Hellenistic cult statue types to Classical predecessors; and honorary titles awarded to rulers. This compendium of information is not only useful for both major and minor sites but also enables us to see clearly, with a sense of wonder mixed with sadness, how much there once was and how much is now absent. In many cases, we have only the cult statue base or a literary description from which to draw any conclusions. Interpretive summaries (201–56, 298–315) following both sections of documentation (cult statues of divinities, cult statues of rulers), include brief treatments of Hellenistic cult statue iconography, geographical distribution of various deities, and terminology, and more extended and intriguing discussions of patronage.

Numerous tangential, often compelling, issues emerge from this study that broaden our view of the Hellenistic sculpture industry and the status of sculptors, such as a reconstruction of the careers and family relationships of Polykleitos and his sons Timokles and Timarchides, the inclusion of statues of sculptors in the temple for which they made cult statues, the possible heroön at Messene for the sculptor Damophon, and city decrees stating the financial terms for the commission of cult statues from various sculptors (e.g., 14–17, 23–4, 217–9, 321–2). Elsewhere, we learn about developments in Hellenistic religion, such as the worship of eastern gods (e.g., Atargatis, Hadad, Isis, Sarapis, and Anubis) and their iconographic syncretism with Greek deities, especially on Delos (97–9, 237–8); the first statuary depiction (largely intact) of the personification Roma, which appears on Delos (93); the intersection of Hellenistic religion and politics, including the worship of Hera Basiliea at Pergamon and her exploitation by Pergamene rulers (137–49, 249); the Attalid dynasty’s veneration and use of Herakles (232, 249–50); and the history of various sanctuaries.

Damaskos carefully tackles the sticky issues of the origin of, and relationship between, ruler cult and divine worship in the Greek world, the distinction between ruler cult statues and votives or honorific statues, the shared worship of ruler and god, and the motivation(s) for ruler cult. Other art historical issues of note (and there are many to choose from) include the treatment of archaizing Hellenistic cult statues (125–7) and the methodological problems of using coins, especially Roman imperial coins, as evidence for Hellenistic cult statues (213–7). Particularly delightful is Damaskos’s inclusion of Pausanias’s account (7.26.2) of how the city of Hyperea adopted the new name of Aigeira in the seventh century B.C.E. because of the role its goats played in the city’s defense against the Sikyonians. Controversies and possible solutions proposed by previous scholars are carefully described, and in some cases, the author adopts a position. In every instance, Damaskos is cautious, always quick to acknowledge the limits of what can be known or even hypothesized.

There is so much of value in this book that one wonders if a straight narrative, perhaps arranged chronologically or thematically, with a catalogue following the text might have been preferable to the descriptive, data-heavy catalogue format used here. With most Greek untranslated, dense discussions of technical matters, a detailed scholarly apparatus, and the necessity to consult a specialized library for most illustrations, this is definitely a text for specialists, few of whom will read it cover to cover but instead will dip into it for information about a particular image or place. In this sense, the text serves the interests of documentation without providing the big picture (although brief conclusions draw together some of the themes presented in the text).

For all its usefulness, the book is poorly illustrated, lacking images of nearly all objects discussed; there may not be a lot surviving but it would be very helpful to see whatever does survive! Some illustrations are perplexing. We are treated to just the lower portion and the base of a larger statue in figure 4; why not show the entire? We see the top and part of the back of a statue in figure 10, which is the focus of the text discussion, but the rest of it is not illustrated. One misses site plans marked with cult statues, which would have helped the reader better understand and visualize the stupendous impact of numerous, usually over-lifesize (occasionally colossal) cult statues displayed in relatively small temples (designed to enhance the impact of the statues [208–9]) at individual sites, such as Aigeira, Delos, or Pergamon. Maps would have helped the reader trace the geographical layout of the text. The lack of a full bibliography is unfortunate, and the subject index would have benefited from subheadings; an entry such as “Altar” followed by a long string of numbers with no further guidance is not particularly helpful. A few misstatements (e.g., 257, second string of numbers with no further guidance is not partic-

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Appearance and Essence is the timely publication of the second Williams Symposium on Classical Architecture at the University of Pennsylvania (1993). The topic is visual refinement in ancient architecture, defined by Hasel-
berger as “intentional deviations from geometrical regularity, that left no line, no element of a structure truly straight, or vertical, or what it appears to be.” Techniques include stereobate or entablature curvature, inclination of columns, entasis and other aesthetic revisions, but the complexity of this field is exemplified by the fact that scholars do not even agree what techniques qualify as refinements. The authors adhere to Haselberger’s strict definition, providing both the evidence for curvature at their sites and proof that it was intentional, including how the optical revision affects a viewer’s impression of the site. The symposium also coincided with an exhibition highlighting Manolis Korres’s recent work on the Athenian acropolis.

Parts I–IV are the core of the symposium. Part I (Outline and Outlook) is Haselberger’s introduction to the topic. The papers are grouped topically into three categories. Part II, General Issues, addresses how modern mathematics may apply to architectural curvature (a problematic issue, as J.J. Coulton and Hans Seybold demonstrate), ways that curvature could be executed in situ, and the optical illusions that refinements were intended to correct. Part III, Monumental Evidence, comprises eight papers detailing specific sites, plus M. Wilson Jones’s analysis of Roman entasis. Part IV, Early Modern Appropriation, addresses Renaissance analyses of Vitruvius’s notorious discussion of scamilli impares.

Discussion among the authors and audience provided valuable insights, which are also incorporated in the publication, including appropriate cross-references. The result is a tight and coherent exegesis of the subject. Furthermore, some members of the audience subsequently wrote contributions, which make up part V. Part VI, First Consequences, consists of two papers written after the symposium, applying key issues to other sites. Part VII is an appendix discussing neo-Classical buildings that emulate Greco-Roman refinements. It is a splendid performance by all involved and, for a scholar of ancient architecture, an exhilarating read.

It would be excessive to evaluate this complex volume systematically, especially the site reports in part III. These are entirely convincing, but also tedious because they consist largely of detailed measurements. They follow a necessary formula, demonstrating the validity of their research methods and then documenting the refinements at their site. Fortunately, most readers will not need to read part III at all, but can use it as reference.

This is because of the fact that Haselberger’s overview of the field in part I is superb, incorporating the symposium papers throughout, including brief synopses. Every scholar and student in the field should be familiar with this profound essay. The introduction is a paragon of clarity and completeness, demonstrating exactly where and how each individual paper fits into the overall topic. Duly supported by the papers of part II, Haselberger’s essay prepares the reader to join the debate on architectural refinement.

Discussions on architectural refinement include numerous controversial issues, two of which can serve as examples. Most famous is the question of what Vitruvius meant by scamilli impares (3.4.5 and 5.9.4: scamilli, “little benches” or “stools”; impares, “unequal” or “odd [numbers]”). His wording is ambiguous (and the manuscripts corrupt), but his topic is stylobate curvature, achieved by adding (something) to the center of it. The problem is the fact that we cannot tell if scamilli impares are architectural features or a technique for executing curvature (his promised illustration is not preserved). Until the early 19th century, before modern scholars noticed curvature in ancient architecture, Vitruvius was taken to mean an architectural feature, most commonly under columns, such as pedestals or articulations in the podium (C. Sgarbi and P. Gros in part IV). Since the discovery of curvature in Greek architecture, scholars have taken scamilli impares to mean a construction mechanism by which curvature can be achieved. Haselberger cites several examples of the former, while H. Bankel and F. Cooper present examples of the latter. For Bankel, scamilli impares are small wooden disks of graduated height, set into cuttings of stylobate blocks to indicate the curved top surface; for Cooper, they are the slightly peaked top surfaces of individual ashlar blocks, so that each block of the course above rests on a flat surface. This disparity is informative. Both techniques fit within Vitruvius’s vague wording; both do create curvature; and both were demonstrably used in antiquity.

So regardless of what scamilli impares were, they were certainly not the only technique used to create curvature; we now know of many techniques, while Vitruvius only names the one. In other words, we know much more about Greek architectural refinements than Vitruvius mentions. As a result, the debate over scamilli impares has now become a curiosity. Figuring out exactly what Vitruvius meant would merely give a name to one of the numerous techniques we already know. Equally important, as Haselberger demonstrates, ancient literary sources other than Vitruvius clearly attest a nonrigorous process, where the nature and degree of architectural refinements were made according to the aesthetic expertise of the architect. There never was one set canon for architectural refinement, but rather architects had many available techniques, which they used, or not, as they saw fit at each site.

Another conundrum is the extent to which curvature was meant to be seen by the viewer (as opposed to unnoticed optical compensation). Several papers address this topic, most notably Korres in part II and D. Booth and M. Lewis in part V. Vitruvius says curvature serves to correct optical illusion, naming no other purpose. While we cannot prove exactly what ancient architects intended, we can address the issue from another angle, not cited by any of the chapters, but suggested by the overall treatment of perceptibility throughout this volume. Optical illusion depends largely on two components, the relationships between adjacent objects and the position of objects relative to the line of sight. As Korres demonstrates, the floor of a pediment appears to sag, both because it is the base of a broad triangle and because it is above the viewer’s line of sight. It does not follow, however, that all long horizontal lines appear to sag. Vitruvius’s claim to the contrary notwithstanding. While a long horizontal above eye level appears to sag, a long horizontal below eye level appears to rise—in both cases the line appears to bow toward the viewer’s line of sight: the greater the distance from the line of sight, the greater the bowing toward it. Thus, because a stereobate is close to
the line of site, the apparent rise will be slight. More problematically, people tend to see what they are looking for, whether or not it is actually there: that is, “I see the curve” does not necessarily mean that the line actually appears to curve, but may instead result from the fact that the viewer expected the line to appear curved. Until the Parthenon was measured, revealing the curved stylobate, no one noticed that it did so, because no one looked for it: perception, even by careful scholars, is conditioned by expectation. Curvature is detectable only in extreme circumstances, such as well-elevated broad triangles like pediments, but otherwise only exists as a matter of suggestion-enhanced perception on the part of persons wanting to see it.

Korres demonstrates that much of the Parthenon’s stylobate curvature, its diagonal tilt, and curves in the west terrace steps were tailored to a view from the Propylaea, keeping the stylobate steps apparently parallel and visible above the terrace steps. This is not to say that a curved stylobate was not intended from the start (some curvature was retained from the old Parthenon, the view of which would have been different), but it does demonstrate that correction of optical illusion was not the only visual problem the architects were trying to address. After the Parthenon, stylobate curvature was quickly reduced until, in the Hellenistic period, it is virtually undetectable (Haselberger’s experience at Didyma is particularly informative). In the Parthenon one detects curvature only in the stylobate. The nearly identical curvature of the entablature is virtually undetectable. Since an upward entablature curvature would compensate for the illusion of sagging above eye level, the curvature there is not perceived. In contrast, the physical upward curvature of the stylobate would actually enhance the illusionistic upward curvature of a horizontal line below eye level. In the Parthenon, therefore, the curvature of the stylobate is readily detected.

The detectable curve of the Parthenon’s stylobate is commonly interpreted as intentional, that is, the architects wanted the stylobate to appear curved in order to give the building a dynamic tension and organic, live feel. To the reviewer, that seems sophisticated, largely intended to maintain that whatever we see in the Parthenon must necessarily be perfect. That this is not true is demonstrated by the fact that only the upward curvature of the stylobate was ever plainly visible, and this was systematically eliminated in later buildings. Perceptible curvature was precisely what later architects tried to correct; it cannot have been what they intended. As Haselberger’s history of curvature demonstrates, the Parthenon was early in the evolution of corrective curvature; apparently its stylobate was a mistake. Thereafter, Greek architects learned that upward curvature in the stylobate exacerbated the illusion rather than corrected it.

F. Hueber’s paper on the library of Celsus at Ephesos illustrates a new approach to optical correction. From the ground floor capitals on up, the colonnades show typical upward curvature, acutely so for the ground floor and then progressively flatter up to a horizontal top cornice. Below eye level, however, the plinths of the lower colonnade are shorter in the middle, by about 5.5 cm, so that colonnade physically sags. The sag is substantial, ca. 1:500, notoriously more severe than the Parthenon’s 1:700 (north stylobate). Thus, if one is inclined to think either that a long horizontal stylobate appears to sag (as Vitruvius does), or to think that the curvature of the Parthenon stylobate was intended to be visible, then one should reflect on the library of Celsus: before Hueber’s paper no one had noticed this substantial curvature. As Booth and Lewis indicate in their paper, the issue of perceptibility is more complex and more problematic than we know, and vastly more interesting.

Appearance and Essence represents a profound improvement in our understanding of ancient architecture. The debate concerning scamiilimi impares and the perceptibility of architectural refinements are just two of the many juicy issues that course through this dense and elaborate publication. There are few publications in classical archaeology to compare with this one, not only for fine scholarly authority, but also for piquing the reader’s intellect.

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Much of Roman history is culled from inscriptions: social historians and archaeologists alike find a wealth of raw material in words cut in stone. The very richness of the epigraphical record—hundreds of thousands of inscriptions survive—renders them unwieldy to manage and difficult to use responsibly. Even simple statistical analysis of their numbers can be tricky; scholars recognize that, for a variety of reasons (or for no reason at all), inscriptions can be more plentiful in some places and at some times than at others, a phenomenon termed the epigraphic habit. Just as problematic is that the very boundaries that separate disciplines to enable scholars to master material meaningfully often force epigraphers to study inscriptions in isolation from their wider contexts (e.g., IG and CIL).

The proceedings of a symposium held at the University of Liverpool in 1995, the volume presents seven essays. In the introduction, Graham Oliver sets out the main theme. Death is the focus of choice because we tend to judge cultures by their monumentalization of the departed. In addition, funerary remains often provide immediate insights into another culture’s belief system, not to mention its political structure. In the modern world, documentation of many kinds rounds out the picture that funerary works suggest, so that one can resist the temptation to take information offered by inscriptions at simple face value. When researching ancient societies, however, scholars must seek out larger
contexts to make sense of the engraved word. Thus, Oliver argues, epigraphers must be like the art historian, to accept an inscription as part of a larger monument with messages implicit in architectural and sculptural forms. She must become topographer; mindful of the monument’s place within an evolving cemetery in a shifting cityscape; and as historian, she must explore economic and social considerations: the economics of burial rites, for instance, and their potential to create identity for social groups.

In the light of new publications of classical monuments, the second essay, by Karen Stears, redresses an old problem: the disappearance of late Archaic Athenian kouroi, korai and shaft-stelae ca. 480, and the subsequent reemergence of Classical stelae in the 440s–430s. Stears revisits a view that antisumptuary laws of ca. 480, attributed to Kimon and preserved in Cicero’s de legibus, curtailed an elite minority’s practice of reifying their privileged position through funerary display. Kimon’s death in ca. 450, and the employment of non-Attic sculptors on the Parthenon, who may have fallen outside the letter of the law or simply disregarded it, led to its gradual obsolescence. Her reading of Athenian politics of display is wide-ranging, suggesting insights into the shifting topography of the Kerameikos, dedication patterns on the Acropolis, and repercussions of Pericles’ citizenship laws.

Oliver responds to a study by Thomas Nielsen et al., who in 1989 challenged the prevalent notion that Athenian tombstones constitute an index of wealth. Oliver rightly problematizes the low burial costs that Nielsen et al. find in an inscription of 367/6. To their observation that names inscribed on grand monuments in the Kerameikos do not match those of wealthy citizens known from prosopographical studies, and that, in fact, some of the wealthy were commemorated by humble markers, Oliver points out that the topographical context (e.g., a monumental peribolos) may have helped to mark status. Moreover, even when sumptuary laws prohibited lavish display, location could continue to communicate status. Oliver’s arguments may be compelling, but since his essay begins by asserting that scholars have not accepted Nielsen’s thesis, he comes off preaching to the converted.

In the fourth chapter Torben Vestergaard investigates the high proportion of Milesians (compared with other non-Athenians) recorded in private sepulchral inscriptions in Athens between 100 B.C. and A.D. 200. He rejects the possibility that they simply had a peculiarly strong epigraphic habit (albeit without citing comparable evidence from Miletus) and prefers to consider the wider archaeological and historical picture. The silted up of the harbors of Miletus (documented in an appendix by Alan Greaves), and competition from other ports, such as Delos, lead him to envisage widespread emigration from a once-wealthy city. The mother city of Ionian cities in western Asia Minor, closely tied to Miletus in dialect and religion, Athens became the natural choice of destination; the fame of her ephebeia added to her attractiveness.

Margaret King’s essay employs Roman tombstones for children to confront the premise that premodern societies with high infant mortality rates allowed the death of a child to pass un lamented, as parents kept a self-protective emotional distance from their young. Accepting that sentiments engraved on tombstones are cultural constructions, King nevertheless rejects the notion that they therefore yield no evidence of individual emotion, instead probing the “language” of grief for word choice and order. She notes that the child’s name frequently precedes the dedicator’s, contrary to the rule in other circumstances, and that a deceased child’s age is often specified down to hours; these facts, alongside choices of epithet, suggest emotional engagement with a child, however young, and grief at that child’s death.

Valerie Hope’s essay constitutes a fascinating test case, exposing the rhetoric of commemoration by questioning whether the tombstones of the Roman fort of Mainz reflect the normative hierarchy of its closely structured military environment. The dedicators are nearly all soldiers, and their monuments are mostly stelae. Deviations from the norm, sometimes in epitaphs, more often in sculptural decoration, lead Hope to conclude that soldiers used tombstones to construct group identity: mounted auxiliaries, inferior in status to their legionary counterparts, conceded inferiority in their epitaphs but used sculptural representations of horses and grooms (emblems of success) to elevate their status. While this conclusion does not come as a surprise (Hope notes the parallel with freedperson monuments in Rome), the essay’s value lies in the unusually strict control that the fort’s closed environment allows the author over her material.

In the final essay, Glens Davies scrutinizes the ash urns of the Ince Blundell collection and their inscriptions for authenticity. Offering careful criteria for distinguishing ancient from modern inscriptions, ranging from spacing to letter forms and flourishes, and documentation in earlier publications of the collection, Davies concludes that several urns have modern inscriptions, added around the time of their purchase from dealers in Rome in the 1780s–1790s. Moreover, several of the urns are not ancient at all. The loud cautionary note that Davies sounds is an important one: scholars unquestioningly rely upon the brief inscriptions in their studies of nomenclature and demographics, and they tend to privilege the inscription as a text over context. Still, Davies leaves dangling an interesting question: in the 18th century, what led modern dealers and collectors to fake inscriptions, and did they intend to deceive?

Given how much we do rely upon the “disembodied” texts of inscriptions to create a story of the past, this volume’s mission is paramount. Yet as rich as the individual essays are in their own right, they do not always adhere to that mission. Although an excellent assessment of Athenian patterns of commemoration, Stears’s essay bears no relation to inscriptions. While others adhere more closely to the subject matter of the volume, some of them veer sharply away from its goal. King’s essay, valuable for understanding family relationships in antiquity, is less concerned with context than with a close reading of just the texts of inscriptions commemorating infants. Although proceedings of conferences often include papers on unconnected subjects and of varying quality, this volume might have served better as a set of
methodological models had the existing essays been shorter and had the editor commissioned others on a wider variety of contexts for the epigraphy of death.

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These two volumes have three things in common: they both present museum collections of regional lamps, mostly recovered in old excavations or from old collections with few details of exact provenance; they are published by Bretschneider; and they are grossly overpriced (in spite of a local subsidy having been provided for the Verona volume). Provincial collections of lamps in Italy are plentiful, and the past two decades have seen publications of a number of them. Most lamps have no exact provenance and come from local collections of varying origin (some made up in the 18th century; the Verona collection includes pieces from Sicily); thus they are of limited use except as comparanda, but the flood continues. In the absence of any detailed archaeological information, such as context, the authors often fall back on extensive presentation of details, often of limited value; unfortunately the Verona book is no exception.

That said, it is an attractively produced pair of volumes that attempt to put the 687 lamps in some sort of chronological context. The collection includes a wide variety of examples from early “saucer lamps” to late Roman through early Christian moldmade lamps; somewhat inconveniently the dates and comparanda are not given with the lamps themselves but in the discussions at the start of each group. The second volume provides an extensive body of supporting material—lists of motifs, signatures, and makers’ marks. It is well illustrated with clear half-size photographs (often of both top and bottom and profile); the absence of profile drawings is unfortunate. Nearly 50 pages are devoted to an itemized list of 241 motifs and published parallels (needlessly duplicated later by pages of indexed motifs) followed by 25 pages on makers’ marks and parallels; there are also 32 pages of tables of lamps, motifs, and signatures from their different sources. The bibliography (repeated in the second volume) is lengthy but undiscriminating. If ever there were an argument for electronic publication this overpublished collection is it!

Types in chronological order include three “cocked hat” lamps, “Apulian” wheelmade, Hellenistic wheelmade and moldmade, “Republican” moldmade, early imperial volute nozzled lamps (especially numerous with nearly 200, all with decorated disks), a few lamps with molded handles, a few semivolute lamps, 15 “Birdshead” lamps, 136 lamps with rounded or U-shaped nozzles (mostly with decorated disks but of markedly lower quality than the volute nozzled lamps), 225 “Factory” lamps which are typical of northern Italian shops in the late first–early third centuries C.E. and are based on metal prototypes, lamps with transverse handles, fat warty lamps of the third century, 26 North African lamps of the fourth–fifth centuries, and a handful of early Christian lamps of Italian and perhaps local origin. The work concludes with four lamps “di dubbia autenticita.”

At times one would have welcomed further discussion of a piece: for example, no. 414 has a menorah on its disk, a representation not identified until the catalogue of motifs. It is included in the same category as a fourth-century Egyptian lamp with no bibliography. The presentation of the North African lamps and local imitations is somewhat wedded with Hayes I and II mixed together in the catalogue, although the former seems to stop ca. 400 C.E. just as the latter is starting.

The largest group consists of the so-called Firmalampen factory lamps whose home seems to have been in northern Italy. Made in great quantities from the late first century on, these lamps with their bold signatures in relief letters on the base were both copied and exported widely, especially in the West.

Chersonesos was one of the great Dorian colonies in the Crimea on the north shore of the Black Sea in present Ukraine; pre-Revolutionary excavations at the site produced the 112 lamps presented in this well researched study by Chrzanovski and Zhuravlev. It is a useful addition to the limited number of lamps published from the former Soviet Union although the material (now in Moscow) is of relatively minor importance and could easily have been accommodated in a long article; while it is likely that most lamps came from the four cemeteries around Chersonesos no detailed provenance is given for any but a handful from recent excavations, and some are from the Rumiantsevskiy museum, not from known excavations. Of particular value, however, is the extensive relevant bibliography that includes much recent Russian and Ukrainian work on lamps.

The range of the collection runs from late Archaic open top lamps, several late Classical–early Hellenistic examples, a single very late Hellenistic “Ephesos” lamp (one of the most northerly found), Roman volute lamps with various scenes on the disk, a bird’s head lamp (rare in this area), factory lamps, many simple U-shaped nozzle lamps with disk scenes (including third century C.E., Attic, or imitation) to various late Roman–early Christian types and one ninth–tenth-century Medieval “histrum”; the collection includes many apparently local products as well as one identified imitation of an early Christian North African lamp made in Naples about 100 years ago. The work is carefully researched and well illustrated with photographs...

The raison d’être of this book is to honor Ellen Macnamara, a member of the British Museum’s Department of Greek and Roman Antiquities and best known for her publications on the Etruscans and on ancient metalwork. As with any festschrift, the essays in this volume were submitted by Macnamara’s colleagues in appreciation of her substantial contributions to the field of Classical archaeology. The 19 chapters are written in English by a group of international scholars, the majority of whom are from those countries where Macnamara did most of her work: Great Britain and Italy. All of the papers focus on ancient Italy and its material culture, with a strong emphasis on metal artifacts.

The book begins with an introductory section called “Ellen Macnamara: An Appreciation.” Readers of this journal are undoubtedly familiar at least with Macnamara’s important books on the Etruscans, Everyday Life of the Etruscans (London 1973) and The Etruscans (Cambridge, Mass. 1991), the latter providing a useful introduction not only to the Etruscan civilization but also to the impressive collection in the British Museum. Some scholars, however, may not be aware of the full nature and scope of her work in both Italy and Scotland, and the two brief essays in this section describe these achievements. They are followed by a bibliography that reveals Macnamara’s impressive record of publishing at least one, and usually several, articles, reviews, and books annually from 1962 to the present.

The initial chapter (Sestieri) reviews the possible applications of historical methodology in Italian archaeology. This theoretical paper represents an exception to the largely technical and practical nature of the other chapters and gives a useful introduction to the broad chronological issues that concern the field. The second chapter (Leighton) provides a valuable discussion of the chronology of Iron Age Sicily and southern Italy, vividly illustrating the complexity of the evidence and the difficulties involved in dating objects from this period and arguing for lowering traditional chronologies on the basis of new diagnostic technologies.

The remaining chapters are written in the style of archaeological reports, with detailed artifact drawings and technical analyses. Several of the papers concentrate on early Italian metallurgy. The first two (Giardino, Pearce) discuss the origins of metalworking in prehistoric Italy, including typologies as well as metallurgical analyses of excavated artifacts. The next chapter (Procelli) addresses stone molds found in Sicily, dating from the Early Bronze Age to the Early Iron Age; and an appendix (Mazzoleni) presents macroscopic observations of these molds and subsequent conclusions about their substance.

The Etruscans are particularly renowned for their bronze work, and some of their most familiar artifact types provide the focus of the next four chapters: fibulae, mirrors, and model boats. The general discussion of fibulae (Toms) is particularly thorough and lucid; its useful information not only applies to Italian examples but also to the fibulae that are found abundantly in Greece and Anatolia. Engraved bronze mirrors are probably the best known products of Etruscan workshops, and the metallographic analysis by Swaddling et al. provides a fascinating new perspective on these artifacts, generally studied for their iconography. Two chapters (Lo Schiavo, Roberts) discuss the miniature bronze boats found on many Etruscan sites.

Four chapters address the question originally implied by the book’s title: how does the culture and landscape...
of ancient Italy fit into their Mediterranean context? Each of these is thoughtful, comprehensible, and interdisciplinary. Snodgrass presents a great discussion of sea travel in the prehistoric era, comparing the Italian maritime landscape with that of Greece, Asia Minor, and the Levant. Next, Ridgway synthesizes his previous and current research on Greek colonization in Italy, particularly Pithekoussa. The following chapter by Naso is one of the most interesting and intelligible of the entire book. Its expressed subject is “the relationships between ancient Italy and the Aegean seen from an Italic viewpoint” (193). Naso presents specific artifacts of Etruscan manufacture found in the Aegean as evidence for cultural interaction from the Bronze Age through the Late Archaic period. Contacts between the Etruscans and the Near East are the focus of the paper by Stary, with analysis of arms and armor forming the basis for several interesting conclusions.

Two chapters focus on special aspects of Etruscan life and culture: the use of javelins in Etruscan warfare (Small), and nudity in Etruscan and Greek art (Bonfante). Another looks at the class of artifact known as the cista a cordani (Williams) and perhaps should have been placed with the other chapters on metalwork. Finally, two papers (Herring et al., Rathje) examine specific grave assemblages and their significance for understanding Etruscan funerary rituals and beliefs.

The volume is concluded by a section entitled “Britain and Italian Archaeology,” which consists of two papers. The first, “Etruria Britannica,” situates Macnamara among the distinguished group of British scholars who have studied ancient Italy since the 17th century (Haynes). This sort of essay is not a standard feature of many festschriften but is a positive addition. It might, however, have also mentioned those non-British scholars who have contributed to our knowledge of ancient Italy and the Etruscans.

Finally, a short statement by Ellen Macnamara herself describes the scholarship that she created in 1970 as a memorial to her mother, Ellaina Macnamara. Four pages list the scholarship’s recipients over the years, many of whom reciprocated by contributing to this festschrift. After Macnamara explains her termination of the scholarship in 1990, she announces her intention to endow a new fellowship in Etruscan archaeology, to begin after her death.

This is an attractive publication. The elegant drawings and crisp black-and-white photographs are plentiful and conveniently interspersed throughout the text. References are easy to track, with author and page numbers in parentheses and complete bibliographies after each chapter. Because of their precise and technical structure, most of the contributions in this book are unlikely to be of much use or interest to laypersons or to undergraduates. Furthermore, since sites and time periods are rarely explained in sufficient detail for someone not already familiar with them, the book certainly will find its most appreciative audience among readers who are already specialists in early Italian archaeology. The price of the volume, too, will probably limit its purchase by individuals, but it should be an important acquisition for any library maintaining a strong archaeological collection.

In conclusion, this publication and the manifold research it presents attest the vitality of this field among European scholars. It is to be hoped that it will stimulate a similar interest and awareness on this side of the Atlantic.

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Of the major Mediterranean cultures, the Etruscans have by far been the most elusive despite the numerous studies, recent discoveries, and considerable efforts to issue long unpublished excavations. A concomitant side effect is the lack of an adequate college-level survey text in English—that is, until now. Haynes’s oeuvre is a remarkable effort. Previous efforts are now out-of-date or are unsatisfactory as textbooks: Emeline H. Richardson, Etruscans (Chicago 1964, reprinted 1976); Massimo Pallottino, The Etruscans, rev. ed. (translated by J. Cremona, edited by David Ridgway, [Bloomington 1975]); Otto J. Brendel, Etruscan Art, 2nd ed., with additional bibliography by Francesca R. Serra Ridgway (New Haven 1995); Larissa Bonfante, ed., Etruscan Life and Afterlife (Detroit 1986); Nigel J. Spivey, Etruscan Art (New York 1997); and Graeme Barker and Tom Rasmussen, The Etruscans (Oxford 1998). The recent catalogue of the Venice-Bologna exhibition, The Etruscans, edited by Mario Torelli (Milan 2000), provides welcome new material.

Most professors, in teaching a typical college survey, prefer a chronological construction, a style that offers a more accessible, and, for students, comprehensible, historical context. Haynes more than meets these expectations in her expansive, yet probing and current, presentation. The result reflects her expert experience in clarifying this complex culture for the lay audience. Her choice and interpretation of the material extends beyond the conventional. Within her five long, chronologically arranged chapters (“The Villanovan, ca. 900–720 B.C.,” “The Orientalizing Period, 720–575 B.C.,” “The Archaic Period, ca. 575–480 B.C.,” “The Fifth and Fourth Centuries,” and “The Hellenistic Period”) she draws upon a wealth of recent artistic, social, and anthropological discoveries and studies. For example, in her wide-ranging examination of the Villanovan period, she includes discussions of food production, diet and disease, women’s work and their status, cemeteries and ash urns, early social stratification, growth of population and migration, exchange of goods, bronze working, contacts abroad, bronze figurines of women, painted pottery, early religious practice, the expansion to the North and into the
Apennines, and religious beliefs. This is a much-desired affluence of information. And this is generally typical of the entire work. For the other chapters she develops incisive, lucid descriptions and gives excellent illustrations of trade contacts, artistic production, wealth, population growth, urbanization, writing, and architecture (domestic as well as public).

A shortcoming of the chronological approach is that there is no clear division between one period and another. As might be expected, the date when a settlement is abandoned does not necessarily coincide with the end of a chronological period. There are, for example, many settlements that continue to evolve during the Villanovan, Archaic, Classical, and Hellenistic periods. The chronological method thus results in certain redundancy and an arbitrary placement of topic. She often skirts this problem by focusing on the continuity of particular sites, cities, sanctuaries, and funerary practices throughout several periods. For the Archaic period, the centers discussed are predictable: for the center, Veii, Cerveteri, Tarquinia, and the like; for the northern expansion, Marzabotto, Spina, Pisa, and the south, Campania and the Ager Picentinus; the emporia at Gravisca and Pyrgi; and the sanctuaries at Punto della Vipera and Castellina del Marangone. She interjects useful historical digressions where more is known, as for example, her discussion of the emporium of Gravisca and its conflicts in the Sardinian Sea, with Veii, Rome, and Cerveteri (Pyrgi), and its Romanization (172–85); there are also “a glimpse of archaic Etruscan history” (185–7), “conflicts in the western Mediterranean” (201–3), “continuity in the north” (264–6), “social tensions” (266–7), and “developments in Rome” (267–8).

The treatment concerning the status of Etruscan women is well done, though its placement at the end of the chapter on the Archaic period is somewhat surprising. One sympathizes with her quandry as to where to position this discussion since women feature prominently in each period. Here, she brilliantly summarizes the major recent studies on Etruscan women. Etruscan women, she concludes, “were regarded with affection and tenderness, accorded the same honors in life and death as their consorts. They rode in carriages and moved about freely, participating in banquets with their husbands and being seen in public as spectators of games, seated on wooden tribunes, or as performers in rituals and theatrical displays” (figs. 201, 202). She reiterates that nude women are rarely depicted in other than an apotropaic function (147, 234; fig. 128, the Cannicella Vei), “or as a victim of violence or exposure.” She notes that the position of the matronymic in a secondary position behind that of the patronymom on children’s tomb inscriptions clearly distinguishes the Etruscan woman from her Greek and Roman sisters. She also turns a critical eye toward selected topics as “representations of wailing women,” “women and wine,” “women’s clothes,” and “female worshippers and priestesses,” as well as female divinities.

The chapter on the fifth and fourth centuries incorporates, along with the history, brief discussions of the primary sources, Etruscan religion, divinities and demons, haruspices and augury, magic and curses, female worshippers and priestesses (on the evidence of the bronze votives), sarcophagi and funerary sculpture from southern Etruria, funerary art from Chiusi, the temples at Orvieto and large scale sculpture, the Gallic incursion, Bologna’s funerary stelae, Tarquinia’s aristocratic tombs, Cerveteri’s family tombs, and Etruscan painted pottery of the fourth and third centuries.

In her chapter on the Hellenistic period, her treatment of Etruria’s crisis-ridden yielding to Roman conquest interweaves evidence from the painted tombs of the Golini I and II, and of Hescanas at Orvieto to illustrate the rising power of manumitted slaves over their former aristocratic owners (a social upheaval also suffered by Faliscan aristocracy). In her discussion of late Chiusine, sarcophagi lid portraits of the deceased, she incorporates the terracotta example of Seiante Hanunia Tlesnasa in the British Museum, including her remarkable head, reconstructed as aged, based on the physical remains contained within. From the rich tombs of fourth-century Tuscania, she skillfully connects family names with the tomb finds and the tombs themselves. Here again she turns her attention to the terracotta and bronze statues of women, some spinning, and includes a treatment on “couples, mothers, babies, and small children,” and life expectancy (355–63). For Volterra, she briefly mentions the pottery and coins, but focuses instead on the alabaster urns, many of which illustrate Greek myths, and discerns the hands of various artists. A good part of the remaining chapter is devoted to a discussion of funerary sculpture and architecture interspersed with Etruscan encounters with Rome and its conquest, predicted by the haruspices in Etruria’s 10th and final saeculum (385).

As in the case of many general works, we lament the lack of footnote references. Other cautions include the lack of a good discussion of pottery development and the need for a more detailed treatment of the Etruscan pantheon (she omits this, she explains, for lack of space at the behest of the publishers—this is unfortunate because American students generally lack a good understanding of the iconography. Some major treatments of Etruscan religion may be found in Erika Simon, *Die Gött der Römer* (Munich 1990), Roland Hampe and Erika Simon, *Griechische Sagen in der frühen etruskischen Kunst* (Mainz 1964), Ingrid Krauskopf, *Der thebanische Sagenkreis und andere griechische Sagen in der etruskischen Kunst* (Mainz 1974), and Mauro Cristofani, ed., *Dizionario della civilità etrusca* (Florence 1985), but students without the necessary German or Italian will have to resort to Maja Sprenger and Gilda Bartoloni, *The Etruscans* (translated by Robert Erich Wolf [New York 1983]).

The organization of the bibliography is unfortunate as well. It is not easy to find references. Rather than accompanying each chapter or site with references, there is first a list of general works, and, second, references by topic (language, art, architecture, sites and monuments, exhibition catalogues, acts of congresses, religion, women, and the like).

But such shortcomings are trivial in comparison with the wealth of information and the numerous excellent illustrations, many in color. Haynes’s *Etruscan Civilization* is an exceptional survey that should find a wide audience and many years of college use.

While Haynes’s study is primarily art historical, Campo- reale’s *Gli Etruschi* takes the approach of archaeologists,
linguists, and historians, emphasizing questions concerning the ancient sources, linguistics, and archaeological context. His study is divided into two parts: the Etruscan culture and the city. Part I is subdivided into 11 sections that treat history and historiography (antiquity through the 20th century), the sites, landscape and urbanization, art, religion, political organization, public life, writing and literature, and survivals of Etruscan culture. His discussion of the art is chronological, like Haynes’s, but his discussion of religion is more comprehensive. In part 2, the city, he treats the major territories and regions such as Veii, Caere, Tarquinia, Vulci, the Padana in the north, and the Campana in the south.

Each section is brief with references conveniently placed at the end for pursuing topics in greater depth. It is, however, particularly annoying that the referenced articles lack titles; it is impossible to determine whether a particular article is relevant and worth pursuing without an array of archaeological journals, festschriften, and congresses at hand. Most of the photographs are clear, but they are small, in black and white, and placed at the end of the text so that one is forced to flip back and forth between the text and illustration.

Nonetheless, both Haynes and Camporeale work well together, and make outstanding contributions to our better understanding of Etruscan culture.

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Everyone who works on Pompeii and the Vesuvian cities and is concerned with the tastes of the inhabitants in the disparate but related areas of religion and decoration must have been struck by the strange lack of representation there of the canonical twelve labors of Hercules. To be sure, no temple of Hercules clearly identified as such has yet been discovered, but pictures of him abound, and representations of him in statuary and the decorative arts are fairly numerous.

He was obviously a very popular divinity, and as a bringer of good fortune and patron of the youth one might expect to find him revered and his accomplishments commemorated, as they are in the metopes of the temple of Zeus at Olympia and on many Roman sarcophagi. But only the fetching of the golden apples of the Hesperides figures at all significantly in Pompeian art, and that in the alternate version in which the hero himself visits the garden. Instead, the popular subjects are Hercules enslaved to Omphale of Lydia and dressed in woman’s garb, Hercules’ drunken rape of Auge, and Hercules and the centaur Nessus. Only in the “Basilica” of Herculaneum and on a pair of silver scyphi from the treasure of the Casa del Menandro do we find the familiar series of exploits shown in sequence.

Yet some of the other representations are especially fine work, notably the large pictures of Hercules discovering Telephus in Arcadia and Hercules ridiculed at the court of Omphale from the Casa di Marco Lucrezio, the bronze of a young Hercules wrestling with a deer from the Casa di Sallustio now in Palermo, and the marble of the drunken Hercules urinating from the Casa dei Cervi. How is one to account for this penchant for showing him at his most disreputable or pathetic? It is easy to see it as comforting and reassuring: if this loutish hero could attain immortality, there is hope for the run of mankind. But it seems to go beyond that, a sort of reverse worship in which devotion is attested by disrespect.

Two important points are demonstrated and emphasized in the study under review: first, that there is a significant difference in representations of Hercules between Herculaneum and Pompeii, and second, that he was regarded in both especially as a tutelary divinity. At Pompeii depictions of Hercules do not regularly appear in public buildings. Except for an early Hellenistic set of antefixes from the area of the Foro Triangolare in which a youthful Hercules alternates with a helmeted Minerva and in representations of the Dei Consentes at compital shrines, we find him only in private houses and shops. But in houses he is ubiquitous; there is almost no area from which he is excluded, and he appears as a monopodium telamon figure, as a lararial divinity, and as a marble theatrical mask, as well as in mythological pictures and as a device on gems.

In Herculaneum, however, where he is the eponymous hero, he is shown in the so-called Basilica both in a narrow frieze depicting the famous labors and at large scale as an infant and as an adult. And in the headquarters of the Augustales he appears in the two pictures on opposite walls. Moreover, he even appears on the standard of a street fountain and by allusion in the hydra fountain in the middle of the Palestra Grande. In short, he is everywhere, sometimes unobtrusively introduced, more often casually, the patron divinity in a range of shapes.

As a tutelary divinity and bringer of good fortune we find him in both cities, in shops and at house entrances, a counterpart or alternate to Mercury. He is usually at rest, or at least not in combat or menacing, a benign presence that Coralini characterizes as Hercule Tutoor and Invictus, whose representation was not only apotropaic but also a bringer of the good life. This is the guise in which he appears most commonly in Pompeii, sometimes seated and crowned with laurel, sometimes provided with a scyphus, sometimes accompanied by an unidentified female figure, almost always with his club but never branding it.

This study is divided approximately in half between discussion of Hercules’ importance and cult in Campania and the various ways he is shown and an exhaustive catalogue of his individual appearances arranged topographically, first for Pompeii (144 entries), then Herculaneum (14 entries), and then other Vesuvian localities (15 entries). In the first half there is discussion of the iconography and pictorial compositions and their variations. The catalogue
entries are succinct but provide all the information necessary for a clear understanding of the item and the iconography, and there are abundant illustrations including ancillary material and comparanda, with numerous plans to permit a more precise location of a picture or object. Here, although one must applaud the inclusion of color photographs of unfamiliar pictures, one must protest that the illustrations of sculpture and gems are poor and sometimes so dark as to be virtually unrecognizable.

The catalogue is followed by synoptic tables arranged according to the myths represented, a very full bibliography, a general index, and a topographical index. Most of the entries, even those in which the identification of the hero or the incident in which he is depicted is somewhat doubtful, are admirable, and there is a judicious discussion of the various interpretations that have been advanced. Too little attention, however, is given to the enormous diversity of representations of Hercules in sculpture and gems, where there is little duplication of types and the range from the deliberately bizarre (e.g., a table support from Herculanenum, E.008) to the romantic (e.g., P.028, P.079) is especially startling. The fondness for the youthful Hercules, sometimes in contexts usually considered late adventures, seems to call for further discussion, and one would welcome expansion of what is included on the cult of Hercules in Pompeii. The important painting in an ossus of VII ix 47/65 of a procession, in which he figures importantly but enigmatically together with Venus Pompeiana and Isis, should be accorded more space than it is given. If he was not officially a patron divinity of the city, he seems to have enjoyed special status as the protégé of those who were.

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Romanization has, of recent years, become a hot topic among historians and archaeologists concerned with the remains of the Roman empire. The major question is the direction(s) in which cultural, social, artistic, and architectural influences flowed, whether consistently from Rome and Italy to the subject provinces, or back and forth between the center and the outlying territories. This was not a view of Romanization that the Romans themselves would have recognized (see Tacitus’s succinct characterization of the process from a Roman’s perspective, Agricola ch. 21: idque apud imperitos humanitas vocatur, cum pars servitutis esset [and this among the unsophisticated natives was called “culture” when it was a part of their enslavement]). Nonetheless, it is an important change in scholarly perception of how Romans and their subjects interacted, and it has produced a quantity of fascinating visions and revisions of what had been commonplace assumptions. The real problem arises with the paucity of the evidence for anything other than the Roman viewpoint, and the search for independent evidence on this topic always raises the likelihood of gross generalization based on “fact” that is paltry at best. Since both these volumes of conference papers employ the term “Romanization” in their titles, it seems reasonable to expect such concerns to be at the heart of them. But that is only partially the case.

Hoff and Rotroff’s volume opens with an essay on “The Problem of Romanization” by S. Alcock (1–7), which neatly summarizes the conceptual problem, and surveys essential recent treatments of it by M. Millett, G. Woolf, R. Hingley, and Alcock herself, as well as a glance at earlier bibliography. Alcock asserting (3) that “Rather than tracing a one-way flow of influence, or monitoring the selection of elements drawn from the dominant culture, a far wider range of potential transformations, evolved through a complex dialogue between ruler and ruled, must be accepted as fit subjects for study.” To her survey there must now be added M.T. Boatwright’s thoughtful treatment of Romanization and the evidence for it in her book Hadrian and the Cities of the Roman Empire (Princeton 2000).

The rest of Hoff and Rotroff’s volume consists of papers, three each, on Roman Athens in (a) history and prosopography, (b) architecture and sculpture, (c) ceramics and coinage, and (d) literature and cult. There is frequent mention of Sulla’s sack of the city (87/6 B.C.): Hoff considers (33–51) the sack as a historical turning point in the redefinition of Athens as a “Roman” city; O. Palagia (81–95) identifies it as a significant moment in the artistic realignment of the city; and Rotroff acknowledges (even if she more or less discounts it) (100) as crucial in the history of ceramic production in the later city. Three other articles in the volume deserve praise for the focus and clarity of their presentation: H. Kienast (55–65) reviews the evidence for and against assigning the enigmatic Tower of the Winds to the Roman period, and by his clear-eyed analysis opens the way for many types of new investigation of that and similarly poorly documented monuments; J. Kroll (135–49) gives a thorough survey of Athenian coinage and what it can reveal about the process and chronology of Romanization in the city; and K. Clinton (161–81) focuses on the prosopography and topography of Eleusis through which he demonstrates convincingly that Eleusis “represents the continuation of a tradition, that of honoring benefac-
These articles combine detailed and comprehensive scholarship with a perception (to a greater or lesser degree) of the complexities inherent in treating Romanization. D. Geagan (19–31) takes a more radical viewpoint by insisting on employing the term “acculturation” instead of “romanization”; his reasons are not compelling, and his historical survey of the Athenian elite is simply too brief to convince.

*Romanization and the City* contains the majority of the papers delivered at a conference held at the American Academy in Rome in honor of the 50th anniversary of the excavations at Cosa. Surprisingly, perhaps, neither Romanization nor Cosa are truly the focus of these papers; rather, there is a broad diversity of material that, inevitably, lessens the scholarly impact of the volume as a whole, even while commanding broader attention.

The volume opens with a survey of the excavations at Cosa and the current state of research on the site by E. Fentress (9–24). While useful and elegantly written, this essay, which should constitute the heart of the volume, reveals a tendency to mention problems but to sidestep a detailed analysis of them: for instance, in a passing discussion of the large atrium houses located on three sides of Cosa’s Forum she acknowledges their uniqueness in that position but without further comment (14–15). In a surprisingly brief treatment, Fentress appears to accept P. Carafa’s assertion without question that the *comitium* at Rome could not have taken the circular shape attested archaeologically at Cosa and elsewhere in Italy, and so could not possibly have been the model for the building type (22–3); in fact, many of his points are disputable, and the entire subject is by no means closed. The only other essay in the volume that deals with the remains of Cosa is P. Gros’s exhaustive and fascinating analysis of the controversial odeum built within the basilica there (211–20), a study that must hereafter be considered definitive for that complicated and puzzling building.

P. Zanker follows Fentress’s essay with a broad treatment of “The City as Symbol” (25–41), which complements W.L. MacDonald’s treatment in his *Architecture of the Roman Empire*, vol. 2 (New Haven 1986). Here, too, there is much of interest, but some assumptions should have been reexamined; for instance, the inscription on the north gate at Saepinum can be dated well into the era of the *pax Augusta*, in fact to A.D. 4, but its walls need not be contemporary. Those walls are executed in a noticeably irregular *opus quasi-reticulatum*, a masonry facing not attested anywhere else in Italy at so late a date. Saepinum’s walls may well predate gate and inscription by as much as a generation.

Because the American Academy conference took place soon after the discovery of the frescoed cityscape beneath the Baths of Trajan on the Oppian hill, two articles are devoted to it. The second of these, by E. La Rocca, (57–71) is fascinating (the first attempt at a comprehensive treatment of the new-found artifact), even if it has little to do with the theme of the conference. There are other intriguing articles throughout the volume, but only a few truly focus on the concept of, and the debate surrounding, Romanization, and that is both a pity and a disappointment, since readers will not find what they were expecting. Three essays do develop and advance the topic of Romanization in interesting ways and in different parts of the empire: G. Woolf discusses the evidence in early Roman Gaul, especially at Autun, for cross-influences between Romans and natives (115–32); S. Dyson provides an intriguing survey of the urbanization of Roman Sardinia, which implies the extent to which Romans were content to leave well enough alone in quiescent territories (189–96); and M. Downs brings together a quantity of recent excavations of Roman foundations in southern Spain (197–210) and anticipates some of the conclusions drawn by Boatwright in her recent book. A concluding summary by Alcock (221–6) reiterates points already made in her Introduction to *The Romanization of Athens*, and tacitly acknowledges the problems of breadth in the later volume; she acknowledges, for instance, that no convincing conclusions can be drawn about what she labels “myth-making and myth-breaking about cities and their role in the Roman world” (221), certainly not in the scatter-gun approach of this set of articles.

In short, both volumes deal with, or circle around, an important and timely scholarly concern and both contain fascinating individual contributions. While neither presents a comprehensive treatment of the many problems inherent in analyzing Romanization, both have much to offer on individual cities and monuments, and both demonstrate the importance and fascination of the subject.

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This is the 12th collection of essays by José María Blázquez to be published in less than 25 years, and he has also written many books on the history, archaeology, art, and economy of ancient Spain, which makes him one of the most prolific Spanish scholars. This book includes 34 articles, all but one published in the 1980s and 1990s, and the common denominator is, according to the author, that they are concerned with “different aspects of the archaeology and art of the peoples from Spain and from the ancient Mediterranean” (9); still, it is very difficult to find much coherence in this collection, except that the papers were all written by the same person.

The book is divided into five untitled parts. The nine essays in the first part deal with pre-Roman Iberia, and especially with the civilization of Tartessos, the influence of Phoenician colonization, and different aspects
of the material culture of Iberian people. In the second part, three papers focus on the urbanism of the city of Castulo, another on the urbanizing process in the Iberian peninsula, and a last one on the importation of alements in Spain during the first millennium B.C. Two articles in the third part deal with great men, namely Alexander the Great and Nero, and a third one with social and economical problems from the fifth and fourth centuries B.C., as reflected in the writings of Diodorus Siculus. In the fourth part, there are four papers about the Roman republican camps from the Republic in the Spanish Meseta, the roads in Roman Spain, the gold mines from northwest Spain in Roman times, and a famous artifact from Late Antiquity, the missorium of Theodosius. The last part comprises 13 essays about mosaics from Spain, Africa, Cyprus, and the Near East: some of these essays focus on the mosaics from a specific region, while others deal with the representation of a theme in mosaics from different areas.

These 34 papers actually belong to very different categories. Some are the result of the author’s special expertise in one field of research, for instance in the case of Castulo, a city he has excavated and knows well, or concerning some mosaics he has studied in person. These are certainly the most valuable, because they give access to a first-hand source of information, even if they are sometimes more rough sketches than fully published reports. Other articles give a Forschungsbericht on very well known artifacts, like the “Dama de Elche” or the missorium of Theodosius, and they can be very useful, although they are not profoundly original. But most essays reflect Blázquez’s methodology and why he is able to be such a productive author. He possesses a vast knowledge of the different types of evidence concerning Roman Spain, most notably the literary sources or some aspects of material culture. In most of these papers, he throws this erudition through the filter of the subject he has chosen, without much concern for the underlying questions of interpretation. For instance, in the fifth essay of the first part, “La península Ibérica y Chipre antes de los Romanos (218 a.C.),” he stresses some archaeological similarities in the pre-Roman cultures of Iberia and Cyprus, but writes that this does not imply any fluid relationship between the two zones, although this might be the case. This is not very helpful, and most of the articles are thus only catalogues with a few comments, and not critical analyses.

As a consequence of this bias and of his working methods, there are sometimes factual errors or imprecisions, such as when he speaks of the reconstruction of the amphitheater of Lisbon during Nero’s reign, although the inscription he quotes only refers to the construction of the orchestra and proscaenium in the theater (343). His interpretations are not always very subtle or up-to-date: for instance, he still sees the third century as a time of crisis and destruction caused, among others, by the barbaric invasions (281–2), whereas their impact has been (rightly) minimized by J. Arce and A. Cepas Palanca. He also takes up Schulten’s vision of the Republican military camps (352–77), although much work has been devoted recently to a reappraisal of the data.

In fact, the interest in Blázquez’s work often lies less in the interpretations he proposes (where there are any) than in the compilation of information he gives. He is such an exhaustive scholar that he is very often aware of an almost forgotten passage of an ancient author, and his pieces are always full of material that waits to be analyzed. Most of the descriptions he gives are precise and detailed, and it is a pity that there are only 19 black and white figures in this book; since more than half of the essays deal with catalogues and classifications of various artifacts, especially mosaics, this is very unfortunate.

In Blázquez’s words, the target audience for this collection of essays is composed of “his disciples, colleagues and those interested” (9)—it is difficult to give a precise definition of this last category. This volume is certainly full of information, but it is probably only required reading for those with a specific interest in one of the topics discussed; it does not have much significance as a whole, except for someone brave enough to plan a reading of all of Blázquez’s immense collection of writings.

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Mediterranean islands have a lot to interest archaeologists, from the evidence for human colonization to the social inequalities that were expressed in the third-millennium B.C. palaces of the Minoan states on Crete, the Neolithic stone temples of Malta, and the tumiform monuments of Sardinia, Corsica, and the Balearic islands in the second and first millennia B.C. This means that there is the potential for both local, historical analysis as well as comparative studies among these island cultures. Mallorca is the largest of the Balearic islands and has a rich history of archaeological fieldwork. Only the most myopic of tourists could fail to notice the settlements of stone towers that still litter the landscape. These monuments have a long history of architectural and typological study, but it is only in the last three decades that their social and economic contexts have become the subject of more systematic attention. What kinds of societies constructed these monuments? What do they tell us about social competition and warfare? How far were social inequalities based in production? These are some of the questions that occupy Víctor Guerrero in this succinct and thoughtful book. His focus is on the sites and monuments of the second and first millennia B.C. Wisely, he recognizes the limitations in our knowledge of this period, namely the lack of definitive publications of key sites and the poverty of systematic research projects designed to collect basic evidence on production. Equally wisely, he accepts the need for qual-
ity control on the radiocarbon dates for these two millennia, as for earlier periods of the island’s occupation. In this respect his chronology closely follows that proposed by Castro et al. (“Dating and the Prehistory of the Balearic Islands,” PPS 63 [1997] 55–86) and the synthesis of Lull et al. (¿La Cova des Carrizó y la Cova des Musoll [Barcelona 1999]). According to this chronology, Mallorca received only occasional human visits before the late third millennium B.C. followed by the colonization of the neighboring islands of Menorca and Ibiza by the mid second millennium B.C. On Mallorca the archaeological record of the period ca. 2500–1600 B.C. consists of open-air settlements and burials in caves and artificial caves, with the addition of megalithic tombs at the end of the period. From then until the 12th century B.C., settlements consisted of groups of naviform buildings, in some cases with evidence from recent excavations for productive and storage activities. But Guerrero argues that from the end of the 12th century more monumental architecture began to be constructed, with a burst of activity in the ninth century, when the stone towers known as talayots were erected all over the island. These towers were also built on Menorca, where, together with ritual centers (taulas) and burial structures (navetas), they constitute an extraordinary density of monuments. Guerrero argues that these talayots were initially constructed for ritual uses, whether standing in isolation, or grouped together in what he calls ceremonial centers, and only later were domestic structures added onto them.

Guerrero’s social interpretation of this sequence from ca. 1600 B.C. makes use of essentially neo-evolutionary categories. For the period before the towers and turrim-form structures, he proposes the existence of an egalitarian society, with the economy centered on extended families and directed by village headmen. The absence of fortifications and arms suggests a lack of conflict. This was succeeded by a tower-building society in which political leadership centers on big men and competing chiefs, with a redistributive economy, the appropriation of surplus for exchange, and the pursuit of strategies (e.g., external trade and fortified settlements) designed to increase personal prestige. After the abandonment of the talayots at the end of the eighth century, Mallorcan society is transformed from one still based on kinship to one in which social classes were supported by tribute, leading Guerrero to ponder the existence of a state-like society before the Roman conquest.

Guerrero’s greatest strength lies in his grasp of the basic archaeological evidence coupled with his critical stance on its absolute chronology (although historical dates have been strangely calibrated as if they were 14C dates). He is also willing to propose a social interpretation for this material. But Guerrero’s social model is still based on a comparatively small amount of high quality data, as he himself acknowledges. The renewed excavations at Son Fornés in the summer of 2002 would undoubtedly add further to these data, but the few systematic collections of animal bones from across Mallorca for any period of its occupation still impede study of basic subsistence. Applying terms like “egalitarian” or “chiefdom” to prehistoric Mallorcan societies may be useful in terms of giving us a starting point in social reconstruction, but we really do need to focus more consistently on field projects designed to collect data on production, distribution, and consumption, so that the extent and basis of social inequalities can be traced through time and space. Inequalities of age and gender may be expected in any society, while the completely “egalitarian” society probably never existed.

Black and white photographs and figures of sites (no artifacts) are provided, but the small-scale format of the volume precludes a more extensive presentation of the archaeological record; and a distribution map of the main sites would have been helpful for the reader new to the island. Nonetheless, the appeal of this book is that it provides a good, informed and up-to-date introduction to the monument building societies of Mallorca. As such it is also a contribution to the broader study of such societies in the west Mediterranean and to the field of island archaeology in general.

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This volume contains reports on the Early Byzantine remains from the excavations sponsored by the University of Crete at Eleutherna since 1985. The site, located roughly 25 km southeast of Rethymnon, occupies a spectacular natural setting atop and alongside a steep outrunner of the Psiloritis massif. Eleutherna was a major ancient settlement particularly during the Geometric-Archaic and Hellenistic periods, and it is perhaps best known for its extensive Iron Age-Archaic cemetery and an intact Hellenistic bridge. But the local settlement also flourished during the Late Roman and Early Byzantine periods, when it was a hub for production and exchange and an episcopal see. The substantial remains from this phase of occupation, the subject of this volume, furnish important evidence for urban life during the transition from classical antiquity to the middle ages, a once obscure chapter in Cretan history that has been gradually illuminated by discoveries at, among others, Aghia Galini, Gortys, Knossos, Lyttos, and Pseira. On the great island as in mainland Greece, the emerging picture is one of broad political and economic changes with the diminution and dispersal, yet resilience and adaptability, of local institutions and settlements.
The recent excavations at Eleutherna have proceeded under three directors in three areas: the eastern Sector I (P. Themelis), the central Sector II (A. Kalpaxis), and the western Sector III (N. Stampolidis). Preliminary reports have appeared regularly in Κρητική Εστία and the final publication in monograph form began in 1994 with Sector II. This volume on Sector I, the second of two projected, covers the finds associated with the Christian basilica, a cemetery, and several buildings flanking a street. A too-brief introduction by Themelis (11–12) is followed by detailed catalogues and discussions in English and Greek of pottery, inscriptions, coins, and human bones; the preceding volume will contain general treatments of the structural, depositional, and funerary evidence and additional artifactual reports.

The first contribution by C. Vogt, the longest and best in the volume, addresses the pottery (39–199). A succinct outline of the objectives and methodology of study introduces the admirably comprehensive but lucid catalogue, fully supplemented with drawn profiles. This chapter should become a standard reference for the typological variation and geographic distribution of Early Byzantine ceramics. Vogt classifies the pottery first according to fabric, distinguishing imports from North Africa, Asia Minor, Syria, Palestine, and Egypt and local products, and, second, according to morphology and function, including tablewares, wares for food preparation (bowls, basins, baskets), cooking wares, wares for transportation and storage, and miscellaneous forms (lamps, candlesticks, beechives, stands). E. Aloupi, V. Kikiloglou, P.M. Day, and L. Jouyer (207–35) report on thin section petrography, trace-element analysis, and SEM examination on samples of ancient imported vessels and modern clays from nearby Margarites. These studies present the scientific characterization of analytical groupings and shed light on provenance and technology.

Vogt concludes (99–101) that at Eleutherna, as at Gortys and elsewhere in Late Antique Greece, Phocaean wares and African red-slips were the commonest import-ed tablewares, but unlike certain centers, like Argos, most amphoras at Eleutherna were manufactured on Crete, a reflection of the community’s dependence on regional agricultural production. The assemblage is also noteworthy for its formal diversity, particularly in the range of local vessels, such as the series of basins (figs. 24–27) and globular cooking pots (figs. 30–37). Vogt places these local wares in the sixth–early seventh century, but one must wonder whether the tradition persisted later. Indeed, P. Gouin and Vogt observe (291–5) that ceramic production continued during the “dark age” in Cretan villages but on a smaller scale, perhaps through the agency of itinerant potters.

The second major contribution is a critical edition with commentary of the Early Byzantine inscriptions by Y.Z. Tzifopoulos (pp. 237–59). These 16 texts, many of which Themelis already published in Κρητική Εστία, include mosaic inscriptions from the basilica, inscribed fragments of the ambo’s parapet, and Christian graffiti and epitaphs from the church’s vicinity. The paleographic, linguistic, onomastic, and formulaic analysis is thorough and the emendations sensibly conservative.

The most important text, from the pavement of the narthex, records that the bishop Euphratas built the “house” (οἰκός) of St. Michael (no. 1 = SEG 45.1267). Tzifopoulos follows Themelis in dating the erection of the basilica to ca. 430–450, or shortly before Euphratas’s attendance at the Synod of Chalcedon in 451 (Hierocles 659.9; Mansi VI, col. 757), but he does not give the entire argument. In any event, this church was surely among the earliest Christian basilicas on Crete. Tzifopoulos cannot offer enough evidence to substantiate his provocative hypothesis that the dedication to the Christian archangel and psychopomp was linked to the earlier worship of Hermes or a mystery cult with chthonic associations in the area, but such a connection is plausible.

The epitaphs (nos. 4–9) as usual give the name of the deceased and the year of death by indictional cycle. Tzifopoulos does not address the curious fact that so few epitaphs have been found in the church’s cemetery, which numbered over 40 graves. One possible explanation is that certain individuals, on account of social or economic status, simply did not receive tombstones; another is that certain burials belonged to a later era when epitaphic commemoration was not a universal funerary concern. They were not all tidy, single interments, like that of the presbyter Nikasios, which was marked by a cleanly incised epitaph (no. 4 = SEG 45.1270). The graves had varied, sometimes informal, designs, and many contained multiple corpses (293). Tzifopoulos also iterates the dubious theory of Themelis that a faint Christian invocation on a lintel block within a house (no. 12 = SEG 45.1266) was scrawled by prayerful residents during the Decian persecution. The adjacent rooms do contain a destruction horizon of the middle third century, but the graffito might as well have been written later, as Tzifopoulos concedes.

The third contribution by K. Sidiroopoulos discusses the 49 bronze coins from Sector I (261–87). Just as at Gortys, most of these coins were minted at Constantinople under Heraclius (610–642) and Constans II (642–688) and none postdates the late seventh century. Sidiroopoulos identifies the caesura in monetary circulation with an economic and political collapse spurred by earthquakes and the Arab invasions. Since coins of Constans II have been found in association with destruction debris in the church and nearby buildings, he concludes that the settlement was abandoned during the reign of Constans II or shortly thereafter (270). It should be stressed, however, that the coins merely furnish a terminus post quem, and that coins of the late seventh–eighth centuries are scarce across Greece, even in centers like Corinth, where urban life changed drastically but continued. Is it likewise possible that the community at Eleutherna survived the decline of coin-based exchange on the island in some form? We do know that Epiphanius, a bishop from Eleutherna, participated in the Nicene Council in 787 (Fedalto 1988, 542). Thus, it seems perilous to rely on the latest coins in the basilica for the upper chronological limit of the entire settlement, particularly in the case of remains that are not stratigraphically continuous with these coin finds (11, 243, 291, 305).

The last contribution, by C.E. Bourbou, addresses the paleopathology of the highly fragmentary bones of 151 individuals buried in the cemetery (289–319). This report
concentrates on pathological diagnosis, but anthropologists will miss much of the information needed to compare the osteological evidence from Eleutherna meaningfully against other datasets, such as a concise outline of analytical criteria, consistent age estimates (cf. table 1), metric and discrete traits, and the calculated prevalence of each condition in the sample. Bourbou’s study reveals a skeletal population not unlike many from the ancient Mediterranean in terms of illnesses and injuries, though dental pathology at Early Byzantine Eleutherna was unusually infrequent by any premodern standard. Osteoarthritis in the vertebral and appendicular joints, injuries to the limbs, and periostitis related to soft tissue trauma speak to a daily life under physical stress, while cribra orbitalia and enamel hypoplasia indicate metabolic disturbance resulting from dietary deficits or juvenile sicknesses. But there is no reason to conclude that these hardships were particular to a population that suffered earthquake and invasion (303–4). Moreover, Bourbou’s confident identification of certain unusual conditions (e.g., scurvy, short-limbed dwarfism) is difficult to evaluate because she does not describe the manifestations sufficiently and she provides no photographs. The provisional identification (300, fig. 6) of diffuse periosteal lesions on a sacrum as evidence for actinomycosis, a rare suppurative disease that was only first noted in a prehistoric specimen from Ontario in 1990, seems beyond reason.

Apart from the overall high quality and utility of the separate reports, the volume as a whole has two shortcomings. First, since the first volume on Sector I has not yet appeared, the reader has no overview of stratigraphy and topography; the only map in this volume has no scale or key and does not locate Sector I within the site. Therefore, it is impossible to integrate the various data or appraise them contextually. This sort of piecemeal organization is also evident in the redundant summaries of natural and historical conditions and, more alarmingly, in the shifting meaning of "πρωταθεμιτή" in the volume’s title ("end of the 4th to the 7th and 8th centuries" [40, 96]; A.D. 400–961 [239]; A.D. 395–827/8 [263]; “παλαιοχριστιανική” [293]).

The second difficulty lies in historical interpretation. The contributors envision broad economic and political dissolution concomitant with the desertion of Eleutherna in the late seventh century as a direct result of earthquakes and (Arab) invaders, favorite culprits in the catastrophist school of the end of antiquity. To be sure, Vogt persuasively explains the impact of these developments on the regional trade network (96–9). But local responses to foreign incursion and seismic disaster can be complex, and it should not be assumed that total abandonment was the only option. The possibility should at least be considered that certain essential activities—ceramic production, burial, even worship—might have continued in the vicinity after coined transactions had ceased, the basilica had fallen into disrepair, and some families had moved up to the citadel.

As archaeologists and historians continue to ponder these challenging questions of cultural change and attempt to reconstruct the material components of life in the Byzantine “dark age,” they will be fortunate to have this abundant compilation of the evidence from Eleutherna as a starting point.

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Villeneuve, Estelle, and Pamela M. Watson, eds. La Ceramique byzantine et proto-islamique en Syrie-Jordanie (IVe–

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