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The Sikyon Survey Project: A Blueprint for Urban Survey?

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Abstract

The few examples of archaeological surface survey conducted in ancient urban centers in Greece and the Mediterranean have employed a variety of methods and yielded results of disproportionate breadth and resolution. The Sikyon Survey Project is a hyper-intensive survey that aims to set a standard for addressing the archaeology of a sizable Mediterranean town center. The efficacy of the proposed methodology is highlighted by preliminary results from the first three years of the survey (2004–2006).

Keywords: *Sikyon*, *Greece*, *urban landscape*, *intensive urban survey*, *urban archaeology*

Introduction

In almost four decades of systematic surface survey conducted in the Mediterranean, ancient urban centers have received little attention. The vast majority of rural regional surveys have not conducted examinations of associated urban centers, mainly due to specific practical issues. Many ancient urban centers, for example, now lie under modern settlements, but it is also the case that archaeological exploration of urban areas traditionally involves excavation (Bintliff and Snodgrass 1988a: 57). In addition, the sheer quantity and wide distribution of artifacts have often deterred survey practitioners from committing to town survey the resources and time it deserves. Where urban surveys have been conducted, they have tended—with a few notable exceptions—to be fairly coarse in resolution, most frequently because of their 'subjugation' to broader regional projects, and because of the lack of exemplars in terms of methodology (Martens 2005: 231-32; Alcock 1994: 181; cf. Ammerman 1981: 67, 76-81). The Sikyon Survey Project, which was initiated in 2004, is an intensive survey that aims to set new standards for the surface exploration of ancient urban centers with a specific focus on Greek examples. Three consecutive field seasons have provided an opportunity to refine a methodology that successfully responds both to the complexity of an ancient Greek *asty* (town) and to the peculiarities of modern Greek land division.

The ancient Greek city-state (*polis*) culture was characterized by a high level of urbanization, with a substantial part of its population

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living in the city itself (Hansen 2006: 12, 63, 69). Besides being the largest nucleated settlement in the whole state, the *polis* was the center for the political institutions, religious ceremonies, defense, production and trade, education and entertainment of a city-state (Hansen 2006: 102-105). These various functions and activities influenced and, in the case of regularly planned cities, often determined urban layout, creating what is often called a 'functional urbanism' (Martin 1974: 30-35, 105-110). Yet even in gridded cities, which had become the norm from the Classical period onwards, a certain versatility is observed in the arrangement of the different functional bodies, not always neatly defined on the ground (Martin 1974: 253). As a result, investigation of complex urban activity, as it is manifested in the surface material record, requires an approach capable of identifying the patterns of urban activity over prolonged periods of time within the parameters of modern land division, agricultural practices and other forms of land use. Since various attempts have been made by several surveys over the last four decades at overcoming the challenge of survey of the urban environment, it is worth providing a brief discussion of the history of this form of survey in both the Greek world and the wider Mediterranean context. After all, it is largely on the basis of the pioneering work of these previous projects—their successes and failures—that the present project's methodology was designed.

Survey of *Polis* Centers

To start with, a distinction should be drawn between large sites and urban areas. Since the 1970s, the notion of 'site' has been under attack by various survey circles (see Dunnell 1992 with earlier references). As a result, some projects have refrained from using the term 'site' and preferred other names—e.g. 'findspot' (Wells 1996: 16-18), 'Place of Special Interest (POSI)' (Davis *et al.* 1997: 401-402; Given and Knapp 2003: 34-35) or 'localized cultural anomaly (LOCA)' (Tartaron *et al.* 2006: 485-86)—to describe artifact and ecofact clusters. Yet concentrations of artifacts are an archaeological reality, whether we call them 'sites' or something else. In other words, the problem does not lie with the terminology, but with the orientation of the survey.

In any case, the term 'site' is understood to mean a discrete concentration of cultural material, and most 'sites' seldom coincide with units of primary deposition, since they are accretive phenomena. By this definition, urban areas can rarely if ever constitute a single site. Within a city-wall, dense residential districts alternate with less crowded areas as well as with structure-free zones reserved for agricultural, pastoral or other purposes. In other words, an 'urban site' of the Classical and Hellenistic periods is in reality a cluster of sites as well as off-site areas typically within a politically defined boundary, most visibly the city-walls. Given the long history of occupation, material abundance and limited size (in relation to the countryside) of many of the *polis*-centers, the boundaries between 'site' and 'off-site' in an urban environment are usually more subtle and complex than in the rural countryside, and therefore more difficult to discern. This means that surface exploration in this context can only be 'siteless', that is, targeted to the overall distribution of cultural items, clustered or not. It also means that tighter spatial control of the surface record is required, involving quantification, fairly accurate mapping and equal (i.e. not quality-biased) treatment of finds.

This is not the approach that many of the early—or even the more recent—urban surveys have adopted (Figure 1). Although almost all of them claim systematic coverage and a holistic approach, namely a desire to study the chronological evolution, spatial development and functional variations of their areas, their methods have varied significantly and often

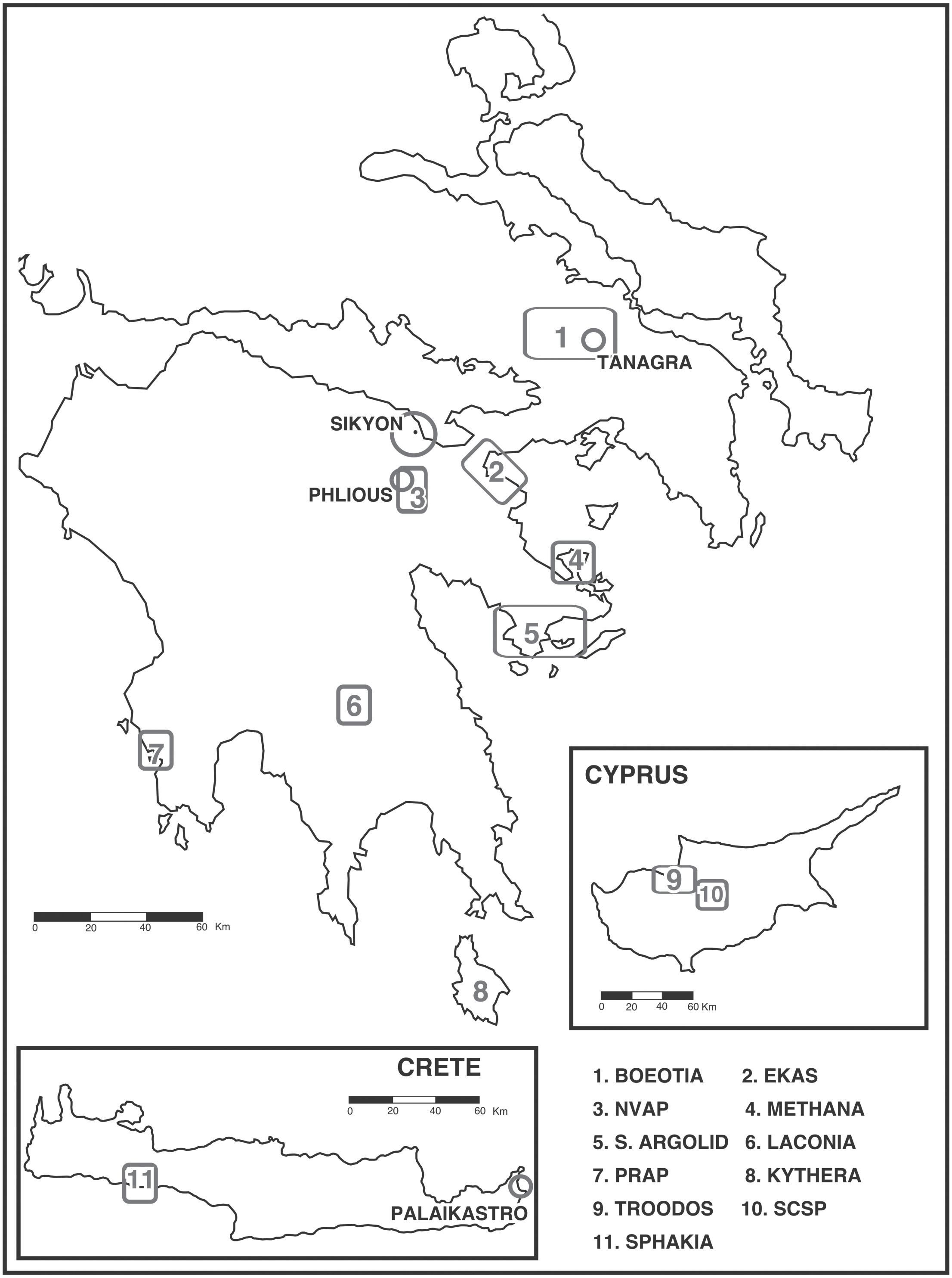

Figure 1. Greek survey projects mentioned in text; locations are approximate. Squares denote regional projects, circles urban surveys.

favored specific types of surface evidence. In terms of orientation, for example, several surveys had an architectural or topographical focus or were heavily dictated by architectural features; these include Palaikastro in Crete, the old survey of Tanagra in Boeotia, Peñaflor in southern Spain, and Kythnos in the Cyclades (MacGillivray-Sackett 1984; Roller 1987; Keay *et al.* 1991; Mazarakis-Ainian 1998). At Peñaflor (ancient Celti) in particular, topographical and geophysical surveys preceded surface survey, and the latter's methodology was tailored towards relating surface scatters to sub-surface remains (Keay *et al.* 1991: 373-75; Keay and Creighton 2000: 12-22). The Doganella survey in Italy's Albegna valley was site-oriented, aiming at identifying clusters of artifacts ('subsites'), and only these sites were recorded (Perkins and Walker 1990: 6-7). Not surprisingly, none of these projects produced any quantification of their pottery, and only Peñaflor used gridding—the surface survey followed the 30 × 30 m geophysical units (Keay *et al.* 1991). In addition, for two of these projects, namely the old survey of Tanagra and the Kythnos survey project, there is no information available on their field-walking strategies.

The material sampling methods of many urban surveys have produced data that are not easily comparable. For example, at Palaikastro and Tanagra no collection was carried out; at Peñaflor material was collected from a mere 3 sq m area randomly located within the survey units; at Doganella collectors picked diagnostic ceramics from 'sub-sites'; in Kythnos only certain categories of ceramic material seem to have been sampled (MacGillivray and Sackett 1984: 134; Roller 1987: 217; Keay *et al.* 1991: 373-75; Keay and Creighton 2000: 22; Perkins and Walker 1990: 7-8; Mazarakis-Ainian 1998). Even broader and more comprehensive projects—such as the survey of the Boiotian towns of Thespiai, Haliartos and Hyettos, the survey of Koressos in Kea, the Phlious survey in the Peloponnese, the survey of Leptiminus in Tunisia, the Sagalassos survey in southwest Turkey, and the new Tanagra survey project in Boiotia—highlight the variety of methodologies, each having employed a wide variety of field-walking strategies and sampling policies.

The Phlious surveyors opted for walking the approximately 120 ha urban area in the same way as the broader region of the Nemea valley, that is, in tracts corresponding generally with modern fields, in order to ensure 'direct comparability between data from Phlious and from the rest of the survey area' (Alcock 1991: 440-42). In the majority of cases in Greece, however, urban areas have been divided into smaller units than the rural areas. At Keos, for example, the urban area of Koressos was surveyed in more or less standard transects of 50 × 25 m whereas the size of the survey unit for the rest of the survey area varied according to the size of individual fields (Whitelaw and Davis 1991: 274). In Pylos the higher density area of the 'lower town' was surveyed by squares of 20 × 20 m (Bennet 1999: 11). The Bradford-Cambridge Boiotian survey used large transects of 50 × 60 m and had their walkers spaced 15 m apart (Bintliff and Snodgrass 1988a: 58). The survey of the Brindisi region in Italy included intensive examination of four fortified settlements, where the present-day agricultural lots served as the basic research unit, and were subdivided into squares of 25 × 25 m within the central zones of the settlements (Burgers 1998: 46-48). At Sagalassos, the scheme ultimately adopted consisted of squares 20 × 20 m with walkers spaced 4 m apart (Martens 2005: 235-40). In the new Tanagra survey, complete surface coverage was carried out in units 50 × 50 m, subdivided in four quadrats, but no information is provided on the interval between walkers (Bintliff *et al.* 2001: 34).

All of these surveys have produced quantitative data either through counting or through total collection. Logistical problems relating to pottery collection were encountered in many survey projects, with density rates ranging from 20 to over 150 sherds per sq m necessarily affecting the collection strategy. Different collection methods pose distinct problems for survey comparability, not to mention potential problems for analysis and future re-interpretation (Bintliff and Snodgrass 1988a: 58). High concentrations of artifacts have generated a variety of responses: collect a sample, collect it all, or collect none. Total collection of artifacts was carried out for select areas at Leptiminus and Sagalassos, whereas elsewhere these were determined on a sampling basis (Mattingly 1992: 98; Martens 2005: 235-40). In Haliartos and Thespiai, all material was collected along one (out of four) 15 m-wide strip in each transect (Bintliff and Snodgrass 1988a: 58). At Phlious surveyors regularly picked diagnostic sherds and total collection was reduced to a 10 sq m area at the center of the tract (Alcock 1991: 442-44), while in Tanagra a tiny sample (less than 1 per cent) from each square was collected (Bintliff *et al.* 2000: 94).

In recent years another sampling method, the so-called 'chronotype', has been advocated and used in a few regional survey projects. Initiated by the Sydney Cyprus Survey Project (SCSP) (Meyer, in Given and Knapp 2003: 14-16), it continues to be used by personnel from that project working elsewhere: e.g. the Troodos Archaeological and Environmental Survey Project (TÆSP) (Given *et al.* 2002), the Australian Paliochora-Kythera Survey (Gregory 2004), and the East Korinthia Archaeological Survey (EKAS) (Tartaron *et al.* 2006: 475). According to this system fieldwalkers collect all artifacts on the condition they do not duplicate the ones already recovered in terms of material, shape and decoration. This way, the proponents of this system argue, all ceramic forms and fabrics are collected 'without the massive amount of largely redundant material' (Tartaron *et al.* 2006: 475-81). We can see two potential problems with this system: a) it places too much confidence on the ability of the field walkers to identify the similarity and dissimilarity of unwashed sherds; and b) it limits the chances of estimating the frequency of certain categories of artifacts since only one example of each is collected (as the EKAS surveyors themselves acknowledged: Caraher *et al.* 2006: 13).

This brief assessment of the orientation and methodology of some urban surveys conducted thus far across the Mediterranean highlights their differences with respect to the spatial control of artifactual distribution, and the information they yield on the quantity and quality of material culture. Roughly half of them applied no gridding, and another half produced no quantification of their pottery. There are also significant differences in the percentage of surface covered and in sampling strategies. In addition, some projects, such as Palaikastro, Peñaflor, Sagalassos and recently Tanagra, have benefited from complementary geophysical investigations, and occasionally test excavations, while others have not. The variety of landscapes, with some areas lying on flat soil and others on slopes or in terraces, and the different field conditions encountered each time—in fortunate occasions plowed land but elsewhere unplowed and rough terrain—underlie some of these decisions, and to some extent explain the different strategies employed and the *ad hoc* adjustments. Whatever the reasons, an attempt, under these circumstances, to investigate the structures and historical evolution of different *astea* across the Mediterranean is a risky operation requiring dubious calibrations and a series of conjectures.

The Sikyon Survey Project

It is in this frame of debate over the subject of an optimal approach to the archaeology of a Greek *polis*-center that we present here the Sikyon Survey Project. By doing so we hope to promote dialogue not simply on the specific methods used at Sikyon, their aptness to the specific area and their adequacy vis-à-vis the aims of the project, but also on the applicability of our methodology to other urban contexts in the geographical radius of *polis* culture, in the pursuit of inter-urban comparisons and cross-regional integration of data. The current project builds upon the regional survey of the territory of Sikyon carried out by Yannis Lolos from 1996–2002 (Lolos 2008). It consists of an architectural and artifact collection survey of the entire plateau in conjunction with mapping of subsurface remains, a geoarchaeological survey, and an architectural, archival and ethnographic study of the modern village of Vasiliko. Although there are tentative plans to conduct focused excavations on the site after completion of the survey and publication of the results, the urban survey of Sikyon is by no means an exercise in site prospection. Rather, it is an attempt to conduct intensive high-resolution urban survey, utilizing a variety of techniques and involving many scientific disciplines, in order to understand the evolution and history of a city in both temporal and spatial terms. The following discussion focuses on the archaeological survey component of the project.

Geographical and Historical Background

Sikyon is located in the northeastern Peloponnese, on a distinctive plateau set back some 4 km southwest from the coast, and roughly 17 km northwest of Corinth. The plateau, with a surface area of approximately 250 hectares, is bordered towards the north and the south by two deep river gulleys, Helisson and Asopos respectively, which are responsible for its triangular shape (with the apex oriented towards the west), and its more or less precipitous slopes on all sides but the east (an aerial photo of the plateau can be found on the project's website—http://extras.ha.uth.gr/sikyon—under 'Study area'). Another geological phenomenon, the episodic uplift of the northern coast of the Peloponnese (through a series of violent earthquakes) accounts for the structuring of the plateau in successive 'marine' terraces rising like a staircase from northeast to southwest with scarps of various heights at their northeastern edges (Keraudren and Sorel 1987; Stiros 1988). The most pronounced one, running directly above the ancient theater, divides the plateau into two broad areas, an upper and a lower. A number of terraces have been mapped in each area, ranging from 120-180 m above sea level for the lower plateau, and from 200-260 m above sea level for the upper plateau.

According to ancient literary sources the plateau was the acropolis of the Archaic and Classical city, which was itself located on the coast. This plateau occupies a central position in the northern Peloponnese, as it towers over the coastal roads to Achaia and Elis towards the west, and straddles some of the most accessible and politically significant routes into the Arcadian mountains and the southern Peloponnese (on Sikyon's placement with respect to the Peloponnesian route network see Lolos 2008; more generally Tausend 2006: 59-85).

This advantageous position afforded Sikyon a place of relative importance in both the political and cultural life of the Peloponnese from the Archaic period onwards, reaching its political *floruit* in the Archaic and Early-Middle Hellenistic periods (Skalet 1928: 40-93; Griffin 1982: 34-91; Lolos 2008). In Archaic times, when ruled by the tyrannical family of the Orthagorids, Sikyon was one of the most powerful states of the Greek world and a cradle of the arts. Its artistic reputation carried on through the Classical and Hellenistic ages thanks to such famous painters and sculptors as Pausias, Kanachos and Lysippos. In 303 BC, Demetrios Poliorketes, son of Antigonos I, destroyed the city in the plain and transferred it to the site of its acropolis. This initiative, beyond its practical purposes, conveyed a strong political message, since Sikyon-Demetrias is one of only two cities founded, or more precisely re-founded, by a Macedonian ruler (the other being Demetrias in Thessaly). The city grew in its new setting during the Hellenistic and Roman periods and witnessed a golden age in the third century BC under General Aratos, head of the Achaian Confederacy. After the collapse of the Roman Empire Sikyon appears again in sources related to Frankish possessions in the Corinthia of the 13th and 14th centuries AD, this time under the name of Vasilika or Vasiliko. The village of Vasiliko, which presently occupies the southeastern corner of the plateau, is often mentioned in archives of the Ottoman and Second Venetian period (mid-15th to early 19th centuries AD).

Previous Archaeological Work

Notwithstanding this prominent historical underpinning, previous archaeological work has been fairly limited in both scope and nature. This work was focused on discovering major religious and secular monuments in and near the agora of the Hellenistic city, following the well-established precedent of tracing Pausanias's route through the city (exemplified by the series of articles in Alcock *et al.* 2001). Excavations successively carried out by the American School of Classical Studies in the 1890s and early 1900s, by A. Philadelpheus, A. Orlandos and K. Krystalli-Votsi on behalf of the Archaeological Society from the 1920s to 1950s and again in the 1980s, brought to light a number of monuments including a theater, a temple, possibly a *palaistra* (wrestling school), a *bouleuterion* (council house) and a long portico, all dated to Hellenistic times (a full summary and bibliography can be found in Lolos 2008; for a selective bibliography, see http://extras.ha.uth.gr/sikyon/en/bibliography.asp). In addition, the Greek Ministry of Culture has undertaken a number of rescue excavations on the plateau from the 1960s onwards (only occasional brief reports exist in the chronicle section of the *Archaiologikon Deltion*). Some of the finds from all these excavations are housed in the local museum, which Orlandos established by reconstructing part of a large Roman bath complex. More recently topographical investigations have mapped the visible remains of the city-walls, showing that the wall was built soon after the foundation of the new city, and encircled the entire plateau (Lolos 2008).

The Urban Survey

Previous archaeological investigations of Sikyon focused on the monumental center of the ancient city and left out all other urban areas and aspects of city life. Moreover, these studies concentrated on the Hellenistic and Roman city and failed to discuss any manifestation of the pre- and post-*polis* presence on the plateau. Although the precise extent of the agora is still not known, it could not have represented more than 2 per cent of the intramural area. The remaining surface of some 240 ha, with the exception of a few pockets where rescue excavations have taken place, is very much *terra incognita* with a number of significant questions surrounding it, not least of which concerns the chronological phases and foci of the settlement (or perhaps settlements) in different periods. With a number of prehistoric sites located within a relatively small radius from the plateau, and a Mycenaean cemetery excavated directly below it towards the coast, it is important to study the earliest phases and extent of settlement on the plateau in pre-Geometric times (these were discovered in the course of the extensive survey and during the construction of the new railway from Corinth to Patras; see Lolos 2008). The use of the plateau during the Archaic and Classical periods, when it served as the acropolis of the coastal city, presents another problem. Equally obscure is the fate of the Hellenistic and Roman city in the late Roman and Byzantine periods, and great uncertainty surrounds the history of this place in Frankish times (the *castellania* of Vasilika appears in some documents of the 13th and 14th century AD, but it is unclear whether it was a just a fort or a citadel [Lolos 2008]). Perhaps more ironic is our total ignorance of the origins of the modern village of Vasiliko and the extent and nature of habitation and land use during the Ottoman period.

For the city of Hellenistic and Roman times, the questions are of a different, more refined nature. They are concerned with the layout and development of the community in the course of these seven centuries. What was the extent of the occupied area and how did it evolve through time? How was land used within the intramural area? Did the city have physically discrete functional areas and if so how were these organized? In keeping with other Hellenistic foundations, it appears that the city was built on a grid, but neither the size of building blocks nor the street layout are known.

The agora lay at the heart of the planned town but despite the archaeological work conducted within it, its shape and extent remain unknown (Lolos 2006). Furthermore, the agora's relationship with the surrounding city-blocks is also unknown. What was the spatial organization of the city-quarters, was there a hierarchy, and what was the density of habitation on the plateau? What was the impact of human presence and activity on the physical environment, how and to what degree did Sikyonians transform it and, conversely, in what ways did the environment condition their behavior?

Also of interest is the city's relationship with its *chora* (territory), and how the evolution of the *polis* affected (or was affected by) the evolution of the countryside. Did the city grow at the expense of settlements in the countryside? Did Sikyonia as a whole experience phenomena of nucleation and decentralization and when might this have happened? Did it develop into a major production center after the destruction of Corinth in 146 BC, and how did Sikyon interact with other cities and regions of the Hellenistic and Roman world?

Surface survey is the obvious (if not the only) archaeological approach that can address these research questions. The plateau is especially suited for such a study: its topography is such that it has discrete natural boundaries, i.e. it qualifies as a natural survey universe (Plog *et al.* 1978: 384-85). At the same time, there is evidence for discrete cultural boundaries, at least during certain periods. Furthermore, a relatively shallow archaeological horizon as demonstrated by several rescue excavations (averaging 1 m in depth) in conjunction with continuous and ongoing land cultivation provide ideal conditions for artifact recovery. In addition, it has large portions of unbuilt and open agricultural land, resulting in a surveyable area of about 180 ha, that is, the entire surface minus the part occupied by the village and the fenced archaeological site—which has been covered exclusively with geophysical methods —and corresponding to 75% of the entire plateau. This combination of environmental, cultural and post-depositional characteristics invites as full an exploration of the plateau as possible.

Survey Design

From the outset it was decided that the survey of the Sikyonian *asty* should be both intensive and systematic in nature, in order to produce reliable data that would be representative of the full range of the archaeology on the plateau. The basic questions were whether to cover the entire available area or portions of it, at what resolution, and which artifact collection strategy to use. Sampling strategies are as varied as survey projects, and are again largely determined by the research questions, size and configuration of the target area, time available for the actual survey, human resources and funding. In whatever way a considered and locally sensitive sampling strategy is devised, it always runs the risk of missing important information lying in excluded areas, and there are ample examples of this (see the now classic debate between Cherry 1983: 400-405; 1984 and Hope-Simpson 1983; 1984). In addition, partial coverage of an area considerably weakens any *argumenta ex silentio* made at the interpretation stage. Having taken these limitations into account, it was felt that our survey area was of manageable size for purposes of total surface coverage.

Our first concern was whether to treat the entire plateau as a single area, or as zones defined by geomorphological parameters. The 1:5000 topographical sheets obtained from the Hellenic Army Geographical Service showed some six 20 m contour lines going up from east to west, and reflecting the 'marine terraces' mentioned earlier. Ground reconnaissance showed that transition from one terrace to the next tended to be rather smooth, undoubtedly a result of erosion of the once crisp conglomerate scarps. Although erosion is a primary factor of post-depositional processes and has a direct impact on the recovery of artifacts, it was deemed that its differential action within our small universe of 250 hectares was not so extreme as to justify defining distinct survey units on the basis of geomorphology alone (cf. Tartaron *et al.* 2006: 466-70). That being said, on a purely topographical basis the terrace against which the *caveas* (auditorium) of the ancient theater and the nearby stadium were shaped does stand out. The northwest-southeast break-line of this terrace is the dividing line between our upper and lower plateaus. The upper plateau, which spreads to the west of the break-line, has an approximate area of 56 ha, whereas the surface of the lower plateau, which opens up to the east, is some 170 ha. Given the latter's large size, it was decided to divide it into two zones, a northern and a southern, with the central road of Vasiliko acting as the dividing line (Figure 2). The size of the two parts open to surface survey (that is excluding the area of the modern village and that of the fenced archaeological site) is 67 ha for the 'northern plateau' and 61 ha for the 'southern plateau'. This division of the plateau overall into three topographically significant units represents the first level of the project's spatial control of the intramural area, creating broad survey areas of more or less comparable size.

The next decision was whether to impose a rigid grid over the entire plateau regardless of its present land use and field conditions or adjust our spatial control to local parameters. Examination of recent aerial photographs and numerous ground reconnaissance visits established that the overwhelming majority of the surveyable area is agricultural land, divided into private fields of irregular size, shape and orientation, and each subjected to various types of cultivation and soil treatment.[1] As it is necessary to maintain as much of this contextual information as possible, the survey follows these field boundaries and uses them as a broad unit of investigation, as has been done elsewhere (see, for instance, the 'block survey' methodology of SCSP's 'Special Interest Areas' [Given and Knapp 2003: 35-36]). This unit is defined as our *tract*. In other words, our definition of the tract is based both on archaeological and practical grounds: each field has its own characteristics, both natural and anthropogenic; and it is practically difficult to walk across fields.

Given the considerable variation in size and shape of modern fields, and the nature of the research questions, it became obvious that the tracts had to be divided into units that were as regular as possible. Establishing the best size and shape of this 'sub-unit' involved the consideration of a variety of factors: the size and shape of the tracts, possible strategies for material sampling, time restrictions and available resources, lessons learnt from other urban surveys, and experiments made on the lateral displacement of surface artifacts through plowing (see especially Schon 2002; Meyer and Schon, in Given and Knapp 2003: 52-56). A 20 × 20 m square was deemed to satisfy many of these criteria, since most tracts could fit multiples

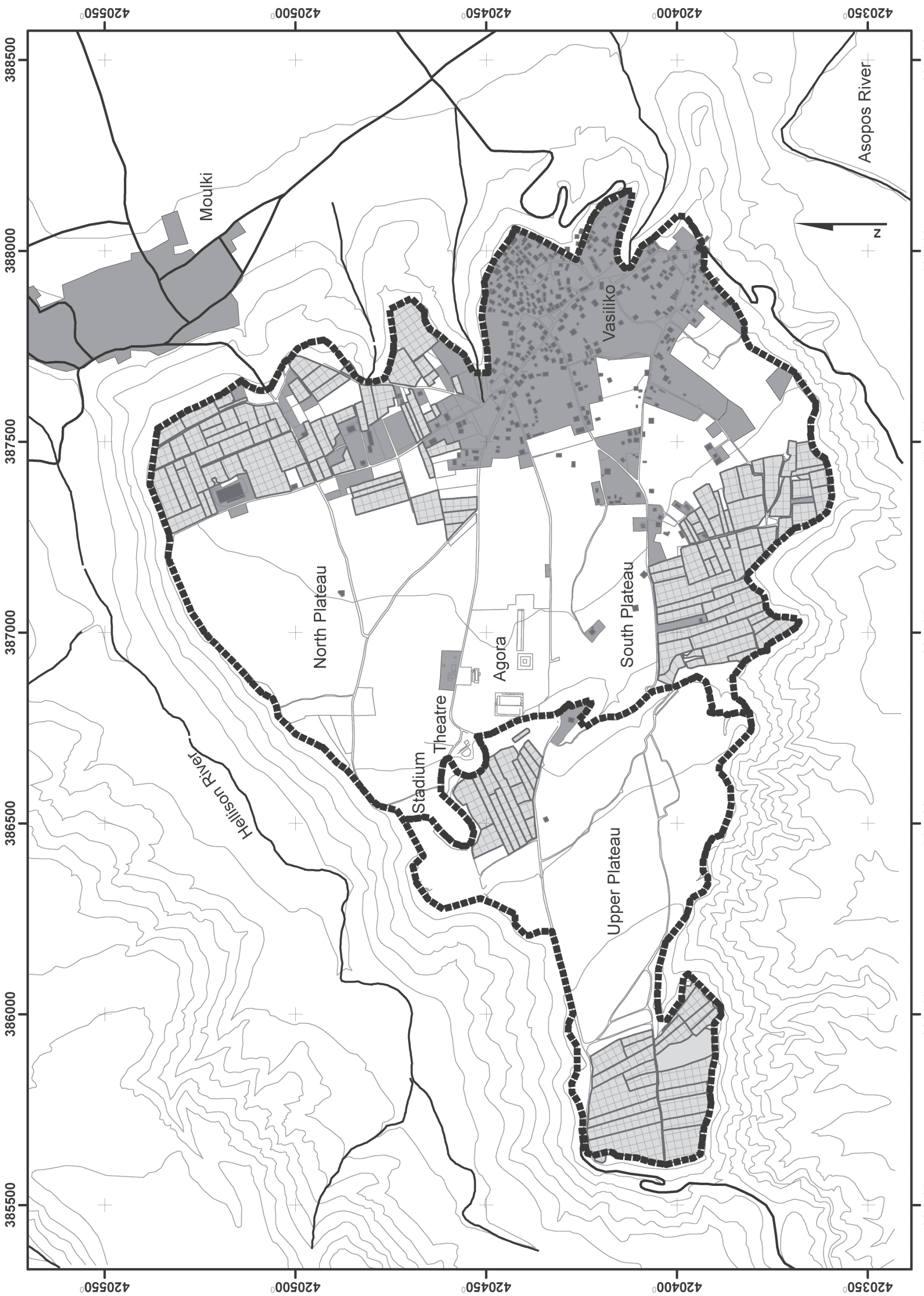

Figure 2. Map of the Sikyonian Plateau showing the three areas (UP, NP, SP), tracts and squares.

of these squares within their boundaries. This unit is particularly suited for sampling with a high degree of statistical viability, for it is large enough to allow the deployment of a walking team and absorb any anthropogenic displacement of artifacts, but also small enough to provide satisfactory spatial control of surface finds and their distribution.[2] Remaining irregular areas (not capable of fitting a 20 × 20 m unit) were gridded on the same system but in-filled with squares of a smaller size or different shape than that of the 20 × 20 m unit. The 20 × 20 m *squares* form the base unit of investigation, and the resolution of the survey is determined by their size. Thus, using these three levels of differentiation—areas, tracts, and squares—it is possible to divide the vast majority of the plateau into one vast grid of predominantly 20 × 20 m squares (Figure 3). The regular grid system also allows for a relatively easy translation

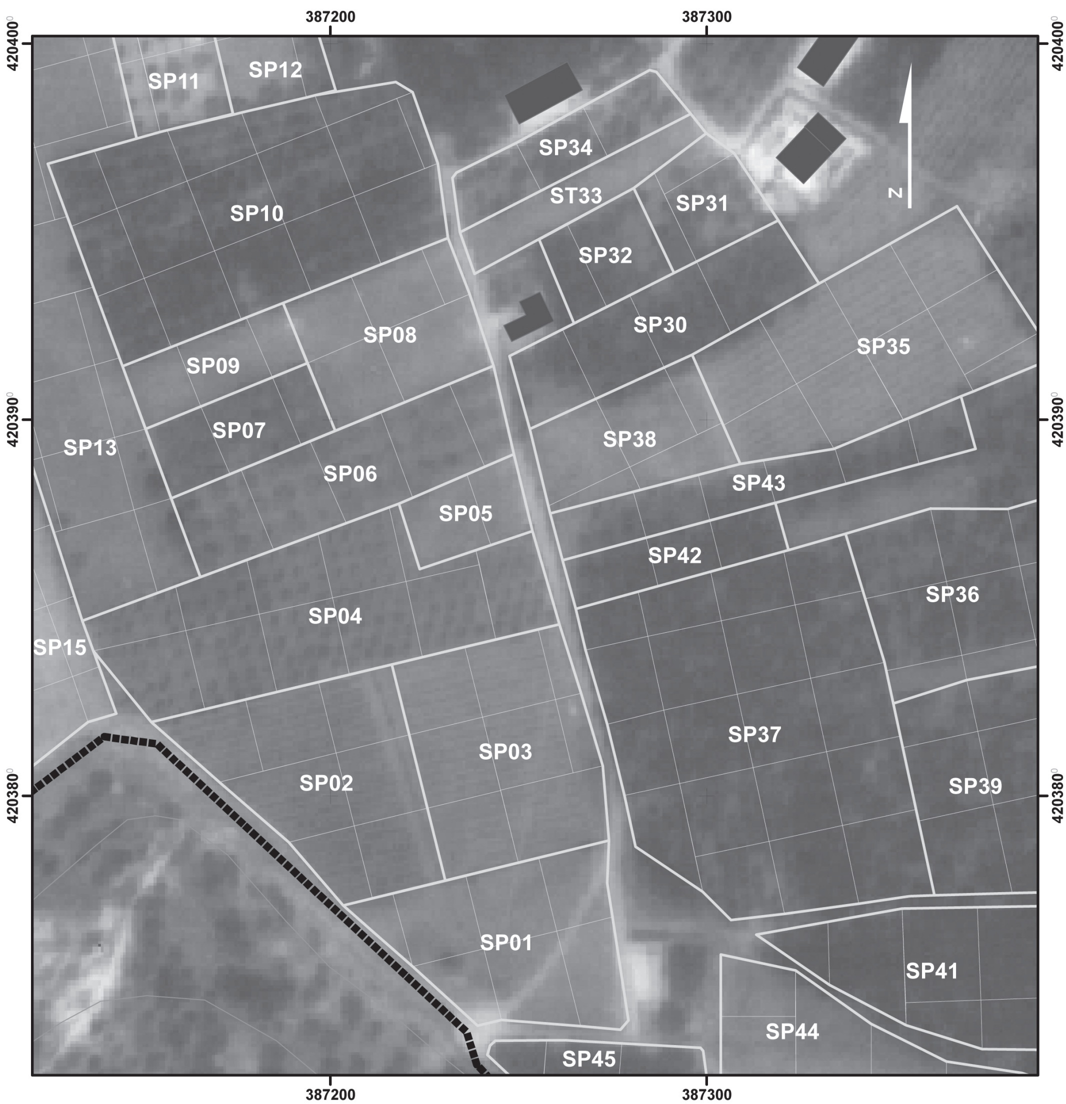

Figure 3. Detail of tracts in the South Plateau showing the arrangement and distributions of squares within tracts (overlaid on the aerial photograph of the plateau).

of the grid from the ground onto the base-map within the GIS.

The final issue to be considered was the sampling of the surface material. To start with, collection of every single artifact was out of the question, for both practical and ethical reasons. On the other hand, it was deemed absolutely necessary to quantify all surface artifacts, including sherds, tiles, and what are normally classed as ‘small finds’, so that future interpretations could be substantiated, and comparative inter-urban data provided. At the same time, collection of feature sherds has its problems as surveyors, willingly or not, tend to collect recognizable sherds, overlooking others considered less ‘diagnostic’ and less ‘datable’ (Alcock 1993: 49-53; Bintliff 2000b: 6; Millett 2000b: 53-59; Pettegrew 2007). As a result the collected artifacts often misrepresent certain periods and certain less-known pottery wares and, conversely, over-represent others (Foxhall 2004: 251; Caraher *et al.* 2006: 22-26).

In order to mitigate these problems, it was decided to carry out total collection over every fifth square of a tract, which would theoretically amount to 20 per cent of the surveyed area (we do recognize that our term ‘total collection’ is a bit of a misnomer, as it really means ‘representative collection of diagnostic and non-diagnostic ceramics from within the basic survey unit’).[3] This entails the collection of all sherds within a square, and their transportation to the storerooms for processing. In those areas with very high artifact densities, the area covered by ‘total collection’ squares was reduced, but the sample retained its statistical viability. As the processing methodology involves both shape and fabric analysis—for which the larger the sample of pottery, especially of coarse wares, the better—this was particularly important.

Method in Practice

The translation of survey design into practical application posed considerable challenges from the outset. Initially, it was considered necessary to work in all three areas of the plateau in each season, as this affords us the opportunity to mitigate walker effects and also to ensure that any methodological refinements are not restricted to a single area of the plateau.

The adaptation of a complex field system into a working base-map for use in the field was the first significant obstacle. Topographical boundaries, features and fields (tract units) had been digitized in a GIS prior to commencing the survey (Figure 2) using both geo-referenced aerial images (1m/pixel resolution) and 1:5000 topographical sheets base-map datasets—now common practice within Greek surveys (Wright *et al.* 1990: 604-606; Davis *et al.* 1997: 402, 411-12; Tartaron *et al.* 2006: 457-58). However, field boundaries as traced on the aerial photograph are not always evident on the ground, and subsequently a layout team—which was responsible for setting out the grid within the individual tracts—examined the tracts in order to verify on the ground their size, shape, type of vegetation or cultivation and overall field condition. In the end, the size of all the tracts was determined by a combination of field boundaries and land use, in conjunction with the immediate surroundings and all other parameters that affected the condition of the fields.

For the subdivision of the irregular tracts, squares of 20 × 20 m were used where possible (placing as many consecutive squares as each tract allows), with units of smaller, often irregular, size used for the remaining area. If this ‘leftover’ is smaller than 100 sq m then it is incorporated into that square, otherwise it is treated as a separate square. This threshold, while essentially arbitrary, was chosen on the basis of the best use of resources—i.e. time invested versus projected returns.

All of the tract and square spatial information was recorded in-field by the layout team in notebooks, and the measurements were confirmed with sub-meter accuracy DGPS (digital global positioning system) survey of baselines and field boundaries to ensure conformity with site-wide base-map data and GIS. All of the information regarding the tract is entered onto the Tract Record Form (TRF). This form contains the factors that may influence the recovery of artifacts: slope and aspect, cultivation and soil type. The number and size of the squares are recorded on this form, with a scale drawing on the back to aid in location and later analysis.

The two field-walking teams consist of five members each, spaced in principle four meters apart. This spacing fits best the size of the squares, guarantees thorough surface examination, and at the same time prohibits confusion in ceramic counting on behalf of the walkers (at Sagalassos, for example, the two-meter interval between walkers during the second season may have produced double counts of the same items, simply because walkers were too close to each other: Martens 2005: 241). In optimal field conditions this practice means 50% coverage since the visibility range is taken to be two meters on average, one meter on either side of the walker (Read 1986: 481). The nature of the ground visibility, its extent and implications for data recovery are quite difficult to gauge reliably. Indeed, the literature on this particular aspect of surface survey is extensive, in and of itself (e.g. Terrenato and Ammerman 1996; Terrenato 2000: 60, 69-70; Given and Knapp 2003: 12, 54-56). The Sikyon Survey assesses the visibility in classes of increasing clarity, from one to five. As this is largely a qualitative measurement, it was decided to limit the number of visibility classes in order to increase the consistency in how they were assigned (as opposed to the common one to ten scale, as seen in Bintliff and Snodgrass 1985: 131; the percentile scale, as seen in Mee and Forbes 1997: 34; or the qualitative scale seen in Cherry *et al.* 1991: 39; fuller discussion in Schon 2002: 137-47). Density counts of pottery and tile were established using hand-held counters or 'clickers', a well-established practice, and feature sherds and other significant small-finds were collected.

Every fifth square was designated a 'total collection' ('TC') square as planned, and these squares were kept as equidistant as possible within the same tract and with regard to TC squares of adjacent tracts. Practically this means that TC squares are never clustered in one area, so that the information extracted from them is as representative as possible of the whole surveyed area (Figure 4). TC squares are walked in the same way as normal squares, except that fieldwalkers collect all sherds but not tiles, which continue to be counted.

In areas of very high artifact density, total collection is limited to two lanes crossing each other at the center of the square, similar in form to a Maltese cross, and not dissimilar to the 'sample transect' of the Southern Argolid survey (Jameson *et al.* 1994: 226) or the site sampling strategies employed by the Methana and Laconia surveys, amongst others (Mee and Forbes 1997: 34-35; Cavanagh *et al.* 2002: 44-45). The main difference lies in the collection strategy, whereby the 'grab-bag' approach has been discarded (on this approach, see Davis *et al.* 1997: 401; Jameson *et al.* 1994: 225-27). On our forms, this method is termed a 'cross sample'. The square is then surveyed using tally counters in the normal manner. There is no absolute threshold for deciding between 'total collection' and 'cross sample'—instead it is assessed on a case-by-case basis. In practice, however, most of the Upper Plateau sees the use of 'total collection' while most of the two lower plateaus see the use of 'cross sampling'.

Architectural features and other non-movable artifacts, either *in situ* or scattered, are recorded with sub-m GPS either as individual points or as line features depending on the feature. The *in situ* architecture is numbered consecutively across the entire plateau. All square information is then recorded on a printed form, the square record form ('SRF').[4]

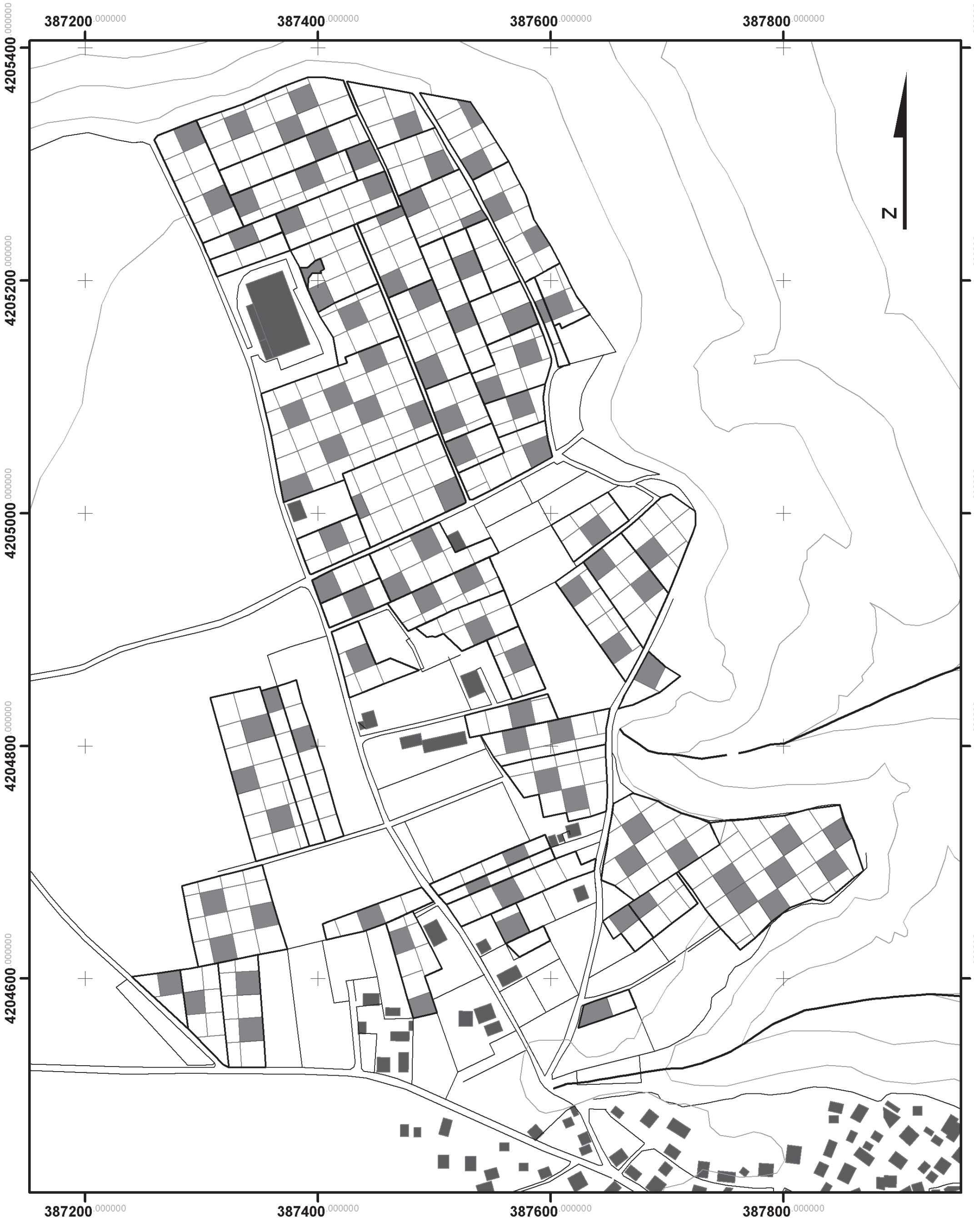

Figure 4. Distribution of total collection and cross sample squares (dark grey) on the North Plateau.

For the roughly 5% of the plateau that lies on slopes (and which cannot be recorded using the Tract and Square surveying described above), the Slope Interface Recording method was developed.[5] It was thought necessary to include these areas in the survey, even though they present obvious difficulties for systematic sampling, provided that the slope's angle does not exceed 30°. The examples of the theater and the stadium in Sikyon show that slopes were not necessarily useless zones, but could have been exploited in antiquity or other times of Sikyonian history. In addition, some of the best preserved artifacts are often recovered from the slopes, as they were not normally subjected to plowing. At the same time the distribution of pottery and other portable artifacts in this zone is conditioned by the slope, and chances are that many of them have washed down from the Upper Plateau. For this reason it was decided to divide this zone into 20 m-wide strips (measured from the top of the slope), with their irregular lengths determined by the extent and configuration of the slope, but in reality never exceeding 40 m. The teams then line up on the bottom of the slope, and walk uphill in as regular a fashion as the terrain and vegetation allow. As with regular squares, counts of pottery and tiles are kept, and diagnostic or unusual artifacts collected. Any architectural or unusual features are also recorded. This method proved remarkably workable, and resulted in some interesting preliminary results. In the few such 'squares' we have covered so far, we found larger than usual pottery fragments and several exposed segments of conglomerate quarry.

Processing and Displaying Data

The Tract and Square paper record forms filled out in the field are entered into a relational database (Microsoft *Access*), designed to provide direct links between tracts and squares, and various subsets of the data. Spatial information and quantitative data—i.e. the limits of each square, the position of architectural features and the numbers of artifacts—are recorded onto the master digitized map of the plateau using GIS. This allows for rapid and simple construction of queries, spatial or otherwise, and interrogation of data within both GIS and database environments (e.g. analysis of categories of finds, ceramic types, median ceramic density values and deviations from it [Figure 5], chronological trends, etc).

Processing of the ceramic material involves two stages: sorting by fabric and by shape. It was decided to proceed with fabric analysis of all collected pottery, because of the shape-based 'diagnostic' pottery constitutes the minority of ceramic populations in survey projects—ours was no exception—and because of the success that fabric analysis has had in other surveys (Moody *et al.* 2003; Kyriatzi 2003; Broodbank and Kiriatzi 2007; see http://sphakia.classics.ox.ac.uk/fabresearch.html).

Our fabric analysis involves two steps: (1) an initial macroscopic examination of the sherds, starting with the total collection squares that offer the larger samples, allowing for the separation of fabrics into groups that are recognizable based upon their physical characteristics, namely their inclusions, texture, and color (in this order); (2) subsequent petrographic analysis of thin-sections of selected sherds from each group then tests this initial classification. Thanks to these procedures, we have been able to determine that the majority of our recovered plain wares were produced locally in a coarse silicate fabric, while others were certainly produced elsewhere. These fabric datasets can then be compared with similar sets of data from neighboring Corinth and other places around the Mediterranean in order to explore possible affinities and patterns of cultural exchange.

The sorting of pottery by shape is usually restricted to the feature sherds, and has so far recognized a number of characteristic shapes mainly of Hellenistic and Roman vessels; and as was done for the fabrics, a reference collection

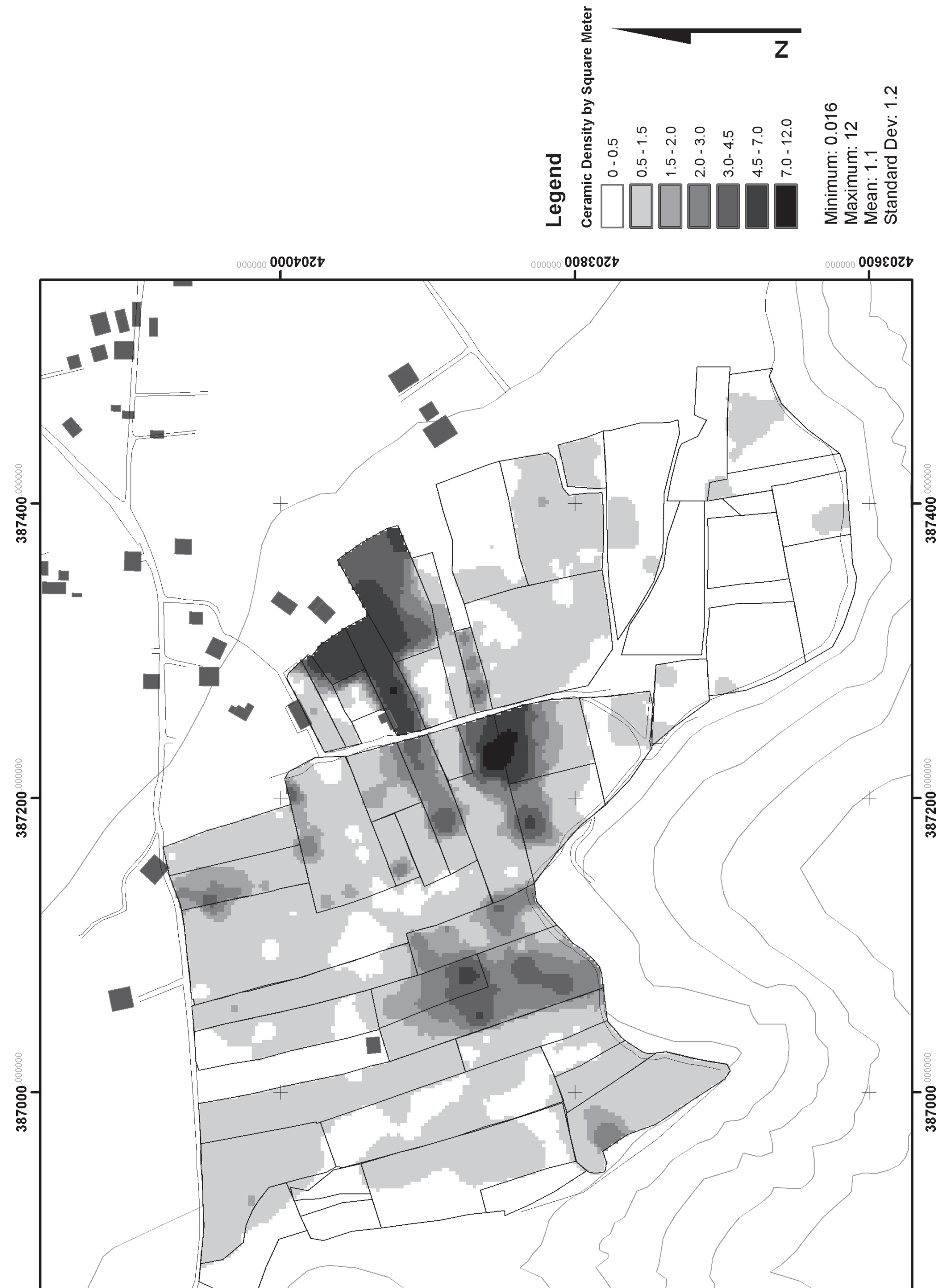

Figure 5. Ceramic density on the South Plateau (data not calibrated).

with examples of each recognized shape has been built. Shapes are identified on the basis of comparanda from excavated contexts, thus offering an indication of the dating of surface material. This basic chronology is built upon the evidence of stratified deposits from Corinth, Isthmia, and a few other sites. This is not a straightforward process, however, and at times can be misleading, since Sikyon produced its own ceramics as well (a recognized problem: Alcock *et al.* 2005: 194-96). Sadly, almost 15 years of excavations in the Sikyonian agora produced no stratified assemblages because Orlandos rarely kept any pottery. In spite of these constraints, shape-classification can also help separate our surface ceramic assemblage into functional categories (table, cooking, transport/storage vessels etc.). This in turn contributes to our efforts to distinguish possible uses of intra-mural space. In addition, the dating of some of these pieces may help us to assign date ranges to the fabrics they are made of, and by extension, to narrow the chronological range of fabric groups that lack diagnostic shapes (as at Sphakia: Moody *et al.* 2003: 51-54).

Testing the Methodology; Controlling and Enhancing Surface Data

The first results from examining part of the recovered ceramic assemblage and its spatial distribution allow for a preliminary evaluation of the grid resolution. Using the comparatively small 20 m collection unit in conjunction with the larger tract unit for the identification of the many environmental factors that affect the presence of material on the ground is providing positive initial results.

Primarily, the sheer volume and range of material recovered—particularly in the case of total collection squares—has proved to be of immense value for the detailed interpretation of the diverse ceramic body. Material is currently still being studied, but a picture is forming of a much fuller range of pottery types and fabrics than is commonly encountered (or at least published) in many surveys. The recovery of material at such a detailed resolution not only provides a workable spatial control for this extensive body of material, but it also allows us to observe trends in the formation of assemblages on the surface. Moreover, the confluence of multiple archaeological techniques provides us with a unique opportunity to address very specific issues relating to urban topography and use of space—the sorts of issues that are most commonly addressed through an evaluation of stratified deposits and excavation data.

Ceramic Production

For example, in the southern plateau the recovery of ceramic wasters from the first season onwards suggested pottery production in this area. The resolution of our survey grid was such that we were able to pinpoint occurrences of relatively high proportions of such material to individual squares. The abundance of wasters and over-fired ceramic products suggest the presence of either kilns or ceramic dumps from this industrial activity. Interpretation goes beyond the presence of such industrial installations, however, to the identification of their probable location within the relatively small area of 60 sq m. Subsequent magnetic survey over these areas has refined further the spatial position of these features and in several cases we have been able to pinpoint their location (Figure 6). Furthermore, in this particular example, several common pottery forms have been identified as being local to Sikyon, and while the study of this material is ongoing it is apparent that the small collection unit employed in the survey will likely assist in the identification of the location of production for specific vessel types across different chronological periods. Already it is clear that significant amphora production was taking place in the area bounded by SP (South Plateau) 06, SP22 and SP02.

Figure 6. Waster density per square overlaid on magnetic anomalies in the South Plateau. High magnetic responses (dark grey to black) are suggestive of highly fired materials.

Changing Urban Topography

Our methodology, moreover, has allowed us to make some preliminary assessments concerning the topography of the city, the nature of its 'planned' layout, and how that space was actually used over time. In surveying the northern plateau, squares with pottery densities significantly lower than those adjacent were noticed, even when the differences in field conditions (most significantly, land use and slope) were taken into account. The fact that these squares are right against the city-wall point to the existence of a zone free of buildings, between the residential blocks and the wall of the city, perhaps corresponding to a road, a kind of *Ringstrasse* attested in other ancient cities as well. On the upper plateau, tile concentrations close to the western edge are almost certainly due to the proximity of the city-wall. Due to the use of 20 × 20 m squares, it can be asserted confidently that these tiles do not come from farmsteads or agricultural shacks in the otherwise thinly occupied area, but from the roofing of the gallery running atop the city-wall. This situation accords well with what is generally known of the topography of Hellenistic walled cities, but demonstrating it without resorting to excavation is unusual.

Moreover, over the three years of survey conducted thus far we have been struck by the relative paucity of later material (especially Late Roman and Late Antique), and the preponderance of Hellenistic artifacts. An interesting pattern has begun to emerge in plotting the incidences and densities of this material. Almost overwhelmingly, we have observed that the majority of Late Roman and later material occurs around the area of the agora and towards the outskirts of the modern village. While analysis is at an early stage, this suggests not only that the occupied area of the walled space of the city contracted over time, but that the monumental civic heart of the city continued to be used. Furthermore, the eastern side of the plateau became the focus for later habitation, culminating eventually in the modern village of Vasiliko. Interestingly, we are able to pinpoint instances of this trend to within specific tracts—in many cases where a tract bounds the agora or the modern village, squares located farthest from those loci show the least amount of later material, even when field conditions and topography are taken into account.

Use of Space

Clearly related to the changing urban topography and demography of the city is the civic infrastructure. The survey's intensive and systematic coverage of the plateau has allowed not only for an understanding of the layout of the city and a preliminary reconstruction of the city grid, but has allowed us to recover many examples of standing architecture in conjunction with surface assemblages. In some cases, we have recorded entire sides of individual *insulae* (building blocks). The correspondence between the standing architecture and the character of the associated ceramic assemblages has allowed us to pinpoint several areas of primarily domestic habitation. In these residential areas, there are some instances where squares of low to medium densities alternate with squares of heavy ceramic concentrations; this could be the manifestation of large houses including the gardens and/or unbuilt spaces between them (Alcock *et al.* 1994: 155-56). Interestingly, these occur most commonly towards the peripheries of the plateau.

Additionally, we have recovered examples of cisterns from within these city blocks. Almost all of these are bell-shaped and are carved out of the underlying limestone; they vary in depth from 6-17 m, in examples that are not substantially in-filled. To date we have recorded 19 examples of these cisterns scattered across all three areas of the plateau. In the majority of cases, the occurrence of cisterns corresponds with instances of *in situ* architecture and traces of *insulae*. The pottery assemblages recovered from these areas tend to suggest domestic occupation, although this is not clear in every case. Moreover, the cisterns themselves are usually located within squares that have a relatively lower density of artifacts than surrounding squares, suggesting that they are indeed located within courtyards of domestic structures (Figure 7). Geophysical survey tends to support this assertion. There are several interesting implications, however, as it suggests that the intensity of our methodology is such that we are able not only to recover broad functional zones within the plateau, but also to perceive differences in such zones *within insulae*. More analysis is needed in this regard before we can make such assertions definitively, but these preliminary results suggest that it may be possible to discuss the use of space to a degree not seen in previous urban surveys, where multiple categories of evidence exist.

Suggestions of this sort may well require a fairly tight spatial control of the surface evidence, but also depend on the homogeneity of factors that influence the recovery of artifacts. These include ground visibility, vegetation/cultivation and corresponding land treatment, post-depositional history, and the fieldwalkers' sight. The last factor, the only one within the absolute control of the investigator, is of some importance. Although individual variability is often underestimated in interpreting raw survey data, tests conducted since the 1970s have shown significant deviations that result not from the archaeological record but from differences between crews or even individuals working on the same survey (e.g. Schon 2002: esp. 116-233; Plog *et al.* 1978: 413-15; Haselgrove 1985: 21-25; Carreté *et al.* 1995: 215-16). Various methods have been suggested in order to deal with this problem, based on the calculation of the average percentage of artifacts missed and subsequent adjustments (e.g. Haselgrove 1985). We are suggesting a type of limited resurvey in order to account for these possibilities: re-walking some of the same squares by two different teams, the one going first simply counting sherds and tiles, with the other counting and sherding feature pottery as usual. This way we should be able to calculate the range of variation due to individual sight differences, and take this into account when producing graphics with categories of pottery densities.

All other parameters listed above as influencing artifact recovery are outside the archaeologist's control, and are noted on the tract and square forms. The question now is how to counterbalance these variants and produce artifact distribution maps as unbiased as possible. Our strategy has been to re-walk selected tracts when soil visibility is much better, as well as compare data from adjacent tracts and squares with different soil conditions or depositional history (Ammerman 1995; Banning 2002: 214). In regional survey there appears to be some consensus suggesting that site recognition is not adversely affected by surface visibility. On a smaller scale—such as within a settlement, where many of the interpretations depend upon the relative pottery densities—re-survey is probably the best means for calibrating the visibility factor. In the eastern Mediterranean a few projects, such as the Nikopolis survey and the East Korinthia Archaeological Survey, have dealt with this problem. At Nikopolis, some tracts were resurveyed under different surface visibility (Tartaron 2003: 43-44). In EKAS they experimented by seeding potsherds and calculating their recovery rate under different field conditions (Tartaron *et al.* 2006: 492-94; see also Schon 2002: 116-233). In this way, we are gradually compiling data that will allow us to calculate a dependable ratio between visibility and recovery rate, and subsequently create filters to adjust the numbers of sherds and tiles.

Resurvey would also help to calculate another factor that affects the recovery of archaeological material, and this is the masking effect of predominant material culture. In artifact-rich

Figure 7. Surface ceramic scatters (1 dot = 10 sherds) in the North Plateau laid over magnetic anomalies. Filled circles represent cistern locations.

historical landscapes, such as Sikyon, the abundance of pottery and tiles influence fieldwalkers' sight and focus of attention, and may cause them to miss some material that is less represented but still there, simply because it is not the kind of material they are accustomed to seeing. For example, after three years of survey, only a handful of lithics have been recovered, something that has been noticed in other intensive surveys as well (Bintliff 2000a: 207; Bintliff 2000b: 5-6; cf. Runnels *et al.* 2005: 281). Having a team re-survey a sample of the tracts throughout the plateau for the recovery of just this type or other non-ceramic types of artifacts may be able to correct this bias.

The example of lithics brings up the most important issue of archaeological surveys, and common source of its criticism by survey skeptics, which is the problem of representation, i.e. the degree to which surface assemblages represent what lies underneath (Cavanagh *et al.* 2002: 44-45). Post-depositional processes, either natural (erosion for example) or anthropogenic (surface plowing and types of surface grading) have a direct impact on the taphonomy and preservation of cultural remains (Millett 2000a). For example, during the course of the Sikyon survey it became evident that there was only a thin representation of fine wares on the surface; it is of obvious importance to determine if fine wares are also scarce in the deposits below. Two strategies have been employed in order to relate surface to subsurface remains: the geophysical survey and the study of rescue excavations.

Geophysical survey has been conducted by two different teams: (1) one focused on the fenced archaeological site as well as the immediate area bounding the agora (this work has been carried out by the Institute for Mediterranean Studies, and preliminary results are also available at the project's website: http://extras.ha.uth.gr/sikyon); (2) the other covering the rest of the plateau with magnetic survey (carried out by the University of York). Selection of the tracts to be covered geophysically is largely dictated by local conditions—not least of which is crop type—but the overall aim is to produce a wide-ranging representation of the surface/subsurface relationships in all areas of the plateau. Magnetic survey has proved to be the most effective method; even though it is impaired in fields with metal posts, wires or pipes, in suitable fields it provided clear readings and is fairly expedient. In practical terms, this excluded most vineyards, but everywhere else it worked remarkably well. Magnetic survey over many of the squares previously walked has already provided very informative data for the comparison of surface assemblages with subsurface remains and the subsequent quantification of post-depositional effects (see Figure 7, above). Contrary to many archaeological projects which have conducted geophysical survey in order to locate promising candidates for excavation purposes, our strategy has been to cover high and low density areas alike, in order to investigate the possible sources of plentiful artifact diffusion or lack thereof (Cavanagh *et al.* 2005: 20, 309-310). This way we hope to contribute to the ongoing debate about the meaning and origin of low-density distributions (Caraher *et al.* 2006: 8-9, with many earlier references).

Rescue excavations, which have been conducted over the last four decades by the Greek Ministry of Culture in several locations around the plateau, can provide valuable sets of comparative data for our surface materials. Here it should be noted that these excavated plots often lie adjacent to surveyed tracts. Thus, while excavated plots will not be surveyed, by comparing rescue excavation material to surface material, it should be possible to calculate not only the representation of subsurface material in the plow-soil assemblages but also the differential preservation of certain types or fabrics.[6] The overwhelmingly Hellenistic and Roman material, coupled with very few fine wares, has already been noted.

Comparative examination of material from stratified deposits should be able to calculate, or at least illuminate, this potential bias in the surface material.

Re-surveys, geophysical prospection, and rescue excavations are all instrumental in enhancing, contextualizing and evaluating the surface record. One more source of archaeological material should be mentioned here, because it is very prominent in our small survey universe, as it is in many other areas of the Mediterranean and the Near East. This is the *spolia* (plundered cultural objects reused in later contexts), incorporated in one form or another in houses, churches, and other buildings of Vasiliko. The recovery of this information was a survey in its own right, with a small group of students visiting every single property of the village, which had previously been divided in sectors for organizational purposes. The result was literally hundreds of ancient pieces and a fair number of late-antique and post-antique fragments that add tremendously to the architectural corpus of the surface survey, and tell us something about 'recycling' of ancient material and people's attitudes towards antiquities. Occasionally, the volume and size of the ancient material used in some properties indicates that the source was likely not very far removed. Although modern villages inhibit surface survey, they can yield important information in their own right, which any survey—urban or regional—should not ignore.

The Challenges Ahead

The completion of intensive surface and geophysical surveys at this resolution is surely the biggest challenge of the project. Until 2007 some 51 ha had been covered in 58 working days with two teams of five walkers. This translates into a pace of about 880 sq m of surface coverage per walker per day. We also plan to continue our experiments in order to control, calibrate and enhance our data and its recovery. The study of rescue excavations is pivotal for assessing the reliability of the surface record and offers much needed comparanda for ceramic analysis. Rescue excavations have also been conducted in the periphery of the plateau, usually concentrating on the cemeteries of the ancient city (Krystalli 1968). Unfortunately, the results of these extensive excavations of the 1960s and 1970s, together with their associated finds, remain unpublished. More Classical and Hellenistic burials came to light during recent excavations for the new railway from Corinth to Patras. We can only hope that the study of this material will complement the settlement data and contribute to the picture of the urban history we have been reconstructing piecemeal (as at Pantanello [Carter 2006]).

The archaeological evidence can then be related to the textual information for Sikyon and Vasiliko, from antiquity to the early modern era. This includes various passages in ancient historical texts, Pausanias's description, ecclesiastical texts and chronicles of the Byzantine period, as well as archives of the Frankish and Ottoman eras (much of this material is discussed in Lolos 2008; many of the Ottoman archives related to the *kaza* [district under judicial jurisdiction] at Corinth, where Vasiliko belonged, have now been collected by the project's Ottomanist, M. Shariat Panahi). Survey archaeologists have often felt a distinct need to divorce their projects from other sources of evidence in order to create an autonomous body of data (Bintliff 1997: 21). As much as this may have served as a successful check on the over-reliance on literary sources, it has also resulted in much survey data being removed from their overall historical context. Ancient sources, if mentioned at all, are frequently relegated to appendices. Survey has moved from walking in Pausanias's footsteps to ignoring the man altogether. By considering the textual evidence when interpreting our archaeological data, not only can we contextualize at least some of the material evidence but also check reciprocally its integrity or biases to the benefit of our comprehensive knowledge of the ancient city.

Finally, the results of our survey can also serve as a guide for excavation of selected areas of the city that show signs of different activities: a sanctuary and other public monuments, a residential quarter, an industrial area or a farmstead. In this way, we should be able to correct the traditional bias toward monumental buildings and complexes, and offer a balanced picture of the archaeology of the city. Targeted excavations in areas already covered by survey would also provide the ultimate check on our survey results.

Surface survey, geophysical coverage, rescue and systematic excavations will all ultimately contribute to a proper management of Sikyon's cultural heritage and the preservation of some of its material remains. Furthermore, we hope that by conducting the first hyper-intensive survey over a *polis*-center of this size, and integrating various types of cross-disciplinary research, not only will we produce a comprehensive account of the archaeology and history of the Sikyonian plateau, and relate it to the evidence from the countryside, but we will also create reliable data for attempting inter-regional comparisons, and evaluating the methods, potential and limitations of surface survey as a whole.

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Notes

1. The aerial photos, shot in 2000, were obtained from the Ministry for Environment, Physical Planning and Public Works (ΥΠΕΧΩΔΕ), which at least for our area has more recent and more detailed aerial photos than the geographical service of the Greek army.
2. For experiments conducted on lateral displacement of artifacts caused by agricultural activities, see Allen 1991: 45-47; Clark and Schofield 1991; Schon 2002; for a recent summary of these artifact-generating processes, see Taylor 2000: 23-24 (with further references).
3. Some urban surveys have opted for very small, essentially negligible total collection units, which could explain why the information these units yielded was not particularly rich. In the case of Phlious, for example, their so-called 'Field Middle' samples, which according to our calculations covered a mere 0.28 per cent of the total area, met only with partial success (Alcock 1991: 442-44).

4 Both our Tract Record Form and our SRF can be found on the project's website: http://extras.ha.uth.gr/sikyon (under Survey Structure).

5 There is hardly any discussion in survey literature on how to deal with slopes of this nature, and most projects have had to devise their own system. In the urban survey of the Arkadian town of Lavda, for example, it was decided to cover also the slopes of the hill in the search of sherd concentrations and building remains. No counting took place, and the recording was done by slope aspect (Goerster 1994: 39-45).

6 This has been noticed in many archaeological surveys. For example, an experiment conducted by British archaeologists in Cambridgeshire revealed that certain types of fabric had not survived well in the ploughsoil as a result of agricultural abrasion and weather conditions: see Millett 2000a: 219 (with references).

References

Adams, K.W.
2000 Mutable boundaries: subdivisions and consolidation in a Greek village, 1936–1978. In S.B. Sutton (ed.), *Contigent Countryside: Settlement, Economy, and Land Use in the Southern Argolid since 1700*, 228-40. Stanford: Stanford University Press.

Adams, W.Y.
1988 Archaeological classification: theory *versus* practice. *Antiquity* 62(234): 40-56.

Alcock, S.E.
1991 Urban survey and the polis of Phlius. *Hesperia* 60: 421-63.
1993 *Graecia Capta: The Landscapes of Roman Greece*. Cambridge: Cambridge University Press.
1994 Breaking up the Hellenistic world: survey and society. In I. Morris (ed.), *Classical Greece: Ancient Histories amd Modern Archaeologists*, 171-90. Cambridge: Cambridge University Press.

Alcock, S.E., and J.F. Cherry
2004 Introduction. In S. E. Alcock and J. F. Cherry (eds.), *Side-by-Side Survey: Comparative Regional Studies in the Mediterranean World*, 1-9. Oxford: Oxbow Books.

Alcock, S.E., J.F. Cherry and J.L. Davis
1994 Intensive survey and agricultural practice. In I. Morris (ed.), *Classical Greece: Ancient Histories and Modern Archaeologies*, 137-70. Cambridge: Cambridge University Press.

Alcock, S.E., J.F. Cherry and J. Elsner (eds.)
2001 *Pausanias: Travel and Memory in Roman Greece*. Oxford: Oxford University Press.

Alcock, S.E., A.M. Berlin, A.B. Harrison, S. Heath, N. Spenser and D.L. Stone
2005 Pylos Regional Archaeological Project, Part VII: Historical Messenia, Geometric through Late Roman. *Hesperia* 74: 147-209.

Allen, M.J.
1991 Analysing the landscape: a geographical approach to archaeological problems. In A.J. Schofield (ed.), *Intepreting Artefact Scatters: Contributions to Ploughzone Archaeology*, 39-57. Oxford: Oxbow Books.

Ammerman, A.J.
1981 Surveys and archaeological research. *Annual Review of Anthropology* 10: 63-88. doi:10.1146/annurev.an.10.100181.000431.

1995 The dynamics of modern land use and the Acconia survey. *Journal of Mediterranean Archaeology* 8: 77-92.

Arafat, K.W.
1996 *Pausanias' Greece: Ancient Artists and Roman Rulers*. Cambridge: Cambridge University Press.

Banning, E.B.
2002 *Archaeological Survey*. New York: Plenum Press.

Bennet, J.
1999 Pylos: the expansion of a Mycenaean center. In M. Galaty and W.A. Parkinson (eds.), *Rethinking Mycenean Palaces: New Interpretations of an Old Idea*. Cotsen Institute of Archaeology Monograph 41: 9-18. Los Angeles: Cotsen Institute of Archaeology, UCLA.

Bettes, F.
1998 *Surveying for Archaeologists*. Durham: Department of Archaeology, University of Durham.

Bintliff, J.
1985 The Boeotia survey. In S. Macready and F.H. Thompson (eds.), *Archaeological Field Survey in Britain and Abroad*, 196-216. London: Society of Antiquaries of London.
1997 Regional survey, demography, and the rise of complex societies in the ancient Aegean: core-periphery, neo-Malthusian, and other interpretive models. *Journal of Field Archaeology* 24: 1-38.
2000a The concepts of 'site' and 'off-site' archaeology in surface artefact survey. In M. Pasquinucci and F. Trément (eds.), *Non-Destructive Techniques Applied to Landscape Archaeology*. The Archaeology of Mediterranean Landscapes 4: 200-215. Oxford: Oxbow Books.
2000b Beyond dots on the map: future directions for surface artefact survey in Greece. In J. Bintliff, M. Kuna and N. Venclova (eds.), *The Future of Surface Artefact Survey in Europe*, 3-20. Sheffield: Sheffield Academic Press.

Bintliff, J., and A. Snodgrass
1985 The Cambridge/Bradford Boeotian expedition: the first four years. *Journal of Field Archaeology* 12: 123-161.
1988a Mediterranean survey and the city. *Antiquity* 62: 57-71.
1988b Off-site pottery distributions: a regional and interregional perspective. *Current Anthropology* 29: 506-513.

Bintliff, J., E. Farinetti, K. Sbonias, L. Sigalos and B. Slapšak
2000 The Tanagra survey: report on the 2000 season. *Pharos* 8: 93-127.

Bintliff, J., N. Evelpidou, E. Farinetti, B. Music, I. Riznar, K. Sbonias, L. Sigalos, B. Slapšak, V. Stissi and A. Vassilopoulos
2001 The Leiden ancient cities of Boeotia project: preliminary report on the 2001 season. *Pharos* 9: 33-74.

Bintliff, J., and P. Howard
2004 A radical rethink on approaches to surface survey and the rural landscape of central Greece in Roman times. In F. Kolb (ed.), *Chora und Polis*, 43-78. München: R. Oldenbourg.

Broodbank, C., and E. Kiriatzi
2007 The first 'Minoans' of Kythera revisited: technology, demography, and landscape in the Prepalatial Aegean. *American Journal of Archaeology* 111: 241-74.

Burgers, G.-J.L.M.
1998 *Constructing Messapian Landscapes: Settlement Dynamics, Social Organization and Culture Contact in the Margins of Graeco-Roman Italy*. Amsterdam: J.C. Gieben.

Caraher, R.W., D. Nakassis and D.K. Pettegrew
2006 Siteless survey and intensive data collection in an artifact-rich environment: case studies from the eastern Corinthia, Greece. *Journal of Mediterranean Archaeology* 19: 7-43. doi:10.1558/jmea.2006.19.1.7.

Carreté, J.-M., S. Keay and M. Millett
1995 *A Roman Provincial Capital and its Hinterland: The Survey of the Territory of Tarragona, Spain, 1985–1990*. Journal of Roman Archaeology Supplementary Series 15. Ann Arbor: Journal of Roman Archaeology.

Carter, J.C.
2006 *Discovering the Greek Countryside at Metaponto*. Ann Arbor: University of Michigan Press.

Cavanagh, W., J. Crouwel, R.W.V. Catling and G. Shipley
2002 *Continuity and Change in a Greek Rural Landscape*. The Laconia Survey 1. *Methodology and Interpretation*. London: British School at Athens.

Cavanagh, W., C. Mee and P. James

2005 *The Laconia Rural Sites Project*. BSA Supplementary Volume 36. London: British School at Athens.

Cherry, J.F.

1983 Frogs round the pond: perspectives on current archaeological survey projects in the Mediterranean area. In D.R. Keller and D.W. Rupp (eds.), *Archaeological Survey in the Mediterranean Area*. British Archaeological Reports, International Series 155: 375-415. Oxford: British Archaeological Reports.

1984 Common sense in Mediterranean survey? *Journal of Field Archaeology* 11: 117-20.

Cherry, J.F., J.L. Davis and E. Mantzourani

1991 *Landscape Archaeology as Long-term History. Northern Keos in the Cycladic Islands from Earliest Settlement Until Modern Times*. Monumenta Archaeologica 16. Los Angeles: UCLA Institute of Archaeology.

Clark, R.H., and A.J. Schofield

1991 By experiment and calibration: an integrated approach to archaeology of the ploughsoil. In A.J. Schofield (ed.), *Intepreting Artefact Scatters: Contributions to Ploughzone Archaeology*, 93-113. Oxford: Oxbow Books.

Davis, J.L., and S.B. Sutton

1995 Response to A.J. Ammerman, 'The dynamics of modern land use and the Acconia survey'. *Journal of Mediterranean Archaeology* 8: 113-23.

Davis, J.L., S.E. Alcock, J. Bennet, Y.G. Lolos and C.W. Shelmerdine

1997 The Pylos regional archaeological project part I: overview and the archaeological survey. *Hesperia* 66: 391-494. doi:10.2307/148395.

Davis, M. (ed.)

1990 *The Pantanello Necropolis 1982–1989. An Interim Report*. Austin: Institute of Classical Archaeology.

Dunnell, R.C.

1992 The notion site. In J. Rossignol and L. Wandsnider (eds.), *Space, Time, and Archaeological Landscapes*, 21-41. New York: Plenum Press.

Foxhall, L.

2004 Small, rural farmstead sites in ancient Greece: a material cultural analysis. In F. Kolb (ed.), *Chora und Polis*, 249-70. München: R. Oldenbourg.

Given, M., and A.B. Knapp

2003 *The Sydney Cyprus Survey Project: Social Approaches to Regional Archaeological Survey*. Monumenta Archaeologica 21. Los Angeles: Cotsen Institute of Archaeology, UCLA.

Given, M., A.B. Knapp, J. Noller and V. Kassianidou

2002 Troodos Archaeological and Environmental Survey Project: report on the 2001 season. *Levant* 34: 25-38.

Goerster, Y.

1994 Lavda: Outside the circuit wall. *Pharos* 2: 39-48.

Gregory, T.E.

2004 Less is better: the quality of ceramic evidence from archaeological survey and practical proposals for low-impact survey in a Mediterranean context. In E. Athanassopoulos and L. Wandsnider (eds.), *Mediterranean Archaeological Landscapes: Current Issues*, 15-36. Philadelphia: University Museum.

Griffin, A.

1982 *Sikyon*. Oxford: Oxford University Press.

Hansen, M.H.

2006 *Polis: An Introduction to the Ancient Greek City-State*. Oxford: Oxford University Press.

Haselgrove, C.

1985 Inference from ploughsoil artefact samples. In C. Haselgrove, M. Millett and I. Smith (eds.), *Archaeology from the Ploughsoil: Studies in the Collection and Interpretation of Field Survey Data*, 7-29. Sheffield: Department of Archaeology and Prehistory, University of Sheffield.

Hope-Simpson, R.

1983 The limitations of surface surveys. In D.R. Keller and D.W. Rupp (eds.), *Archaeological Survey in the Mediterranean Area*. British Archaeological Reports, International Series 155: 45-47. Oxford: British Archaeological Reports.

1984 The analysis of data from surface surveys. *Journal of Field Archaeology* 11: 115-17.

1985 The evaluation of data from surface surveys. *Journal of Field Archaeology* 12: 258-60.

Jameson, M.H., C. Runnels and T.H. van Andel

1994 *A Greek Countryside: The Southern Argolid from Prehistory to the Present Day*. Stanford: Stanford University Press.

Keay, S., J. Creighton and D. Jordan
1991 Sampling ancient towns. *Oxford Journal of Archaeology* 10: 371-83. doi:10.1111/j.1468-0092.1991.tb00026.x.
Keay, S., and J. Creighton
2000 The surface survey. In S. Keay, J. Creighton and J. Remesal Rodríguez (eds.), *Celti (Peñaflor): The Archaeology of a Hispano-Roman Town in Baetica: Survey and Excavations 1987–1992*, 12-42. Oxford: Oxbow Books.
Keraudren, B., and D. Sorel
1987 The terraces of Corinth (Greece)—a detailed record of eustatic sea-level variations during the last 500,000 years. *Marine Geology* 77: 99-107. doi:10.1016/0025-3227(87)90085-5.
Krystalli, K.
1968 Korinthia. *Archaiologikon Deltion* 22: 164-66.
Kyriatzi, E.
2003 Sherds, fabrics and clay sources: reconstructing the ceramic landscapes of prehistoric Kythera. In K.P. Foster and R. Laffineur (eds.), *Metron: Measuring the Aegean Bronze Age*. Aegaeum 24: 123-30. Liège: Université de Liège, Histoire de l'art et archéologie de la Grèce antique.
Lolos, Y.A.
2006 Demetrias in Thessaly and the Peloponnese: a comparative approach. In A. Mazarakis-Ainian (ed.), *Proceedings of the First Archaeological Conference of Thessaly and Central Greece*, 171-83. Volos: Ministry of Culture, University of Thessaly.
2008 *Land of Sikyon: Archaeology and History of a Greek City-State*. Hesperia Supplementary Volume 39. Princeton: American School of Classical Studies at Athens.
MacGillivray, J.A., and L.H. Sackett
1984 An archaeological survey of the Roussolakkos area at Palaikastro. *Annual of the British School at Athens* 79: 129-59.
Martens, F.
2005 The archaeological urban survey of Sagalassos (south-west Turkey): the possibilities and limitations of surveying a 'non-typical' Classical site. *Oxford Journal of Archaeology* 24: 229-54. doi:10.1111/j.1468-0092.2005.00234.x.
Martin, R.
1974 *L'Urbanisme dans la Grèce antique*. 2nd edition. Paris: Picard.
Mattingly, D.J.
1992 The field survey: strategy, methodology, and preliminary results. In N. Ben Lazreg and D.J. Mattingly (eds.), *Leptiminus (Lamta): A Roman Port City in Tunisia, Report no. 1 Journal of Roman Archaeology*, Supplementary Series 4: 89-114. Ann Arbor: Journal of Roman Archaeology.
2000 Methods of collection, recording and quantification. In R. Frankovitch, H. Patterson and G. Barker (eds.), *Extracting Meaning from Ploughsoil Assemblages*. The Archaeology of Mediterranean Landscapes 5: 5-15. Oxford: Oxbow Books.
Mazarakis-Ainian, A.
1998 The Kythnos survey project: a preliminary report. In A.G. Mendone and A. Mazarakis-Ainian (eds.), *Kea-Kythos: Istoria kai Archaiologia*. Meletemata 27: 363-79. Athens: Research Center for Greek and Roman Antiquity.
Mee, C., and H. Forbes
1997 Survey methodology. In C. Mee and H. Forbes (eds.), *A Rough and Rocky Place: The Landscape and Settlement History of the Methana Peninsula, Greece*, 33-41. Liverpool: Liverpool University Press.
Millett, M.
2000a The comparison of surface and stratified artefact assemblages. In M. Pasquinucci and F. Trément (ed.), *Non-Destructive Techniques Applied to Landscape Archaeology*. The Archaeology of Mediterranean Landscapes 4: 216-22. Oxford: Oxbow Books.
2000b Dating, quantifying and utilizing pottery assemblages from surface survey. In R. Francovich, H. Patterson, and G. Barker (eds), *Extracting Meaning from Ploughsoil Assemblages*. The Archaeology of Mediterranean Landscapes 5: 53-59. Oxford: Oxbow Books.
Moody, J., H.L. Robinson, J. Francis, L. Nixon and L. Wilson
2003 Ceramic fabric analysis and survey archaeology: Sphakia survey. *Annual of the British School at Athens* 98: 37-105.
Perkins, P., and L. Walker
1990 Survey of an Etruscan city at Doganella, in the Albegna valley. *Papers of the British School at Rome* 58: 1-143.
Pettegrew, D.K.
2007 The busy countryside of late Roman Corinth: interpreting ceramic data produced by regional archaeological surveys. *Hesperia* 76(4).

Plog, S., F. Plog and W. Wait
1978 Decision making in modern surveys. *Advances in Archaeological Method and Theory* 1: 383-421.

Read, D.W.
1986 Sampling procedures for regional surveys: a problem of representativeness and effectiveness. *Journal of Field Archaeology* 13: 477-91. doi:10.2307/530171.

Redman, C.L., and P.J. Watson
1970 Systematic intensive surface collection. *American Antiquity* 35: 279-91. doi:10.2307/278339.

Roller, D.W.
1987 Tanagra survey project 1985. The site of Grimadha. *Annual of the British School at Athens* 82: 213-32.

Runnels, C., E. Panagopoulou, P. Murray, G. Tsartsidou, S. Allen, K. Mullen and E. Tourloukis
2005 A Mesolithic landscape in Greece: testing a site-location model in the Argolid at Kandia. *Journal of Mediterranean Archaeology* 18: 259-85. doi:10.1558/jmea.2005.18.2.259.

Schiffer, M.B., A.P. Sullivan and T.C. Kilnger
1978 The design of archaeological surveys. *World Archaeology* 10: 1-28.

Schon, R.
2002 Seeding the Landscape: Experimental Contributions to Regional Survey Methodology. Unpublished PhD dissertation, Department of Classical and Near Eastern Archaeology, Bryn Mawr College.

Skalet, C.H.
1928 *Ancient Sicyon, with a Prosopographia Sicyonia*. Baltimore: Johns Hopkins University Press.

Stewart, D.R.
2005 Review of S. Alcock and J.F. Cherry (eds.), *Side-by-Side Survey: Comparative Regional Studies in the Mediterranean World* (Oxford: Oxbow Books, 2004). *Bryn Mawr Classical Review* 2005.01.17.

Stiros, S.C.
1988 Model for the northern Peloponnesian (central Greece) uplift. *Journal of Geodynamics* 9: 199-214.

Tartaron, T.
2003 The archaeological survey: sampling strategies and field methods. In J. Wiseman and K. Zachos (eds.), *Landscape Archaeology in Southern Epirus, Greece* I. Hesperia Supplementary Volume 32: 23-45. Princeton: American School of Classical Studies at Athens.

Tartaron, T., D. Pullen, T. Gregory, J. Noller, R. Rothaus, W. Caraher, J. Rife, D. Pettegrew, L. Tzortzopoulou-Gregory, D. Nakasis and R. Schon
2006 The Eastern Corinthia archaeological survey: integrated methods for a dynamic landscape. *Hesperia* 75: 453-523. doi:10.2972/hesp.75.4.453.

Tausend, K.
2006 *Verkehrswege der Argolis: Rekonstruktion und historische Bedeutung*. Geographica Historica 23. Berlin: Walter de Gruyter.

Taylor, J.
2000 Cultural depositional processes and post-depositional problems. In R. Frankovitch, H. Patterson and G. Barker (eds.), *Extracting Meaning from Ploughsoil Assemblages*. The Archaeology of Mediterranean Landscapes 5: 16-28. Oxford: Oxbow Books.

Terrenato, N.
2000 The visibility of sites and the interpretation of field survey results. In R. Frankovitch, H. Patterson and G. Barker (eds.), *Extracting Meaning from Ploughsoil Assemblages*. The Archaeology of Mediterranean Landscapes 5: 60-71. Oxford: Oxbow Books.
2004 Sample size matters! The paradox of global trends and local surveys. In S.E. Alcock and J.F. Cherry (eds.), *Side-by-Side Survey: Comparative Regional Studies in the Mediterranean World*, 36-48. Oxford: Oxbow Books.

Terrenato, N., and A.J. Ammerman
1996 Visibility and site recovery in the Cecina valley, Italy. *Journal of Field Archaeology* 23: 91-109. doi:10.2307/530610.

Thompson, K.
1963 *Farm Fragmentation in Greece: The problem and its Setting, with 11 Village Case Studies*. Athens: National Center of Planning and Economic Research.

Wells, B.,
1996 Introduction. In B. Wells and C. Runnels (eds.), *The Berbati-Limnes Archaeological Survey 1988–1990*. Skrifter utgivna av Svenska Institutet i Athen, series in quarto 44: 9-22. Stockholm: Svenska Institutet i Athen.

Whitelaw, T.M., and J.L. Davis
1991 The *polis* center of Koressos. In J.F. Cherry, J.L. Davis and E. Mantzourani, *Landscape Archaeology as Long-term History: Northern Keos in the Cycladic Islands from Earliest Settlement Until Modern Times*. Monumenta Archaeologica 16: 265-84. Los Angeles: UCLA Institute of Archaeology.

Whittaker, C.R.
1990 The consumer city revisited: the vicus and the city. *Journal of Roman Archaeology* 3: 110-18.

Wiseman, J., and K. Zachos (eds.).
2003 *Landscape Archaeology in Southern Epirus, Greece* I. *Hesperia* Supplementary Volume 32. Princeton: American School of Classical Studies at Athens.

Wright, J.C., J.F. Cherry, J.L. Davis, E. Mantzourani, S.B. Sutton and R.F. Sutton
1990 The Nemea valley archaeological project: a preliminary report. *Hesperia* 59: 579-659. doi: 10.2307/148078.