https://doi.org/10.30549/opathrom-10-07

SVENSKA INSTITUTEN I ATHEN OCH ROM
INSTITUTUM ATHENIENSE ATQUE INSTITUTUM ROMANUM REGNI SUECIAE

Opuscula

Annual of the Swedish Institutes at Athens and Rome

10
2017

STOCKHOLM

https://doi.org/10.30549/opathrom-10-07

EDITOR:
Dr. Petra Pakkanen
Department of Archaeology and Classical Studies
Stockholm University
SE-106 91 Stockholm
editor@ecsi.se

SECRETARY'S ADDRESS:
Department of Archaeology and Ancient History
Uppsala University
Box 626
SE-751 26 Uppsala
secretary@ecsi.se

DISTRIBUTOR:
eddy.se ab
Box 1310
SE-621 24 Visby

For general information, see www.ecsi.se
For subscriptions, prices and delivery, see http://ecsi.bokorder.se
Published with the aid of a grant from The Swedish Research Council
The English text was revised by Rebecca Montague, Hindon, Salisbury, UK

Opuscula is a peer reviewed journal. Contributions to *Opuscula* should be sent to the Secretary of the Editorial Committee before 1 November every year. Contributors are requested to include an abstract summarizing the main points and principal conclusions of their article. For style of references to be adopted, see www.ecsi.se/guides-contributors. Books for review should be sent to the Secretary of the Editorial Committee.

ISSN 2000-0898
ISBN 978-91-977798-9-0

Printed by Elanders, Sverige AB, Mölnlycke 2017
Cover illustration from N.-P. Yioutsos in this volume, p. 172

https://doi.org/10.30549/opathrom-10-07

OPUSCULA • 10 • 2017

Contents

https://doi.org/10.30549/opathrom-10-07

https://doi.org/10.30549/opathrom-10-07

JEANNETTE FORSÉN, TATIANA SMEKALOVA & ESKO TIKKALA

The lower city of Asea, Arcadia

Results from a geophysical project 2001–2012

Abstract

Between 2001 and 2012 a geophysical survey project was carried out on and around Asea Paleokastro in Arcadia, Greece. The results of this work complement the archaeological surface survey[1] carried out in the same area in 1995 and the cleaning session[2] of the acropolis walls in 2000. We have now a fair idea of how the lower city was laid out and how the city wall encompassed the city blocks. Detailed information concerning a residential block was supplied in part by the excavation published by Erik J. Holmberg in 1944, and this supports our results. We have an orthogonal town plan consisting of rectangular city blocks of *c.* 38 x 56 m. The city wall has several towers and a postern gate, as well as at least one more complex city gate. The agora is more elusive, but we think that it could be placed in an area mostly devoid of anomalies downhill from a built-up area revealed by the magnetometer survey and bordered by the main passageway to the acropolis entrance.

Keywords: Arcadia, Asea Paleokastro, magnetometer survey, lower city, orthogonal town plan, Hellenistic period

Several seasons of magnetometer survey and multiple other investigative methods were carried out between 2001 and 2012 on and around the Asea Paleokastro in Asea, Arcadia.[3] Most of the results (through geo-electrical mapping, geo-electrical tomography[4] as well as geo-radar) prior to the magnetometer survey in 2007/2009/2012 are superseded by the latter and are therefore not dealt with in this paper.[5] As a starting point to this project we consider the cleaning of the acropolis and lower city walls carried out in 2000 and published in 2002.[6] In the 2002 paper we concluded that the acropolis walls were of Classical date, whereas the city, or city wall, was suggested to date from the time of the Achaian League, plausibly from the period of the Kleomenic war 229/228–222 BC.[7]

Archaeological background

Near the centre of the Asea valley lies the Asea Paleokastro, a conspicuous acropolis site, which was excavated in 1936–1938 by Erik J. Holmberg of Göteborg, Sweden. Here Holmberg found a prehistoric settlement with abundant remains dating from Neolithic times to the Middle Bronze Age, as well as evidence of later occupation, especially from the Hellenistic period. In 1944 Holmberg published his final excavation report.[8]

In the early 1990s a restudy of the prehistoric sherd material kept in Göteborg since the 1930s was undertaken.[9] As a result of the restudy it was suggested that Asea Paleokastro was settled throughout most of the Middle Neolithic (MN)

[1] Forsén & Forsén 2003.
[2] Forsén *et al.* 2002.
[3] Funds from several sources have been granted to this project throughout the years. Here we must mention our gratitude in particular towards Herbert och Karin Jacobssons Stiftelse, Gothenburg, Kungliga Vitterhets, Historie- och Antikvitets Akademien, Stockholm, and Gunvor and Josef Anérs Stiftelse, Stockholm for their generous support without which there would be neither project nor paper. Instrumental in obtaining necessary permits from the local Ephorate and IGME in Tripolis have been the Swedish Institute at Athens with its various directors and secretary, Bodil Nordström-Karydaki. The participants in these five seasons were, in various groupings, Mark Bauer, Meliha Dogan, Björn Forsén, Jeannette Forsén, Konstantinos Oikonomopoulos, Antonis Papardukakis, Stavros Papamarinopoulos, Anna Patteri, Tatiana Smekalova, Mikko Suha, Esko Tikkala, and Militades Tsifoutides. Many thanks are also due to Bruce W. Bevan for additional help in interpreting the magnetometer survey results of 2012.
[4] Dogan & Papamarinopoulos 2003, 241–248.
[5] However, some data are included from the multi-electrode resistivity tomography (MRT) undertaken in squares 15 and 16 (see *Figs. 5–6*) as they were not covered by the magnetometer survey.
[6] Forsén *et al.* 2002, 83–104.
[7] Forsén *et al.* 2002, 94–96.
[8] Holmberg 1944.
[9] Forsén 1996.

https://doi.org/10.30549/opathrom-10-07

period, probably continuing from Early Neolithic times, but that this habitation dwindled or stopped towards the end of the MN period. The few vestiges left of a Late Neolithic and Final Neolithic presence may not justify the belief in a permanent settlement at that time. During most of the Early Helladic (EH) period Asea was settled again with abundant pottery remains from EH I, all subphases of EH II, and most of EH III (a possible hiatus may occur during EH III:1). The latest Middle Helladic (MH) pottery in the sherd collection in Göteborg dates to MH I–II.[10]

Throughout prehistory Asea Paleokastro was part of a network of sites spread over southern Greece evidenced by a koiné in pottery production, especially during the MN, and EH I and EH II periods. Moreover, non-local imports to the site e.g. Aeginetan ware of early MH date and a Cypriote Bichrome tankard jug of Late Bronze Age date throw light on the fact that Asea Paleokastro was never isolated or hidden away in the mountainous Arcadian landscape.[11]

In the Asea Valley Survey (AVS), carried out in 1994–1996, the largest and the most significant Late Helladic (LH) site turned out to be the Asea Paleokastro.[12] Holmberg had found very few LH remains on the plateau, but in the survey LH pottery was found on the slopes of the acropolis indicating that a settlement of some importance existed continuously from the MH period until at least the LH IIIB period.[13] The least-known period of Asea Paleokastro is between *c.* 1100–750 BC, i.e. from LH IIIC down to the Late Geometric period. However some scant evidence of this later presence exists: some Late Geometric vessels were found by Holmberg and he also published a few metal objects, which later were dated to the 8th–7th century BC.[14] In the 1997 excavation of the Doric temple on top of Agios Elias above Ano Asea, pottery from Protogeometric times indicates the beginning of the cult activity, which had its floruit during the Late Geometric and Archaic period.[15] Thus, the conclusion we reached after the excavation was that the people using this temple for their cult activities mostly originated from Asea Paleokastro, but for some odd reason we cannot find or identify correctly their everyday plain pottery of Geometric date.[16]

The AVS collected clear evidence of a growth of the settlement at Asea Paleokastro during the 6th century BC. On the basis of historical sources and the archaeological finds it is believed that Asea existed as an independent *polis* centred on Asea Paleokastro at least from the 6th to the 3rd century BC.[17] Asea was one of several small communities belonging to the Mainalian tribe, other members including Oresthasion and Pallantion, which were indisputably *poleis* during the Classical period.[18] Of special importance in connection to this paper is the history of Asea Paleokastro during the time of the Kleomenic war (229/228–222 BC). This was a period of stress for Asea and its allies in the Achaian League. Several different strands of data suggest that the city wall of the lower city of Asea was constructed during this war; most telling is an apparent cessation of activity around *c.* 225 BC at the extra-urban sanctuary discovered by the survey (*Fig. 3*, marked with S in a red box north of the acropolis).[19] The AVS finds may also indicate a contraction of the site once the wall was put in place: the Hellenistic/3rd–1st century finds were recovered from a more restricted area than previously.[20]

The cleaning of the existing walls at Asea in 2000, which was undertaken not only to document them, but also to save them from the destructive action of tree and bush growth, also revealed new information about towers, postern gates, and the chronology of the walls. Thus, the acropolis walls are suggested to be of early 4th century date, whereas the lower city wall, as we have seen above, most likely is of late 3rd century BC date.[21]

Today the only visible part of the lower city wall is the southern spur, which has a preserved length of 24.80 m, is 3.30 m thick and has a maximum preserved height of 4.40 m.[22] In 2000 we cleared 40 m of the northern spur down to the northern spur tower.[23] However this part is nowadays covered by vegetation and not clearly visible.

Methodology

A detailed magnetic survey involves setting up a co-ordinate system on the site for data collecting, then measuring the earth's magnetic field, point by point, at intervals not more than half a metre apart and near the surface. The measurements are then plotted to create a magnetic map.

The main survey instrument is the Overhauser magnetometer GSM-19WG.[24] The magnetometer is operated in "walking mode", taking a measurement every 0.20 second, with the mapping sensor kept about 0.20-0.40 m above the ground. A second magnetometer of the same type is used to monitor

[10] Forsén 1996, 71–72.
[11] Forsén 1996, 41–72; Forsén & Forsén 2003, 185–198; Forsén 2010, 59–60; Forsén *et al.*, in press.
[12] Schallin 2003, 177–182.
[13] Schallin 2003, 196–198.
[14] Forsén & Forsén 2003, 199 nn. 96–97.
[15] Forsén, forthcoming.
[16] Forsén & Forsén 2003, 199.
[17] Forsén & Forsén 2003, 333.
[18] Forsén & Forsén 2003, 252–260.
[19] Forsén & Forsén 2003, 252, 257–260.
[20] Forsén & Forsén 2003, 249 fig. 151, 259 fig. 156.
[21] Forsén *et al.* 2002, 83–104.
[22] Forsén *et al.* 2002, 88–89.
[23] Forsén *et al.* 2002, 89–93.
[24] Built by GEM Systems, Ontario, Canada.

https://doi.org/10.30549/opathrom-10-07

temporal changes of the magnetic field. Its sensor is installed at a base or reference point in a zone of more or less 'normal' magnetic field, while the other magnetometer is moved about the site. Using special software the signals from both sensors are used for the removal of daily variations of the earth's magnetic field.

After the survey the data is transmitted from the magnetometer to a portable computer. Different presentations of the magnetic data can be prepared using Surfer software.[25] Most useful are the coloured contour maps and grey-scale maps. On the contour maps the positive anomalies are marked with blue colour and negative ones with red. On the grey-scale maps the positive anomalies are marked in a dark colour and the negative ones in a light colour. The contour interval is usually 2 or more nanoteslas (nT).

Since the magnetic method like other geophysical methods is indirect, the geophysicist interprets the data in the form of anomalies. The causes behind an anomaly can be suggested or speculated upon. However, only excavation can verify the true character of an anomaly.

Multi-electrode resistivity tomography (MRT) was applied to squares 15 and 16 (*Figs. 5–6*) in Asea in the summer of 2002. Electrical resistivity has been used for many years within Mediterranean archaeology. The principle behind the technique is to measure varying degrees of subsurface resistance, when a current is induced into the ground, by means of attaching a resistivity meter to electrodes in the ground. It can be used either to measure the horizontal distribution of resistance, or the vertical distribution, or both, a so-called tomographic mode which was used in Asea. The MRT was carried out using the Wenner-Schlumberger electrode array.[26]

The lower city of Asea

The area surveyed in 2007 (*c.* 2.50 ha) was located in the lower area to the north-east of the Asea Paleokastro (*Fig. 1*). The conditions for a magnetic survey in this part of the site were good as there were not too many magnetic disturbances from modern buildings, fences, or other iron items. The area for the survey was delineated by the acropolis to the west, the Panaitsa ravine to the north-east, and the visible part of the city wall to the north-west. The tracts for the magnetic survey were all oriented according to the modern fields and terraces in order to cover as much area as possible.

The magnetic field is quite anomalous in the investigated part of the site. Streets can be discerned on the magnetometer maps as either dark coloured (positive anomaly) if they are paved by tiles or broken pottery, or light coloured (negative anomaly) if paved with stones, for instance limestone, which is nonmagnetic. However, a negative anomaly can also be a stone wall, such as the city wall.[27]

The most interesting features are four long parallel positive and/or negative anomalies, which are orientated roughly in an east-westerly direction on the lower east slopes of the acropolis. The northernmost negative line represents the city wall, and the second positive line from the city wall leads directly up to the main gate of the acropolis, thus we interpret this as a street (*Figs. 1–3,* marked II on *Fig. 3*). The distance between the first, i.e. the city wall, and second parallel line is about 36 m. Two perpendicular long anomalies are also seen, where the eastern one represents the city wall and the other, parallel to the eastern city wall, divides the four clearly defined city blocks into four parts (*Figs. 1–3,* marked 1–4 on *Fig. 3*).

Thus, we have a regular town planning system with city blocks built in a rectangular pattern, albeit slightly different in size. During the 3rd century BC the city blocks are usually 38 m wide consisting of two 18 x 18 m houses or *insulae* divided by a 2 m wide rainwater channel *ambitus*[28] or corridor.[29] In the lower city of Asea we have, as seen above, four city blocks of almost exactly that size including an *ambitus* or corridor dividing block 3 (*Fig. 3*).

It is noteworthy that the building Holmberg took for "possibly a palaestra" has its long wall (excavated to a length of 37.50 m compare with the 38 m "ideal size" of a Hellenistic *insula*) exactly in line with the boundary of the city blocks. This 37.50 m long wall is 0.90 m wide and consists of smooth-hewn blocks. Perpendicular to this long wall is a "boundary wall, which is 1.60 m broad and built of large, irregular stones."[30] We interpret this so-called boundary wall to be the inner face of the city wall.[31]

The 37.50 m long wall makes a right-angled corner and was exposed for another 21.50 m. The latter stretch of the wall (21.50 m) constitutes the boundary to the next city block or *insula* to the south,[32] divided by a corridor aligned in an east-west direction (*Fig. 3*, Block 3). Inside the house two square column supports (*c.* 0.50 x 0.50 m), a hard-compacted earthen floor as well as some smaller inner walls were exposed.[33]

[25] By Golden Software, Golden, Colorado, USA.
[26] This work was carried out by M. Dogan from the University of Patras.

[27] Bevan & Smekalova 2013, 133–134.
[28] *Der Kleine Pauly* 1979, Band 1, 294–295.
[29] Holmberg excavated a Hellenistic house or *insula* (House I) on top of the acropolis, which is *c.* 25–29 m wide and where he calls the divide a corridor, 2.25 m wide (1944, 147–148 fig. 135).
[30] Holmberg 1944, 143.
[31] Karlsson 2002, 89–93 and fig. 19.
[32] Holmberg 1944, 143–145 and figs. 132–133.
[33] Holmberg 1944, 144. Note that the Hellenistic house (House I) which was excavated in the north-eastern part on top of the acropolis had

https://doi.org/10.30549/opathrom-10-07

Fig. 1. Grey scale map combined with a Google map showing Asea Paleokastro with the results of the magnetic survey seasons 2007, 2009 and 2012.

Due to the large size of the structure in conjunction with the two exposed column supports leading onto an assumed open court, Holmberg identified the building as "possibly a palaestra".[34] However, the identification as a palaestra is dubious in our view for several reasons: the long ashlar wall has no partitioning walls on the interior; the spacing of column supports, if projected into the space between the city wall and the northernmost column support, ends up irregular; and the two partitioning walls exposed by Holmberg to the east make little sense if one assumes an open court in the centre.

The presence and character of this assumed public building with its smooth-hewn ashlar blocks is somewhat surprising at this location near the northern edge of the lower city. Parallels to public buildings which use or incorporate the city wall into its buildings can be seen: the sanctuary of Athena Lindia on Lindos has several buildings, e.g. a portico and courtyard, constructed in this way.[35] A more obvious example is the agora in Cretan Lato dating from the 4th century, where a prytaneum and hestiatorium were constructed using part of the city wall.[36]

All efforts on our part in trying to reconstruct Holmberg's public building have failed so far. There seems to be a built-up area, due west of an area mostly free of anomalies, consisting of two long constructions, *c.* 37 m in length, well visible on the grey-scale map (*Figs. 1–3,* marked E on *Fig. 3*) leaving an inner court of *c.* 17.50 x 30 m. To the north of this feature is the road leading up to the main gate of the acropolis (*Fig. 3*, marked II). The area east and downhill from this built-up area may be an agora as very few anomalies were recorded (*Fig. 3*, marked Agora?).

In 2009 a total of 1.70 ha was surveyed around the Asea Paleokastro. The main focus of investigation this season was on the south and south-east of the acropolis and the Tripolis-Megalopolis highway. The continuation of the city block sys-

two square column supports at the entrance to an open courtyard; see Holmberg 1944, 147–148 fig. 135. However the stone walls of House I are very flimsy constructions compared to the ashlar masonry of the public building in the lower city.

[34] Holmberg 1944, 144.

[35] Winter 2006, 12, fig. 29.

[36] Lawrence 1983, 333 fig. 327.

https://doi.org/10.30549/opathrom-10-07

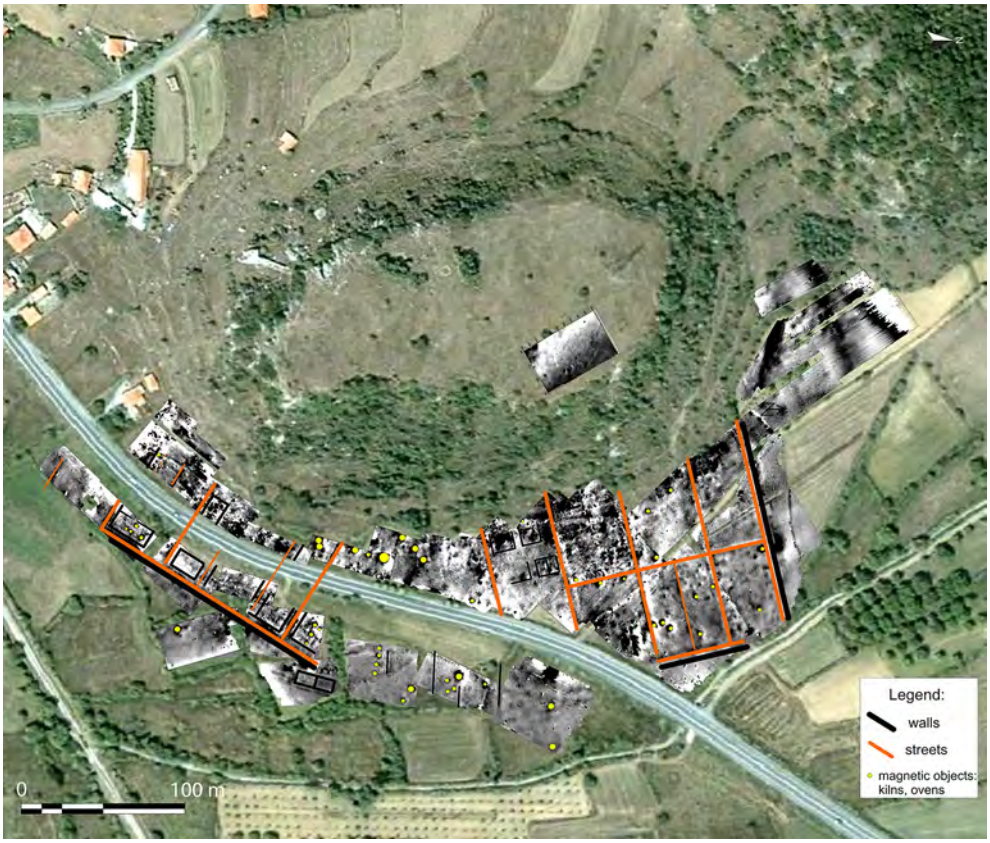

Fig. 2. Geophysicist's interpretation.

tem was found also in this area. Three, maybe as many as five, parallel anomalies/streets were documented, but at an acute angle to the blocks found in the north. Thus the city blocks are arranged fan-shaped below the acropolis (*Fig. 2*).

The streets are seen as long positive, i.e. dark, magnetic anomalies (*Figs. 1–2*). The width of the *insulae* in the southern and northern systems range between 38–43 m and the length of one block is about 53 m. Pits, wells, and kilns or ovens are found inside the lower city at numerous places. These all show up as strong magnetic anomalies occupying small distinct areas (*Fig. 2*).

In the AVS slag fragments were found in subareas 60/21, 60/23, 60/24, 60/36, and 60/38 supporting the notion of kilns/ovens in these areas (*Figs. 2* and *4*). One of the slag fragments has been analysed by neutron activation (NAA) in Bonn and the elemental pattern is paralleled by three Mycenaean sherds from Aristomenis in Messenia as well as one EH IIC sherd from Lerna in the Argolid. This means that Asea produced pottery from the Early Bronze Age through the Late Bronze Age, at least. The elemental pattern is henceforth called ArkC indicating Asea as the production site.[37] Surface analysis of the remainder of the slag fragments found in S60/21, 23, 24, 36, and 38 indicate that these possibly originate from smithing or pottery production.[38]

Another point to make is that subarea 60/37 (Fig. 4) adjacent to Holmberg's so-called "palaestra" did not produce any finds in the AVS as this area was completely covered by recent deposits of alluvium carried by the Panaitsa creek.

As all the walls that show up in the magnetometer greyscale map are all aggregated one on top of the other one would hope that the survey finds picked up in the individual fields and terraces would help in dating the subterranean walls. However, in looking at the pottery found by the AVS, little or no help is given as most pottery spans the Archaic to Hellenistic periods.[39]

[37] Hans Mommsen, personal communication, for which we are most grateful.
[38] Christina Risberg, personal communication, for which we also are most grateful.
[39] Forsén & Forsén 2003, 249 fig. 151.

https://doi.org/10.30549/opathrom-10-07

In pursuit of the northern city wall

The last remaining part of the northern city wall, which was cleaned in 2000, is a square tower with a postern gate adjacent to it.[40] In the 1930s the Swedish excavator of Asea Paleokastro, Erik J. Holmberg, managed to trace the outer face of the city wall for 110 metres including the square tower. After this he lost it and suggested two possibilities, either that it turned 90 degrees and "followed the same direction as the modern terrace down toward the road", or that, after a bend, it continued eastward, between a "modern well" and the Hellenistic "palaestra", toward the Panaitsa ravine. As he could find no traces of an ancien wall in the modern terrace wall and as small soundings at its foot gave a negative result, he considered the second alternative the most likely.[41]

The magnetometer survey revealed three additional towers to the city wall, two on the north side and one, probable, on the east side (*Figs. 1* and *3*). However, the city wall disappears from view just north of the modern Tripolis-Megalopolis highway. It reappears south of the road with one additional tower, this time constructed across the wall and not aligned with the wall as the previous two/three. The city wall makes a few kinks at this point, but then we lose track of it (*Figs. 1* and *3*).

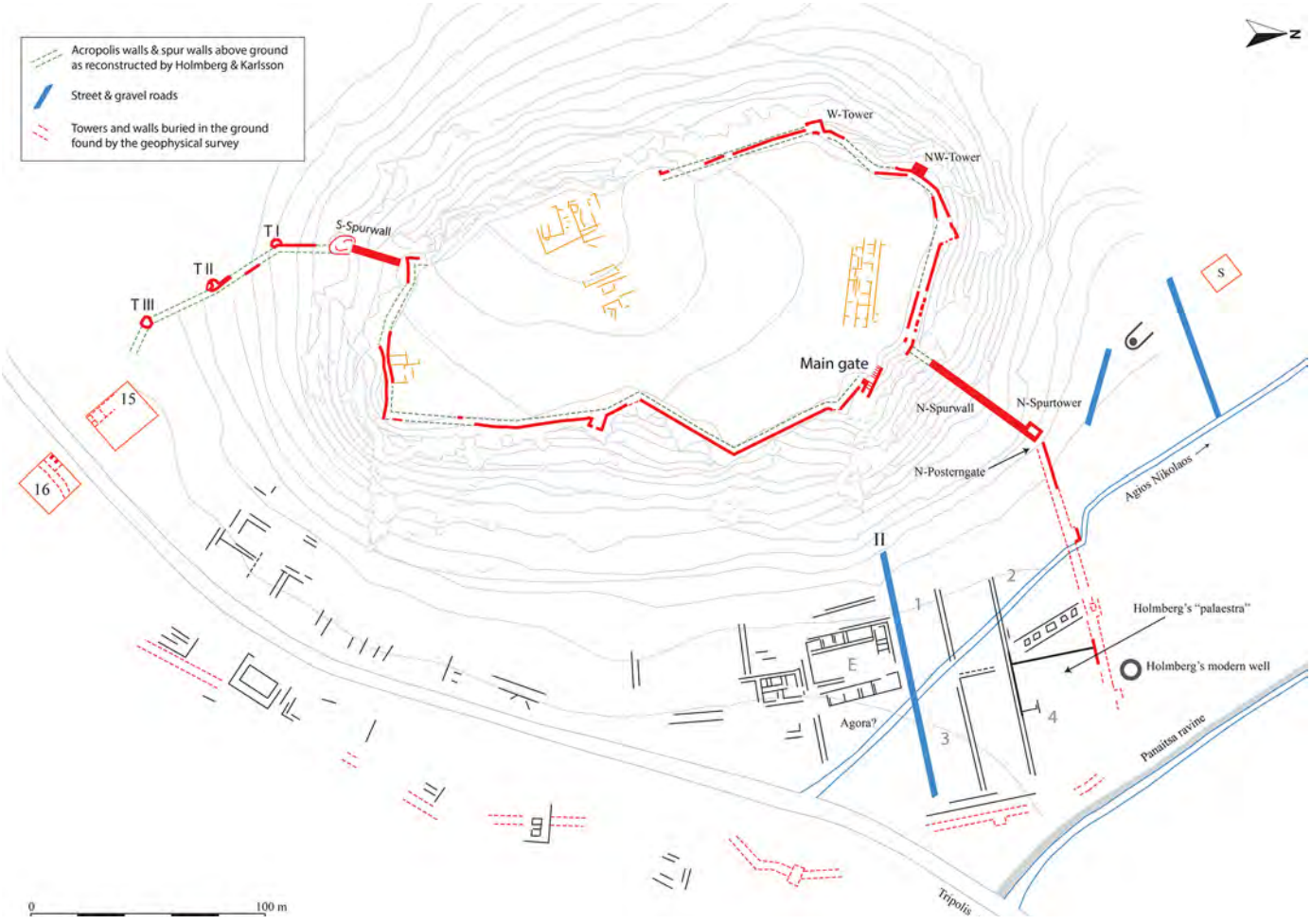

Fig. 3. Archaeologist's interpretation.

[40] Forsén *et al.* 2002, 93–94, figs. 19–24. The postern gate was unknown by Holmberg and not revealed until the cleaning in 2000.

[41] Holmberg 1944, 141 n. 1 and for the Hellenistic "palaestra" see 143–144 and figs. 132–133.

https://doi.org/10.30549/opathrom-10-07

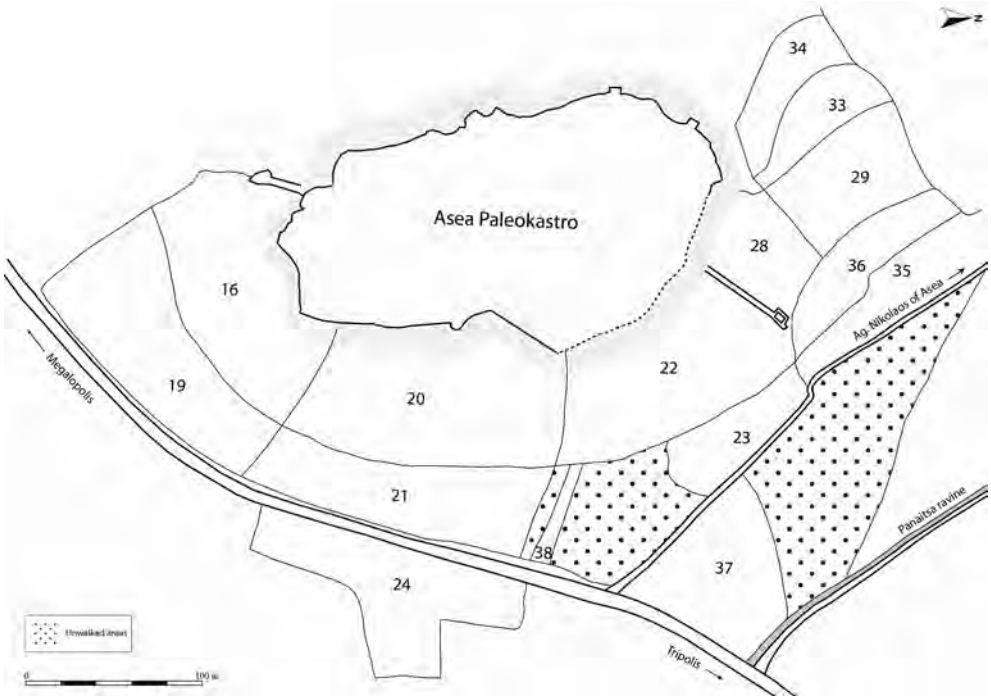

Fig. 4. Subareas walked by the AVS in 1994-1996 on and around the Asea Paleokastro.

In pursuit of the southern city wall and city gate

To measure the electrical resistivity of the soil has proved to be a suitable method when searching for architectural features like walls, wells, and other buried remains at differing depths.[42] Because of time restrictions the electrical tomography technique (MRT) was in 2002 applied only to two squares (15–16), in both cases using the Wenner-Schlumberger array. Twenty-five electrodes were applied with an electrode interval of 0.80 m for square 16 and 1 m for square 15, thus extending the size of square 15 to 24 x 19 m (*Fig. 3*). This electrode interval enabled scanning the subsurface to a depth of approximately 4 m.

It can be discerned that squares 15 and 16 contain architectural elements that very likely are parts of a city gate buried in the ground on both sides of the modern Tripolis-Megalopolis highway.[43] The eastern part of the gate complex contains two or three different rooms where some might be part of a tower (*Fig. 5*). On the western side of the modern road, the architectural features in square 15 include what is most probably part of the continuation of the city wall south of Tower III as well as part of the city gate complex, but less clearly defined than in square 16 (*Figs. 3* and *6*).

Finally looking at the magnetometer results it has become clear that the two parts of the city wall that we can identify on the magnetometer maps from the northern and southern sides of the modern Tripolis-Megalopolis highway are not aligned, possibly indicating a gate overlap.[44] Such gate overlaps can be found for instance at Stymphalos[45] and Mantinea.[46]

The area north and east of the city wall

An area north of the city wall, outside the lower city, was also surveyed. Crossing three terraces there was one strong, wide and long positive anomaly leading from the city wall going up the hill, possibly indicating a passageway over the gentle saddle just north of Asea Paleokastro. We interpret it as a gravel road leading to the west side of the acropolis (*Fig. 3* marked in light blue).

[42] Sarris & Jones 2000.
[43] A modern road often preserves the ancient road's alignment and entrance to a village in such a way as can be seen in the modern village of Kato Asea.
[44] Winter 1971, 153 fig. 130, 208–209, 222–223.
[45] Boyd 1984, 183 fig. 3, 185; Williams 1985, 220 fig. 3.
[46] Fougères 1898, plate VIII.

https://doi.org/10.30549/opathrom-10-07

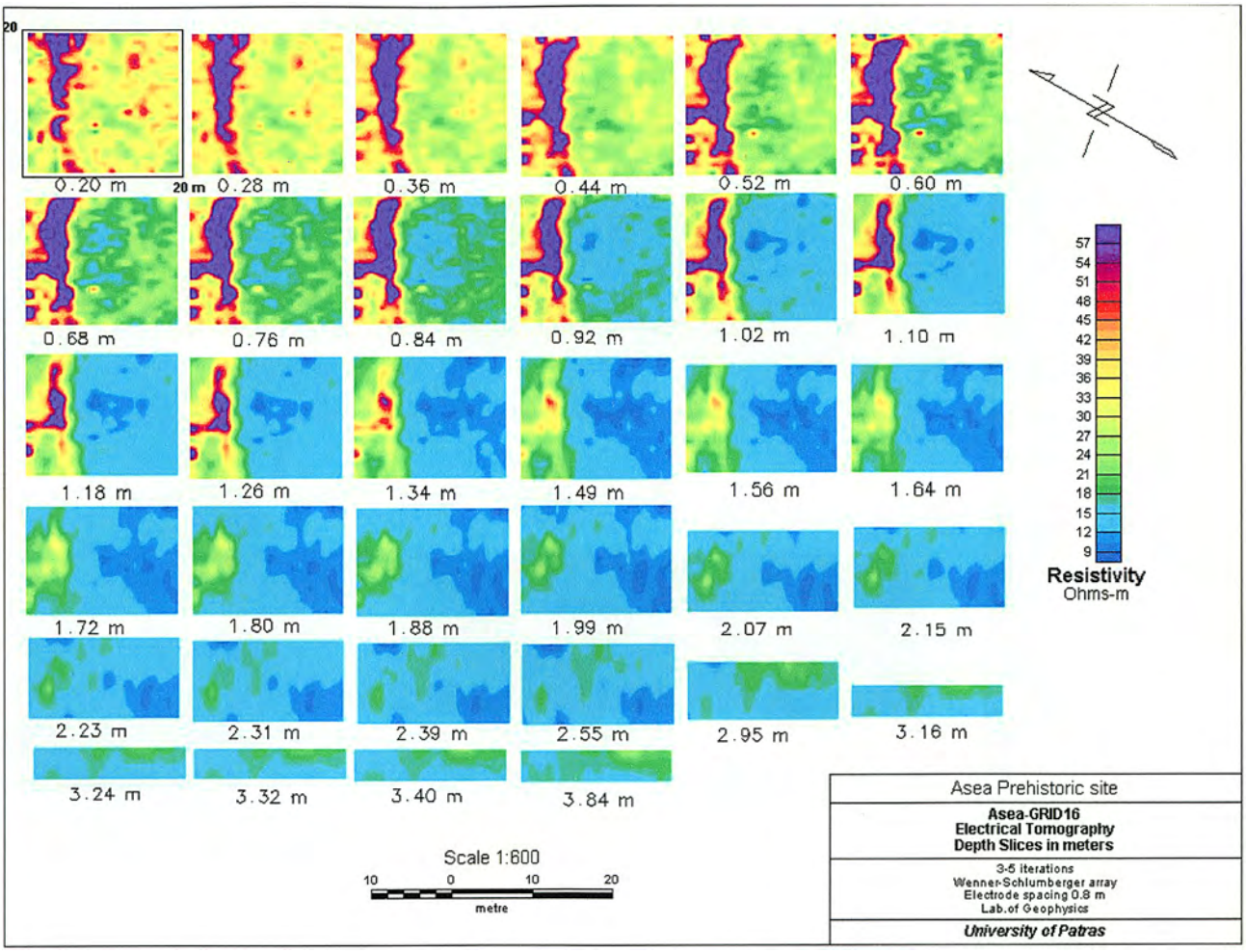

Fig. 5. City-gate complex in the SW, eastern part, using electrical tomography, showing depth slices in meters in square 16.

Another road (*Fig. 3* marked in light blue) leads to the extra-urban sanctuary (*Fig. 3* marked with S in a red box) isolated and identified by the AVS in 1995.[47] An architectural feature was found by the magnetometer survey some 40–50 m south of the sanctuary. This feature is shaped like a horseshoe with slightly elongated sides (*Figs. 1, 3*). In the centre of the rounded southern side there is a strong positive anomaly. Is it ancient? Is it a kiln? Is it a dried-out spring filled with magnetic pottery material? There is no way to tell without excavation, but the similarity of this feature to the so-called sacred spring in Corinth[48] leads us to believe that this could be interpreted in a similar way. As in Corinth, with the nearby sanctuary to Peirene, the AVS found a sanctuary nearby (*Fig. 3*).

Furthermore there is a dark, strong positive anomaly just opposite the perpendicular wall (i.e. Holmberg's "palaestra") dividing the northernmost city blocks, but outside the city wall (*Figs. 1–3*). This is most probably what remains of Holmberg's modern well.[49]

East of the Panaitsa ravine another plot was surveyed, which gave conclusive evidence, *ex silentio*, that the city wall turns southwards prior to the ravine (*Fig. 2*).

Comparative data

The Stymphalos survey (1982–1984) demonstrated clear evidence of an orthogonally planned town as well as a plan of the

[47] Forsén & Forsén 2003, 95 fig. 65, 101 fig. 72, 102 (S60/35–36).
[48] Romano 2003, 282 fig. 17.2.
[49] Holmberg 1944, plate V.

https://doi.org/10.30549/opathrom-10-07

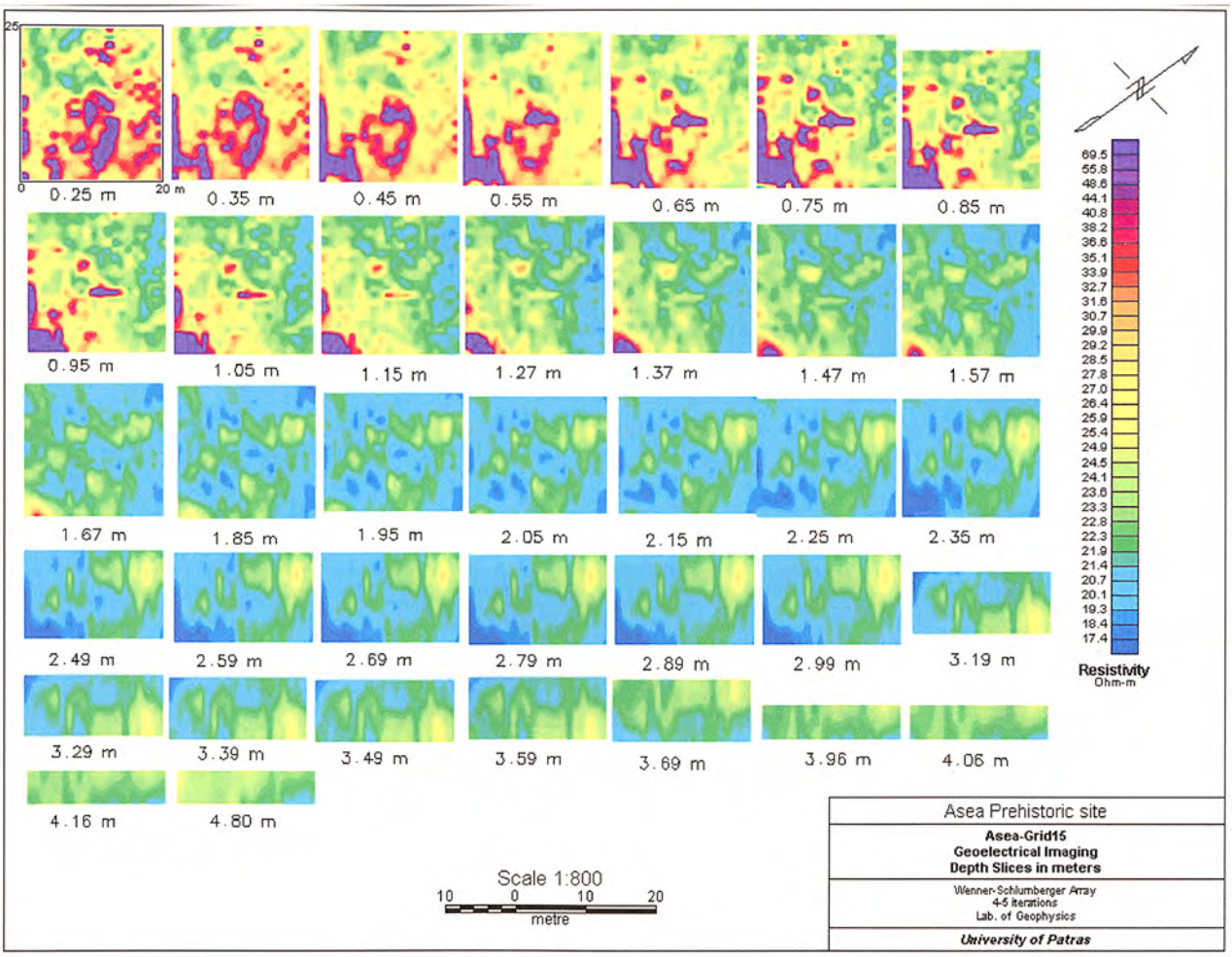

Fig. 6. City-gate complex in the SW, western part, using electrical tomography, showing depth slices in meters in square 15.

ancient city wall and structures within its walls.[50] Many similarities exist between the city walls of Asea and Stymphalos such as the use of rounded and square towers, usually at an even distance of *c.* 30 m, a wall which is about 3 metres thick,[51] possibly also of gates of the overlap type, which we have postulated in the north-east leading in to the lower town of Asea. The orthogonal city plan of Asea consists of *insulae* of 38–43 metres in width and about 53 metres in length. This can be compared to the blocks in Stymphalos, which are 36 metres in width and about 103 metres in length. The main difference between the two cities is the layout of the blocks, which in Asea are fan-shaped whereas the entire city of Stymphalos has an orthogonal layout, albeit interrupted hypothetically by an agora at the centre of the city.[52] Another difference is the date of the city walls, which for Stymphalos has been considered to be around 300 BC,[53] while Asea's are suggested to be from the last quarter of the 3rd century BC.[54]

The city wall at Mantinea is older, considered to be from *c.* 360/365 BC and with a stone socle and mudbrick superstructure,[55] contrary to the Asea wall which was a solid stone construction. The elliptical city wall at Mantinea, encompassing *c.* 4 km, had square towers at a regular interval and probably ten gates.[56] Satellite remote sensing of Mantinea has revealed a pattern of linear anomalies spaced 89 m and 60

[50] Williams 1984; 1985; Jones 1986.
[51] Williams 1984, 174–176; Karlsson 2002, 83–96.
[52] Boyd 1984, 183–186.
[53] Williams 1984, 176 and n. 5.
[54] Karlsson 2002, 96.
[55] Winter 1989, 189–191.
[56] Donati & Sarris 2016, 369 fig. 5, 370 fig. 6, 379–380.

https://doi.org/10.30549/opathrom-10-07

m from one another representing north-south and east-west aligned streets, respectively.[57] Thus the city blocks in Mantinea are about 60 metres wide and 89 metres long.

Concluding remarks

Between 2001 and 2012, several seasons of geophysical work were carried out on and around the Asea Paleokastro in Asea, Arcadia. The results show a lower town built according to an orthogonal scheme with city blocks of *c.* 38 x 56 metres inside the Hellenistic city wall (229/229–222 BC). The city blocks are laid out fan shaped below the acropolis. The agora is rather elusive, but we think that it could be placed in an area mostly devoid of anomalies, downhill from a built-up area revealed by the magnetometer survey, and bordered by the main passageway to the acropolis entrance.

Several towers and at least one complex city gate in the south-west have been located by different survey techniques. Outside the northern spur tower and postern gate there seems to be a gravel road leading to what we think could be a spring. Another gravel road likewise outside the city wall and to the north, but aligned at a different angle, seems to lead to the extra-urban sanctuary identified by the AVS in 1995.

JEANNETTE FORSEN
Lilla Lis 104
31193 Långås
Sweden
jeannetteforsen@hotmail.co.uk

TATIANA SMEKALOVA
tnsmek@mail.ru

ESKO TIKKALA
e.tikkala@gmail.com

[57] Donati & Sarris 2016, 379–380.

Bibliography

Bevan, B.W. & T.N. Smekalova 2013. 'Magnetic exploration of achaeological sites' in *Good practice in archaeological diagnostics, non-invasive survey of complex archaeological sites*, eds. C. Corsi, B. Slapsak & F. Vermeulen (eds.)Heidelberg, 133–152.

Boyd, T. 1984. 'Appendix' in H. Williams, 'Mytilene and Stymphalos, 1983', *EchCl* 28:2, 183–186.

Der Kleine Pauly =
Der Kleine Pauly. Lexikon der Antike in fünf Bänden, München 1979.

Dogan, M. & S. Papamarinopoulos 2003. 'Geoelectric prospection of a city wall by multi-electrode resistivity image survey at the prehistoric site of Asea (Southern Greece)', *Archaeological prospection* 10, 241–248.

Donati, J.C. & A. Sarris 2016. 'Evidence for two planned Greek settlements in the Peloponnese from satellite remote sensing', *AJA* 120, 361–398.

Forsén, J. 1996. 'Prehistoric Asea revisited', *OpAth* 21, 41–72.

Forsén, J. 2010. 'Mainland Greece', in *The Oxford handbook of the Bronze Age Aegean*, ed. E.H. Cline, Oxford, 53–65.

Forsén, J. forthcoming. *Agios Elias of Asea, Arcadia. From early sanctuary to medieval village* (ActaAth-4°).

Forsén, J. & Forsén, B. 2003. *The Asea Valley Survey. An Arcadian mountain valley from the Palaeolithic period until modern times* (ActaAth-4°, 51), Stockholm.

Forsén, J., B. Forsén & L. Karlsson 2002. 'The walls of Asea', *OpAth* 27, 83–104.

Forsén, J., H. Mommsen & C. Shriner, in press. 'Some preliminary remarks concerning a neutron activation analysis (NAA) study and fabric correlation of ceramic samples from Asea in Arcadia, Greece', in *Scientific meeting in honour of Angelika Dousougli and Konstantinos Zachos, Ioannina, November 1–3, 2012*.

Fougères, G. 1898. *Mantinée et l'Arcadie orientale*, Paris.

Holmberg, E.J. 1944. *The Swedish excavations at Asea in Arcadia* (ActaRom-4°, 11), Lund & Leipzig.

Jones, R.E. 1986. 'Geophysical prospection at ancient Stymphalos', in *Science in archaeology* (BSA Fitch Laboratory Occasional Paper 2), eds, R.E. Jones & H.W. Catling, London, 35–38.

https://doi.org/10.30549/opathrom-10-07

Karlsson, L. 2002. 'The ancient city walls' in J. Forsén, B. Forsén & L. Karlsson 'The walls of Asea', *OpAth* 27, 2002, 83–96.

Lawrence, A.W. 1983. *Greek architecture*[4] (rev. ed. R.A. Tomlinson), London.

Romano, D.G. 2003. 'City planning, centuriation, and land division in Roman Corinth. Colonia Laus Iulia Corinthiensis & Colonia Iulia Flavia Augusta Corenthiensis', in *Corinth. The centenary: 1896–1996* (Corinth XX), eds. C.K. Williams & N. Bookidis, Princeton, 279–301.

Sarris, A. & Jones, R.E. 2000. 'Geophysical and related techniques applied to archaeological survey in the Mediterranean: a review', *JMA* 13, 3–75.

Schallin, A.-L. 2003. 'Late Helladic pottery', in J. Forsén & B. Forsén, *The Asea Valley Survey. An Arcadian mountain valley from the Palaeolithic period until modern times* (ActaAth-4°, 51), Stockholm, 177–182.

Williams, H. 1984. 'Mytilene and Stymphalos, 1983', *EchCl* 28:2, 174–186.

Williams, H. 1985. 'Investigations at Stymphalos, 1984', *EchCl* 29:2, 215–224.

Winter, F.E. 1971. *Greek fortifications* (Phoenix Suppl. 9), Toronto.

Winter, F.E. 1989. 'Arkadian notes II. The walls of Mantinea, Orchomenos and Kleitor', *EchCl* 33:2, 1989, 189–200.

Winter, F.E. 2006. *Studies in Hellenistic architecture* (Phoenix Suppl. 42), Toronto.