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A decade of research on Greek fortifications

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The *Chronique des fouilles en ligne – Archaeology in Greece Online* has recorded close to 300 field operations dealing with fortifications in the last decade. It is impossible to account for each of them in this brief survey, but the reader can effortlessly find them in the database (http://chronique.efa.gr/). Here, instead, I wish to focus on the main achievements of the last decade (2006–2016) by reviewing the major publications, recording current trends and research objectives, and suggesting future directions for the field of fortification studies.

The multiplication of synthetic studies

The last decade has seen the multiplication of synthetic volumes on fortifications, decades after the classical reference works of Frederick E. Winter (1971), Arnold W. Lawrence (1979) and Jean-Pierre Adam (1982). This trend demonstrates that the field has reached a new level of maturity and that, building upon its experience, it is expanding.

Ancient Fortifications. A Compendium of Theory and Practice (Müth *et al.* 2016) can be considered the first methodological synthesis on ancient fortifications in the eastern Mediterranean. Intended to be a guide to research, it presents new approaches to the study and interpretation of fortifications. It offers new thoughts on site documentation, reassesses source criticism, delivers 'tools' for understanding masonry techniques, re-underlines the importance of quarries, provides paths to the study of wall-building economics, reviews the functions of fortifications (defensive, urbanistic, symbolic) and frames methodological issues. A catalogue of sites and regions, divided into categories (sites, architectural elements, details of architectural elements) is meant to offer new standards for describing fortifications (plan, construction materials and techniques) while providing solid typologies for towers and gates.

Syntheses on specific chronological periods have thrown a much-welcomed and desired light on the pre-Classical history of wall-building in Greece. The prehistoric fortifications of Crete have been the object of a monograph (Alusik 2007), while Mycenaean fortifications are now conveniently grouped (Hope Simpson and Hagel 2006). Rune Frederiksen (2011) has delivered a *tour de force* by meticulously grouping a broad range of data (literary, archaeological) on Archaic fortifications. The dating of many sites still remains a thorny issue that can only be resolved by excavation, and some of the remarks made by Anthony Snodgrass at the Valbonne conference remain valid today (Snodgrass 1986; reprinted in Snodgrass 2006). But Frederiksen's book serves as the reference source for Archaic fortifications and should be read by all students of Greek fortifications. As stated by John K. Papadopoulos (2012), 'Frederiksen's book is not the last word on Archaic fortification walls, but it does provide the starting point for all future research on the subject.'

Also worth mentioning is the publication of the third volume of Marie-Christine Hellmann's *opus magnum* on Greek architecture that encompasses urbanism and fortifications (Hellmann 2010; on which see Nevett 2011). Richly illustrated and impeccably documented, the chapters dedicated to urban and extra-urban fortifications offer arguably the best available and up-to-date introductions for every student interested in the study of Greek fortifications.

Studies of urban circuits

City walls are an integral and monumental part of urban planning and were arguably the costliest investment that an *asty* had to sustain in the long term. Cities were also the main laboratories where architectural developments were tested and put into practice. Therefore, they play a crucial role in understanding

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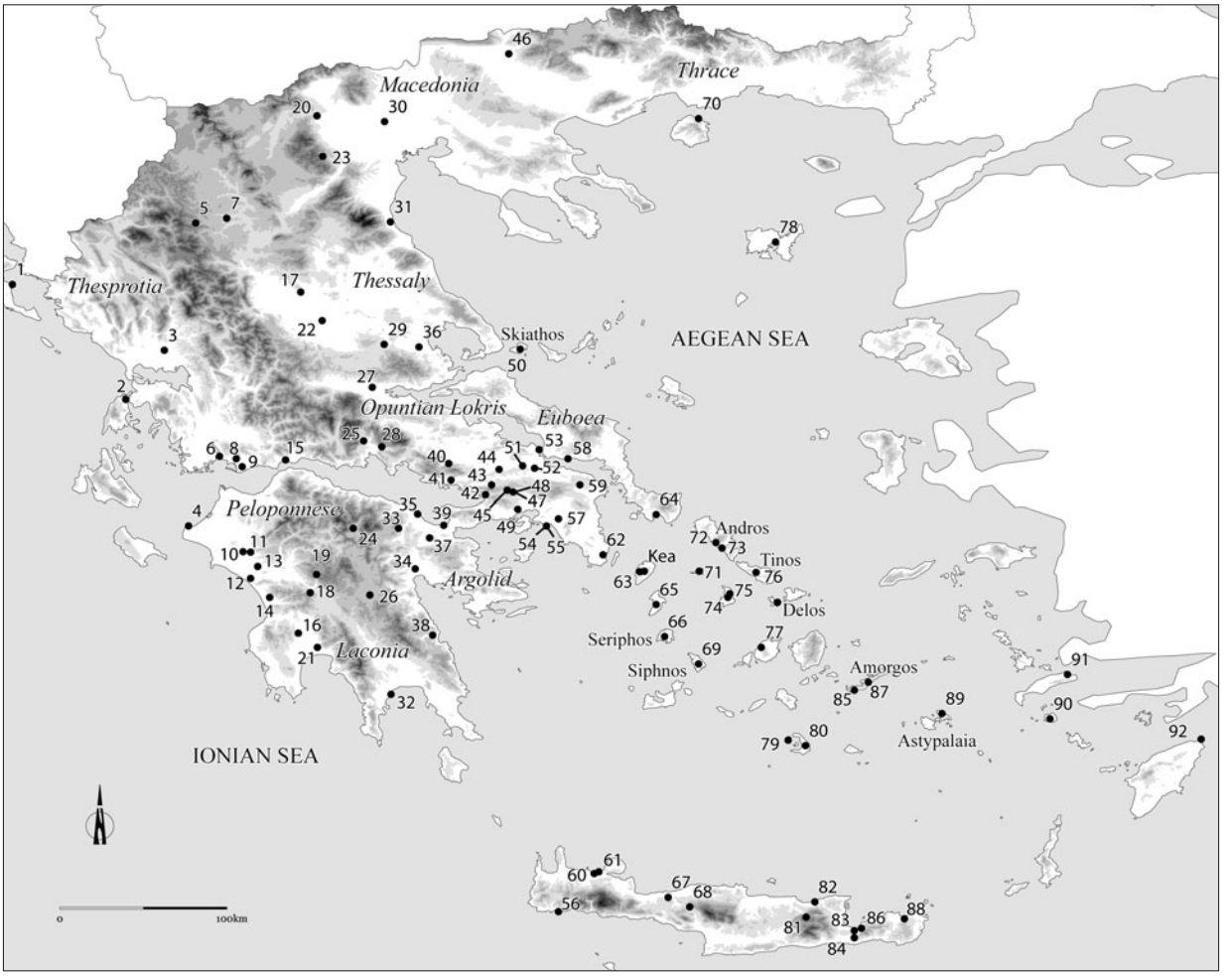

Map 5. List of sites mentioned in the text. © BSA. *1 Corcyra; 2 Lefkas; 3 Ambrakia; 4 Kyllini; 5 Kastri Polyneriou; 6 Pleuron; 7 Grevena; 8 Alikyrna; 9 Kalydon; 10 Kouti; 11 Lasion; 12 Triphylia, Samikon; 13 Olympia; 14 Lepreon; 15 Naupaktos; 16 Messene; 17 Pelinna; 18 Theisoa; 19 Teuthis; 20 Edessa; 21 Thouria; 22 Kierion; 23 Beroia; 24 Pheneos; 25 Amphissa; 26 Tegea; 27 Lamia; 28 Delphi; 29 Peuma; 30 Pella; 31 Leibethra; 32 Gytheion; 33 Titane; 34 Argos (Aspis); 35 Sikyon; 36 New Halos; 37 Kleonai; 38 Prasiai; 39 Corinth; 40 Koroneia; 41 Thisbe, Paliokastro; 42 Aigosthena; 43 Plataia; 44 Thebes; 45 Eleutherai; 46 Pallantion; 47 Oinoe; 48 Mazi; 49 Mount Trikerato; 50 Kephala, Palaiskiathos; 51 Eleon; 52 Tanagra; 53 Chalkis; 54 Mounichia, Piraeus; 55 Zea, Piraeus;56 Elyros; 57 Athens; 58 Eretria; 59 Aphidna; 60 Aptera; 61 Chania; 62 Velatouri; 63 Agia Marina; 64 Karystos; 65 Kythnos; 66 Aspros Pyrgos; 67 Agia Irini; 68 Syvritos; 69 Agios Andreas; 70 Thasos; 71 Gyaros; 72 Palaiopolis; 73 Strophilas; 74 Syros; 75 Chalandriani; 76 Xobourgo; 77 Paros; 78 Hephaistia; 79 Therasia; 80 Thera; 81 Karfi; 82 Sisi; 83 Gournia; 84 Kephali Aphroditis; 85 Arkesini; 86 Azoria; 87 Agia Triada; 88 Roussa Ekklesia; 89 Vathy; 90 Nisyros; 91 Kos; 92 Rhodes.*

the historical developments of Greek defensive architecture. However, comparatively few urban circuits have been the subject of proper archaeological investigation and even fewer of exhaustive monographs, which is unfortunate. Granted, the excavations of urban fortifications are notoriously difficult to conduct and to publish, given the scale (urban walls are mostly measured in kilometres) and complexity of city walls (multiple phases, reuses, destructions and repairs). Such studies are, however, fundamental and much needed for our understanding of urban military architecture, as well as for establishing firmer and sounder chronologies. Fortunately, the last decade has seen the publication of several monographs entirely dedicated to urban circuits, while more studies, including new excavations, are under way. This is a positive trend which will increasingly win acclaim in the forthcoming decades.

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The first detailed publication of the walls of Athens is to be saluted and its author praised for this achievement (Theocharaki 2015; see also Theocharaki 2011). This study includes several sections dedicated to the literary testimonia, the history of research, the main characteristics of the walls, a description of its circuit, a fascinating history of its preservation in the urban expansion of Athens, as well as an extremely useful catalogue containing details of 117 excavations conducted on the city walls. The rich photographic documentation, accompanied by excellent colour plans (including a fold-out one in the back-cover pocket), provides unmatchable documentation of the Athenian city walls, and the book will serve as a reference for decades to come. Combined with new studies of the Long Walls (Conwell 2008) and the Piraeus (see below), the city walls of Athens now stand among the best-studied city walls in Greece.

An exhaustive archaeological study of the city walls of Thasos was published in 2011 (Grandjean 2011; on which see Müth 2013). This excellent and monumental volume of 650 pages is the concentration of over a century of research on the Thasian walls (initiated in 1911, the latest campaigns were conducted in 2006 and 2007; **ID684** and **ID724**) and offers a complete study of the remains, a very clear presentation of the numerous excavations carried out on the rampart, meticulous observations, as well as technical commentaries backed up by excellent plans and photographs. Yves Grandjean's volume will serve as a model for future monographs on city walls.

Plataia can now be added to the group of published city walls (Konecny *et al.* 2013). The fortifications are studied in connection with the urban fabric, characterized by a settlement structured along an orthogonal grid. The publication includes chapters on the walls, streets, habitation blocks, public and sacred monuments and material culture, as well as the results of the geophysical survey, which has contributed to the localization of the main urban monuments. Often under the spotlight of 'grand history' (the subject of one of the most detailed and dramatic siege accounts by Thucydides), the walls of Plataia illustrate the importance of fortifications for the defence and survival of a polis squeezed between two of the most powerful city-states in Greece.

In Thessaly, the impressive walls of New Halos (4.7km long with 120 towers) have been published in an all-colour monograph (Reinders *et al*. 2014). Other archaeological studies conducted during the course of the last decade await publication. The walls, towers and gates of Messene, enclosing an area of 350ha, have been entirely surveyed with differential GPS and documented (Müth and Giese 2016; Müth and Bessac forthcoming). This study should mark a milestone in our understanding of the development of military stone architecture in Greece. At Argos, a new research programme focused on the diachronic study of the walls of the Aspis was conducted between 2009 and 2015 (**ID1360**, **ID2635**, **ID3403**, **ID5440)**. It included the stratigraphic analysis and pottery study from older excavations, new excavation and cleanings, an analysis of tool marks and buildings techniques, as well as a presentation of the diachronic occupation of the hill in historical times (the publication is close to completion: Touchais and Fachard forthcoming). The Aspis was, of course, one of Argos' two citadels, and the new study does not include the complete city walls of Argos, which remain poorly understood. But the hill benefited from a vigorous programme of wall building which can now be precisely dated (based on archaeological data) to the end of the fourth and beginning of the third centuries. This building phase represents a snapshot of Early Hellenistic military architecture, and could serve as a point of comparison for future fortification studies in the Argeia and the Argolid.

Moreover, systematic and rescue excavations, survey, mapping and documentation have been conducted on several city walls throughout Greece, shining new light on many sites. In the Peloponnese, work has been conducted at Corinth (long walls, **ID2492**), Sikyon (**ID107**), Kleonai (**ID1426**), Titane (**ID108**), Pheneos (**ID5051**), Teuthis (**ID2432**), Tegea (**ID120**), Pallantion (**ID2418**), Leonidio (**ID2436**), Gytheion (**ID2554**), Thouria (**ID888**), Kouti (ancient Lasion?, **ID5149**), Samikon, Lepreon and other unidentified sites in Triphylia (**ID892**, **ID1513**, **ID2079**). At Olympia, a tower of the Roman defences has been excavated (**ID893**).

On the northern shore of the Corinthian gulf, between the territories of Kalydon and Pleuron, the remains of the fortified kome of Alikyrna (**ID5049**) were discovered. At Kalydon, new work has been undertaken at the east gate (**ID162**; Dietz and Stavropoulou-Gatsi 1995). A new fortification has been

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discovered above ancient Naupaktos (**ID2394**) and was perhaps part of the advanced defences of the ancient city. New sections of the city walls of Ambrakia (**ID459**, **ID2512**, **ID5130**), Lefkas (**ID2618)** and Corcyra (**ID2607, 5041**) were discovered during rescue excavations, while the walls of Kephallenia have been the object of a new study (Randsborg 2014). In Thesprotia, fortifications found in the Kokytos valley have been studied in the course of the Thesprotia Expedition (Suha 2009; 2011) and the impressive walls of Elea have been developed for access by the general public.

In Euboea, a long section of the city walls of Chalcis has been discovered and excavated (Kalamara *et al*. 2015; Kosma 2015). This is a major discovery that will contribute to our understanding of the urban plan of this important yet understudied city. In Boeotia, a new plan of the city walls of Tanagra has been mapped (**ID164**, **ID2632**), revealing the extension of the Classical (60ha) and Late Roman town (30ha). At Eleon, the meticulous polygonal wall of the acropolis has been cleaned and partially excavated, confirming a date in the late sixth century BC (**ID5442**). The urban survey conducted at Koroneia has clarified the limits of the ancient city (*ca*. 30ha) and its fortifications (**ID2630**). Survey at Thisbe has revealed the multi-phase fortifications on the height of Paliokastro (**ID163**, **ID444**). In the Megarid, large-scale restoration work (including excavation) has been conducted at the site of Aigosthena, resulting in the impressive reconstruction of the southeastern tower (**Fig. 76**). On the Attic-Megarian border, a new fort has been documented on Mount Trikerato (Daly 2014). In Phokis, the small fort above Delphi, known from literature as the fortifications of Philomelos, has been cleaned and mapped (**ID4772**). At Amphissa, a new round tower belonging to the fourth-century city walls was discovered during a rescue excavation (**ID5486**). The fortifications of Opuntian Lokris have been the object of a comprehensive study (Nankov 2009). In Thessaly, a section of the walls of Kierion (**ID1355**) and a gate belonging to the city walls of Pelinna (**ID811**) have been unearthed. Segments of the Hellenistic city walls of Lamia have been investigated (**ID5480**). At Peuma (modern Kallithea Pharsalon), two *diateichismata* and a new tower have been added to the plan of the city walls (**ID248**). In Macedonia, work has been conducted on the acropolis of

76. Aigosthena, Megarid. © Hellenic Ministry of Culture and Sports: Ephorate of Antiquities of West Attika, Pireus and Islands. I am indebted to Evgenia Tsalkou (Ephorate of Antiquities of West Attika, Pireus and Islands) for providing information about this project.

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Leibethra (**ID2236**), while new stretches of the Hellenistic city walls of Edessa were discovered during rescue excavations (**ID2921**, **ID5498**). At Pella, the precise positions of the Hellenistic eastern and western city walls have been determined, along with a section of a *proteichisma* (**ID485**, see also **ID4577** on the chronology of a new segment). Excavations of the city walls of Vergina have clarified the date of their construction in *ca.* 300 BC (**ID5526**). Northeast of the Pindos massif, near Grevena, the acropolis of an unidentified fortified Hellenistic city has been excavated at Kastri Polyneriou (**ID358**, **ID4563**).

Several projects have dealt with city walls on the Aegean islands. On Skiathos, the fortified site of Kephala has been identified with the polis of Palaiskiathos; fortifications, which go back the Late Geometric period, have been surveyed, mapped and partially excavated, along with other sections of the settlement (**ID1021**, **ID2050**, **ID2688**, **ID2984**, **ID4227**, **ID5052)**. On Tinos, at Xobourgo, the Archaic date of the fortifications has been confirmed by evidence from several trenches (**ID722**, **ID2068**, **ID2633**). On Delos, new studies have focused on the Roman fortifications of Triarius, built in 69 BC (**ID1955**, **ID2641**, **ID4771**), revealing a much more complex construction than originally thought. The city walls of Kos have been the object of new investigations in several sectors of the town, including between the agora and the harbour (**ID5415**, **ID5416**, **ID5421**). At Hephaistia on Lemnos, new work has been conducted on the Archaic and Hellenistic walls (**ID499**, **ID2037**, **ID2624**, **ID3059**). The walls of Nisyros have been the object of a programme of restoration, excavation and study (**ID4754**). At Paros, remains of the city walls, including the east gate, have been unearthed (**ID720**). In Rhodes, rescue excavations have been conducted on the city walls, including the Hellenistic *proteichisma* (**ID5405**). Several prehistoric fortified settlements have been investigated on the islands: Andros-Strophilas (**ID2690**, **ID3098**); an Early Cycladic fortified settlement above Vathy on Astypalaia (**ID862**); Chalandriani on Syros (**ID653**, **ID1309**, **ID2689**); Gyaros (**ID4762**); and Agios Andreas on Siphnos (**ID5394**).

On Crete, much work has been conducted on Bronze Age fortifications (in the area of the *Gournia Survey*: **ID766**, **ID1783**; Karfi: **ID777**; Kephali Aphroditis: **ID764**; Sisi: **ID775**; and the *South East Crete Survey*: **ID762**), as well as on city walls and other types of fortifications of the historical period (Syvritos: **ID2855**; Hellenistic fortified settlement at Agia Irini: **ID1839**; Aptera: **ID216**; Azoria: see below; Chania: **ID2806**; Elyros: **ID2801**; Roussa Ekklesia: **ID2799**). Cretan city walls have now been handsomely grouped and studied by Nadia Coutsinas (2014).

This brief survey does not do justice to all the projects, studies, surveys and excavations dealing with city walls, but it suffices to demonstrate that our knowledge of urban fortifications is progressing exponentially across all regions of Greece.

Harbour fortifications

An interesting and rather recent development in the field of defensive architecture concerns the study of harbour fortifications and naval bases. This is an essential yet long understudied subject, but new projects and publications are steadily starting to bridge this gap, building on the advances made in underwater survey and geomorphological studies, as well as on our knowledge of ancient shipsheds and harbours (Blackman *et al*. 2014; Ladstätter *et al*. 2015). An excellent synthesis of the main research problems and findings of harbour fortifications, including the fortification of shipsheds and naval arsenals, is provided by Kalliopi Baika (2013), who shows that harbour fortifications were most often planned along with the city walls, as a coordinated ensemble, and followed the developments of poliorcetics.

In the last decade, several archaeological projects combining multiple domains of competence have shone new light on several fortified harbours. Spectacular archaeological research (in a challenging modern marine environment) has been conducted in the harbours of Zea and Mounichia of the Piraeus, clarifying the topography of the harbour fortifications (**ID87**, **ID1878**, **ID2474**, **ID2975**) and resulting in important publications (Lovén 2011; Lovén and Schaldemose 2011). In the Peloponnese, a survey project has mapped and studied the ancient and Frankish harbour and naval base of Kyllini, the harbour of ancient Elis, with its preserved moles, quays, breakwaters and towers (**ID894**); the project utilized geomorphological studies, sub-bottom profiling, side-scan sonar and magnetometry. On Kythnos, the harbour fortifications have been investigated, and the possible presence of *neosoikoi* has been suggested (**ID1307**). On Andros, an

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ancient mole connected with the fortification walls has been examined at Palaiopolis (**ID5223**). In Rhodes, a rescue excavation has unearthed the remains of the fortified mole of the southern harbour, as well as a stretch of the fortifications (**ID4755**). At Eretria, an interdisciplinary study programme of Holocene coastal mobility (including the use of coring) and a re-examination of the southeastern sector of the city walls have confirmed the existence of a Classical and Hellenistic closed military harbour which was silted up in the Roman period (Ghilardi *et al*. 2016); the fortifications protecting this harbour were designed along with the rest of the city walls, rebuilt around 400 BC.

More research and publications in this expanding domain of fortification studies should be expected in the coming years.

Extra-urban fortifications and regional studies

The presence of extra-urban fortifications in the territories of Greek poleis has been a well-recognized phenomenon since the 19th century. Their studywas the high point of fortification research in Greece in the 1980s and 1990s, boosted by the work of Josiah Ober in Attica (Ober 1985) and other topographers of the ASCSA (Vanderpool 1978; Camp 1991; Munn 1993). It has been a current trend to associate rural fortifications with 'defensive networks' operating at the level of an entire chora, designed to block enemy incursions and to provide a system of visual surveillance. However, classifying and interpreting fortifications as military constructions has somehow oversimplified the combination of factors that commanded their construction and the varied roles they were meant to play in the long term. It is well established that towers can serve as guard posts and observation stations, but they can also be farm towers built by private citizens. Similarly, fortified rural settlements are often called 'fortresses' or 'forts', which favours a militaristic interpretation of the remains, when they are in fact civilian settlements fortified for their own security. As a result, the civilian, social and economic dimensions of building fortifications in the chora has often been neglected and undervalued. Thus, it becomes increasingly important to grasp the complexity of their position by trying to situate them in their historical landscape. This can achieved by adopting a 'landscape approach', adding multiple layers of information (geological settings, agricultural surfaces, settlement patterns, communication networks, political borders, internal administrative limits), conducting spatial analyses and multiplying the factors of investigation at the level of various regions and microregions (Fachard 2016a; 2016b). Strategic and military functions can indeed remain dominant, but the protection of rural settlements, the defence of agricultural production and the policing of the countryside should increasingly be considered. In this regard, historical and epigraphical studies have framed new grounds of enquiry regarding collective security in the Classical, Hellenistic and Roman chorai of the Greek world (Brélaz 2006; 2008; Oliver 2007; Brélaz and Ducrey 2008; Chaniotis 2008).

Careful studies of fortifications at the level of a 'region' (a term that needs to be defined, but most often a microregion, administrative district, polis, confederation or empire) can reveal diverse patterns of distribution and various approaches to defence and security. Generalizations should be avoided, as poleis or other polities had different and changing policies of homeland security, varying according to their geographical setting, their economic power, the changing nature of their relations with their neighbours and the constant evolution of 'world affairs'. In the vast territory of Eretria, it appears that the rural fortifications (mostly fortified settlements built in the fourth century BC) were not intended to close the borders of the chora, but to protect instead significant population centres and loci of agricultural production in the core of the Eretriad, highlighting a regionalization of territorial security (Fachard 2012). In Akarnania, the study of fortifications at the level of the region (Ley 2009) shows that Akarnanian cities, whose access to the coast had been long denied by colonies, developed the exploitation of agricultural lands of the interior, and, when they eventually secured access to and control of the coastal regions, established small fortified harbours well connected to the old centres. A particular feature of Akarnanian fortifications are the small refuge-fortresses: they enclose cisterns but lack traces of perennial habitation; they seem to have been deliberately hidden, sited away from cities, but in direct vicinity to fertile lands; and they were used as points of refuge by local communities living far from fortified cities. On Crete, the various policies of security and defence of poleis have now been studied (Coutsinas 2014), with particular attention paid to

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the protection of resources and the importance of borders. The fortifications of the territory of Sikyon have now been exhaustively documented (Lolos 2011), the fortifications of Triphylia are the object of a new research programme (**ID892**, **ID1513**, **ID2079**; Richter 2016) and the fortifications of Opuntian Lokris have been studied by Emil H. Nankov (2009). Other regional corpora of fortifications are currently being studied: southern Achaia Phthiotis (Chykerda *et al*. 2014), Laconia (Guintrand 2016), the Argolid, Boeotia, Achaia and Thessaly (Balandier 2016). Other studies have been resumed west of Beroia (**ID5511**) and in the territory of Theisoa in the Peloponnese (**ID870**). In Attica, new research projects are investigating in greater detail the fortifications of the deme centres of Aphidna (**ID238**, **ID2002**, **ID2476**) and Oinoe (**ID4875**; Fachard *et al*. 2015), while new work is underway at Eleutherai, on the Attic-Boeotian border (Fachard 2013; Knodell *et al*. 2016).

The ongoing study of towers benefits from the high-quality investigations conducted in the 1990s and early 2000s (Lohmann 1993; Morris 2001; Morris and Papadopoulos 2004; Marangou 2005). In the last decade, groups of towers have been published from Euboea – in the territories of Eretria (Fachard 2012) and Karystos (Seifried and Parkinson 2014) – from Crete (Coutsinas 2014), from southeastern Corinthia (Caraher *et al*. 2010) and from Molossia (Nakas 2016). In Attica, the towers of Velatouri and Mazi have been newly investigated using intensive field survey methods (Fachard *et al*. 2015). The excavation of the Late Classical tower complex at Arkesini on Amorgos has continued, yielding a third-century BC horos inscription notably mentioning the house and the garden of the tower (**ID849**). On Seriphos, the tower at Aspros Pyrgos has been excavated and dated to the fourth century BC (**ID4752**). On Astypalaia, a Hellenistic tower complex, similar to that of Agia Triada on Amorgos, has been excavated at Ellinika, in the sector of Vathy (**ID3099**). A Hellenistic tower has been documented on Therasia, off Thera (**ID4763**). Two Hellenistic round towers have been excavated on the southern acropolis at Azoria (**ID2856**), one of them identified as a possible beacon. On Kea, the impressive Hellenistic tower of Agia Marina has been restored (**ID2961**, **ID4219**).

Overall, regional studies over the past decade have continued to deepen our knowledge of extra-urban fortifications, to underline their ubiquity throughout the Greek landscape and to develop new methodological frameworks for understanding the reasons and factors that commanded their construction. This is a major contribution by archaeology to the study of the security of Greek poleis (φυλακὴ τῆς χώρας).

Future developments

As underlined in the introduction, the field of fortification studies is rapidly expanding and evolving. In the next decade, six main developments can be anticipated.

First, more systematic excavations are needed in order to clarify the chronology of individual sites. Abstract dating – based on superficial observation, interpretation of literary data, deceptive masonry affinities or associations with historical events – can be counterproductive for the understanding of a monument (and for the discipline). More monographs and individual articles dedicated to single sites are highly desired because they provide solid landmarks for understanding the development of defensive architecture and for establishing comparisons between well-dated bodies of evidence. Exhaustive monographs lend credibility to the field of fortifications studies.

Second, archaeologists should increasingly take into account 'The Building Experience',[1] a term developed by the *Fokus Fortifikation Network* to encompass the various decisions made at the different stages of the process of planning and building a fortification, from the quarry to the roof tiles (De Staebler 2016a; 2016b). A leading authority in this domain is Jean-Claude Bessac, an archaeologist and stonecutter, whose life-long work in France and Syria (Doura-Europos) has set new standards of analysis and pioneering research perspectives in the study of ancient fortifications. Bessac's recent involvement at Messene and Argos (Aspis) will make his methods and conclusions more widely available to archaeologists

[1] 'This is a useful catch-all term that describes decisions made about the material used, the course of a circuit, the locations and styles of gates and towers, and even the extent to which the fortification is primarily a military monument or what other social or cultural factor may have influenced the design' (De Staebler 2016a: 61).

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working in Greece. Scholars must increasingly take into account factors such as the geological determinism of fortifications (or how the geological setting of a site might influence directly the varieties of stone selected for construction, the masonry techniques employed and the surface treatment of the blocks), the qualities and defects of stones, the technical qualities of tools, the technical level of building teams and the building conditions (Bessac 2016). This can be done following a checklist of steps – identifying and describing the materials; identifying the substrate; sourcing the materials; describing the techniques; recognizing tools and machines; and identifying carved symbols – before drawing a set of conclusions (De Staebler 2016b). Granted, this process requires experience that most archaeologists do not necessarily have, but collaborative work can overcome this obstacle.

Third, the multiplication and publication of regional studies (including corpora for individual poleis) will improve our understanding of the multiple categories of fortifications scattered across the Greek landscape (fortresses and forts, fortified settlements, towers, rubble enceintes, refuges) and how they correspond to the varied and rich vocabulary of ancient terms found in our literary sources (*phrourion*, *teichos*, *teichisma*, *eryma*, *phylakterion*, *peripolion*, *pyrgos*, etc.). They will also provide a novel contribution to the study of polis organization, especially in terms of defence and security, but also in terms of settlement patterns and the protection of agricultural production. In this regard, it is essential to study extra-urban fortifications in relation to the archaeological map of the region under consideration, its geomorphology and other valuable layers of information. Geographic information systems (GIS) are key here – for organizing and structuring the data, but also for conducting spatial analysis – and are an indispensible tool for regional studies. The past error of studying fortifications in splendid isolation from other features should be avoided in the future. Unfortunately, it is still common to see published 'dot maps' which ignore the different types of fortifications or, worse, maps which show fortifications on 'blank maps' that disregard terrain, agricultural surfaces, settlement patterns, communication networks and borders. Such maps fail to express the complexity of the ancient landscape. As a result, the reasons for the construction of fortifications can only be superficially understood.

Fourth, a further increase in the application of intensive field survey methods in fortification studies is highly desirable. Survey projects have been successfully put to work in past years to clarify urban spreads and to map city plans (Tanagra, Koroneia, Thisbe, see above). Based on the distribution of surface material, intensive survey methods reveal the span of human occupation at sites and contribute to defining, in some cases very neatly, the limits of fortified settlements whose walls are only partially visible. At the Attic deme of Oinoe, the Late Roman walls (and possibly Classical beneath them) are only partially visible in the lower town, but the strongly marked contrasts in surface ceramic densities recorded by the *Mazi Archaeological Project* have revealed the supposed trace of the walls protecting the settlement (Fachard *et al*. 2015). When combined with geophysical investigations, intensive surveys become pivotal for mapping cities and fortified settlements without a single turn of the spade. The application of intensive survey methods has also been advocated for the study of extra-urban fortifications (Fachard 2016a), because they can help us to characterize the nature of occupation. For example, the iconic fourth-century BC fortress of Eleutherai has been surveyed (*intra* and *extra muros*) using intensive survey methods (Knodell *et al*. 2016). In a matter of days a single team of six fieldwalkers completed an intensive pedestrian survey of this 3ha fortress and its surroundings and yielded a considerable amount of exciting new data – including previously unrecorded features, pottery types, chronological information, etc. These two examples from the *Mazi Archaeological Project* eloquently demonstrate the validity of intensive survey for investigating the fortifications of the Greek countryside. It should become a standardized practice in the future.

Fifth, the increasingly common use of new tools, especially differential GPS mapping, drone photography and photogrammetry is literally revolutionizing archaeological practices in the field. Photogrammetry, in particular, allows archaeologists to document complex architectural features with extreme metrical precision (**Fig. 77**) in limited time-frames that even a few years ago seemed inconceivable (Sapirstein and Murray forthcoming). The ability to document architecture quickly and accurately is especially transformative for those documenting architecture within the framework of archaeological survey projects. Rural forts and fortresses, often difficult to reach, can now be documented and mapped

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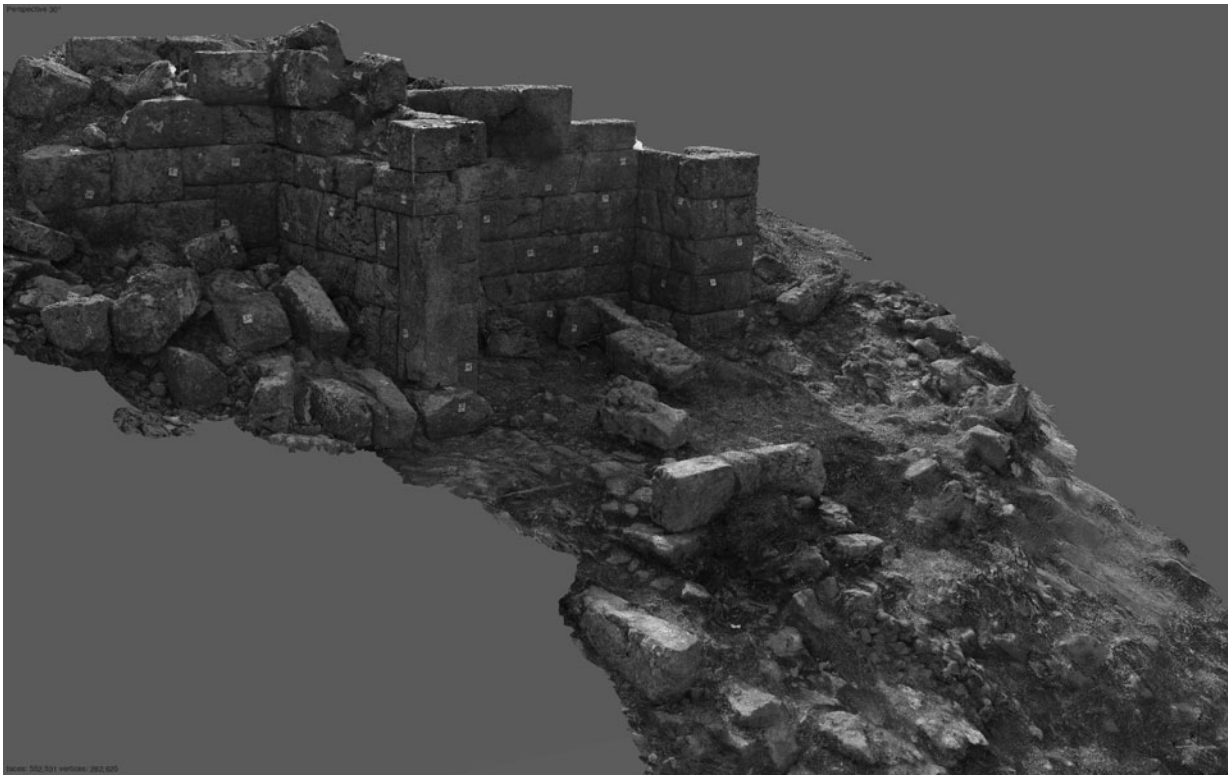

77. Photogrammetry model of the southwestern gate of Eleutherai. © S.C. Murray/Mazi Archaeological Project. I thank S.C. Murray for providing a draft of her paper and for sharing her knowledge of photogrammetry.

in days instead of weeks, while smaller monuments, for example a single well-preserved tower, should not take more than a few hours of work for a properly equipped and experienced team of three. Fast and efficient documentation not only frees up time for careful study and analysis of structures in the field, but also means that more sites can be documented during a field season. Such practices will change the ways fortifications are documented in the future and we should therefore expect to see increasingly higher standards of recording, description, mapping and, by extension, publication and preservation.

Finally, it is hoped that more interdisciplinary work will be conducted on the economy of wall building. Fortifications, and in particular city walls, have been increasingly recognized as the biggest investment – in terms of costs, materials and labour– that most cities had to sustain in the course of their history. However, very few studies have dealt concretely with this economic aspect, so it remains challenging to estimate the financial and human/work weight of wall building at the scale of a city or a site (Camp 2000). A working group of the *Fokus Fortifikation Network*, under the guidance of Jean-Claude Bessac, has dealt with these issues, and new and concrete approaches have been laid out, as a sequel to the Building Experience analysis (De Staebler 2016a; 2016b; Bessac 2016). The goal is not to come up with a precise 'fortification bill', but to study the evidence for estimating the overall costs of wall building in terms of materials and workforce. Such estimates can then be set within the economic, historical and political context of the city/region, providing a greater and most often unexplored level of analysis. If such economic evaluations are more systematically pursued in the future, the role and importance of fortifications will be better understood throughout the Greek world.

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Bibliography

Adam, J.-P. (1982) *L'architecture militaire grecque* (Paris)

Alusik, T. (2007) *Defensive Architecture of Prehistoric Crete* (Oxford)

Baika, K. (2013) 'The fortifications of shipsheds and naval arsenals', in D.J. Blackman and B. Rankov (eds), *Shipsheds of the Ancient Mediterranean* (New York) 210–30

Balandier, C. (2016) 'Etudier l'organisation défensive d'une région et son évolution: pour une archéologie historique des fortifications. Question de méthode', in R. Frederiksen, S. Müth, P.I. Schneider and M. Schnelle (eds), *Focus on Fortifications: New Research on Fortifications in the Ancient Mediterranean and the Near East* (Oxford) 417–34

Bessac, J.-C. (2016) 'Techniques et économie de la construction des fortifications en pierre: méthodes et perspectives', in R. Frederiksen, S. Müth, P.I. Schneider and M. Schnelle (eds), *Focus on Fortifications: New Research on Fortifications in the Ancient Mediterranean and the Near East* (Oxford) 129–41

Blackman, D., Rankov, B., Baika, K., Gerding, H. and Pakkanen, J. (2014) *Shipsheds of the Ancient Mediterranean* (New York)

Brélaz, C. (2006) *La sécurité publique en Asie Mineure sous le Principat (I^er^–III^ème^ s. ap. J.-C.): Institutions municipales et institutions impériales dans l'Orient romain* (Basel)

— (2008) 'L'adieu aux armes: La défense de la cité grecque dans l'empire romain pacifié', in C. Brélaz and P. Ducrey (eds), *Sécurité collective et ordre public dans les sociétés anciennes* (Geneva) 155–96

Brélaz, C. and Ducrey, P. (eds) (2008) *Sécurité collective et ordre public dans les sociétés anciennes* (Geneva)

Camp, J.M. (1991) 'Notes on the towers and borders of Classical Boeotia', *American Journal of Archaeology* 95, 193–202

— (2000) 'Walls and the polis,' in P. Flensted-Jensen, T.H. Nielsen, L. Rubinstein (eds), *Polis and Politics: Studies in Ancient Greek History: Presented to Mogens Herman Hansen on his Sixtieth Birthday, August 20, 2000* (Copenhagen) 41–58

Caraher, W.R., Pettegrew, D.K. and James, S. (2010) 'Towers and fortifications at Vayia in the southeast Corinthia', *Hesperia* 79, 385–415

Chaniotis, A. (2008) 'Policing the Hellenistic countryside: realities and ideologies', in C. Brélaz and P. Ducrey (eds), *Sécurité collective et ordre public dans les sociétés anciennes* (Geneva) 103–53

Chykerda, M.C., Haagsma, M.J. and Karapanou, S. (2014) 'From city to sea: Kastro Kallithea (Thessaly) and its role in the defense of southern Achaia Phthiotis', in D.W. Rupp and J.E. Tomlinson (eds), *Meditations on the Diversity of the Built Environment in the Aegean Basin and Beyond: Proceedings of a Colloquium in Memory of Frederick E. Winter, Athens, 22–23 June 2012* (Athens) 285–310

Conwell, D.H. (2008) *Connecting a City to the Sea: The History of the Athenian Long Walls* (Leiden)

Coutsinas, N. (2014) *Défenses crétoises : Fortifications urbaines et défense du territoire en Crète aux époques classique et hellénistique* (Paris)

Daly, K.F. (2014) 'On when and where to find Athenian forts,' in K.F. Daly and L.A. Riccardi (eds), *Cities Called Athens: Studies Honoring John McK. Camp II* (Lewisburg) 23–60

De Staebler, P.D. (2016a) 'The Building Experience', in S. Müth, P.I. Schneider, M. Schnelle and P.D. De Staebler (eds), *Ancient Fortifications: A Compendium of Theory and Practice* (Oxford) 207–30

— (2016b) 'Physical surroundings, technique and building experience: the state of research in the Network Fokus Fortifikation', in R. Frederiksen, S. Müth, P.I. Schneider, and M. Schnelle (eds), *Focus on Fortifications: New Research on Fortifications in the Ancient Mediterranean and the Near East* (Oxford) 123–28

Dietz, S. and Stavropoulou-Gatsi, M. (1995) 'Archaeological field work in ancient Kalydon 2005. Second preliminary report', in E. Hallager and S. Riisager (eds), *Proceedings of the Danish Institute at Athens* (Aarhus) 161–66

Fachard, S. (2012) *La défense du territoire d'Erétrie: Etude de la chora et de ses fortifications* (Gollion)

— (2013) 'Eleutherai as the gates to Boeotia', in C. Brélaz and S. Fachard (eds), *Pratiques militaires et art de la guerre dans le monde grec antique études offertes à Pierre Ducrey à l'occasion de son 75ème anniversaire* (Paris) 81–106

https://doi.org/10.1017/S0570608416000077 Published online by Cambridge University Press

— (2016a) 'Studying rural fortifications: a landscape approach', in S. Müth, P.I. Schneider, M. Schnelle and P.D. De Staebler (eds), *Ancient Fortifications: A Compendium of Theory and Practice* (Oxford) 207–30
— (2016b) 'Regional fortifications and the fortification of regions', in R. Frederiksen, S. Müth, P.I. Schneider, and M. Schnelle (eds), *Focus on Fortifications: New Research on Fortifications in the Ancient Mediterranean and the Near East* (Oxford) 413–16
Fachard, S., Knodell, A.R. and Banou, E. (2015) 'The 2014 Mazi Archaeological Project (Attica)', *Antike Kunst* 58, 178–86
Frederiksen, R. (2011) *Greek City Walls of the Archaic Period, 900–480 BC* (Oxford and New York)
Ghilardi, M., Müller Celka, S., Theurillat, T., Fachard, S. and Vacchi, M. (2016) 'Evolution des paysages et histoire de l'occupation d'Érétrie (Eubée, Grèce) du Bronze ancien à l'époque romaine', in M. Ghilardi (ed.), *Géoarchéologie des îles de la Méditerranée* (Paris) 149–63
Grandjean, Y. (2011) *Le rempart de Thasos* (Paris)
Guintrand, M. (2016) 'Les fortifications dans le système défensif lacédémonien à l'époque classique', in R. Frederiksen, S. Müth, P.I. Schneider, and M. Schnelle (eds), *Focus on Fortifications: New Research on Fortifications in the Ancient Mediterranean and the Near East* (Oxford) 435–45
Hellmann, M.-C. (2010) *L'architecture grecque* 3. *Habitat, urbanisme et fortifications* (Paris)
Hope Simpson, R. and Hagel, D.K. (2006) *Mycenaean Fortifications, Highways, Dams and Canals* (Sävedalen)
Kalamara, P., Kosma, M., Boukaras, K. and Chairetakis, Y. (2015) *The City of Chalkis* (Athens)
Knodell, A.R., Fachard, S. and Papangeli, K. (2016) 'The 2015 Mazi Archaeological Project: regional survey in northwest Attica (Greece)', *Antike Kunst* 59, 132–52
Konecny, A., Arabantinos, V. and Marchese, R. (2013) *Plataiai: Archäologie und Geschichte einer boiotischen Polis* (Vienna)
Kosma (2015) 'Η τοπογραφία της αρχαίας Χαλκίδας υπό το πρίσμα της πρόσφατης έρευνας', in S. Oikonomou (ed.), *Archaiologikes symboles* 3 (Athens) 209–20
Ladstätter, S., Pirson, F. and Schmidts, T. (eds) (2015) *Harbors and Harbor Cities in the Eastern Mediterranean from Antiquity to the Byzantine Period: Recent Discoveries and Current Approaches* (Istanbul)
Lawrence, A.W. (1979) *Greek Aims in Fortification* (Oxford)
Ley, J. (2009) *Stadtbefestigungen in Akarnanien: Ein bauhistorischer Beitrag zur urbanen Entwicklungsgeschichte einer antiken Landschaft* (Berlin)
Lohmann, H. (1993) *Atene: Forschungen zu Siedlungs- und Wirtschaftsstruktur des klassischen Attika = Atene* (Cologne)
Lolos, Y.A. (2011) *Land of Sikyon: Archaeology and History of a Greek City-State* (Princeton)
Lovén, B. (2011) *The Ancient Harbours of the Piraeus. The Zea Shipsheds and Slipways: Architecture and Topography* (Aarhus)
Lovén, B. and Schaldemose, M. (2011) *The Ancient Harbours of the Piraeus* 1.2 – *The Zea Shipsheds and Slipways: Finds, Area 1 Shipshed Roof Reconstructions and Feature Catalogue* (Aarhus)
Marangou, L.I. (2005) *Αμοργός* 2. *Οι αρχαίοι πύργοι* (Athens)
Morris, S.P. (2001) 'The towers of ancient Leukas: results of a topographic survey, 1991–1992', *Hesperia* 70, 285–347
Morris, S.P. and Papadopoulos, J.K. (2004) 'Greek towers and slaves: an archaeology of exploitation', *American Journal of Archaeology* 109, 155–225
Munn, M.H. (1993) *The Defense of Attica: The Dema Wall and the Boiotian War of 378–375 BC* (Berkeley)
Müth, S. (2013) 'Review of *Le rempart de Thasos* by Y. Grandjean', *Journal of Hellenic Studies* 133, 267–69
Müth, S. and Bessac, J.-C. (forthcoming) *Die Stadtmauer von Messene* 1. *Topographie und Beschaffenheit – Materialen und Steinbearbeitung – aussenliegende Befestigunganlagen – Geschichte und Funktion*
Müth, S. and Giese, J. (2016) 'Messene', in S. Müth, P.I. Schneider, M. Schnelle and P.D. De Staebler (eds), *Ancient Fortifications: A Compendium of Theory and Practice* (Oxford) 278–85

https://doi.org/10.1017/S0570608416000077 Published online by Cambridge University Press

Müth, S., Schneider, P.I., Schnelle, M. and De Staebler, P.D. (eds) (2016) *Ancient Fortifications: A Compendium of Theory and Practice* (Oxford)

Nakas, Y. (2016) 'Isolated towers in the fortification network of ancient Molossia: a case study', in R. Frederiksen, S. Müth, P.I. Schneider, and M. Schnelle (eds), *Focus on Fortifications: New Research on Fortifications in the Ancient Mediterranean and the Near East* (Oxford) 446–55

Nankov, B. (2009) *Phrouria Lokrika: Aspects of Military Presence in Hellenistic Opountian Lokris*. PhD thesis, Cornell University

Nevett, L. (2011) 'Review of *L'architecture grecque* 3. *Habitat, urbanisme et fortifications* by M.C. Hellmann', *American Journal of Archaeology* 115. http://dx.doi.org/10.3764/ajaonline1154.Nevett

Ober, J. (1985) *Fortress Attica: Defense of the Athenian Land Frontier, 404–322 BC* (Leiden)

Oliver, G.J. (2007) *War, Food, and Politics in Early Hellenistic Athens* (Oxford and New York)

Papadopoulos, J.K. (2012) 'Review of *City Walls of the Archaic Period, 900–480 BC* by R. Frederiksen', *Bryn Mawr Classical Review* 2012.05.08. http://bmcr.brynmawr.edu/2012/2012-05-08.html

Randsborg, K. (2014) 'Kephallénia masonry', in R. Frederiksen and S. Handberg (eds), *Proceedings of the Danish Institute at Athens* (Aarhus) 133–44

Reinders, H.R., Dickenson, C., Kondoyianni, K., Lee, B., Malakasioti, Z., Roos Meiwaard, A., Nikolaou, E., Radloff, L., Rondiri, V., Rose, T.C. and Tsiouka, F. (2014) *The City of New Halos and its Southeast Gate* (Groningen)

Richter, E. (2016) 'Platiana', in S. Müth, P.I. Schneider, M. Schnelle and P.D. De Staebler (eds), *Ancient Fortifications: A Compendium of Theory and Practice* (Oxford) 310–17

Sapirstein, P. and Murray, S.C. (forthcoming) 'Establishing best practices for photogrammetric recording during archaeological fieldwork', *Journal of Field Archaeology*

Seifried, R.M. and Parkinson, W.A. (2014) 'The ancient towers of the Paximadi Peninsula, southern Euboia', *Hesperia* 83, 277–313

Snodgrass, A.M. (1986) 'The historical significance of fortification in Archaic Greece', in P. Leriche and H. Tréziny (eds), *La fortification et sa place dans l'histoire politique, culturelle et sociale du monde grec, Valbonne, décembre 1982* (Paris) 125–31

Snodgrass, A.M. (2006) *Archaeology and the Emergence of Greece: Collected Papers on Early Greece and Related Topics (1965–2002)* (Edinburgh)

Suha, M. (2009) 'The fortification walls of Agios Donatos', in B. Forsén (ed), *Thesprotia Expedition* 1. *Towards a Regional History* (Helsinki) 119–31

— (2011) 'Further observations on the Hellenistic fortifications in the Kokytos valley', in B. Forsén and E. Tikkala (eds), *Thesprotia Expedition* 2. *Environment and Settlement Patterns* (Helsinki) 203–24

Theocharaki, A.M. (2011) 'The ancient circuit wall of Athens. Its changing course and the phases of construction', *Hesperia* 80, 71–156

— (2015) *Τα αρχαία τείχη των Αθηνών* (Ελληνική Επιγραφική Εταιρεία 18) (Athens)

Touchais, G. and Fachard, S. (forthcoming) *Argos. Les fouilles de l'Aspis (1974–2011)* 1. *Les occupations d'époque historique* (Paris and Athens)

Vanderpool, E. (1978) 'Roads and forts in northwestern Attica', *California Studies in Classical Antiquity* 11, 227–45

Winter, F.E. (1971) *Greek Fortifications* (Toronto)

https://doi.org/10.1017/S0570608416000077 Published online by Cambridge University Press