1 | Introduction

At the end of the nineteenth century and upon the founding of the first foreign schools of archaeology in Athens, national teams began long-term investment at archaeological sites that would become the 'household names' of classical archaeology in Greece.[1] The École Française d'Athènes started excavating at Delos (1873) and Delphi (1892), the Deutsches Archäologisches Institut at Olympia (1875), and the American School of Classical Studies at Athens began work at Corinth (1896). These early excavations – characteristically clearing as much ground as possible, revealing monumental architecture, and conducted in pursuit of highly aesthetic objects like fine painted pottery – have been described as 'big dig' archaeology *par excellence* (*cf.* Davies 2009, 12–14): archaeology conducted on an enormous scale, and archaeology generating huge datasets.

This early activity conducted by the foreign schools was in part responsible for establishing a particular 'pattern' for the archaeology of Greece. Although much valuable data now comes from Greek universities and learned societies since established and from the rescue excavations of the Ephorates of Antiquities,[2] it is the research at those 'big dig' sites that have shaped the peculiarity of the discipline's history. That is, there has been long-term excavation at single sites led by single national teams, recovering enormous quantities of objects which are published within quite specific formats established early in a project's history.[3] Corinth (Fig. 1.1) – a site

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[1] A full history (with bibliography) of archaeological field activity conducted by the British School at Athens is available through the online interactive 'Collection Events' database, prepared by Anastasia Vassiliou, Michael Loy, Deborah Harlan and others, and part funded by the AridanePLUS Horizon 2020 initiative (https://digital.bsa.ac.uk/fieldwork.php).

[2] For English (and French) language summaries of work of this nature, see the *Archaeology in Greece Online* database at chronique.efa.gr

[3] On the phenomenon of there being sites in Greece that are close to one another but under investigation by different Foreign Schools and that, as a result, their teams might not be in regular communication with one another, see Slawisch and Wilkinson 2016 and Koporal 2020. There is also the risk with 'big dig' archaeology of creating 'intellectual silos' (*cf.* Whitley in press), or institutional networks or personal networks (Whitley 2015b, *cf.* Loy 2020a) that become so entrenched and specialised within the cycle of discovery, study and publication on site that their discussion can become echo-chambers.

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Figure 1.1 View of Corinth during the first years of the 'big dig' excavation campaign. BSA SPHS 01/2105.5577, 'Ancient Corinth: Agora excavations'

which, like those others listed above, is still currently under investigation over 100 years later – is a good example: after years of continued exploration, the major publication series of the Corinth excavations was established in 1932 as a monograph series ('red books'), produced by the American School of Classical Studies at Athens, with the publication of the *Topography and Architecture* of the site by Harold North Fowler and Richard Stillwell. Although field reports from Corinth continue to appear

in the journal *Hesperia* (and elsewhere), the monograph series, now with forty-seven volumes and more in preparation, remains the principal venue for disseminating data from the site. And, with similar long-running monograph series established for publication of material from Delos, Delphi, Olympia – and for many *other* 'big dig' sites established around this time too – one can see that this really is quite a distinct pattern for how a lot of archaeology in Greece gets done.[4]

The format of publication dictates, to a large extent, the sorts of questions that are asked about the excavation material. To stay with Corinth, volumes are generally dedicated to the study of one type of object or material, the work of a scholar who is specialist in the typology and chronology of certain objects. This specialisation ranges from architecture (vol. I.2, Stillwell, Scranton and Freeman 1941), to sculpture (vol. IX.1, Johnson 1931), to small finds (vol. IV.2 on lamps, Broneer 1930; vol. VI on coins, Edwards 1933), to specific styles of pottery (vol. VII.1 on geometric pottery, Weinberg 1943; vol. VII. 4 on red-figure pottery, Herbert 1977; vol. VII.7 on Hellenistic fine wares, James 2018). Monographs provide first and foremost lists of objects organised by their types, described for their shape, appearance, decoration, chronology, place of production; and less space is given to how these objects fit into the longer and broader history of the site in question. When one examines what is done with the data in these sorts of publications, the answer in many cases is that archaeological debate focuses on relatively few contexts, characteristically used to answer chronological questions, or questions that do not move beyond a few excavation contexts.[5] In some senses, this goes back to the roots of classical archaeology in *Altertumswissenschaft*, that a 'science of the object' ought to be produced in the same mould as a 'science of the text', with no fundamental requirement within the early discipline to produce a wider narrative based on archaeology. Moreover, while these extensive studies cover a range of object types, by virtue of the vast amount of data that exists from the long-term investment in a site, in many cases only a sample of the total

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[4] On the issue of overburden and the accumulation of material far outstripping the rate at which objects can be studied and published, see Snodgrass 1993, Huggett 2012: 539.

[5] *cf.* comments made in a review by Papadopoulos (2001) concerning the nature of archaeological publication: 'Put bluntly, this is a very large book about a lot of very small fragments.' Relatively little work has been done on using these vast datasets to investigate the worlds of ancient Greece more broadly beyond the boundaries of certain objects, contexts, or sites. For Archaic Greece, the furthest that the conversation got was probably in the work of Anthony Snodgrass (esp. 1980) and his 'school' of former PhD students (*cf.* Whitley 2018a), in using (primarily quantitative) archaeological data to answer questions of interest to ancient historians, an 'archaeological historical' approach to material culture.

assemblage of objects discovered in excavation can be published in such a catalogue. In essence, the pattern on national school 'big dig' archaeology dictates that the priority must be to sift through backlogs of primary material, to establish the objects' chronologies and contexts, and to produce catalogues of data, painstakingly studied at the micro-level. But this also raises a broader question: why investigate at a 'big' scale if not to ask 'big' questions?[6]

Large quantities of archaeological data are particularly well-placed for helping us to uncover patterns about the behaviour of individuals and groups over the long term and across large areas. Patterns in the distribution of large quantities of material evidence tell us that people in the past were either acting in similar ways or different ways to one another, and, upon finding evidence for these behaviours, it becomes possible to evaluate the extent to which those patterns are historically meaningful. Particularly useful are the sorts of things that are found commonly at many sites and in high numbers, where the variation between objects is such that by measuring their similarities and differences, patterns in behaviours can also be identified through their distributions. Patterns can tell us about the access that people had to different resources, their production and consumption habits, the desires and motivations that they had to acquire, manipulate and consume different types of objects. Practically, this means that most useful are smaller objects like pottery sherds and coins, but bigger things, like inscribed objects and sculptures, can also be usefully deployed in this way. And, to return to the point of publication, the *desideratum* to have large sets of smaller objects whose difference can be distinguished fairly easily on a macroscopic scale certainly plays to the strength of classical (Greek) archaeology, where a traditional interest in connoisseurship and aesthetic has (explicitly or implicitly) lent the bias in favour of publishing large amounts of these sorts of things (Snodgrass 2007: 13–19; Haggis and Antonaccio 2015: 1–4; Whitley 2018a: 1–3). The discipline is not short of catalogues of pottery, databases of coins, nor inventories of inscriptions. The archaeological data exist in substantial number, and, were the data to be mobilised in such a way, a wide-reaching analysis of their distribution offers significant potential for understanding behaviour in and the shape of the ancient Greek world.

The problems, however, are twofold in bringing together large quantities of material data for broader historical enquiry. First, there is the issue of

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[6] On the problem of needing the data to ask 'big' questions but on 'big' efforts required to get that data to a workable state, see Bevan 2015 and Green 2020: 430–1.

organising the data in a meaningful way (i.e. of classifying data into useful categories for analysis); and then of finding ways to address inconsistencies between datasets (both in completeness and in quality) so that meaningful patterns can be found.[7] This book will propose that, for the seventh and sixth centuries BC, 'Archaic Greece', there *are* suitable ways to handle this information – and that one can indeed find meaningful patterns about ancient behaviours through looking at 'big data'.

How to Make 'Big Archaeology' Work for 'Big History'

The 'big data' phenomenon, born out of computational developments over recent decades to mine, store and manipulate huge sets of generally *contemporary* data (e.g. demographic data, population statistics, epidemiological trends), has arrived in archaeology over recent years, (Cooper and Green 2015; McCoy 2017) albeit in ways that cannot be simply cut-and-pasted directly from techniques developed in the hard or social sciences. Even if the amount of material that comes out of the ground in an excavation (or across a region of excavations) could truly be classed as 'big data', once one considers the volume of data that is actually published and of the right quality and shape for analysis, the amount of *usable* and readily digestible data is somewhat smaller. So, any attempt to grapple with archaeological data on the scale indicated will never quite be 'big data' in the sense of other disciplines *per se*, but it is certainly 'bigger data' than the sorts of scales with which the humanities usually engage (*cf.* Gattiglia 2015: 114; Green 2020: 432). What *is* useful to borrow from elsewhere are the tools for making data work: techniques for cleaning and classifying data, and techniques for finding meaningful patterns in them.

The first step towards a broader understanding of the seventh and sixth centuries, then, is to identify datasets that are both comprehensive and representative of the material culture of Archaic Greece. The first of these criteria is simpler to handle, as this involves the systematic mining of all data available. The second, however, presents a more complicated challenge, and this is one of the major methodological challenges of a project

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[7] Recognising that there is now (and there has been for many years) a critical mass of data that exists, many important synthesis projects (many begun in the past decade) have taken up this challenge across all wings of Classical Greek and Roman Archaeology (*Archaeology in Greece Online/ Chronique des Fouilles en Ligne*, AtticPOT, Portable Antiquities Scheme, the EAGLE portal, to name just a few of many). It is completely timely, particularly now with widespread access to suitable computing technology, to think about ways to bring datasets like these together.

like the present study. To ascertain that the data used are indeed representative, one must subject the data gathered to various levels of qualitative and quantitative review.

First, the qualitative review of data. This involves a sampling strategy for mining data only from sources that have been published to a suitable standard. In practical terms, this involves looking at published site reports and excavation volumes that include within them catalogues of material recorded to the required degree of precision. The publication of 'highlight' objects or single pieces (e.g. in the Greek periodical *Archaiologikon Deltion*) might be excluded from the main data mining, as reports of this type typically precede the publication of a much more extensive site catalogue. Such objects are usually published independently for the sole reason of their *exceptional* nature, not because they are in some way representative of the material culture of a given site. Secondary publications might also be excluded, on the basis that any further sorting and selection of material from a base dataset reduces the likelihood that they discuss a full, comprehensive and representative dataset.

Once the material has been selected, the second issue is how messy the dataset is: can all the data that have been gathered be used? The challenge here is that one deals not with completely mute nor even data points. Archaeological data are 'human' or 'social' data in two senses: first, this is information produced within particular social and historical contexts (*cf.* Hodder 1986; Roskams and Whyman 2007), and, second, this is data *discovered, recorded* and *made available* within particular social and historical contexts. How one fits these complex and quite subjective social units into an analysable objective data-framework is not necessarily so simple.[8]

Thinking through how data are recorded goes some way towards illustrating the problem. It is often at the discretion of the field archaeologist to make a judgement on what is worth recording, how extensively, in what way and with what sort of vocabulary.[9] It is not impossible to escape human error at this stage, and invariably some data points will be incorrectly or incompletely recorded. Then the excavator (or, in some cases, someone else who was not involved in the generation of the data) further selects which of

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[8] For the idea that there can never be a completely 'raw' and 'empirical' archaeological data – or even any sort of data, for that matter – partly because the data creation process is subject to far too many variables that can be conceived or controlled, see Gitelman and Jackson 2013.

[9] Particularly in the case of the pottery of Archaic Greece, this often presents a problem for older publications, where coarseware sherds (particularly small ones) were frequently thrown in favour of more aesthetically appealing finewares.

these 'raw data' need to be published, choosing how that information should be cleaned and presented, which (if not all) categories of information are published, in what sort of format, and employing what sort of language. In a final publication of data (as one does in a bibliographic study such as this) it is sometimes difficult to understand how all of these decisions have been made; but without access to the original material or without extensive restudy one must accept the decisions made with a degree of confidence.

And then there are issues of coverage. Quite simply, not every 'big dig' excavation has been published to the same degree (in discrete number of publications or in the granularity of information available), nor are the 'big digs' distributed evenly across Greece. On chronology, as noted, much detailed and painstaking work has been done on establishing chronological sequences for material from ancient Greece; but the intensity of study is variable between different regions – even *within* a site, different classes of material might have been more intensively studied and disseminated than others – and there still exist questions about how exactly these chronologies might relate to one another in absolute terms. Furthermore, although scientific analysis is becoming more common across the field, many of our existing chronologies are based on typology or style alone (i.e. there is little external contextual information available). Then there is the problem of the intensity of exploration. For classical archaeology, there are far more 'dots on the map' around Athens and Attica for the simple reason that this area has been more extensively explored. Can we really write a truly horizontal history of how the regions of ancient Greece fit together if each of those component parts is a different shape? As becomes clear from this rather brief overview, although over 100 years of 'big dig' excavation within the Aegean has generated substantial publication, the amount of data that is usable for a project like the present study, while still 'big', is not the 'biggest' in any absolute sense.[10]

Using the remaining data, then, will necessarily result in some degree of 'mess' or 'noise', but it does not prevent us from finding patterns within the dataset. It is not an unrecoverable situation of 'rubbish in, rubbish out'. First, the nature of those factors generating 'noise' within a dataset is not patterned. That is, inconsistencies or gaps within datasets are random and, while random errors might mask patterns or make real patterns much

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[10] There is also naturally a bias towards particular types of sites (e.g. sanctuaries, where there has been much exploration and significant publication) and data which comes from particular national schools that have traditionally prioritised horizontal and empirical publication of individual artefacts (e.g. systematic German publications).

harder to see, this 'noise' is not so systematic across the archaeological record that it will force us to see *false* patterns. The patterns that emerge from analysis, one might reasonably suggest, are real patterns, and 'noise' will only prevent us from seeing other patterns – but nothing more. To account for this random 'noise' in the dataset, one useful strategy is to keep the scale of the analysis as broad as possible, that is, there will always be errors in the datapoints, but if the total number of datapoints analysed is much larger, then each of those random errors in itself becomes less significant in distorting the overall pattern. The questions raised in this book are best answered by looking at the Aegean basin in the very broadest terms: in approaching the target area through a largely survey-based archaeology of regions. The scale of the study region and the timespan investigated is large enough that even though there will undoubtedly be (sometimes undetectable) variations and fluctuations caused by rogue data points or gaps in the dataset, by working at this scale the 'bumpiness' is smoothed over to give, it is hoped, a solid and reliable overall *general* picture for the Aegean.

The second thing that can be done is to think carefully about categorisation in making units drawn from different sources comparable with one another.[11] That is, the researcher must take some subjective judgement in combining classes of information that might be recorded as different in the source publications (e.g. 'cup' vs. '*kotyle*' vs. 'Ionian bird bowl'), aggregating where it makes sense for the particular questions being asked to categorise similar sorts of data together. Some might call this 'mapping' the information, others 'lumping' (*sensu* Snodgrass 1977).[12] Archaeologists necessarily use different language even within a national tradition to describe the same or similar things (e.g. pot, vessel, ceramic, vase):[13] these differences must be

[11] Clearly, if one begins a new project or designs a new database then these principles can be adopted from the outset, using tools and workflows to help guide non-specialist users towards good data curation (Powlesland and May 2010; Vlachidis et al. 2010; Wallrodt 2016; Strupler and Wilkinson 2017), following guidelines on creating 'good' and 'clean' datasets (Parthenos et al. 2018). The issue here is how to produce clean data *after* the data have been created and published.

[12] Morris 1987 demonstrated that Snodgrass 1980 had distorted his picture of Archaic Greek society by 'lumping' together categories of child and adult burial data, and he (and many others subsequently) advocated the opposite approach of 'splitting' data down into as many non-equivalent units as possible, necessarily making the size of each data class much smaller.
A secondary aim of this book is to demonstrate that there is still value in 'lumping', and that, while a broad-level analysis might bring to light a different order of patterns than one would in adopting a close and more contextual view of the data, the patterns that are discernible are still useful for helping to write history.

[13] Paradoxically, even though the interest of this book is in lumping together data to assess broad-level patterns, the analysis is also enabled by splitting. In taking an object like the Nikandre *kore*:

smoothed over by adopting some type of common vocabulary (*cf.* Kintigh 2006: 570; Bodard et al. 2011; Cooper and Green 2015: 290; Bodard et al. 2017; Green 2020: 434–5). Data standards, thesauri and lists of fixed vocabulary terms provide the bases against which heterogeneous datasets can be homogenised for collective analysis, and indeed this book makes use of standardised vocabularies against which myriad different terms are mapped for convenience.

But mapping different classes of data to one another is not without its challenges. Further to the fact that the mapping process itself is a subjective process that requires the creative input of a user (*cf.* Roskams and Whyman 2007), clearly in transforming data one cannot generate new information that is not there, and it is only possible to 'map-down' to less specific common classes. The necessary consequence of this is an apparent 'simplification' of some of the data that we are handling: one might be left with lumpy and far-reaching categories like 'urban' vs. 'sanctuary', while losing the nuance of more specific terms like 'filled well', or 'floor deposit'. Requiring a certain level of data specificity would duly shrink the dataset available for analysis, not to mention the possibility that one predetermines the types of conclusions drawn from the data by fixing the categories of things that are being looked for too early. Although data synthesis and data mapping are not without challenges – and ones that can be overcome – the alternative seems even more grave: to simply junk all of the old data. We may all lament the state of old and 'bad' data, but that does not remove the need to engage with it, nor to think through its particular characteristics intelligently and pragmatically. We are required to take each dataset in its own context, to massage data together in a workable format, and to see inconsistencies between datasets not as deficiencies but as challenges to be solved.

This book analyses four sets of things that we have in great number from many sites across all parts of the Aegean: pottery, coins, inscriptions and marble sculpture. As will be discussed, assemblages of these objects taken on a macro-scale variously demonstrate connections with local and non-local sites in both quality and quantity. These sorts of objects all inhabited the same world and are similar enough that they can usefully be put side-by-side with one another; but they are necessarily different enough that analysis of their distribution will put different sorts of behaviours in the spotlight. The spread of material is also fairly even across the Aegean basin, such that most

this object is both a freestanding stone statue that can be analysed alongside other sculptures, and yet it can also be analysed quite separately in the context of its inscription. This issue of simultaneous lumping and splitting will be evaluated and discussed in the penultimate chapter.

parts of the Aegean world (with some necessary adjustment) can be productively discussed. And, on a more practical note, generations of discovery, research and discussion on this material provides us with a dataset that is a suitable size and shape for study.[14]

To summarise: a particular type of archaeology in Greece has generated large swathes of material data that has, to some extent, been underexploited in historical enquiry. The particular types of questions that this 'big data' might answer are about behaviour, about how individuals and groups of individuals – in the Greek world of 700–500 BC – interacted with one another. Although the data are heterogeneous and messy, they are not beyond the point of being usable. Careful selection, cleaning and mapping of datasets will result in useful units of analysis that can be aggregated to reveal patterns of historical interest for further interrogation. The next important step is to propose useful methods for organising and analysing that data.

Material Networks as Evidence for Behaviour

The solution posed in this book is to look at archaeological 'big data' through the lens of Social Network Analysis (SNA), as a way of organising the data and recovering patterns in their distribution. Commonalities in the distribution of certain types of objects in certain places will be read as proxy for similar activities undertaken both by individuals and by collectives of individuals. These patterns will then be used to think through the connections that existed between different groups, and the extent to which these similarities constituted complex networks of interaction.

The production and distribution of objects reflects human agency. In creating or acquiring objects that either resemble or look distinct from one's neighbours, groups or individuals (either consciously or unconsciously) commit to associating themselves with or distancing themselves from nearby settlements. Access to similar or the same resources or technical information might inform the ways in which communities create objects, and mobile craftspeople might bring different styles, methods or techniques for creating objects to new places. However, in all cases the decision to

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[14] Excluded here are categories of objects that are somewhat 'exceptional' (e.g. faience, jewellery and scarabs: things that were traded between different parts of the Aegean, but which were moved in much lower quantities). Such objects do not show us the normal range of a site's connections; their acquisition was entangled with unusual circumstances beyond the everyday set of networks.

produce or acquire objects of a certain type is always a *conscious* one, and the objects must, therefore, reflect to some degree the people who projected them. The material record is entangled with all these human decisions. In looking across assemblages of things from different places, we can begin to disentangle some of the interactions that created these distributions.

If we are to understand how a whole region like 'Archaic Greece' functioned and how its component parts interacted in a *broad-scale* 'connectivity' (*sensu* Hordon and Purcell 2000: 123–72; Broodbank 2013), we cannot look simply at single objects: the size of the dataset must be adjusted to the level of the questions being asked. In going from mute objects to dynamic processes of interconnection, two things are required: a dataset large enough to identify continuities and discontinuities between sites, without background noise; and formal methodologies for sorting and interpreting data on this scale. The challenge is to find ways of putting these data together systematically and comparing them in a productive way that can allow us to make reliable and robust conclusions about the interactions of the communities that produced them.

The nuts-and-bolts of social network analysis are now so familiar to archaeologists, ancient historians and classicists that it is not necessary to rehearse here yet another explanation for the fundamentals of SNA,[15] but it suffices to say that under this framework real or imagined individuals or collectives are visualised as nodes, and the relations between them as links or edges: the structure of an interconnected network of nodes can therefore be visualised descriptively, or investigated with exploratory statistics, as a formal means of visualising, interpreting and explaining connections between various actors (Fig. 1.2).[16] Crucially, there is no 'one-size-fits-all' network approach (*cf.* Mills 2018), and each adapts techniques and frameworks to the particularities of each dataset under analysis.

Largely thanks to the work of Tom Brughmans (2010 and 2012) and Carl Knappett (2011), *computational* SNA network analysis has now become a serious and significant branch of study within the scholarship of the ancient world,[17] itself much inspired by ongoing 'big data' network analysis

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[15] A range of approaches have been adopted both in the articles of edited collections (Collar et al. 2015, Brughmans, Collar, and Coward 2016, Leidwanger and Knappett 2018) and individual studies (Constantakopoulou 2007; Knappett, Evans and Rivers 2008; Mol 2013; Iacono 2016; Orengo and Livarda 2016), some tending to more literal uses of SNA, while others adopt this framework as a more general metaphor.

[16] On the development of SNA in sociology, see Hanneman and Riddle 2005 *cf.* Barnes and Harary 1983, Wasserman and Faust 1994, and Freeman 2004.

[17] See Brughmans 2014 for a quantitative overview of computational network studies, and their exponential increase in uptake.
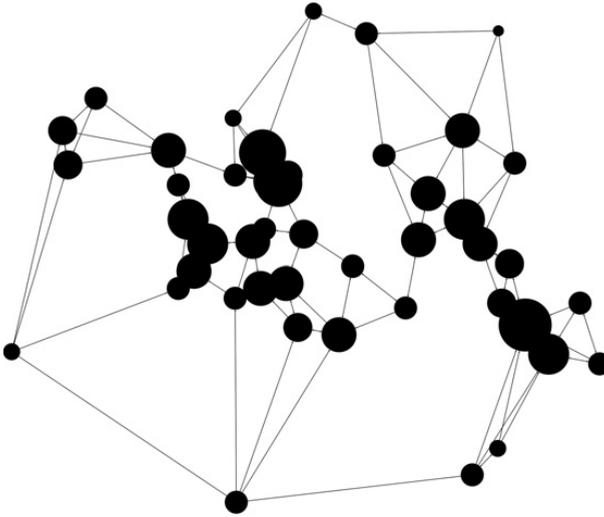
Figure 1.2 Illustrative network graphic. Nodes and edges are weighted; the arrows on the edges indicate that edges in this graph have direction.

conducted in the sciences, in mathematics and on contemporary datasets. The 'computational' aspect of SNA conducted in this way pertains both to the size of the dataset that can be handled in such an analysis, but also to the complexity of the analysis that can be run: literally hundreds or thousands of connections can be drawn in the overall network, and their overall structure and sub-groups analysed in a matter of seconds. Computational tools are used to run descriptive and exploratory statistical tests on these networks to facilitate their interpretation (i.e. to let one see much *quicker* patterns that could be seen otherwise) but also to elucidate patterns that one would not otherwise be able to see. Network analysis helps, therefore: to visualise a large number of relationships simultaneously; to put emphasis on the nature of the relationships between nodes, rather than on the nodes themselves; to explore the overall structure of all combined interactions, and how they might change over time; and to extract and to evaluate the role of individual nodes in a wider system.

A note on the interpretive framework of the network analysis. The network – although useful for putting emphasis on the activities of units interacting with one another – is to some extent an artificial and anachronistic framework, an 'etic' tool into which data might be forced in order to see patterns:[18] to put this another way, network analytical perspectives

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[18] 'Emic' and 'etic', although terms gleaned from linguistics (Pike 1954), are useful for thinking through the interpretation of the sorts of data discussed here. See Mostowlansky and Rota 2020

encourage us to see data in categories that would not have been meaningful to ancient people. To handle data at the high level such that it is available for this study, a very broad-brush and top-level analysis has been conducted, adopting mapping principles to 'reduce' the complexities of data to more easily manipulated units. This necessarily removes some of the nuance behind each cultural unit examined, with each level of simplification moving us further from any 'emic' possibility to a progressively more 'etic' framework. Somewhat more crucially, in going from material culture to activities, the networks described have had to be necessarily broad-brush too. A 'political network' or an 'economic network' can mean a range of different things, and, unless defined more precisely, stopping simply at such definitions risks being too 'etic' to be useful.

This type of framework – although more common in other parts of World Archaeology – goes against the tide of the more 'emic' approaches undertaken recently within the Ancient History of Archaic and Classical Greece (e.g. Anderson 2018; Blok 2017). Recent studies part of this 'ontological turn' have taken a very useful, cautious and much-needed re-analysis of rather generalising and outdated frameworks and assumptions about the Greek world, providing a challenge to some of the (anachronistic) terms that we use to describe the ancient world – for instance the 'economy'. And, yet, in the face of the success of this sort of scholarship, what is being proposed here almost looks like a backwards step towards processualism, an uncritical 'archaeology by numbers' that prizes manipulation of the data without full contextual discussion of each datapoint.[19] Can such an approach still be defended in the twenty-first century?

The solution is to be completely explicit about what is being modelled, and to move very gently through the interpretative framework. That is, this study will take large sets of material data, and it will use SNA simply as a heuristic for sorting groups of similar materials together according to units of place around the Aegean basin. Those similar materials will be understood to represent the cumulation of a set of similar activities, and it is those similar practices undertaken in the same way at the same places that are understood to represent the historically meaningful building blocks of wider networks. Nothing more and nothing less. Using SNA to

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for a summary on the history of interpretation of these terms, particularly their usefulness for archaeology. This binary opposition is perhaps unfair. 'Emic' and 'etic' understandings of a community need not be in opposition with one another, and can be adopted quite successfully in synergy, *cf.* Berger et al. 1976; Feleppa 1986; and Geertz 1976.

[19] This is perhaps an unfair over-generalisation. Much recent work done by computational archaeologists could be more precisely labelled as the coarsely defined 'processual+', still bringing in substantial bodies of theory but championing above all else method and data.

sort the material record will therefore help to reveal simple units of behaviour, whose similarity or difference can be discussed next to one another. It is from here that our understanding of the dynamics of the Aegean basin in the seventh and sixth centuries will emerge. Ironically, this 'etic' approach demands that one is as equally agnostic about definitions as in an 'emic' approach. That is, words like the 'economy' or 'community' will be used as neutrally as possible, steering us away from the precise and specific definition of each datapoint towards the broad patterns that exist between them in combination. And that is the defence for a more data-led archaeology: that our interest is not in the data themselves but in the *questions* and *problems* that are raised by their patterning.

Having established the interpretative framework, the next step is to establish those 'basic units', those collectives of individuals, located in the same places.

The Community, and Communities of Activity

To analyse a network in which nodes represent places at which certain activities take place, a neutral vocabulary is required that presupposes nothing about a group's composition nor about its behaviours.[20] What is proposed here is that the notion of the 'community' is one that is both appropriately unspecific yet descriptive enough, although subject to a history of debate on its own definition.

The particularly useful thing about adopting a community-focused framework is that the community is an idea that has been conceptualised far less as a physical thing than in the case of the *polis* or state. With the exception of geographers and urban theorists in the mid-twentieth century who theorised the community as something environmentally defined that bounded together groups of people who did similar things or had similar practices owing to the fact that they were located proximate to one another,[21] the important thing for theorists in identifying communities

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[20] The PhD thesis on which this book is based used the 'state' as the basic indicator of activity taken at a specific place. But the 'state' is weighed down by much more interpretive baggage than the 'community', as a term first adopted within a neo-evolutionary progressive framework (Service 1962). Even though scholarship has now moved on and the 'state' has been theorised in myriad different ways (Boardman 1980; Osborne 1985; Haldon 1993; Yoffee 2005), this is still a problematic term to use in Aegean studies, principally because many of the models developed by the Michigan School have focused on non-familiar case studies from Mesoamerica (*cf.* Whitley 2015b) and have received less critical analysis within Mediterranean scholarship.

[21] The discussion here is necessarily brief, but a full literature review is given by Mac Sweeney 2011: 13–15.

has been that the *activities* of its members are mutually similar enough that this is some form of meaningful collective. Catie Steidl (2020) has recently laid out a useful framework that illustrates how the behaviour of individuals – with one another, with their landscape and with material culture (*cf.* Bourdieu 1977; Van Dommelen, Gerritsen, and Knapp 2005; DeMarrais 2011) – creates a community, either consciously or unconsciously (*cf.* Houston et al. 2003; *contra* DeMarrais 2016):[22] communities share practices of maintaining their built environment; practices of religion and ritual; and they have a shared social experience. Steidl's case studies from western Anatolia help to illustrate this framework, wherein she indicates that individuals at Ephesos formed a community of shared practice, using the same pottery vessels for stewing meats and for feasting: by using the same types of objects to process the same sorts of foods, the individuals who prepared these foods clearly have some shared experience and outlook of their immediate environment, and this similarity can be called, as neutrally as possible, a 'community' of individuals (*cf.* Whittle 2005; Harris 2014). Quite clearly this is a very specific example from a particular place, but the framework can be scaled up to much larger units, with the crucial notion being that communities are units that are defined by the actions taken by the people within them – they are by no means static entities.

The framework of the community is also particularly useful in this study for two additional reasons. First, as suggested, the community does not have to be bounded to a specific geographic place, nor does it operate at a fixed scale. Quite obviously, in sharing practice with other individuals, one does necessarily need to inhabit the same physical space (*cf.* Anderson 1983; Cohen 1985; Canuto and Yaeger 2000; *contra* Knapp 2003 on the importance of *both* shared geographic space *and* experience). The diaspora of Greek citizens living internationally – as an example – can certainly be understood as a community, even though many of its members have not met one another. It is their shared heritage – a shared understanding of spaces, a common iconography or language – that gives its members a particular and shared outlook on the world, making these individuals part of a community. And in an increasingly globalised, international and digitally connected world, it makes quite logical sense to us that one can share experiences, thoughts and practices with non-proximate individuals, and in doing so one can be considered to be a 'community' with those

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[22] Naoíse Mac Sweeney 2011 arrives at a similar definition of community but suggests that collective ideologies must be more consciously maintained. The present discussion tends more towards Steidl's idea, that a group can be a collective, loosely defined and based on their similarities even if they do not actively identify themselves with one another in that way.

others, whether that be groups of just a few individuals or groups that include millions of members.

For the Archaic Greek world in which we are dealing with settlements and collectives of different sizes and complexities, not to mention with groups of Greeks who are 'on the move' (*sensu* Antonaccio 2007), the more flexible the definition of their collectives, the better. It is well recognised that Greeks might identify themselves simultaneously with different communities (*cf.* Taylor and Vlassopoulos 2015), and just as, for example, one could reasonably be a member of the deme of Thorikos and a citizen of Athens at the same time, it is clear that the size and scale of these units were flexible and non-overlapping.[23] And so the 'community' here is a catch-all for a commonality of belonging, identity or practice, created through the conscious or unconscious shared beliefs and practices of its members – where membership of one community does not exclude one from membership of another.

A second reason that this is a useful model is that it is a framework defined by the practices of its individuals, one which puts emphasis on the *positive* actions of individuals as a group rather than on the things to which they are *negatively* opposed. Communities have also been variously defined by scholars on the basis that an 'us' and 'them' dichotomy helps to define a collective spirit more strongly (e.g. Cohen 2002). Particularly prevalent within the definition of Greek ethnicity is this notion of having an 'other' (see Chapter 5). While some form of opposition can contribute to making a communal identity *stronger*, it might not be the most effective way of *creating* a sense of community among smaller or more isolated groups: small mountain or island village sites, particularly prevalent throughout Greece, might not have regular contact with other outside groups to create significant antagonism, and that should not negate the idea that these small groups can form and harbour strong communal feelings with one another. Practice, activity and experience shared among any number of individuals create collective groups – whatever sort of groups those are, however big, and operating at whatever scale.

This framework is useful for the current study. The notion of the 'community' will thus be employed as a fairly neutral term that operates across different scales, crossing both physical and unbounded space, and informed by the dynamic activities of its constituent members. The aim remains to make sense of the 'big data', and the 'community' is just as much

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[23] The general orthodoxy that Greeks belonged first and foremost to 'communities of cult' (*sensu* Morgan 2003, *cf.* Anderson 2018) will be addressed in the conclusion, Chapter 7.

a tool for achieving that aim: the patterns in the 'big data' do not simply require a panoply of separate communities, they demand that those communities are in some sense a network. It is unhelpful to use sets of arbitrary criteria (e.g. population sizes) to try and designate some communities as anything like a state or a non-state; it is acknowledged that in the diverse world of Archaic Greece there were communities of various sizes and scales that exercised different political and economic structures, and yet they might be seen as somewhat roughly equivalent autonomous political units. The community, therefore, is a unit of collective activity, whose actions have a mutual impact upon the activity of the group. Clearly, it is the *actions* of a community that more importantly define it, and the main interest of this book is not on definitions *per se*, but on investigating what these groups did and what they did with each other. The term 'community' will be used almost somewhat interchangeably with 'political community', 'economic community' or 'political-economic community', depending on the sorts of activities that are being presently described.

Another methodological note: 'community' is a flexible unit, and while in many cases this will refer to quite large collectives, in others the focus is on a smaller group of individuals *who represent* the wider community. In the interest of maintaining a fairly neutral vocabulary that does not presuppose the nature of these basic units of analysis, the term 'peers' will be used or (to borrow from the language of those who have investigated these phenomena for Archaic Greece) 'elite peers'. The use of this term is not to presuppose ideas of class, status, aristocracy or wealth,[24] but to adopt a framework similar to that of Alain Duplouy (2006), in which 'eliteness' was not something one was born with in the world of Archaic Greece, but rather something that one attained; 'eliteness' was not a permanent state and it could be lost. Essentially, the world of Archaic Greece was one with very little (if any) inherent class, but individuals were constantly striving to achieve this level of 'eliteness' in everything they did. Moreover, certain activities could be performed by individuals to generate status, through public recognition; by acting in this way individuals did things that were recognised in the community as 'elite', and through this *performance* they increased the likelihood that they would be viewed by others as themselves 'elite'. In this model, the consumption of material culture and quest for

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[24] Van Wees and Fisher (2015) and Duplouy (2002 and 2005) explain that this view was the result of two misconstructed beliefs: first, that ancient 'elites' were analogues to feudal lords of the European medieval period; and second, that many scholars took their picture of a hereditary elite straight from the pages of Homer and projected it towards the Archaic period.

social recognition were entangled – an idea that will be key to the forth-coming analysis in this book.

To reiterate, then: SNA will be used throughout this book to organise the plethora of archaeological 'big data' from the Aegean of the seventh and sixth centuries BC, as a way of identifying patterns in the distributions of objects across sites: marble, pottery, coins and inscribed objects. These patterns will be used to think about behaviour where 'communities' are the basic unit of analysis, and where those communities – or elite peers representing those communities – are the abstract nodes in a series of networks connecting across the worlds of Archaic Greece.

Chronological Boundaries

The 'Archaic period' analysed in this book begins in 700 BC and ends in 500 BC.[25] These seemingly 'fixed points' are somewhat arbitrary – as are any dates that classical archaeologists assign to material culture on the basis of style. On the one hand, while there do actually exist certain synchronisms for the Classical Aegean that can help to assign genuine fixed points to horizons of material culture styles (e.g. the sacking of Miletos or the Athenian Acropolis),[26] on the other hand, a few fixed points at the end of the sixth century are not necessarily helpful to the questions asked in this book: this book examines *long-term change* and shifts in economic and political activity over time rather than *specific calendrical events*. And, therefore, changes in style that we heuristically but imprecisely assign to chronological periods are perfectly acceptable for this analysis. For example, it is relatively unimportant whether a pot that our catalogue tells us was painted 'in the second half of the sixth century BC' was actually painted in the 540s or the 520s – or even the

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[25] For various (equally arbitrary) definitions for the start and end points of the Archaic period, see Davies 2009. The most frequently cited date range for this period is 776–480 BC, based on two historical events: respectively, the first Olympic games, and the second Persian invasion of Greece.

[26] One might wonder why the analysis does not go as far as 480 BC to take in the exceptional quantity of material yielded from Persian destruction layers. The issue here is context. As has been outlined above, this book is interested in thinking through objects in motion: material culture as part of dynamic processes in the formation and co-ordination of networks. Objects found within Persian destruction contexts are not objects in transaction and, paradoxically, even though their archaeological context might be more helpful in this case for providing firm dating, such objects are considered contextually less useful here. Scale is another issue, that the range 500–480 BC would yield so much material that it is both beyond the scope of the present study to synthesise, and (providing an opposite problem to include the eighth century), its inclusion could weight modelling to such an extent that it would mask more subtle patterns from the start of the seventh century, from which there is less data.

490s. What matters is that this pot shows clear and measurable change from something that was painted at the start of the seventh century BC.

How then does a broad-range and imprecise chronological framework of time slices help? First, it helps to mask some of the 'edge effect' that might arise in analysing data either side: there is a much smaller quantity of material available for study from the eighth century as opposed to the seventh or sixth, and extending the same models for analysis into the eighth century would create problems for data comparability. That is not to say that the results of the analysis conducted will be taken in isolation, and qualitatively at least the story that emerges from the formal network analysis for the seventh and sixth centuries will be put next to the narrative of the eighth century. It is a question of balance: the 'Archaic period' as it is analysed here pertains to the seventh and sixth centuries BC, centuries which provide reasonably comparable amounts of data such that modelling these two centuries together can produce more evenly discernible results.

The second reason for adopting this framework is to do with style. The dataset for this book is material culture, and analysis relies on categories defined in previous studies, building on the legacy of art history's treatment of these data. The timeframe for analysis must map, therefore, onto the stylistic categories as defined in previous scholarship. The year 700 BC marks a good point of departure, marking the end of the Late Geometric period (in Attica, Ionia and in the Cyclades, at least). This also provides an interesting start point from which regional pottery styles begin to take on a character even more distinct than in the Geometric period, such that they can be distinguished from one another relatively simply in macroscopic terms (e.g. one can quite readily distinguish visually Orientalizing from Wild Goat from Proto-attic): and these relative distance measures of similarity and difference are required for the modelling proposed above. Contextual find information is rarely considered, and style is the place to start in looking for temporal information. Furthermore, a century-based approach is sensible stylistically when it comes to dealing not only with pottery, but also with the other main material datasets that feature in this book: coins and inscriptions. Both datasets are subject to long histories of stylistic analysis, often related to categories that consider centuries (e.g. 'seventh century BC', 'end of sixth century BC') or parts of centuries (e.g. 'last quarter sixth century', 'first half seventh century').[27] It makes sense, therefore, to follow where possible similar chronologies to the source data,

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[27] It is useful to consider briefly what these date ranges represent. A date-range estimate is essentially a 'probability' value: for an inscription as 625–550 BC, we might decide that within this range there is a certain likelihood that the 'actual' date of the inscription is somewhere near

and to work within the same limits of reference.[28] As a result, for both reasons of data quantity and of previous stylistic analysis on the target data, 700 BC–500 BC is taken as the main chronological framework here.

The final point to make here is on chronological subdivisions. Data will be analysed in this book under a four-part division based on half-centuries: 700–650 BC, 650–600 BC, 600–550 BC and 550–500 BC. These 'time slices' are broad enough to account for the variation in precision and accuracy of the dating assigned to each object in previous studies, while also being narrow enough that change can be detected between each group. It is also important in this context to deal with time slices of equal duration.

Geographical Boundaries

The scope of this study is limited to communities located in, around and principally facing into the Aegean Sea. The main areas for analysis include the coasts of the Saronic Gulf, the Cycladic islands, the Dodecanese, and the region of Aegean Turkey known as 'Ionia', in addition to parts of northern Greece and Crete. Within these broadly defined areas of interest, sites for analysis are selected on the basis of data available in each area (Fig. 1.3, Table 1.1). But in general there is a particular emphasis in this book on *coastal* sites of the Aegean. Studies of Mediterranean 'connectivity' and networking from the last twenty years have placed particular emphasis on the geographical factors that enable connectedness, and, above all, that the sea affords a medium of mobility. One of the aims of this study, therefore, is to assess the extent to which these models are appropriate for the particular historic setting of the Archaic period. This is not to make the *a priori* assumption that maritime transport and seascape mobility were responsible for the intensification of interaction in Archaic Greece, but it acknowledges that the role of the sea in enabling connectivity needs to be considered.

the middle of this estimate (e.g. 590 BC), or that it is just as likely to be somewhere near the 'edges' of this (e.g. 610 BC or 555 BC). Essentially, the question in treating date ranges as probability distributions is in deciding what those probability distributions ought to look like. Is there an equal probability that the date of the inscription could fall anywhere within the range 625–550 BC (a uniform distribution), or is there a most likely value in the middle of this range, and dates towards the edges of this boundary are more unlikely (a normal distribution)? This book understands that a uniform distribution can suitably represent a range of dates, as there is no good reason to think the dataset requires otherwise (*cf.* Sinn 1980), and that 'Early', 'mid' and 'late' dates given within a century were also distributed across a fifty-year range (e.g. early sixth century = 600–550 BC; mid-sixth century = 575–525 BC; late sixth century = 550–500 BC).

[28] See further discussion below on data mapping, that categories can be reduced but that they cannot be made more precise.

Figure 1.3 Distribution of sites discussed in this book.

Table 1.1 *Sites discussed in this book, according to the materials available for analysis in each case.*

Site	Marble	Pottery	Coins	Lettersets
Abai				x
Abdera			x	
Abydos				x
Achaea				x
Aegilia				x
Aegina	x	x	x	x
Aigiai	x			
Aigiale				x
Aixone				x
Akanthos			x	
Akovitika				x
Akraifia		x	x	
Alope				x
Ambryssos				x
Amorgos	x			x
Amyklai				x
Anafi	x			x
Anagyrous				x
Anavyssos	x			
Andros	x		x	
Antiparos	x			
Antissa				x
Apollonia				x
Apollonis Hyperteleatae				x
Argilos			x	
Argos				x
Arkades				x
Arkadia				x
Arkesine				x
Asea				x
Assos				x
Athens	x	x	x	x
Axos				x
Brauron				x
Chalkis			x	x
Chersonesos			x	x
Chios	x		x	x
Chrysapha	x			
Corinth		x	x	x
Cynus				x

Table 1.1 (*cont.*)

Site	Marble	Pottery	Coins	Lettersets
Delos	x	x	x	x
Delphi	x		x	x
Dichova				x
Didyma	x			x
Dikaia			x	
Dodona				x
Dreros				x
Dyme				x
Eion			x	
Elateia				x
Eleusis	x			x
Eleutherna				x
Eltynia				x
Emporio				x
Ephesos	x		x	x
Epidauros	x			x
Erchia				x
Eretria	x		x	x
Erythrai	x			x
Eutresis	x			
Galaxidi				x
Gargettos				x
Gortyn				x
Gortyna	x			
Halai				x
Halai Araphenides				x
Haliartos			x	
Halikarnassos	x			
Hyperteleaton				x
Ialysos			x	x
Ikarion				x
Ioulis			x	
Isthmia	x			x
Ithaka				x
Ixia				x
Kalapodi		x		x
Kalaureia		x		
Kalavryta				x
Kalydon				x
Kalymnos	x			x
Kamiros	x		x	x
Karpathos			x	

Table 1.1 (*cont.*)

Site	Marble	Pottery	Coins	Lettersets
Karthaia			x	
Karystos			x	
Karystos				x
Keos	x			x
Kephale				x
Kephallonia				x
Keratea	x			
Klaros	x			x
Klazomenai	x	x	x	x
Kleonai			x	
Knidos	x		x	
Knossos		x		x
Kolophon				x
Kommos		x		
Koresia			x	
Korkyra	x		x	x
Koropi				x
Kos			x	x
Kosmas				x
Krommyon				x
Kythera				x
Kythnos			x	
Larisa				x
Laurion	x			
Lemnos				x
Leontinoi	x			
Lepreon	x			
Lesbos			x	x
Lete			x	x
Leukas				x
Limnai				x
Lindos	x	x	x	x
Lousoi				x
Magnesia			x	x
Magoula				x
Markopoulo	x			
Maroneia			x	
Megara	x			x
Melie				x
Melos	x		x	x
Melpeia				x

Table 1.1 (*cont.*)

Site	Marble	Pottery	Coins	Lettersets
Mende			x	
Mesogaia	x			
Methana				x
Methymna				x
Miletos	x	x	x	x
Mount Mavrovouni				x
Mycalessus			x	
Mycenae				x
Mykale				x
Myli				x
Myous				x
Myrrhinous	x			x
Mystras				x
Mytilene		x	x	x
Naupaktos				x
Naxos	x		x	x
Neandria				x
Neaopolis			x	x
Nemea				x
New Phaleron	x			
Oinoi				x
Oitylos				x
Olympia	x	x		x
Olynthos		x	x	
Opous				x
Orchomenos	x		x	x
Orminion				x
Oropos				x
Paiania				x
Palairos				x
Paros	x		x	x
Penteskouphia				x
Peparethos			x	
Perachora		x		x
Phaistos				x
Pheia	x			
Phigaleia	x			
Phleious			x	x
Phokaia			x	
Phokikon				x
Phokis			x	

Table 1.1 (*cont.*)

Site	Marble	Pottery	Coins	Lettersets
Pleiai				x
Poteidaia			x	
Praisos				x
Prasiai				x
Priene				x
Prospalta				x
Ptoan sanctuary	x			x
Rhizenia				x
Samos	x	x	x	x
Samothrace	x	x		x
Sangri				x
Selinous				x
Sellasia				x
Seriphos			x	
Setaia				x
Sigeion				x
Sikinos				x
Sikyon				x
Sindos		x		
Siphnos	x		x	
Siris				x
Skione				x
Smyrna		x	x	x
Sounion	x	x		x
Sparta				x
Sphettos				x
Stagiros			x	
Stiris				x
Stratos				x
Styra				x
Syros				x
Tanagra	x		x	x
Tegea		x		x
Tenea	x			
Tenedos			x	
Tenos			x	x
Teos			x	x
Thasos	x	x	x	x
Thebes			x	x
Thera	x		x	x
Thermon				x

Table 1.1 (*cont.*)

Site	Marble	Pottery	Coins	Lettersets
Thespiai				x
Thessaliotis				x
Thorikos		x		x
Thrace	x			
Tiryns				x
Torkoleka	x			
Torone		x		
Triteia				x
Troezen				x
Troy				x
Tyros				x
Vlachomandra				x
Volomandra	x			
Vourva	x			
Zacynthos				x
Zarax				x
Zone		x		

It is also important to note areas that are *not* included within this book. Quite clearly the 'Greek world' at this time was much more than just the Aegean, taking in the Greek settlements of the Black Sea region in the northwest, Magna Graecia, Sicily, and all the way to Massalia in the west, North Africa (including major sites at Libya at Naukratis), not to mention Cyprus, often considered alongside other 'Greek' territories but far out of reach of the immediate Aegean zone.[29] And what about those communities in contact with the edges of the Aegean – particularly to the north – which, although not using the 'Greek' language, would still cut across all sorts of economic and cultural networks that were being exercised elsewhere: social networks do not map directly onto barriers of language nor of geography. The answer, quite simply, is that the unit of analysis must stop somewhere, and that there will always be opportunity to think about what effect there might have been for linking a little further beyond the edges.[30]

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[29] See Archibald 2017 on going 'beyond Greek archaeology', *cf*. Foxhall 2017.

[30] It is not new to suggest that the Greek world at this time was part of a wider world system (Sherratt and Sherratt 1993), and the network approach is a useful one for reminding us that the 'end' of a network is not necessarily the 'end' of any sort of cultural or geographical unit – that there could always be some other network right on the side pulling or pushing on the Aegean network.

Undoubtedly new patterns might be uncovered and other patterns might fall into much sharper focus once the geographic remit is extended, and perhaps a similar study that goes beyond the Aegean to a Mediterranean-level analysis of the 'Greek world' is a project to be undertaken elsewhere: but, as it stands, this book already contains over 30,000 individual units for analysis and the boundary has to be drawn somewhere.

So for this book, at least, the main focus is on the *internal* dynamics and formation of networks *within* the Aegean region. 'Archaic Greece' will be used as a shorthand for 'the Archaic Aegean' and, while acknowledging that the Greek-speaking world was much larger with its settlements abroad and subject to a much broader set of contacts at this time, the Aegean remains here the focus.

Scope and Structure of this Book

The purpose of this book is to run some experiments on the myriad of archaeological data available from the world of Archaic Greece and to see whether the patterns that emerge are in any way meaningful or historically interesting. This will integrate new archaeological data into the debate on the structure of Archaic Greece, specifically with a view to exploring how political and economic interrelations contributed to processes of community-level interaction between 700 and 500 BC. Undoubtedly there will be some misfires in the experiments run owing to the quality of data available and gaps in the dataset, but this will also allow for critical reflection on the current state of data availability.

Although this book is about using methodologies that are new for this period of study, it is written in a way to be accessible and broadly appealing to ancient historians and classical archaeologists more generally. Supporting data and models for reproducing the analysis conducted are hosted elsewhere for a more specialist audience, but the focus here is opening up the possibility of new historical narratives to a broader audience in a way that does not isolate the non-specialist.

This book is framed around four separate case studies, brought together in the final section for more general discussion. All four case studies, though, are interested with the broader issue of what an analysis of big data can tell us about the 'big issues' that have been of concern to historians of early Greece, and can be most easily expressed in two key research questions:

- How formally organised were the political communities of early Greece, and what role within these communities was played by elite peers?
- To what extent can methods of modern economics appropriately be used to analyse the ancient economy?

Chapter 2 looks at the transport of raw marble in the production of freestanding sculptures. The first part of the chapter estimates the rate at which *kouroi* and *korai* statues were produced in the sixth century, and in the second half of the chapter various types of maritime shipping routes are reconstructed. The focus of this case study is on economic networks, and on the extent to which economic activity was entangled with the embedded social activities of elite peers.

Chapter 3 takes this idea of maritime shipping routes further by bringing ceramics into the discussion. Here the interrelation of 'luxury' and 'commodity' shipping is considered, considering both the ceramic dataset quite separately, and putting it directly alongside the marble dataset. Discussion follows on the extent to which parts of the Aegean world might have targeted certain products at certain times, making way for discussion of an early market-based economy.

The networks discussed in Chapter 4 are considered 'entangled' in that they relate to both issues of political affiliation and issues of economics. The first coinage is analysed in relation to the network of shared weight standards that spread across the Aegean and, following discussion on the extent to which the data give evidence for consumption and/or production, coinage is put alongside the distribution of certain types of transport amphorae to elucidate the shape and chronology of some economic networks even more clearly.

Chapter 5 considers the inscriptional record, and, specifically, the use of different forms of the early Greek alphabet. By looking at the co-existence of various lettersets in different parts of the Aegean, this chapter considers how consciously Greeks chose to associate themselves with or distance themselves from each other; and it explores ways in which writing was used to advertise personal and communal identities. This chapter also asks a broader question about data modelling, and about the extent to which certain patterns can be encouraged or masked depending on the models used.

The previous discussions are set in a wider historical framework in Chapter 6. Alliances, leagues and *amphiktyonies* attested in textual and historical sources are discussed side-by-side with the patterns of the previous four chapters. Both a 'top-down' and a 'bottom-up' approach

are considered, working both from networks that the historical record tells us ought to exist, and, by contrast, beginning with the material data and evaluating the patterns that emerge. This chapter also considers the extent to which communication and knowledge were pre-requisites in the formation of other types of networks.