Exploring Writing Systems and Practices in the Bronze Age Aegean

Philippa M. Steele

Contexts of and Relations between Early Writing Systems Vol. 7

Exploring Writing Systems and Practices in the Bronze Age Aegean

Exploring Writing Systems and Practices in the Bronze Age Aegean

Philippa M. Steele

OXBOW | books
Oxford & Philadelphia

Published in the United Kingdom in 2024 by
OXBOW BOOKS
The Old Music Hall, 106–108 Cowley Road, Oxford, OX4 1JE

and in the United States by
OXBOW BOOKS
1950 Lawrence Road, Havertown, PA 19083

Hardback Edition: ISBN 978-1-78925-901-8
Digital Edition: ISBN 978-1-78925-902-5

A CIP record for this book is available from the British Library

Library of Congress Control Number: 2023943563

Printed in the United Kingdom by CMP Digital Print Solutions

Typeset in India by Lapiz Digital Services, Chennai.

For a complete list of Oxbow titles, please contact:

UNITED KINGDOM
Oxbow Books
Telephone (0)1226 734350
Email: oxbow@oxbowbooks.com
www.oxbowbooks.com

UNITED STATES OF AMERICA
Oxbow Books
Telephone (610) 853-9131, Fax (610) 853-9146
Email: queries@casemateacademic.com
www.casemateacademic.com/oxbow

Oxbow Books is part of the Casemate Group

Front cover: Linear B tablet from Knossos, listing chariot wheels. © Ashmolean Museum, University of Oxford (no. AN1910.211).
Back cover: Limestone statuette of a seated beardless male votary writing on a scroll. Metropolitan Museum New York, no. 74.51.2695: The Cesnola Collection, Purchased by subscription, 1874-76. Public domain image.

To my gorgeous little baby, still growing inside me as I completed work on this book.

Contents

Acknowledgements

The research presented in this book was conducted as part of my remit as Principal Investigator of the project Contexts of and Relations between Early Writing Systems (CREWS), which received funding from the European Research Council (ERC) under the European Union's Horizon 2020 research and innovation programme (grant agreement No. 677758). I am as ever hugely grateful to everyone at the ERC for making the CREWS project possible, and for their help and kindness when things were difficult during the COVID-19 pandemic (for which a generous extension to the project term was granted, as well as understanding concerning personal difficulties). The final stages of completion of the manuscript, and the proof stages, were completed during my time as Principal Investigator of a further project, Visual Interactions in Early Writing Systems (VIEWS), a UK Research and Innovation Frontier Grant (No. EP/X028240/1) project underwritten through the UK's Engineering and Physical Sciences Research Council, which had originally been granted funding as a successful application for a European Research Council Consolidator Grant.

I owe thanks to a great many friends and colleagues who have inspired and helped me over recent years, and I cannot hope to name them all. However, I must single out the peer reviewers and the colleagues who read parts of the present manuscript, for whose kind attention to detail I am very grateful, especially Torsten Meissner, Philip Boyes, Sarah Finlayson, Colton Siegmund, Jordan Miller and Theo Nash. I gladly take responsibility for any remaining errors or suspect theories found here. It is also important to emphasise that this book would not be what it is if it were not for the CREWS project and the many people who took part in it, both the core research team (Philip Boyes, Natalia Elvira Astoreca and Rob Crellin) and the wider CREWS family, comprising many colleagues who spent periods visiting the project and/or participated in our conferences and other events. One of those was Pico Rickleton, who first inspired me to work on the concept of vitality in writing traditions, through his art project imagining a modern survival of Cypriot syllabic writing. Where my research intersects with work on modern writing traditions, particularly those under threat or associated with minority or indigenous languages, I owe particular thanks to Tim Brookes for many inspiring conversations, as well as to everyone who has become involved in the Endangered Writing Network I have set up under the aegis of the VIEWS project.

This book also represents the culmination of the series of CREWS open access volumes published with Oxbow Books, whose editorial team have been friendly, efficient, helpful and understanding at every turn. I especially want to thank Julie Gardiner, Mette Bundgaard, Jess Hawxwell, Declan Ingram and Felicity Goldsack,

and everyone at the press for their help and kindness: they have been a pleasure to work with.

Finally, some personal thanks. I owe my mum so much that I can hardly do it justice in words: she has been there for me all my life and loved and supported me through everything I have been through, good and bad – and she is always there to discuss my ideas, which has been a very considerable contribution to the writing of this book. I also have to thank my partner, James, for his endless love and kindness, for helping me to work and helping me to rest, and for all the cuddles. But the book is dedicated to my gorgeous little baby, still growing inside me as I type this, who may never realise quite how much difference he has made to this research by making his mummy so much happier than she has ever been before.

List of tables and figures

Introduction

Exploring Writing Systems and Practices in the Bronze Age Aegean is intended to do just what the title indicates – to explore particular problems in the study of the Bronze Age Aegean scripts via a combination of system-based and context-based approaches. The book grew out of research conducted during my time as Principal Investigator of the Contexts of and Relations between Early Writing Systems (CREWS) project, whose remit underpins the theoretical approaches taken here. The final stages of manuscript revision were, however, completed just after the CREWS project ended, when I had begun to act as PI for the new Visual Interactions in Early Writing Systems (VIEWS) project. It may at times be obvious how some of the concerns related to this subsequent project, particularly in relation to visual features and visibility of writing, grew out of what was essentially CREWS research.

I would like to mention at the outset that this book was largely worked on during the COVID-19 pandemic and the complications that ensued, which for me involved health issues, caring responsibilities and the impossibility of travelling abroad for research purposes – so my plan to spend a period in Greece consulting the Minoan and Mycenaean archives by autopsy unfortunately had to be abandoned. I decided in the end that a planned chapter on palaeographic developments in Linear A and B (which would have followed up on some methodological observations published during the pandemic[1]) would have to be omitted, even though I had assembled rather a lot of data (with thanks to the many colleagues who shared photographs and gave access to RTI images) and had begun to work on some initial results. Without direct access to the clay documents under study, I simply could not accomplish the kinds of analysis I wanted to, which would have involved looking closely at sign shapes and the material properties of the styli used to make them, in order to understand better how stylus use changed over time across the Minoan and Mycenaean worlds, with implications for the ways in which writing practices spread. I will not make any great claims to what I might have discovered, and I hope to pick up these themes in future research one day, when time and circumstances allow.

The three chapters that remain have three separate areas of focus. Chapter 1 looks at the concept of script adoption, concentrating on the development of the syllabographic repertoire of Linear B from the pre-existing Linear A writing system. Chapter 2 then explores logographic writing, and highlights the very different ways in which logography is employed in each of the Bronze Age Aegean scripts. Finally, Chapter 3 focuses on what I have labelled as the concept of 'vitality', considering what

[1] Steele 2020.

factors underpinned the success and the eventual loss of the writing traditions of the Bronze Age Aegean, with a long excursus on the related Cypriot scripts as an important source of comparanda. It was not intentional that each chapter is considerably longer than the previous one, but this structure perhaps reflects the way in which my views of writing developments build over the course of the book. The last chapter includes an epilogue pointing towards what I hope will be relevant uses in the modern day for some of the observations arising from this ancient world research.

Cretan Hieroglyphic, Linear A and Linear B (and their Cypriot cousins)

I will begin with a brief introduction to the main three writing systems under focus in this book: Cretan Hieroglyphic, Linear A and Linear B. It is also worth mentioning the related writing systems of Cyprus, which will sometimes deserve mention in the context of themes discussed here, and occasionally a whole section of their own (as in Chapter 3: Exploring Vitality, where a discussion of Cypriot syllabic writing proves a very helpful comparison for the fate of writing in the Aegean).

There is a huge disparity in the state of attestation of each system: very roughly, there are around 6,000 Linear B inscriptions, with some 70,000 signs, but only around 1,500 Linear A inscriptions, with 8,000 signs, and fewer than 400 inscriptions in Cretan Hieroglyphic, with just 1,500 signs.[2] It hardly needs saying that this makes it comparatively very difficult to reach the level of nuanced interpretation of surviving Linear A and Cretan Hieroglyphic epigraphy that is possible for Linear B – and it also makes it quite tempting to read what we know about Linear B and its context of use backwards onto the other systems. As we will see, sometimes this works (for instance when using Linear B sign values to help reconstruct those of Linear A; see Chapter 1: Exploring Script Adoption) and sometimes it doesn't (for instance in the assumptions often made about how logograms work in each system; see Chapter 2: Exploring Logography).

The earliest examples of writing on Crete are sometimes grouped as the Archanes Script, the earliest seal-based writing, appearing on seals from the end of the 3rd or beginning of the 2nd millennium BCE, possibly related to the inception of what we call Cretan Hieroglyphic. Cretan Hieroglyphic writing then emerged in the first century or two of the 2nd millennium BCE, first appearing on seals before quickly being adapted to writing directly on clay for administrative purposes. Meanwhile, Linear A heavily overlapped with Cretan Hieroglyphic in its first periods of use, albeit with a quite different visual appearance (which led to the hieroglyphic vs. linear terminology introduced by Arthur Evans) and typically at different sites; it was not used on seals, but clay became its main attested medium of use in administration,

[2] I borrow here the estimates of Perna 2014, 253. For Cretan Hieroglyphic, the problem of counting inscriptions has been exacerbated by scholarly disagreement as to what counts as a script sign – and so what counts as an inscription – and a reanalysis of the corpus is much needed on this basis: see Jasink 2009; Decorte 2017, 2018c; Ferrara, Montecchi and Valério 2023.

with inscriptions also appearing on a range of other objects. These are the writing traditions of what has usually been characterised as the Minoan period. Neither Cretan Hieroglyphic nor Linear A has been deciphered, in the sense that we do not understand the language(s) in which they are written, but some progress can be made in reconstructing sign values. It was in the mid-2nd millennium BCE that Linear B first appeared, clearly derived directly from Linear A but used to write Greek, heralding what is usually termed the Mycenaean period. Writing progressively spread outside Crete, with Linear A making appearances (in very small numbers of finds) on several Greek islands as well as the mainland, while Linear B writing was used and is well attested across a number of mainland sites, particularly across the Peloponnese, and appears as far north as Thessaly.

Over in Cyprus, writing first appeared at around the same time as the later phase of writing in Linear A, in the 16th century BCE (the first phase of the Cypriot Late Bronze Age). The new system is labelled Cypro-Minoan and was used continuously through to the Early Iron Age. Around the turn of the millennium, Greek began to appear, and throughout most of the 1st millennium BCE Greek and one or two other local languages were written in what is usually termed the Cypriot syllabic script, a descendant of Cypro-Minoan.

Chronology

The dates of objects and features referred to in this book are given either with an approximate absolute date or with a reference to the relevant ceramic phase (thus a relative rather than absolute date). The issue of chronology does not affect the arguments presented in any significant way, and readers who wish to follow up on the many questions surrounding the way in which dates have traditionally been assigned, and the ongoing debate over 'high' or 'low' dating for the ceramic phases, may look elsewhere for instructive guides.[3] The following encapsulates a fairly typical division of the main periods in question (*i.e.* the ones relevant to writing), following the model of high dating:

Crete

Proto-palatial period: MM II (1900–1800), MM III (1800–1700): Cretan Hieroglyphic and Linear A.

Neo-palatial period: LM IA (1700–1600), LM IB (1600–1450): Linear A.

[3] Shelmderdine 2008 is particularly helpful. On high dating, see the seminal treatment of Warren and Hankey 1989. On further issues related to low dating, see Manning 2010 and some of the papers in Manning and Bruce 2009. On the specific issue of site destructions across the Aegean world and our ability to reconstruct how they relate to each other, see recently the papers in Jung and Kardamaki (2022). Schoep in prep gives an enlightening discussion of the ramifications of different approaches to archaeological dating and phases for our understanding of the epigraphic record.

Final palatial period: LM II (1450–1400), LM IIIA 1 (1400–1375): Last examples of Linear A? Linear B emerging in later phase.
Post-palatial period: LM IIIA 2 (1375–1300), LM IIIB (1300–1200), LM IIIC (1200–1050): Linear B only in first two phases.

Mainland Greece

Early Mycenaean period: LH I (1700–1600), LH IIA (1600–1450), LH IIB (1450–1400): Small amount of evidence for Linear A in earliest phase.
Late Mycenaean period: LH IIIA 1 (1400–1375), LH IIIA 2 (1375–1300), LH IIIB (1300–1200), LH IIIC (1200–1050): Linear B up to the beginning of the final phase.

Theoretical perspectives and terminology

The direction this book eventually took was strongly influenced by the overall research remit of the CREWS project, particularly as time went on and the various case studies at the heart of the project matured and developed new areas of interest. As the project's title makes clear, there were two primary items on the agenda from the beginning: contexts and relations. Contexts came to encompass a range of different types of context, and to depend on seeing writing as far more than a way of encoding language: it became clear that it is important to view writing also as an embodied and socially embedded practice, bound up with other social practices and involving material resources, technical equipment, physical locations, visibility to a range of audiences, sociolinguistic backgrounds and cultural attitudes about what writing might be used for and who ought to be involved in it. Relations, meanwhile, refers to how we visualise the ways in which writing systems are related to each other. Although it is quite common to try to capture relationships by placing writing systems on a family tree and seeing them as mothers, daughters, sisters and cousins, any close look at the relationship between any two systems will inevitably throw up a number of complexities that spoil such a picture. As I have tried to argue elsewhere, modelling writing relationships along the lines of the linguistic *Stammbaumtheorie* ('family tree model') is overly simplistic, and we would be better placed to think in terms of 'graphic contact' between communities passing on aspects of their writing traditions (which may go beyond the basic notation systems to encompass, for example, visual inspirations or aspects of practice).[4]

Here we meet two possible ways of looking at writing, one of which is associated more with linguistic research and the other more with archaeological or anthropological research – and I will point out from the beginning that they are not mutually exclusive even if there is sometimes a desire in certain scholarship to make them appear so.[5] Firstly, we can talk about writing systems from a structuralist perspective, which

[4] Steele forthcoming a (specifically looking at the Greek alphabets and Cypriot syllabic writing). See also Steele and Boyes forthcoming on the adoption of cuneiform techniques by Cypriot writers, for example.
[5] For a more detailed review, see Boyes, Steele and Elvira Astoreca 2021.

typically casts them as encoding systems subservient to language, following the line of thinking of early scholars such as de Saussure.[6] If structuralist approaches to writing have started to acquire a bad name, it is perhaps because Gelb's seminal study of what he called 'grammatology' (the first major iteration of a study of writing systems) is associated with some very outdated thinking and rather a lot of cultural baggage in the quest to present alphabetic writing in the Greco–Roman tradition as a pinnacle of human achievement.[7] To him we owe unhelpful and long-lasting ideas about the unidirectional 'evolution' of writing systems from pictographic to syllabic to alphabetic, and thus the intellectual sidelining of non-alphabetic systems (and even more so the many communicative systems that lie around the edges of what is usually classed as 'proper' writing). But these were nevertheless the foundations of a great deal of ongoing linguistic research on writing, which has come a long way to lose these unwanted associations with cultural supremacy, and other problematic aspects of early theories, in order to focus on the specifics of language encoding and notation systems. A review of the current state of the literature and the various recent developments in grapholinguistics and graphematics would go far beyond the scope of the present book; however, I will point out that some of the case studies arising from CREWS research, specifically by Elvira Astoreca and Crellin, are themselves important examples of the advancement of this general field.[8] It remains to say that these approaches to writing have given us a range of useful ways of categorising script signs and grapholinguistic systems, to which this book inevitably owes a debt (and we will return to the terminology adopted here shortly).

Standing on the other side is an approach that views writing as a practice, and that focuses on its social context and the agency of people and things involved. While materiality-based studies of inscribed objects have been gaining traction for some time now, wider perspectives are still fairly new and are finding their feet in terms of the range of possible areas of investigation (bearing in mind, of course, that it can be difficult to reconstruct practices and social contexts in the ancient world, depending on the state of preservation of the archaeological record in any given case). This is again an area where CREWS research has made progress and led to theoretical advancements, and Boyes has argued for an archaeology of writing that uses agency-based and relational approaches to writing in its social context (for example, seeing the practice of writing as enmeshed and entangled with a whole range of other practices and attitudes).[9] While the considerable benefits of these perspectives are clear, I want to return to my earlier point that they do not

[6] *E.g.* de Saussure 1983 [1916], 24.
[7] Gelb 1969 [1952].
[8] Elvira Astoreca 2021 (a graphematic approach to the Greek alphabets); Crellin 2022 (word notation and conceptualisation in a range of writing systems); Crellin and Tamponi 2020 (vowel notation in Neo-Punic).
[9] Boyes 2021a (on the application of these approaches to the case study of writing at Ugarit), 2021b (on the theory and methods). Also Boyes 2022 (on social diversity in Ugaritian writing practices); Steele 2020 (on the agency of the stylus in Aegean and Cypriot writing); Steele and Boyes 2023 (on materiality and the interactions between Cypriot writing and cuneiform).

need to be seen as incompatible with more structuralist views of writing. There are several disciplinary areas that bring together both structuralist and practice-based approaches, for example in cognitive studies that increasingly emphasise not only the cognitive system behind the mapping of graphic features onto linguistic ones, but also the way in which the brain is trained and changes as it responds to the materiality of practised writing and the embodied techniques associated with it.[10] The study of palaeography in the Bronze Age Aegean, particularly in the case of Linear B, is also an excellent case in joined-up thinking: studies of the writing system repertoire and variation in sign shapes have been associated not only with material concerns, but have also formed the basis for the identification of individual 'hands' (*i.e.* writers), and when combined with close study of the content and find spots of the documents they wrote, this allows some very fine-tuned observation of the roles and movements of individuals involved in Mycenaean administration.[11]

In applying such a range of approaches to the research in the present book, it was necessary to make some initial decisions as to how particular concepts related to writing would be referred to. The choices do not reflect any great adherence to particular viewpoints, but it may be helpful to the reader if I end this brief introductory chapter by explaining what is intended by certain terms. The main terms of interest throughout the book can be grouped as follows:[12]

Writing systems and scripts

Overall, the terms **writing system** and **script** are used quite interchangeably here. This is not to ignore the valid points made by recent scholars that graphematic approaches to writing, which encourage different definitions of the two terms, can be helpful when thinking about how writing functions at different levels. For example, in her CREWS research, Elvira Astoreca uses a graphematic approach to demonstrate that the regional alphabets of Archaic Greece functioned as independent writing systems;[13] meanwhile, Salgarella uses the separation of the two terms to argue that while Linear A and B may be thought of as distinct writing systems, they shared the same script (*i.e.* the core of syllabographic signs).[14] However, on balance, the distinction seemed less useful to the central discussions of this book, which focus instead on the fine-grained details of how particular features work (*e.g.* logography) as well as much wider views of writing and its context (*e.g.* script adoption and the vitality of writing).

Units of writing systems

There are many sets of terminology applied to the units of writing systems, and individual grapholinguistic scholars will often settle on a set of variant terms that

[10] *E.g.* Overmann 2021, which builds on cognitive studies of materiality (*e.g.* Malafouris 2004, 2013).
[11] See Palaima 2011 for an overview.
[12] Terms that will be explained later, such as 'vitality' (Chapter 3), are omitted here.
[13] Elvira Astoreca 2021.
[14] Salgarella 2020.

suit their particular argumentation, without too much regard for their universal acceptance. It is impossible to talk about such units without using some terminology that may be agreeable to some but disagreeable to others, so I am largely using quite basic terms that are not intended to be especially controversial.[15] For an individual unit of a writing system, I generally use the term '**sign**' and occasionally the term '**grapheme**'. For a writing system that expresses sound units, its signs can be referred to as **phonographic**, which can be broken into two types: correspondences between signs and individual phonemes (*i.e.* the individual sound building blocks of a given language: **phonemographic**) and correspondences between signs and whole syllables (*i.e.* units typically comprised of consonant-vowel-consonant, vowel-consonant, consonant-vowel: **syllabographic**).[16] In systems containing signs that represent whole words or concepts, I am consistently using the term '**logographic**' to refer to such signs, though not without awareness of some potential problems – but since one of the points of this book is to problematise the whole concept of logography (on which see the discussion in Chapter 2: Exploring Logography for more detailed discussion), I think it is more helpful to settle on a single, relatively neutral term here. I generally avoid the term 'pictogram'; where a sign bears a close visual relationship with a thing depicted (whether it is a logographic sign representing the word for it directly or a syllabographic sign that perhaps takes its syllabic value from the word for it), I usually use the term '**iconicity**' to denote this aspect.

Another term that could cause some confusion is '**orthography**', by which in general I mean the system of spelling and the way in which arrangements of syllabographic signs (for these particular systems) are used to represent features of language – an issue that comes up primarily where there are difficulties such as the representation of consonant clusters and word-final consonants in a system where all signs have values ending in a vowel (vowel-only or consonant-vowel, rarely consonant-consonant-vowel). But the term orthography has another specific usage in the field of modern writing system developments: when a pre-existing writing system is adopted for the use of a new language, the new product will typically be referred to as an orthography of the pre-existing system. This issue will come up in Chapter 1: Exploring Script Adoption, where I hope the context will ensure clarity.

Writing traditions and practices

A term that will come up frequently is '**writing tradition**'. While this is hardly a new coinage, I do mean something quite specific by this term, namely a whole set of

[15] Fortunately in this book on syllabic systems we do not need to engage with the alphabet vs. abjad debate, but I will briefly mention that I have argued for seeing such systems as encoding language on exactly the same level (thus making alphabet the more useful catch-all term): Boyes and Steele 2019.

[16] It is perhaps worth pointing out that phonemographic scripts are rarely fully phonemographic (for instance they may contravene the phonemic principle by having signs for consonant clusters or by underrepresenting parts of the phonological repertoire of the language), and that syllables can also, obviously, have consonant clusters in onset and/or coda (depending on the syllabification rules of the language).

features and aspects that encompass the way writing is practised in a given society or community, at a given time. The writing system itself is an important part of that, both the repertoire of signs and the way they are applied to a given language (or multiple languages). But the writing tradition also encompasses the domains of writing (*i.e.* what writing is used for), the materials and equipment used for it, the cultural attitudes to writing, its social visibility (a term that will be discussed in Chapter 3: Exploring Vitality) and potentially a range of other factors related to the way it is practised, when, where and by whom. The tradition need not be static and may change over time. In this way I hope that the term 'writing tradition' is a useful way of expressing writing as a combination of system and practice.

Social contexts of writing

More neutral terminology is generally preferred also when talking about aspects of the social context of writing. For example, the word '**writers**' is used in preference to the traditional but loaded term 'scribes', for many of the same reasons cited by Boyes in his CREWS monograph on Ugaritic writing:[17] writers in the Bronze Age Aegean world may have come from a range of backgrounds, and many of the best-attested ones will have been administrators in some sense (as we will see), but to call their activities scribal would be to recall many associations from the wider ancient Mediterranean and its surroundings that are probably not valid in this case (*e.g.* writing as a profession rather than incidental to a person's other professional activities). On a similar basis, the term '**administrative centre**' is preferred over 'palace' because of the varied nature of places where administrative archives are found – though this is not intended to detract from the clear association of many of these places with elite activities. The term '**elite**' could itself be seen as loaded or problematic, but I use it in the general sense of people who may benefit from the accrual of wealth, resources and power, whose imprint on the world of writing may at times be quite considerable (perhaps most obvious in Chapter 3: Exploring Vitality). Finally, on matters of gender, which are not discussed in any detail in this book, I again adopt a position of neutrality, and it is not unreasonable to suppose that writing took place across a spectrum of different genders in different cases.

Exploration

A final concern is what is intended by the word 'exploring' in the title of this book. I chose this word, over other terms, such as 'analysing' or 'interpreting', to convey the idea that the theoretical remit is deliberately expansive. In this spirit, the emphasis is usually on understanding complexity rather than narrowing down to single interpretations – even if it is occasionally unavoidable to take a stance on a particular issue (such as the applicability of Linear B sign values to Linear A, or the degree to

[17] Boyes 2021a, 19–22.

which writing was restricted in the Mycenaean world, both questions that will be explored in some detail). I hope that this research has brought some interesting and perhaps unusual perspectives into conversation with each other, particularly showing the mutual relevance of the study of writing in the ancient world and the study of writing in the modern day. The latter involves a number of concerns that are not usually encapsulated in ancient world research, where developments are historical and therefore appear as a series of 'facts' and 'snapshots': for instance, ongoing developments and attitudes as writing systems are adopted for new languages, or the problem of creating or maintaining a writing tradition for an underrepresented indigenous, minority and/or endangered language. I will leave it to the reader to decide whether these approaches have been effective or useful.

Chapter 1

Exploring script adoption

The main focus of this chapter will be the development of the Linear B syllabographic repertoire from a Linear A template,[1] a process that has attracted much discussion over the years. Despite the doubts of many scholars, extensive study of the repertoires used in each writing tradition shows that it is valid to apply the values of Linear B signs to Linear A, as will be discussed below. The idea that there might have been an extensive restructuring of the Linear A syllabary in the creation of Linear B, as suggested by a range of scholars over the years (even Ventris and Chadwick wondered whether there had been a 'wholescale reshuffling process'[2]), is not only unnecessarily cautious, but also out of step with the evidence we have.[3] The number of shared sign shapes in Linear A and B, the evidence for shared values in individual cases and the implications of statistical distributions will all play a role in confirming that the syllabographic repertoire of Linear A was borrowed with its values intact in the creation of Linear B. This will then allow us to look more closely at the process of adoption and to try to understand how it took place and in what context.

It is important to point out from the beginning that this chapter focuses only on the syllabographic, and not the logographic, repertoire. While the demonstrable overlap between the Linear A and B syllabaries is very considerable (something like a 72% match on the signs about which we can be certain,[4] or higher if we focus on the core syllabary), it is also striking that Linear B does not appear to inherit most of its logographic repertoire from Linear A. It has been suggested that as many as 80% of the logographic signs of Linear A were abandoned in the creation of Linear B, with a series of signs for wool and textiles representing one of the most notable exceptions (pointing also towards continuity in this technological sphere).[5] Meanwhile, Linear B appears to have created a large set of new logographic signs covering numerous

[1] It would be premature to try to discuss the relationship between Cretan Hieroglyphic and Linear A, since it is not at all clear that the latter developed directly from the former and we lack significant amounts of evidence for the important periods when these scripts emerged. The Cypriot scripts will provide some interesting comparanda but will not be discussed in detail as script adoptions here (see Steele 2018, chapters 1 and 2, for further thoughts on these issues).

[2] Ventris and Chadwick 1973, 39.

[3] *E.g.* Olivier 1975.

[4] Steele and Meißner 2017, 95–96.

[5] Nosch 2016; Nosch and Weilhartner forthcoming.

industries and commodity types: in part these changes may be administrative, though some may be more language driven (*e.g.* where a logographic sign was originally used with reference to a Minoan word that may not have continued to be used in Greek[6]). Although the state of preservation of Linear A makes it difficult to know how accurate our assessments of the percentage of adopted or created signs are, a greater problem is the way in which logography works in each system; Chapter 2: Exploring Logography, will consider these issues in much more detail. For the purposes of the present chapter, logographic writing will largely be set aside in order to concentrate on the syllabographic repertoire, which also allows us to draw comparisons with the ways in which sets of phonographic signs have been borrowed and adapted in other writing systems.

While the adoption or development of ancient writing systems are never helpfully described by their users, the modern world can offer some useful parallels. There are numerous documented cases of unwritten languages acquiring a written form by developing an orthography in a pre-existing writing system,[7] whether devised by the speaker community themselves or, as is more often the case, by linguists or missionaries working with the community to give their language written representation.[8] Sometimes these will be minority or endangered languages, but sometimes they will be widely spoken languages with high vitality that are minoritised by popular or state preference for other languages that therefore become regionally (or supra-regionally) dominant from a social or political perspective. The adaptation of any writing system to a new language will present problems because each language has its own phonological repertoire, which may or may not be well represented by the writing system being adapted to its use. Typically the new system will be referred to as an orthography of the old system, rather than a new system in its own right, which brings us to some interesting questions surrounding the shared use of a core set of signs by more than one language – Salgarella, for instance, has argued strongly that Linear B used the same script as Linear A,[9] *i.e.* its core set of syllabographic signs and their values, while other elements of the wider system (such as the metrical signs or the way logograms are used) could differ much more substantially. Is Linear B simply an orthography of Linear A used to write Greek rather than Minoan language then, and if so, how and why was it devised? These are questions we will return to.

The development of orthographies for unwritten languages (sometimes referred to as graphisation) in the modern world very often takes the Roman alphabet

[6] There are, however, some examples that do point towards continuing use of Minoan terminology in some form, such as the MA+RU compound sign for 'wool' used in both scripts.

[7] See recently Gnanadesikan 2021.

[8] On the issues of writing development for previously unwritten languages, see recently Shah and Brenzinger 2021 and the papers in Jones and Mooney 2017. In the case of missionaries, developing an orthography has usually been seen as a step towards making it possible for the community to read the Christian Bible in their own language.

[9] *E.g.* Salgarella 2020, 374, where she proposes using the term the Aegean Linear Script for both Linear A and Linear B.

as a starting point, especially when the orthography is devised by linguists or missionaries – though some languages may have orthographies developed in other majority systems, such as Devanagari or Arabic, depending largely on the wider cultural context. There are even some languages whose written forms differ depending on the cultural setting, such as Afar in eastern Africa, which is written in Ge'ez in Ethiopia, in the Roman alphabet in Eritrea and in the Arabic alphabet in Djibouti, despite being seen broadly as a single language. We might compare the use of the Cyrillic or Roman alphabets for closely related languages in the Balkans, or indeed the different orthographies associated with closely related Scandinavian languages. For some communities, these choices are affected by an element of identity, for instance showing that a local language is 'real' by giving it the same sort of appearance as nearby majority languages, such as English, Spanish, Hindi or Arabic. But for others the writing system of a nearby majority language may carry associations of cultural hegemony, colonialism or hostility, making it favourable to choose a different existing system or even to develop a completely new system. Several newly invented writing systems in Africa have followed such a path, for instance, and in North America the Cherokee and Cree syllabaries are good examples of systems that are, wholly or partly, deliberately visually distinctive. Mixed visual and structural inspirations are also possible: consider the combination of wedge-shaped signs with the structure of the linear alphabet to produce alphabetic cuneiform in ancient Ugarit,[10] or the combination of sign shapes inspired by local traditions of ceremonial scarring with the structure of the Roman alphabet in the creation of the Naasioi Otomaung script in Bougainville,[11] to give just two examples.

Shah and Brenzinger have drawn up a list of six possible factors that may affect the process of developing a writing system or orthography for a previously unwritten language, based on observations of modern systems but with applicability too for pre-modern systems:[12]

1. Governmental, administrative and legal policies, obligations and restrictions, which must be considered when working on community-driven (bottom-up or grassroots) projects. For example, in Ghana all writing systems have to use the national orthographical conventions.
2. Cultural or religious traditions, including ease of access to earlier written materials, such as pre-Conquest Central American manuscripts, visual appearance (*i.e.* symbolic meaning of individual graphemes), the values attached to a script or typeface (*e.g.* the close relationship between Arabic script and Islam).
3. Linguistic factors, including sound-grapheme or meaning-grapheme correspondence (according to the script type), or how to decide where word breaks come.

[10] Boyes 2021, 68–78.
[11] Kelly 2021.
[12] Shah and Brenzinger 2021, 230. For a similar discussion of factors important in orthography development, see Cahill and Karan 2008.

4. Educational and social factors, including literacy issues and ease of learning, access to the learning of additional language.
5. Sociolinguistic aspects, including language ideologies, attitudes, how to choose the 'standard' variety and its applicability to other varieties of the language in question.
6. The need for and importance of written language documentation for the community.

These factors are, or should be, also of interest when looking back towards script creation in the ancient world, boiling down to the following main concerns:

1. Political or administrative control over writing and/or the purposes for which it is used.
2. The cultural context of writing, its visibility and any cultural values attached to it.
3. The relationship between a language's features and features of the writing system (especially sign values, but also extending to orthographic features).
4. Education, literacy and the means by which the writing system is disseminated.
5. Sociolinguistic factors related to the choice of language variety to be written.
6. The perceived need for writing.

In discussions of Linear A and B, it is particularly point 3 that has attracted the most interest, since the alleged 'suitability' of a given set of writing features to a language raises questions not only about the choices made in the adaptation of Linear B, but also about the underlying structure of the Minoan language written in Linear A – which remains undeciphered in as much as we cannot identify its linguistic affiliations, nor interpret the majority of sequences written in it.[13] Suitability is in any case a very subjective property of a writing system, since a high degree of phonemic representation is only one aspect of potential significance, while the degree to which it is practical and functional in given contexts of use could be perceived as more important to users.[14] It is also important to consider the degree to which a writing tradition has become standardised, as it can be anachronistic to project ideas of standardised spelling back onto traditions of the ancient world: for Linear B, we can reconstruct a situation where training seems to have concentrated on ways of spelling phonological sequences rather than standard spelling for certain words or even morphological features, for example.[15] Phonemic underrepresentation and overrepresentation are in fact very common in writing systems across the world, and do not tend to be the sole factor responsible for the success or otherwise of a writing tradition, even though they are often perceived as having some effect on the system's usability by its own language's speakers. This means that it is important to

[13] On these problems, see Stephens and Justeson 1978.
[14] See Consani 2016 on Linear B.
[15] Judson 2022.

look beyond purely linguistic concerns to understand the choices made during and following the adoption of a writing system for a new language.

Focusing specifically on the development of what we call Linear B from Linear A, there will of course be several aspects we cannot reconstruct easily: we do not even know what words these early writers may have used for their writing system(s), nor do we have any direct accounts relating to their attitudes towards writing. But there is much more we can do to understand issues such as sociolinguistic, cultural and educational factors, and from there we may be able to draw some important observations about the cultural and social contexts of writing. It is also important to bear in mind what Blommaert has referred to as 'economies of literacy', that is the different kinds of usage and status that writing can acquire in different social situations; when transposing one kind of writing to a different situation, fundamental inequalities will arise that affect the performance and the reception of the writing.[16] This raises some particularly important questions not only about the differences between Minoan and Mycenaean attitudes to writing and literacy (which will be an important topic for Chapter 3: Exploring Vitality), but also what happened at the crucial juncture when the Greek language first came to be written in a sphere that was or had been dominated by Minoan language and, presumably, Minoan cultural attitudes.

We will begin by considering what we know about the relationship between Linear A and B, in order to establish the basis on which we can draw further conclusions about the nature of the transition from one to the other, followed by an excursus on the importance of such findings for our knowledge of Minoan language.

How do we know that Linear B adopted Linear A syllabographic sign values with little change?

In order to make progress with understanding the development of Linear B from Linear A, it is first important to establish why we think that many of the syllabographic sign values were carried over from one to the other, at least approximately. Rather than revisiting the doubts expressed by a number of scholars, as mentioned at the beginning of this chapter, we can make the best progress by focusing on the positive evidence for continuation of sign values. The following comments largely follow an earlier article I published in conjunction with Torsten Meißner that treats the main reasons for assuming we can project Linear B values backwards onto Linear A,[17] namely:

1) Around 64 out of 89 Linear B syllabographic signs have very strong formal correspondences with Linear A signs, going beyond the bounds of chance similarity,

[16] Blommaert 2004.

[17] Steele and Meißner 2017. The original article can be consulted for further detail on each point.

giving a 72% shared identity, which is comparable also with well-established script adoptions (such as the Latin alphabet from the Greek alphabet). If we concentrate on the core syllabary, by which I mean the main set of V (vowel-only) or CV (consonant-vowel) signs excluding ones that provide optional spelling alternatives in Linear B, then this percentage rises to 86% (51 out of 59).

A note of caution is necessary on the concept of the 'core syllabary'. In Linear B we are justified in thinking in terms of 'core' signs and 'extra' signs because we can show that the extra signs provide alternative options for spelling words, sometimes motivated by a desire to convey a more specific sound sequence (*e.g.* a_2 in favour of *a* to show the presence of the otherwise unwritten aspirate /h/) or perhaps to save space by expressing a consonant cluster in a single sign where it might otherwise be spelt out (*e.g. nwa* for *nu-wa* in words such as *pe-ru-si-nwa*, using four signs rather than five).[18] The Linear B sign grid is laid out in Table 1.1, divided into sections for the core syllabary, the extra signs and the still-undeciphered signs: while the still-undeciphered signs are a category only relevant to a modern viewpoint (owing to our inability to reconstruct their values), the concepts of obligatory 'core' signs and optional 'extra' signs must certainly have had relevance for the writers of Linear B documents, as we can tell from their orthographic choices. But in Linear A we do not have any evidence to point towards a similar situation, and in fact it is often assumed that some of the Linear B extra signs were motivated by the existence of Linear A signs that were phonologically odd-looking in a Greek-language setting (such as labialised consonants that might be reinterpreted as consonant clusters, perhaps). This may even have prompted the creation of new signs along the same lines, for example Linear B *dwo* (which has no Linear A precedent), created from two *wo* signs facing each other and so accomplishing a Greek pun (*dwo* being the word for the number 'two'), developed on the template of pre-existing signs inherited from Linear A that contain a consonant + *w*, such as *nwa*.[19] When isolating the core syllabary, in essence we are viewing the situation from the Mycenaean Greek side; however, there is value in looking at it this way, because in assessing the adoption of the Minoan Linear A script by Greek speakers, Greek is inevitably the target language and the one that will have dictated which signs were adopted and with what values.

2) Linear B shares a number of syllabographic sign shapes and values with the Cypriot syllabic script used during the 1st millennium BCE to write the Cypriot dialect of Greek, a point already clear to the early decipherers of Linear B and the scholars who preceded them: this is one factor that allowed Michael Ventris to place certain sign values on his grid as his attempt to identify the language of Linear B progressed.

[18] On these broad issues, see Judson 2017b, 2020a, 2022.
[19] See Meißner and Steele 2017, 109–111.

Table 1.1. The Linear B syllabary, separated into its core set of syllabographic signs, the 'extra' signs (those that offer options for orthographic variants) and the untransliterated signs (those still considered by most to be undeciphered). Signs drawn by Rupert Thompson. Only one variant of any sign is given here.

Linear B Core Syllabary														
a		**08*	*e*		**38*	*i*		**28*	*o*		**61*	*u*		**10*
da		**01*	*de*		**45*	*di*		**07*	*do*		**14*	*du*		**51*
ja		**57*	*je*		**46*				*jo*		**36*	*ju*		**65*
ka		**77*	*ke*		**44*	*ki*		**67*	*ko*		**70*	*ku*		**81*
ma		**80*	*me*		**13*	*mi*		**73*	*mo*		**15*	*mu*		**23*
na		**06*	*ne*		**24*	*ni*		**30*	*no*		**52*	*nu*		**55*
pa		**03*	*pe*		**72*	*pi*		**39*	*po*		**11*	*pu*		**50*
qa		**16*	*qe*		**78*	*qi*		**21*	*qo*		**32*			
ra		**60*	*re*		**27*	*ri*		**53*	*ro*		**02*	*ru*		**26*
sa		**31*	*se*		**09*	*si*		**41*	*so*		**12*	*su*		**58*
ta		**59*	*te*		**04*	*ti*		**37*	*to*		**05*	*tu*		**69*
wa		**54*	*we*		**75*	*wi*		**40*	*wo*		**42*			
za		**17*	*ze*		**74*				*zo*		**20*			
'Extra' signs														
a_2		**25*	a_3		**43*	*au*		**85*	*dwe*		**71*	*dwo*		**90*
nwa		**48*	*pte*		**62*	pu_2		**29*	ra_2		**76*	ra_3		**33*
ro_2		**68*	ta_2		**66*	*twe*		**87*	*two*		**91*			
Untransliterated signs														
**18*			**19*			**22*			**34*			**47*		
**49*			**56*			**63*			**64*			**79*		
**82*			**83*			**86*									

Crucially, these sign correspondences are not direct and have to have been passed on through Linear A, since the chronology makes it impossible that the Cypriot syllabic script as used for Greek was developed directly from Linear B:[20] writing first appeared in Cyprus in the earliest phase of the Late Bronze Age, probably more than 100 years before Linear B was developed, making it an independent development directly from Linear A.[21] This makes the shapes and values of Cypriot syllabic signs more helpful in an attempt to reconstruct the values of Linear A signs, since they give confirmation via a separate route of development from that of Linear B – particularly in the case of a small number of signs whose shapes and values are very close.

The peculiar circumstances of syllabic writing in Cyprus through the Bronze and Iron Ages were such that there was a high level of palaeographic variation and change, meaning that for many of the other sign values we are left to piece together a number of palaeographic puzzles in order to try to understand the precise relationship between Linear A and Cypro-Minoan, and how that then resulted in the repertoire of Cypriot syllabic writing during the 1st millennium BCE. It is also worth noting that some of the puzzles are very difficult to resolve even in relation to the well-established correspondences: for example, why does the Cypriot syllabary distinguish between /r/ and /l/ while Linear B does not (and did Linear A and/or Cypro-Minoan have this feature?), and how is it that the *ta* sign in the Cypriot syllabary is related to the Linear B *da* sign (belonging to the d-series, which distinguishes voicing), while *ti* and *to* relate to Linear B *ti* and *to* (from the t-series, unvoiced)?[22] Nevertheless, the Cypriot syllabic values of comparable signs allow us to reconstruct a number of approximate values for Linear A signs that align with those of Linear B – at least 10 or 11 signs, and perhaps more depending on how far you are prepared to accept palaeographical arguments for further correspondences.

3) There are numerous sign sequences attested in both Linear A and Linear B, many of which stand a good chance of representing the same word (with perhaps minor variation due to *e.g.* morphological differences). The odds of a real correspondence are increased in particular where the word has three or preferably four or more shared signs, where the Linear B attestation is from Knossos (particularly in the case of personal names) and where Cretan toponyms are recorded (of which there are perhaps as many as six attested in both scripts). In the case of personal names, a trend whereby Linear A names appear to end in *-u* and corresponding Linear B names in *-o* further suggests regular morphological correspondences and cases where Minoan morphology was adapted to Greek paradigms (namely the o-stems in these

[20] On these issues and on the development of the Cypro-Greek syllabary from Cypro-Minoan, see Egetmeyer 2013; Steele 2018, chapter 2.

[21] See *inter alia* Valério 2017. The possibility that Linear B was later transferred to Cyprus and had any influence on the development of Cypriot syllabic writing as used for Greek seems very unlikely, particularly given the very different orthographic choices of each system (on which see also the next section).

[22] On these problems, see Steele 2014 and also brief discussion in the next section.

cases). Each of these shared words helps to establish or confirm shared sign values across the two scripts.

4) Where sign sequences are attested multiple times in Linear A, we sometimes see variations, particularly at the end of a word (and sometimes at the beginning): for example *su-ki-ri-ta / su-ki-ri-te-i-ja* or *ja-sa-sa-ra-me / a-sa-sa-ra-me / ja-sa-sa-ra-ma-na*. In cases like this it is possible to make assumptions about which series particular signs belong to, for example that the *ta* and *te* in *su-ki-ri-ta / su-ki-ri-te-i-ja* share the same consonant and so both belong to the t-series, or similarly that the *me* and *ma* in *ja-sa-sa-ra-me / a-sa-sa-ra-me / ja-sa-sa-ra-ma-na* share the same consonant and so both belong to the m-series.[23] This also confirms that whole consonant series of signs in Linear B functioned in the same way in Linear A, thus constituting a strong piece of evidence against the idea of random restructuring of the sets of signs and their values.

5) As shown long ago by Packard, a statistical approach to Linear A and B lends some confirmation to the assumption that sign values were carried over from one to the other.[24] His experiments clearly demonstrated that by applying the same values, the number of correspondences between the two traditions is much higher than would be found when substituting sets of random values (with Linear A closer to Knossian Linear B in terms of shared sequences than to Pylian Linear B), and, within Linear A, that relative expected frequencies were maintained across different series of signs (for instance if *da* were twice as common as *di*, then *ka* and *ma* should be twice as common as *ki* and *mi*, respectively), again indicating that what we think of as consonant series in Linear B also acted as such in Linear A.

6) We have evidence from later Greek glosses that certain Cretan words of non-Greek origin must have been transmitted to Greek. In two particular cases these can explain the values of signs used in Linear B in both logograms and syllabograms, but with syllabographic values that do not match the usual Greek words for the commodities in question: the syllabographic value of the 'fig' logogram, *ni*, does not match the Greek word for 'fig' (σῦκον) but can be explained via a gloss νικύλεον· τὸ σῦκον ἐν ταῖς Κρητικαῖς γλώσσαις ('*nikuleon: the fig in the Cretan tongue*': Hermonax cited in Athenaeus *Deipnosophistae* 76e);[25] and the compound logogram MA+RU 'wool', which does not match the Greek word for 'wool' (λῆνος) but can be explained via a gloss μάλλυκες· τρίχες in Hesychius (*mallukes: hair*; also μαλλός used for 'fleece' in Hesiod *Works and Days* 234). The fact that both the 'fig' and 'wool' logograms appear in very similar forms and usages in Linear A, along with the evidence for the adoption of these non-Greek words in Greek, gives further confirmation of shared sign values.

[23] This may put us in mind of Alice Kober's 'triplets' in the decipherment of Linear B (Kober 1945).
[24] Packard 1974.
[25] Neumann 1962.

Table 1.2. The Linear A signs with formal correspondences in Linear B whose values we can confirm, structured on the grid for the Linear B core syllabary. Signs drawn by Ester Salgarella. Only one variant of any sign is given here.

Linear A signs shared with Linear B (with evidence for shared values)			
a *08		*i* *28	
da *01		*di* *07	
		ki *67	
ma *80	*me* *13	*mi* *73	*mu* *23
na *06		*ni* *30	
pa *03			*po* *11
		ri *53	*ro* *02*	*ru* *26
sa *31	*se* *09	*si* *41		*su* *58
ta *59	*te* *04	*ti* *37	*to* *05	*tu* *69

These observations may be collected from a number of different sources, but together they form a powerful argument for the maintenance of sign values from one script to the other. They allow us to reconstruct a grid containing 25 shared sign values from the core syllabographic repertoire that we can be certain were carried over from Linear A to Linear B based on direct evidence for correspondences (Table 1.2). While in a sense randomly selected, given that they rely on a patchwork of evidence that just happens to confirm one value or another in any given case, the distribution of the confirmed values is significant: it covers a number of consonant values and all five vowels, thus giving good overall coverage across the grid.

If we look at purely formal correspondences between Linear A and B signs of the core syllabary (*i.e.* shared shapes, with or without evidence for shared values), we will find that the majority of Linear B core signs (51 out of 59) are inherited from formally identical (or very similar) signs in Linear A: all signs containing the vowels *a*, *i* and *u*, and most of those with other vocalic values (Table 1.3). The most obvious gaps are for o-vowel signs, with 7 out of 13 o-vowel signs unattested in Linear A (*do*, *jo*, *mo*, *no*, *qo*, *so*, *wo*), along with 2 out of 13 e-vowel signs (*pe* and *we*, although a correspondence has been suggested for *we*); this is a problem we will return to shortly.

Table 1.3. The Linear A signs with formal correspondences in Linear B, structured on the grid for the Linear B core syllabary; shared signs not in the Linear B core syllabary are given in a separate section at the bottom. Signs drawn by Ester Salgarella. Only one variant of any sign is given here.

Linear A signs shared with Linear B														
a		**08*	*e*		**38*	*i*		**28*	*o*		**61*	*u*		**10*
da		**01*	*de*		**45*	*di*		**07*				*du*		**51*
ja		**57*	*je*		**46*							*ju*		**65*
ka		**77*	*ke*		**44*	*ki*		**67*	*ko*		**70*	*ku*		**81*
ma		**80*	*me*		**13*	*mi*		**73*				*mu*		**23*
na		**06*	*ne*		**24*	*ni*		**30*				*nu*		**55*
pa		**03*				*pi*		**39*	*po*		**11*	*pu*		**50*
qa		**16*	*qe*		**78*	*qi*		**21*						
ra		**60*	*re*		**27*	*ri*		**53*	*ro*		**02*	*ru*		**26*
sa		**31*	*se*		**09*	*si*		**41*				*su*		**58*
ta		**59*	*te*		**04*	*ti*		**37*	*to*		**05*	*tu*		**69*
wa		**54*				*wi*		**40*						
za		**17*	*ze*		**74*				*zo*		**20*			
Other shared signs (not in the core syllabary from a Linear B perspective)														
?		**22*	*pu*$_2$		**29*	*?*		**47*	*nwa*		**48*	*?*		**49*
?		**56*	*ta*$_2$		**66*	*ra*$_2$		**76*	*?*		**79*	*?*		**82*
au		**85*	*?*		**86*	*?*		**87*						

On top of the core syllabary, there also exist a number of signs with optional, more specific values as used in Linear B, usually referred to as the 'extra' signs, and of these, three have formal correspondences in Linear A (*nwa*, ra_2, ta_2), another one has a perhaps doubtful correspondence (*twe*), and eight do not have attested correspondences (a_2, a_3, *dwe*, *dwo*, *pte*, ra_3, ro_2, *two*).[26] For most of the still-undeciphered (or 'untransliterated') signs of Linear B, we are dealing with very small numbers of attestations, and only in the occasional case can we see a close correspondence with Linear A (*e.g.* the common sign *22).[27]

What conclusions can we draw from the very high number of formal correspondences between Linear A and Linear B signs, especially in the overwhelming majority of the core syllabary? While formal correspondences alone are not enough to prove shared values, the very strong evidence that we can piece together in 25 cases on the principles outlined above gives an encouraging indication that values were shared across multiple consonant series and vocalic values: these account for around half the number of core signs with formal Linear A correspondences, distributed randomly (depending on the availability of evidence) across the grid. This makes it methodologically very unsound to argue for large-scale value reassignment in the development of Linear B. While we can almost certainly assume there would have been some modification of the values of Linear A signs as the script came to be used to write a new language with a different phonological inventory,[28] it does not follow that the modifications must necessarily have involved drastic change in the underlying sign value, such as reallocation to a completely different consonant-vowel combination. A comparison with the development of the Greek alphabets is instructive: while a number of Phoenician consonantal letters were reassigned vocalic values, these were not applied at random but rather seem to have related to the position of articulation of a given sound (*e.g.* the glottal consonant *aleph* reinterpreted to represent a Greek back vowel as *alpha*, and something similar might be said of the pharyngeal consonant *ayin* reinterpreted to represent another Greek back vowel as *omicron*). To some extent this issue depends on how we envisage the development of Linear B having taken place, as a decisive initial redesign or an evolving new orthography for example, a question to which we will return later.

But what the confirmed shared values between Linear A and B do show us is that there seems to have been a significant amount of stability in the values carried over from one to the other. All five vowels are represented in this selection, as well as eight different consonants. Whatever the phonetic reality of the sign values in the Linear A tradition (on which, see the next section), they must nevertheless have been close enough for Greek speakers to borrow the majority of signs in their script in such a way that they preserved the sorts of shared features we have seen above, such as shared spellings for Cretan place names and personal names. A number of the values were

[26] See Judson 2017b.
[27] See Judson 2020b. The sign *65 is considered here to be confidently assigned the value *ju* (and so appears in Table 1.2 as part of the core syllabary).
[28] *E.g.* Bennet 2008, 15.

even stable enough in the Cypriot case to survive two separate language adaptations, first from Minoan to whatever language might have been written in Cypro-Minoan, and from there to a different but related variety of Greek at a later stage. Finally, it is not insignificant that we have evidence of Linear A consonant series (*i.e.* sets of signs with the same consonant but different vowels) being organised in the same way as in Linear B, which is clear both where we can observe patterns of morphological variation and in the statistical experiments for relative frequencies carried out by Packard. All these factors should give us some confidence in 'reading' Linear A using Linear B sign values – although how far that will take us in understanding the Minoan language is another question.

Can we use Linear B sign values or structural features to reconstruct Minoan phonology or other linguistic features?

It is important to note at this point that I am not arguing (and I am sure no Aegean scholar would argue) that the sign values shared by Linear A and B are an exact phonetic match: even from a purely theoretical and typological perspective, we should expect two different and unrelated languages, *i.e.* Mycenaean Greek and what we label as Minoan, to have different phonological repertoires and features. So it is all the more valid to ask to what extent we can use the evidence for shared values between Linear A and Linear B to reconstruct the phonology of the Minoan language, and here it would be unwise to make any great claims. Although there have been some very confident reconstructions of Minoan phonology (and of other linguistic features, such as morphology and word order),[29] Duhoux's caution that any interpretations are 'trop hypothétiques, parce qu' invérifiables' remains salutary.[30] With just over 8,000 signs in total, spread over approximately 1,500 short inscriptions, there is simply too little scope to test any given hypothesis that relies on internal factors – unlike the 'backwards' analysis of Linear A derived from Linear B, where the deciphered state and far more extensive corpus of Linear B at least give us a good understanding of the values and usage of signs in that tradition, and so give us a solid starting point for comparison.

Ultimately, while we can reconstruct approximate values for each sign, we cannot know the phonetic reality of the sound or sounds involved in the Minoan language. We might guess that there is some approximation between the two, for instance that the place of articulation will be close if not identical – but this only takes us so far. The lack of distinction for voicing and aspiration in the Linear B consonant series looks odd from a Greek perspective, since these contrasts are phonemic in that language, but there is little to guide us in interpreting the status

[29] Davis 2014 is a good example, with extensive analysis and reconstruction of Minoan phonological features (193–245), despite his counselling some caution as to the decipherability of the script (157).
[30] Duhoux 1989, 90 ('too hypothetical because they are unverifiable').

of voicing and aspiration in Minoan (whether they existed at all, whether they were allophonic rather than phonemic, and so on). A cautionary tale is to be found in the problem of the Linear B d-series, which differs from all other stop series in the script in distinguishing voiced consonants from the unvoiced ones (so Greek /d/ is distinguished from a series representing both /t/ and /t^{h}/, whereas all other stop series feature no distinctions of voicing or aspiration at all). It is difficult to accept that this imbalance was inherited from Linear A (though this is not at all impossible), since there is no obvious reason why voicing should be distinguished in the dental series but not elsewhere, so instead scholars have been keen to see here some disjunct between Greek and Minoan phonology. But what sort of sound was it that Greek speakers heard as closest to their /d/, and where did it fit in the Minoan phonological repertoire? Lejeune suggested that in Minoan this was actually some sort of /l/ phoneme, thus tackling not only the problem of the unexpected Linear B d-series, but also the failure of Linear B to distinguish between /r/ and /l/ (which are separate phonemes in Greek): 'pour cette double étrangeté, une explication unique'.[31] The suggestion seems ingenious, and would also provide a neat solution to the use of a d-series sign in the contentious 'labyrinth' word (*da-pu$_2$-ri-to-jo*) attested in the Linear B tablet KN Gg(1) 702,[32] which also recalls other examples of confusion between /d/ and /l/ in words of non-Greek etymology (cf. Odysseus vs. Ulixes and related forms).

But another problem remains, namely the signs inherited from Linear A in the Cypriot scripts. Cypro-Minoan could theoretically have inherited two separate series of signs for /r/ and /l/ from Linear A, which could explain why the Cypriot Syllabic script used later for Greek had separate series for these phonemes, unlike Linear B (which had just one series for both), while also not having a separate d-series. But why is it that in the Cypriot Syllabary the sign for /ta/, /t^{h}a/ and /da/ is derived from the sign shape that in Linear B would become *da* (= /da/), while the signs for /ti/, /t^{h}i/ and /di/ and for /to/, /t^{h}o/ and /do/ are derived from sign shapes that would belong to the Linear B t-series (*ti* for /ti/ and /t^{h}i/ but not /di/, *to* for /to/ and /t^{h}o/ but not /do/)?[33] A further problem acknowledged by Lejeune is the fact that the Cypriot Syllabic sign *lo* (representing only /lo/, not /ro/) would be derived from a sign he had just argued to represent an /r/ phoneme in Minoan, on the assumption that the Linear B liquid series (representing either /l/ or /r/) came from a Linear A series representing only /r/. These Cypriot outcomes are very difficult to reconcile with

[31] M. Lejeune 1958, 327 ('for this double abnormality, a single explanation').
[32] On which see Judson 2017a.
[33] Valério 2016, 292–293, cites a parallel from the use of logosyllabic cuneiform to write Hurrian in the Mitanni Letter, where both voiced and unvoiced consonant signs were used to write single Hurrian consonants (which did not feature phonemic voicing); however, these may be ad hoc spellings rather than part of a standardised orthography, and the situation is different in that the original language features voicing while the target language does not (the opposite of the situation here, where Minoan may not have featured phonemic voicing but Greek most certainly did).

the evidence provided by Linear A and B alone, but equally they cannot be ignored, especially given the usefulness of certain shapes and values in the Cypriot Syllabary for confirming the values of Linear A and B signs.[34] So should we accept a partial or modified version of Lejeune's proposal or abandon it altogether? In the spirit of acknowledging the difficulties of reconstructing Minoan phonology, it is better to leave this question hanging.

Another problem surrounds the Linear B *dwo* sign, traditionally understood as a Linear B innovation based on a 'pun' that brings two *wo* signs together in a single sign (2 × *wo* = *dwo*, Greek for 'two'), and the apparent existence of labialised consonants in Minoan. Brent Davis has argued in favour of a set of signs for labialised consonants in Linear A based on the attestation of some signs that seem to have such a derivation in Linear B:[35] he argues that a language's speakers are unlikely to create signs for highly marked sounds, such as labialised consonants, without first developing signs that distinguish the (in Greek) phonemically distinct but less marked features, such as voicing and aspiration – so Linear B really ought to have separate signs for /b/, /p^h/, /g/, /k^h/, etc, before creating signs for highly marked labialised consonants that don't exist in Greek, such as /d^w/ or /t^w/. He therefore suggests that Linear B *dwo* is not a new invention but an inheritance from Linear A that was instead split in half to create the *wo* sign. But this argument falls down on several points. Firstly, the Linear B *dwo* sign doesn't have a clear antecedent in Linear A as Davis claims (Linear A sign 118 is not a good match palaeographically), nor does it represent a labialised consonant but rather a cluster of two consonants /dw/.[36] Minoan may indeed have featured labialised consonants, as suggested by Linear B's inherited labiovelar q-series (which *was* useful for a small set of labialised Greek phonemes in this period) and the inherited *nwa* sign (only discovered in Linear A in the 1990s although it was already attested in Cretan Hieroglyphic before that). But it nevertheless seems most plausible based on available evidence that Linear B did invent at least one new sign for a /d/ + /w/ combination, namely *dwo*, which can be interpreted as a creation inspired by the reanalysis of the *nwa* sign from a presumed Minoan value /n^wa/ or similar, as the sequence of Greek phonemes /nwa/.[37] This is also reinforced by the fact that other signs involving labial clusters in Linear B (*dwe*, *twe*, *two*) do not have confirmed Linear A antecedents. We may indeed wonder whether Linear B might have made use of more labialised consonant signs (reinterpreting them as consonant clusters) if more had existed in Linear A.

What is curious is that Mycenaean Greek didn't really need a sign for the sequence /nwa/, which was perfectly well represented by sets of two signs (usually *nu-wa*) and could always be spelt in that way – *i.e.* the use of *nwa* remained optional. This flies in the face of claims about typological universals in the development of writing systems, such

[34] See Steele 2014 for further discussion of the problem.
[35] Davis 2014, 195.
[36] See Judson 2017b, 117–118.
[37] Meißner and Steele 2017, 109–111.

as that of Stephens and Justeson that 'innovations that produce overrepresentations of highly marked sounds, while ignoring underrepresentations of less marked sounds, are almost nonexistent in the writing systems of the world'.[38] Such claims tend to be both unhelpful and poorly substantiated, and many writing systems contain similar oddities that contravene the supposedly idealistic principle of having both minimal and maximal representation of the underlying language's phonemes (*i.e.* enough signs for all phonemes, with no unnecessary signs or overlap). A closer look at newly developed writing systems in the modern day also shows numerous choices that we might see as linguistically unjustified but that nevertheless have compelling and traceable motivations. Sometimes they will be motivated by a desire to make a system or orthography appear different to another dominant (perhaps colonial) script, as in the case of deliberate distancing from Spanish spelling in modern orthographies designed for Mayan languages in central America: in Ch'orti', to take one example, the conjunction pronounced [i] has come to be written *yi* or *yi'* to distance it from the spelling of the Spanish conjunction *y* (also pronounced [i]), where speakers or writers 'are making overt political statements through their conscious and determined orthographic choices'.[39] What looks to a linguist like a phonological oddity may be better explained by non-linguistic or sociolinguistic factors.

The final phonological problem I will mention is that of the vowel structure of the Minoan language. As has already been observed, 7 out of 13 Linear B o-vowel signs lack any established formal correspondence in Linear A (*do*, *jo*, *mo*, *no*, *qo*, *so*, *wo*), and the same can be said of 2 out of 13 e-vowel signs (*pe*, *we*), focusing solely on the core syllabary. At the same time, it is clear from looking at Linear A that signs containing the vowels *-a*, *-i* and *-u* are far more frequent than those containing the vowels *-e* and *-o*. These factors have long been assumed to suggest that the Minoan language had only three vowels, and that Greek speakers, who had a five-vowel system, were then forced to reallocate sign values and create new signs in order to represent their extra two vowels.[40] The relevant frequencies of Linear A signs with a/i/u vowels compared with e/o vowels seems to confirm this picture in showing that the e/o vowels are far less frequent.[41] However, this is where arguments in favour of a three-vowel system in Linear A meet a significant problem, because if it is claimed that Linear A did not represent e/o vowels, then such statistical evidence could not be used in support (since we would be forced to accept that the e/o-vowel signs did not represent e/o after all). As we have already seen, there is also comparative evidence to suggest that the Linear A e/o-vowel signs with continuations in Linear B really did represent something close enough to the Greek phonemes to be used in similar spellings (*e.g. to*

[38] Stephens and Justeson 1978, 279.
[39] Hull 2017, 152–153.
[40] *E.g.* Palaima and Sikkenga 1999, 603–604. See also the discussion in Duhoux 1989, although he suggests that Minoan could have had more rather than fewer vowels than Mycenaean Greek depending how we interpret the evidence (p. 72).
[41] Davis 2014, 240–242; Meißner and Steele 2017, 105.

in the place names *pa-i-to* and *se-to-i-ja*) and in some cases to appear also with the same values in the Cypriot syllabic system (*lo*, *po*, *se*, *to*). On this basis, there can be no doubt that Linear A did represent e/o vowels, and that it seems to have done so systematically – though this does not have to mean that these vowels were as common in Minoan language as the a/i/u vowels. Indeed, the statistical evidence suggests that the e/o vowels were far more rare, which could in turn explain why some Linear B o-vowel signs in particular still lack Linear A correspondences: they may simply not have been found yet.[42] Indeed, a close look at Linear A palaeography does reveal some signs that could theoretically be close to the shapes of the Linear B signs in question: *do* and *jo* look close to signs attested only once each in Linear A (A 364 on ZA 15 and A 349 on KH 11 respectively, although with some perhaps problematic palaeographic features in the latter case); *no* and *so* perhaps also correspond with one-off attestations (A362 on ZA 10 and A 363 on ZA 14 respectively); and *wo* could arguably be seen in a sign with slightly better attestation though with varying shapes (A 306), leaving only *mo*, *no* and *qo* without any obvious parallels at all.[43] Here we again seem to be dealing with a case of being able to say more about the Linear A writing system than about the phonological features or structure that may have underpinned it.

Another assumption commonly made about the Minoan language is that it may have suited the structure of its writing system somewhat better than Greek suits that of Linear B, and in particular that the motivation for a system of open syllable signs (*i.e.* vowel-only or consonant-vowel but never ending in a consonant) could lie in the language's syllabification. This would make Minoan a predominantly open syllable language, with languages such as Japanese (with its developed open syllable kana systems of writing) and Polynesian providing the sort of parallel many scholars have cited.[44] However, there are several problems with this proposition. One is that we do not know whether Linear A was originally developed to write the language we label as Minoan (*i.e.* the language found in a corpus composed predominantly of administrative documents, along with some other types, from sites across Crete across the MM–LM periods). Was Cretan Hieroglyphic (perceived to have some differences in

[42] See further Meißner and Steele 2017, 102–108. Meanwhile outliers such as the relevant frequency of *ro* in Linear A, in comparison with any other o-vowel sign, could be related to the frequent attestation of accounting words (*po-to-*)*ku-ro* 'total' and *ki-ro* 'deficit' in administrative records, words which were not necessarily of Minoan etymology (argued particularly in the case of *ku-ro* as a possible Semitic loanword).

[43] Discussed in Salgarella 2020, 291–297 (where she also suggests a relationship between *qo* and the derivation of the saffrom logogram in Linear B, which thus perhaps has an unattested antecedent, and the issue that some forms of the *i* sign in Linear A look somewhat closer to the shape of Linear B *no*). See also Melena 2014, 84–88, on some of the proposed identifications, as well as the suggestion that Linear B *mo* could derive from a sign attested only logographically in Linear A, such as A 302, 'olive oil', or A 303, some type of grain.

[44] On similar views of the Minoan languages, see *inter alia* Chadwick 1959, 274; Sharypkin 2008, 740; Ventris and Chadwick 1973, 69. Although it is not very relevant to our discussion, it is perhaps worth bearing in mind that some scholars have seen certain writing systems of similar types as representing moras rather than syllables: for discussion, see Gnanadesikan 2012.

its repertoire as well as its palaeography) developed first, growing out of the earliest seal inscriptions, and did it represent a different language? Another possible problem is the fact that the Aegean syllabaries are not the only open syllable writing systems of the Bronze Age Mediterranean, since Anatolian hieroglyphs also have a very similar structure (vowel-only and consonant-vowel signs). Although the timescale of the origin of Anatolian hieroglyphs is open to question,[45] there is no evidence that they were developed for any language other than that for which they were used: an Anatolian language usually classed as Luwian, which is Indo-European, like Greek, and shares similar problems of the presence of consonant clusters and final consonants (*i.e.* it is not a language with a preponderance of open syllables).

But perhaps the greatest obstacle to the idea that the Minoan language had a predominantly open-syllabic structure is that Linear A writing appears to preserve direct evidence of consonant clusters. The evidence is to some extent open to question, in that it depends on orthographic principles that are not straightforward to reconstruct for an undeciphered language, particularly one using an open-syllabic system and that therefore required a spelling strategy for any consonant cluster: you can write either one consonant too few or one vowel too many.[46] We know that many consonant clusters in the closely related Linear B system were graphically suppressed in what is usually known as 'partial spelling' (for example *pe-ma* for *sperma* 'grain', where the clusters /sp/ and /rm/ are not written in full and only one element is written). Orthographic principles in the writing systems related to Linear A are, however, somewhat mixed. In Linear B, 'partial spelling' co-exists with 'plene spelling', where certain clusters were spelt out (*e.g.* the initial /kn/ of *ko-no-so* 'Knossos'), and although these choices are governed by rules on which kinds of clusters are spelt out only partially and which are spelt out fully, we do also see a certain amount of variation in the spelling of some words.[47] If we compare Cypriot syllabic writing as used for Greek, we find that consonant clusters were more often spelt out in plene, such that the name Stasikupros would be written *sa-ta-si-ku-po-ro-se* for instance.[48] Here the syllabification of the word determined the way in which dummy vowels (*e.g.* the *a* of the *sa* and the *o* of the *po* in *sa-ta-si-ku-po-ro-se*) were chosen: when the

[45] Waal (2012) has argued for a high date for the creation of Anatolian hieroglyphs, pushing it back into the earlier 2nd or even the 3rd millennium BCE. Hawkins (1986) argued for a common origin of Anatolian and Cretan hieroglyphic writing, although this theory has not met with widespread acceptance; evidence for contact or similarities between writing traditions in the Aegean and Anatolia (see Waal 2021) is not sufficient to demonstrate a link between the writing systems, which share very few possible formal correspondences. A lower date for the creation of Anatolian hieroglyphs is also widely preferred because structural and linguistic features point towards its having been created under the influence of Hittite cuneiform writing (see Payne 2015, 66–70; Yakubovich 2022). On relationships between writing systems in Bronze Age Anatolia, see recently Rieken and Yakubovich 2023.

[46] In Egetmeyer's words: 'Ils imposent de noter ou une consonne en moins ou une voyelle en trop' (Egetmeyer 2010, 220).

[47] See Meißner 2008; Melena 2014, 91–123; Judson 2019, 2022.

[48] See Egetmeyer 2010, 220–235.

cluster was heterosyllabic (*i.e.* straddled the border between two different syllables), the vowel from the previous syllable was typically chosen, and when the cluster was tautosyllabic (*i.e.* both consonants belonged to the beginning of the same syllable), the vowel from the following syllable was typically chosen. The difference between Linear B and Cypriot syllabic spelling rules shows us that we cannot make assumptions about those of Linear A, since there are multiple possibilities.

Consani has gathered data on possible consonant clusters in Linear A by isolating all sequences that involve two adjacent syllabographic signs composed of different consonants with the same vowel.[49] Theoretically, this could point towards the existence of consonant clusters, though a word of caution is necessary because two adjacent signs displaying this pattern could always point towards two adjacent separate syllables that just happen to contain the same vowel (cf. in Linear B *a-ta-na at^{h}āna* 'Athena' for instance, with three syllables using the same vowel). A positive indication may be given by the case of *(j)a-di-ki-te-te* (also *a-di-ki-tu*), which appears on libation bowls and could refer to Mount Dikte or a deity associated with that site, thus suggesting the *i* of *ki* acts as a dummy vowel here in the spelling of a consonant cluster. This word also appears in Linear B in the phrase *di-ka-ta-jo di-we* ('to Diktaian Zeus', KN Fp 1), where the different syllabification (*-di-ka-* rather than *-di-ki-*) could suggest tautosyllabic treatment made possible by the existence of *kt-* clusters at syllable onset in Greek. Obviously the toponym Dikte may not belong to the same language as written in Linear A, but the apparent stability of the name over time, whatever its linguistic origin, makes it a helpful case for comparing the way in which Linear A and B dealt with consonant clusters – and if we can detect a spelling strategy for dealing with a consonant cluster in Linear A here, it strengthens the proposal that other consonant clusters (some presumably arising from Minoan language words) were treated the same way. Other Linear A sequences are more difficult to contextualise because their meaning remains obscure, but it stands to reason that among 160 possible examples, a good number may reflect underlying consonant clusters, as Consani suggests. For our present purposes, the most important point is that if consonant clusters were being written regularly in Linear A, that rather implies that at least some of the words written could be from the Minoan language, and further suggests that the open-syllabic nature of the script was not designed to accommodate a purely open-syllabic language structure in Minoan.

It is worth mentioning that in Consani's view the evidence he has assembled strongly points towards an extensive use of plene spelling in Linear A, and that he sees a direct continuation of this in the Cypriot scripts through the 2nd and especially the 1st millennium BCE, whereas he sees the considerable degree of partial spelling in Linear B as a significant departure from the spelling rules of Linear A.[50] On the one hand, some apparent spelling strategies do seem to bear out this theory. On the other,

[49] Consani 2021.
[50] Consani 2021, 26–28.

the word *pa-i-to*, which, as we have seen, is attested in both Linear A and B, seems to suggest partial spelling of an *-st-* cluster, provided that we assume the same place name is referred to in both systems. Consani sees this as doubtful,[51] but the data collected contain only nine possible examples of clusters involving the sibilant with a following stop (*i.e.* signs with the consonant *t*, *p*, *k*; *d* are discounted since there is a possibility they do not represent a stop in Minoan): only *a-tu-ri-si-ti* (which as Consani admits could represent *atursiti* rather than *aturisti*); *se-sa-pa*$_3$; *si-pi-ki*; *a-su-pu-wa*; *qe-su-pu*; *a-si-ki-ra*; *ja-ki-si-ki-nu* (*jakiskinu*, *jaksikinu* or indeed *jakskinu*?); *si-ki-ne*; *si-ki-ra*. Any one or more of these examples *could* represent a consonant cluster involving the sibilant plus a stop, but it is impossible to say how many did and how many did not. On the other hand, if partial spelling were used for such clusters in Linear A, it would leave no trace at all since the sibilant would not be written, and the only way of telling would be if we were sure of the meaning of a word; similarly, we would not know that there is an unwritten *s* at the beginning of *pe-ma sperma* 'grain' in Linear B if we did not know what it stood for. That being the case, I am inclined to be cautious about the assumed non-existence of partial spelling in Linear A.

How should we understand the nature of the transition from Linear A to Linear B?

The previous sections have focused on questions surrounding the ways in which we understand Linear A and Linear B to be related to each other, and the degree to which we can use details of that relationship to understand features of language encoding. However, that discussion is somewhat abstracted from any hypothesis concerning the way in which writing was passed on, or perhaps more appropriately how a writing system used for a Minoan language came to be adopted and adapted for the Greek language. Was the writing of Greek in Linear B the result of design (*e.g.* users making a set of initial decisions as to how to represent Greek in this syllabic writing system, including the application of sound values and orthographic rules)[52] or the result of an organic process of changing practice (effectively the outcome of ongoing attempts to write Greek in Linear A)?[53] The argument that Linear A and B share the same script might be taken to imply the latter scenario,[54] and this could also be a better fit for the wider changes in social practices and in politico-economic organisation taking place around the same time. Furthermore, it is demonstrable that the earliest known phase of Linear B (attested primarily in the Room of the Chariot Tablets at Knossos) is closer to Linear A both palaeographically and on some points of usage than it is to

[51] He cites the ending in -o as reminiscent of the Greek o-stem declension, which ought not to exist in Minoan: Consani 2021, 17.
[52] See especially Heubeck 1982 for this perspective.
[53] Cf. Tomas 2017a, 59.
[54] *E.g.* Salgarella 2020, 369: 'one and the very same script', with a 'soft' adaptation from one to the other.

the later Linear B.[55] At the same time, however, it is evident that Linear B already had well-established orthographic rules by this point, suggesting some sort of training was in place;[56] training in the writing system (which is surely necessary to account for the very high level of similarity in script use, orthography and many other aspects of writing across the Mycenaean world) also suggests awareness of the script repertoire and direct consciousness of its application to the Greek language. The administrative context of Mycenaean writing, inherited directly from Minoan writing practices, might also be argued to give the perfect setting for a conscious and deliberate design of Linear B orthography, since it was in the hands of presumably a small number of users and 'stakeholders'. With two competing views of the way in which Linear B arose out of Linear A, how do we decide which one fits the evidence better?

Theoretical approaches to the development of Greek alphabetic writing make a useful comparison. The Greek alphabets that are first attested in the 8th century BCE (alongside the closely related Phrygian alphabet now thought to be first attested in the 9th century BCE) featured the use of dedicated signs for vowel phonemes that had not existed in the Semitic consonantal alphabet from which they were derived, as already mentioned above. But how and when were they added? There are three main competing theories:

1. An original adapter or group of adapters took the Semitic consonantal alphabet, disregarded signs that were not useful for representing Greek phonology (*e.g. aleph* and *ayin*), and gave them new vocalic values (based on the position of their consonantal values) that suited Greek better.
2. Greek speakers heard some signs of Semitic alphabet as vowels, or as close in position to vowels, in their own phonemic repertoire.
3. A pre-existing practice of using consonant signs to also represent (long) vowels in some Semitic writing traditions (particularly Aramaic), a usage known by the term *matres lectionis*, was picked up and expanded by Greek speakers when adopting the alphabet.

It is hardly surprising that the Greek language (and indeed other Indo-European languages with similar phonological repertoires) needed to be able to write vowels separately: how else could words such as οὐ, ἥ or indeed Αἰαία be written, and how could frequently encountered initial vowels be specified, without dedicated vowel letters? The vowel letters are particularly significant because these are the only invention shared by all the regional alphabets: the first attested Greek alphabetic inscriptions do not belong to a single tradition but rather are spread across the Greek-speaking world in areas where regional alphabets had already or would go

[55] The continuation of sign variants across Linear A to early Linear B is especially telling, as it implies continued practice and perhaps even continuing personnel: Salgarella 2019.

[56] On the early Linear B of the Room of the Chariot Tablets, see Driessen 2000, and on its relationship with Linear A, see especially Salgarella 2019, 2020.

on to develop distinctive features,[57] meaning that we never see evidence of a single ancestor alphabet that later went on to diversify into the attested 'branches'. We may indeed question whether there ever was a single ancestor alphabet, or *Uralphabet* as the idea has often been labelled,[58] and a closer look at the vowel letters reveals some significant differences (such as the distribution of straight and crooked *iota*) that point towards at least two early traditions rather than a single, homogeneous one.[59] This makes some of the more extreme interpretations of monogenesis of a Greek alphabet look somewhat fanciful: for example, Powell imagines a Phoenician and a Greek speaker sitting down together, with the Phoenician speaker writing each sign and speaking its name and value aloud as they go, and the Greek speaker quickly making some changes to sign shape and value to accommodate their own language, before spreading the new invention on to others.[60] Indeed, the very idea of pinning down a date and location for the creation of the Greek alphabet, which has dominated the scholarly agenda for many years without any signs of broad agreement, arguably needs to be abandoned. As more recent research has shown, far more progress can be made by trying to understand the diversity of early attested Greek alphabetic writing.[61]

The case of the Greek alphabets shows quite clearly that theoretical models can impede our understanding as much as they can further it, particularly the very popular view that a single original Greek *Uralphabet* (for which we have no direct evidence) was created at a moment in time before undergoing a diversification process. While we do not have to postulate numerous independent borrowings in order to explain the pattern of regional alphabets, at the same time we can more plausibly account for what we do see (*i.e.* diversity) than what we don't (*i.e.* homogeneity). Indeed, the diversity of attested Greek alphabetic writing in the Archaic period makes the situation in Mycenaean Greece, where numerous regional centres over a similarly wide area employed strikingly homogeneous sets of writing practices, look rather odd; we are left to try to explain it either by positing an unusually homogeneous linguistic situation across such a wide area (which seems unlikely) or by looking towards the contexts of use of writing, where it may be that a particularly prestigious dialect came to be associated with effective administrative control, against a background where whatever diversity existed was not of great sociolinguistic significance for those involved. Nevertheless, it is perhaps understandable that this situation has again led many scholars to look for a place and moment of creation of Linear B, after which it would have been transmitted wholesale around the rest of the Mycenaean

[57] On which see Steele 2019a.
[58] See *e.g.* Wachter 1989, 2021.
[59] Elvira Astoreca 2021, 85–86.
[60] Powell 1991, 25–27, 42ff. Cf. also Wachter's scenario of an evening party (1989, 36–37).
[61] *E.g.* Elvira Astoreca 2021, 136–138, on the regional alphabets as independent writing systems or Luraghi 2010, 2021 on the importance of localised perceptions of ethnic divisions as alphabetic writing diversified (though he assumes an early stage of homogeneity).

Greek–speaking world. But we are in danger of overlooking some degree of complexity in the process of adaptation by thinking of it as a single event.

Salgarella has pointed out that the adaptation of Linear A to write Greek must have involved multiple levels ('palaeographical, structural, phonological, logographical, metrological', etc), and that at the palaeographical level we see not the borrowing of single standardised sign forms but the continuation of multiple variants of many of the signs.[62] This is an important point strongly borne out by the palaeographical evidence, and already shows that it was not a single set of sign forms that was initially borrowed to write Greek but rather a set of fluid practices (which almost certainly must have involved Linear A writers continuing administrative work as the language of administration switched to Greek). Consani, meanwhile, has seen the structural elements as the more important ones, not only the correspondence between phonemes and graphemes but also the orthographic principles by which they were applied to the languages.[63] The syllabographic repertoire must, however, be considered separately from the logographic repertoire, which clearly underwent some quite drastic changes in not only the range of signs themselves but also the basic operating principles of logography. It will be argued in the next chapter (Chapter 2: Exploring Logography) that logographic signs underwent a change of status, from a situation in Linear A where they played a role within broader syntactical structures, to one in Linear B where they were entirely removed from syntax and given separate slots within the document format. Further, Tomas pointed out that the development of the script system is a separate matter from the development of the administrative system, which seems to have different origins.[64]

Usage must be figured into the equation from several perspectives, for instance continuities and discontinuities in document types and sealing practices.[65] Linear A clay tablets are of the small, page-shaped type (*i.e.* oriented in portrait format), and while the basic shape of tablet was continued in Linear B writing, the size of page-shaped tablets generally increased, and seems to have depended largely on the amount of information being recorded; they also seem to have served different purposes, with no indication that information from other document types was redacted onto page-shaped tablets in Linear A, a phenomenon well attested in Linear B.[66] Meanwhile palmleaf-shaped tablets are a new invention under the Linear B writing tradition. Out of the range of sealing types employed under Linear A administration, only one has a strong continuation under Linear B (the two-hole hanging nodule) while most others are abandoned completely (other than a small number of noduli and some flat-based nodules, confined to the Room of the Chariot Tablets at Knossos). Even the apparent continuities here are not straightforward, as differences in their

[62] Salgarella 2019 (quotation from p. 61) and 2020 in more detail.
[63] Consani 2022.
[64] Tomas 2017a, 60. Similarly Bennet 2005, 270.
[65] See Tomas 2003, 2008, 2011, 2012, 2017b.
[66] See *e.g.* Schoep 2001.

material properties and features of their usage have led to different terminology being used for the Linear B sealing types.[67] Tomas has suggested that some of the document types prevalent under Linear B administration do not stem from the latest attested phases of Linear A but rather from earlier attested practices, in particular from some that are, as far as we know, unique to Cretan Hieroglyphic accounting.[68] The obvious chronological problem with this theory (which she fully acknowledges) might be assuaged if we consider that the surviving archaeological record may not have preserved ongoing practices at some Cretan sites and that at Knossos we do not have surviving contexts from the period immediately before the development of Linear B administration. This gap in evidence makes it far harder to argue for particular details of administrative change, because we are forced to extrapolate from the much more varied usage of Linear A attested across other sites in the LM IB period, and from there to guess at exactly what the emergent Linear B practices in the Room of the Chariot Tablets might have been working from and building on.[69]

The implication that a writing system can develop independently from the contexts of its use needs to be interrogated in more detail. While the nature of the evidence we have seen does seem to point to a disjunct between graphic and administrative changes, it becomes difficult to construct a plausible historical situation around such a hypothesis. Would the same people who first took Linear A and used or adapted it to write Greek have taken their inspiration for what they were writing on from a completely different direction? It is perhaps helpful to think in terms of different rates or types of change, since a full picture of what Linear B writing looks like only emerges at quite some time after the initial period of adaptation. To a considerable extent our reconstructions will inevitably rely on speculation, but one particular deposit may help us to bridge the gap: the Room of the Chariot Tablets at Knossos. It has been seen as a special case, whose apparent chronological isolation as the earliest surviving Linear B archive may be able to help us reconstruct a step between Linear A and the Linear B of later destruction horizons.[70] From a graphic and linguistic perspective, it looks as though it may preserve early developments that were later abandoned at Knossos but continued at mainland sites. For instance, the a_2 sign is used to represent an initial aspirate only in the Room of the Chariot Tablets at Knossos, whereas outside of this room it appears only in the textile term *pa-we-*a_2 in the North Entrance Passage (also argued to be earlier than the main destruction at Knossos although not as early as the Room of the Chariot Tablets) and in the word for a deity, probably Hermes, *e-ma-*a_2 (and *e-ma-*a_2*-o*); on the mainland its use is more prevalent, although still optional. This could suggest that the a_2 sign was used in early Linear B

[67] See Hallager 2005, 252–258.
[68] Tomas 2012, 2017a.
[69] On the evidence for what was emerging in the LM II period and how it related to later material, see recently Driessen and Mouthuy 2022; Whitelaw 2022.
[70] See Driessen 2000. Also widely used in Salgarella 2020 as a basis for interpreting palaeographic and systemic changes, and in the phylogenetic palaeographic analyses of Firth and Skelton 2016.

at Knossos and that over time its usage was abandoned, perhaps because of psilosis in the local dialect (remaining only in the occasional conservative spelling), as argued by Nosch, in turn implying that its usage was transmitted to the mainland at an early stage.[71] A linguistic example could be the usage of the case form *-pi* (linked with later Greek -φι, particularly prevalent in Homer), which seems to have been used with dative-locative force with toponyms, whereas in the rest of the Knossian archives it had a primarily instrumental function. On the mainland, the dative-locative *-pi* with toponyms is well attested.[72] This could suggest an innovative usage again transmitted to the mainland (or shared with the mainland) at an early stage, whereas at Knossos its usage was restricted over time.

In document type, too, the Room of the Chariot Tablets presents some features that set it apart not only from later Linear B, but also from Linear A. Here we see the first attested palmleaf tablets, but there are also a number of tablets whose shape, size and typology do not quite fit the pattern established in later archives, sitting somewhere between the palmleaf and the page-shaped tablet in both shape and function. Palmleaf-type documents could be cut into smaller segments in order to re-arrange information (known as simili joins[73]), which might recall cutting practices attested in Linear A and perhaps the use of long dividing lines in Cretan Hieroglyphic documents.[74] This area also attests the last known uses of flat-based nodules, the same type as are known to have sealed parchment documents in the Linear A tradition, although their typology is not an exact match.[75] Perhaps these oddities point towards a period in which there was a lack of standardisation and a high degree of experimentation.[76] But another way of looking at the evidence might be to see an administrative system that operated according to changing rules over time, and that may have involved changing personnel and perhaps a changing sociolinguistic situation too. It may be that the usage of the syllabographic repertoire was established at an early stage and needed little refinement, while other aspects of administrative practice went through phases of successive changes or improvements, as they may have been perceived by their users. The logographic repertoire of the Room of the Chariot Tablets looks in-keeping with later Linear B usage, except in a few minor details of sign shapes, suggesting that the reanalysis of logography had already taken place (see further Chapter 2: Exploring Logography); but some differences in the way measurement signs were used, including the almost exclusive use of Q and a dotted variant of M, could point towards some aspects of administrative practice being abandoned at this stage or updated later on.

[71] See Nosch 2022. Note that Linear A does not preserve any correspondence for the a_2 sign, and this sign could have been an invention of Linear B.
[72] On the *-pi* case form, see Thompson 1998.
[73] Driessen 1987. See also Tomas 2013.
[74] See Schoep 2002, 77–78; Tomas 2003, 223.
[75] Hallager 2005, 252.
[76] See Salgarella 2020, 187–190.

This rather complicates the question of what was transmitted to the mainland and when, since it does not look as though what we see in the Room of the Chariot Tablets was transmitted wholesale. In particular there are some features of document typology that do not seem to have featured in mainland usage. This may make it difficult to argue for early features present in the Room of the Chariot Tablets having been transmitted elsewhere but then being abandoned at Knossos while growing in popularity elsewhere. There could be various ways around this problem, however, such as placing the transmission slightly later than the Room of the Chariot Tablets or, indeed, abandoning the idea of a single transmission event. It could after all be that there was constant contact between Knossos and the mainland centres, and that practices were sometimes 'updated' through shared networks of communication and perhaps even movement of personnel from one place to another. The lack of early archival deposits from the mainland is another problem for trying to reconstruct the timeline on which, and the ways in which, Linear B writing was adopted across numerous mainland sites: most of the mainland archives date to the later part or the end of LH IIIB (towards the end of the 13th century BCE, probably post-dating the main archive at Knossos by at least 100 years and the initial development of Linear B by perhaps some 200 years), with very few finds in between (for instance the archives at Ayios Vasileios, mid-LH IIIB and so mid-13th century BCE,[77] a small group of tablets from Pylos, apparently LH IIIA 2[78] and another from the Petsas House at Mycenae from a reasonably secure LH IIIA 2 context[79]).

Looking at the broader context of the administrative changes that occur in the Linear A to Linear B interface, the large-scale changes in the socio-economic landscape must be of considerable importance. Significantly, there was a move away from multiple smaller regional administrative complexes across Crete to a more centralised, island-wide system operating out of Knossos (from a poly-palatial to a mono-palatial society in Driessen's words[80]), which seems to have developed its control over other parts of the island over time.[81] This change looks from our perspective as though it must have taken place at the same time as there was a language shift in administration from Minoan to Greek. Old-fashioned views of the aggressive arrival of Greek-speaking invaders in Crete have, however, begun to give way to a more nuanced understanding of internal social changes that may have given rise to the adoption of the Greek language, particularly in the context of elites trying to reframe and reinforce their power base with reference to mainland practices.[82] This has implications for our understanding of the phonological or phonographic aspects of adaptation too,

[77] See Aravantinos and Vasilogamvrou 2012; Vasilogamvrou, Kardamaki and Karadimas 2022.
[78] See Melena 2000–01, 366–368; Skelton 2010; Vitale, Stocker and Davis 2022.
[79] See Shelton 2002–03.
[80] Driessen 2000, 220.
[81] See Bennet 1985, 1990, 2011, 148–151; Driessen 2001.
[82] See *e.g.* Preston 1999; Driessen and Langohr 2007, 181–187; Bennet 2008, 20; Galanakis, Tsitsa and Günkel-Maschek 2017; Galanakis 2022.

since we may be looking not at one language group borrowing writing from another language group, and thus operating across a language barrier, but rather at a situation in which people literate in a pre-existing writing system were acquiring expertise in the new language while also thinking about how to write it down – or at least this might have been the case for some individuals involved in these processes.[83] There was a sociolinguistically motivated choice here of the language variety to be used in writing, whereby, we can assume, some prestige was attached to the Mycenaean dialect of Greek, such that making a decisive switch to its use at least in the practice of bureaucracy (and who knows how widely outside of this sphere?) made sense as a strategy employed in elite behaviour and control of resources.

The perceived need for writing, as it appears from looking towards the Linear B evidence, must have been largely administrative, and so it makes sense also to think of the adoption of writing for Greek as taking place within an administrative milieu. However, given the existence of a small number of very late non-administrative Linear A inscriptions (of which at least one could easily be interpreted as Linear B in terms of sign shapes),[84] it might be that the move towards restricting writing to bureaucratic uses happened only gradually. It makes sense, for instance, that Linear A could have continued to be used in ritual practice for a short period while what we now call Linear B was emerging in administrative practice, before religious literacy began to disappear (see further Chapter 3: Exploring Vitality). Largely this must have depended on a number of ongoing changes in elite behaviour, social attitudes, economic control and religious practice whose overlap is very difficult to judge from the archaeological record, especially since they must have taken place within a relatively short period of time.

So where does this leave the question of the transition from Linear A to Linear B? Crucially we do not have to see the development of Greek writing in Linear B as one single process of change, but rather we can see it as a whole changing set of resources and practices – and likewise we do not have to give one single answer to the question of whether Linear B was a result of intelligent redesign or a slowly evolving entity. Theoretically one aspect could have changed suddenly, while others took longer to effect, and some may have been a result of deliberate design (such as how the writing system would be taught to new users), while others may have been an effect of changing attitudes (such as the, from our perspective sudden-looking, move away from socially visible writing in religious spaces). Whatever caused the rise in prestige of the Greek language, and the desire to use it in written administration, it makes sense that the existing Linear A tradition should have been borrowed and

[83] Cf. Driessen's musing on a language switch from Minoan to Greek taking place over one generation to another (2000, 161–164).

[84] The Poros figurine (LM IIIA1) is undoubtedly Linear A from a palaeographical perspective according to its editors (Dimopoulou, Olivier and Réthémiotakis 1993, 512), but an inscription in the Kephala tomb at Knossos (LM II) reading only *a-pi* could plausibly be Linear B as much as Linear A (and, as suggested by Bennet, could even be read in Greek as 'Go away!', a fitting text for a tomb perhaps: Bennet 2008, 20).

adapted to its use. Indeed, this has been observed to be a cross-linguistically common process, termed by Gnanadesikan as the 'native script effect', whereby a pre-existing writing system already in relatively local use will offer certain benefits (particularly to those already using it) for adaptation to a previously unwritten language.[85] There was a deliberate motivation behind the creation of what we call Linear B: in the words of Houston and Rojas, 'secondary scripts come into existence because people decide they need them, not vaguely, diffusely, neurally, or by pressing linguistic impulse, but because they fulfill a function'[86] – making it highly important that we look beyond the fine details of linguistic structure in order to take contextual factors into account.

Against this background, and following Salgarella in her assessment of the Linear A to B transition from palaeographic and structural perspectives,[87] seeing the early stages of Linear B as a developing Linear A orthography for writing Greek fits in well. Linear A did not die, though the writing of Minoan language in it did.[88] The degree of overlap in the syllabographic repertoire (and evidence for stability of values) strongly suggests that the majority of Linear A signs were perceived to be useful for representing the Greek language, and so were adopted with their original values intact, give or take small matters of phonological precision that are inevitable when applying the writing system of one language to the phonological repertoire of another. When we look at the core syllabary, we are viewing the situation from a Mycenaean Greek perspective, and focusing on the set of signs that formed the basis for the original orthography; the development of extra signs offering options for orthographic variation may have developed over time from a mixture of redeployed Linear A signs and newly invented ones.[89] As we will see in the next chapter, the developments in the logographic repertoire may have taken place alongside or subsequent to the initial orthographic development in the syllabographic signs, but they certainly involved a more radical degree of change.

[85] Gnanadesikan 2021.
[86] Houston and Rojas 2022, 266.
[87] Salgarella 2020.
[88] Following also Bennet 2008.
[89] See Judson 2017b.

Chapter 2

Exploring logography

Writing systems are typically categorised in a way that is intended to encapsulate the types of signs (or graphemes) they employ and the ways the signs are used to represent language. So, it would seem uncontroversial that Linear A and B would generally be categorised as logo-syllabic systems, meaning that they use both logographic and syllabographic signs as part of their standard inventory (we will return to the more questionable case of Cretan Hieroglyphic later). This is a categorisation that aligns with the most common approaches to categorising, or taxonomising, writing systems, which have been dominated by linguistic approaches and are most interested in the ways in which language units (*e.g.* phonological or morphological segments, or lexical items) are represented by the system's signs.[1] Linear A and B both undeniably employ signs that represent syllables (specifically open syllables, *i.e.* vowel-only or consonant-vowel signs) and signs that represent whole words or concepts. However, as we will see, even the categorisation of signs within a system is not a straightforward matter, and in the case of Linear A and B we have good reason to think that what we tend to call 'logograms' (or sometimes 'ideograms') may not always work in the same way as each other or have the same origins.

On the subject of categorising whole writing systems, some more recent developments, such as modular and graphematic approaches, view the elements of a writing system differently. For instance, they would separate the repertoire of signs (to which they typically apply the term 'script') from its application to the language(s) written, while also separating some other features of the wider system, such as numerals, metrical notation and even sometimes visual features, such as text layout.[2] To some extent language encoding is still central to these approaches, which aim to shed light on the application of the script to the language. Nevertheless, they represent a certain improvement on taxonomies that inflexibly pigeonhole a writing system as employing a single method of language representation, by allowing more

[1] Bearing in mind, however, that no one taxonomy or terminological system has found universal acceptance in writing systems studies: compare, for example, the slightly different schemata presented in handbook-style treatments, such as Gelb 1969; Sampson 1985; Daniels and Bright 1996; Rogers 2005.
[2] *E.g.* van Neef 2012, 2015; Weingarten 2013; Meletis 2020, chapter 2; Meletis and Dürscheid 2022, chapter 4. On graphematic approaches to ancient writing systems, see Salgarella 2020; Elvira Astoreca 2021, 25–30.

room for description and by taking account of a range of system features that may not always co-exist with each other. Salgarella has specifically advocated a graphematic approach to Linear A, demonstrating that the script (*i.e.* the basic repertoire of syllabographic signs) is also shared with Linear B, while other features, such as the metrical system (*i.e.* signs for weights and measures), are more idiosyncratic to each.[3]

Recent research on the family of Aegean linear scripts has begun to elucidate aspects of the relationships between the systems, and the sometimes quite different ways in which signs seem to be used within the different writing traditions employing them. By taking each of the systems in turn, I hope to show that these differences also give us some important hints as to how writing changed over time and in the use of different groups of people. Even the steadfast labelling of the different systems as completely separate entities is demonstrably problematic: there are some inscriptions, for example, whose attribution to either Cretan Hieroglyphic or Linear A remains contentious,[4] and the development of Linear B has been shown to be best understood as a situated transition from Linear A writing practices rather than a momentous and wholesale adoption and overhaul of the system (which is the subject of Chapter 1: Exploring Script Adoption).[5] The focus in this chapter will be mainly on the 'logographic' components of the systems (see the next section on some of the problems surrounding this terminology), though it is also important to mention other types of signs; we will therefore begin by thinking about the classification of sign types.

Classifying signs in writing systems

A broad division can be made between signs that represent sounds and signs that represent whole concepts. The former category is often referred to as phonographic writing, an umbrella term covering what I will refer to as phonemographic writing, as employed at least in principle in alphabets (one sign = one phoneme in the represented language[6]), and syllabographic writing, as employed in syllabic systems (one sign = one syllable). There are also a number of systems that do something in between (often called alpha-syllabaries, or abugidas), for example using a base syllabographic sign plus a set of diacritics to cancel or change the associated vowel. Although it is not really relevant to the systems central to this book, I will just reiterate a point

[3] Salgarella 2020.

[4] See Petrakis 2017b, 81–82.

[5] See Salgarella 2019, 2020. We again see cases where a Linear A attribution would fit as well as a Linear B attribution for some documents. On the development of Linear B from a complex administrative matrix involving Cretan Hieroglyphic as well as Linear A, see Petrakis 2014, 2017b; Tomas 2017a.

[6] While this is often considered an ideal, thus allowing maximal representation of the phonological system in the smallest number of signs, real writing systems tend to not to obey the phonemic principle fully in practice. Even the Greek and Latin alphabets, which come quite close, have signs representing consonant clusters and underrepresent features such as phonemic length in the vowels. In the orthographic system of English, the alphabet used strays very far from a one-to-one correspondence between signs and phonemes.

I have previously made that the consonantal alphabets (sometimes referred to as abjads) and the alphabets-with-vowels are encoding at the same level, namely the phoneme, and so should be seen as typologically similar or identical.[7] Representation of the whole phonemic inventory is more of a scale anyway, and just as consonantal alphabets underrepresent vowels, it is similarly possible for an alphabet to feature overrepresentation, for example of the consonantal repertoire by having signs for consonant clusters or for allophones of individual phonemes. Morphographic writing as employed in some systems, *i.e.* the use of a sign to represent a morphological unit, could also be seen as phonographic in some circumstances, *i.e.* representing the way in which the morphological unit is pronounced; on the other hand, they could be seen as representing the morphological unit directly (which means some overlap with the second category).

The second main category of signs that represent whole concepts is altogether more slippery than phonographic writing, partly because there are a number of types of concepts that could be represented and there is rather a lot of potential overlap, and partly because of some disagreement over the terminology to apply to these signs. Among other possibilities, a sign could represent a word (which could be a word for a thing or an abstract concept), it could represent a concept directly (without reference to a word in a language, theoretically), or it could represent *e.g.* a number, a quantity or measurement, a break between language units. This list matches the range of sign uses in the Aegean linear writing systems quite well, and it is not intended to be exhaustive. The most contentious is easily the first item in the list, namely words and/or concepts, and exploring this kind of representation in a number of different writing systems will make it clear that we are not dealing with a single idea here but rather a range of possibilities – which makes it even more difficult to settle on a representative terminology.

The term 'logogram' is often used for a sign that represents a whole word or concept; we will return to the question of whether it is a good term to use later. But does a logogram represent the concept directly, or does it represent the word for the concept in a given language? If the sign is a visual depiction of the thing it represents (and note that this does not work so well for abstract concepts that are less easily visualised), we might justifiably say that the reader does not necessarily need to think of or even to know the word in the underlying language, since they can make a direct visual link with the thing. In this way, such a sign could transcend language boundaries: compare the way in which logographic Chinese writing in the modern day is often thought of as transcending linguistic boundaries by theoretically being legible in different dialects, or Sinitic languages, that have different pronunciations for the words or concepts represented by the signs,[8] or, indeed, the application of

[7] As previously argued in Boyes and Steele 2019.

[8] See *inter alia* Li 2006. However, the development of writing in China and the representation of language varieties is far more complex than this may suggest, on which see recently Li and Zhu 2019.

Fig. 2.1. The Linear B pig logogram, transcribed SUS. Drawing by Rupert Thompson.

Japanese linguistic values to borrowed kanji signs. Strong visual links between sign shapes and the things denoted are often referred to in terms of iconicity: the Linear B logogram representing a pig, for example, is highly iconic because it is effectively a small drawing of a pig's head (Fig. 2.1).

To add a further complication, logographic signs can themselves be phonographic (even at the same time as being highly iconic in some cases). A telling example is found in the early stages of **Egyptian hieroglyphic** writing, where signs were originally associated with whole concepts and the words for them but quite quickly came to be able to represent the sound of the word in other linguistic sequences. So, the pharaoh Narmer, whose famous palette represents a very early example of phonographic Egyptian writing, has his name spelt out as catfish+chisel *i.e.* two signs that look like a catfish (*nʿr*) and a chisel (*mr*) but that represent the phonetic sequence *nʿr+mr* as a name. This phonetisation of what were originally iconic, logographic signs is frequently referred to as the rebus principle. However, it is important to point out that in the earliest stages (and arguably continuing later), the iconographic potential of the signs remains an important part of their use: Narmer stands out as a name that can be represented partially with an animal sign, growing out of a tradition where rulers were represented by emblematic animals, and offering the further advantage that animals can be depicted acting (for example Narmer's catfish with arms to smite enemies) – which is not generally the case for name elements represented by inanimate objects.[9] The fact that Egyptian hieroglyphic signs maintained their highly iconic nature has led to their often being referred to as 'pictograms' – *i.e.* even as they developed a greater range of representation through the rebus principle, as described above, and so could be used to write complex sentences involving actions and abstract concepts (also with the aid of features such as phonetic complementation and semantic classifier signs or determinatives[10]), they generally resisted visual abstraction, or perhaps better, schematisation (unlike, for instance, the contemporary cuneiform writing tradition). The motivation for their continued iconicity in the long term is evidently both visual and cultural, and has a lot to do with the way in which manifestations of writing were associated with artistic and architectural contexts in Egyptian society.[11] As an aside, it is worth pointing out that hieratic writing, although evidently related to the hieroglyphs and strongly cursive in nature, was not simply a tradition that consisted of visual abstractions of hieroglyphic signs. In Egyptian hieroglyphic writing, the logographic and phonographic potentials of signs (*i.e.* the ability to read them as whole words or as a consonantal sound or series

[9] I am indebted to Jordan Miller for guidance on these observations.
[10] Arguably not all signs usually classed as determinatives should be considered as semantic classifiers in Egyptian writing, so these are potentially terms with overlapping functional ranges, rather than synonyms.
[11] For the wider context, see Baines 2007. On the principles of sign variation, see Miller 2022.

of consonantal sounds) remain present throughout their usage, and it is perhaps more useful to think of a given sign as polyvalent (*i.e.* having multiple types of readings) rather than primarily one or the other.

Some interesting parallels can be found in **Mayan** writing, a system that would typically be categorised as different from Egyptian hieroglyphs from a linguistic perspective. Phonologically, Egyptian hieroglyphs encode only consonants, with individual signs representing either a single consonant or groups of two or three consonants, as determined mainly by the number of consonants in the word for the thing depicted in the original hieroglyph. Mayan phonographic writing, on the other hand, encodes whole syllables, specifically open ones (*i.e.* syllables that end in a vowel, not a consonant, just as in Linear A and B). But aside from these differences, the two systems share some remarkable similarities, perhaps the most striking of which is their very high levels of iconicity of signs (albeit with some differences in the degree to which they are conventionalised or naturalistic), combined with a strongly visual and artistic context for many inscriptions. The ability to write words and sequences in multiple different ways is also central to the Mayan practice of writing, which broadly speaking favoured intra-text variation and used different ways of combining signs as one way of achieving this aesthetic principle of 'horror repetitionis'[12] (or the avoidance of 'graphemic tautology'[13]).

In Figure 2.2, a drawing of a stela from Ixtutz, in Guatemala, we can see some examples of the different ways in which syllabographic and logographic signs in Mayan can be combined in glyph blocks, showing a very high level of dynamic flexibility and variability. The first thing we might notice is that a given sign can have different visual appearances, as with the logogram AJAW ('lord', also referring to a date) in its various instantiations in A1, B4, A5 and B5; in one case in B4, the word *ajaw* is spelt with not only the logogram AJAW but also an accompanying syllabographic sign *wa,* used as a phonetic complement to confirm the last sound of the word. We can also see that logographic signs can be used in different ways. In A2, the logogram TUN ('stone') is used to represent the word *tuun* ('stone'), and again we see the use of a phonetic complement, *ni*, although this is optional (and we might wonder whether the decision to include it was primarily visual, as a sort of space filler). In A4, on the other hand, the logogram CHAN ('snake', with the visual form of a snake's head) is used in the middle of the word *uchan* ('guardian'), spelt u-CHAN-na, where *na* is again a phonetic complement but *u* is the first sound of the word; here the meaning of the logogram, 'snake', has no relationship with the meaning of the word *uchan* and is used only to contribute the phonetic value *chan* to the whole sequence. This might indeed remind us of the rebus principle as employed in Egyptian hieroglyphs. Note, however, that semantic classifiers do not play a role in Mayan writing (except in rare examples, such as the cartouche with volutes used to mark out day names, which appears in A1 here).

[12] Prager 2021, 108; Prager and Gronemeyer 2018.
[13] Kettunen and Helmke 2014, 17.

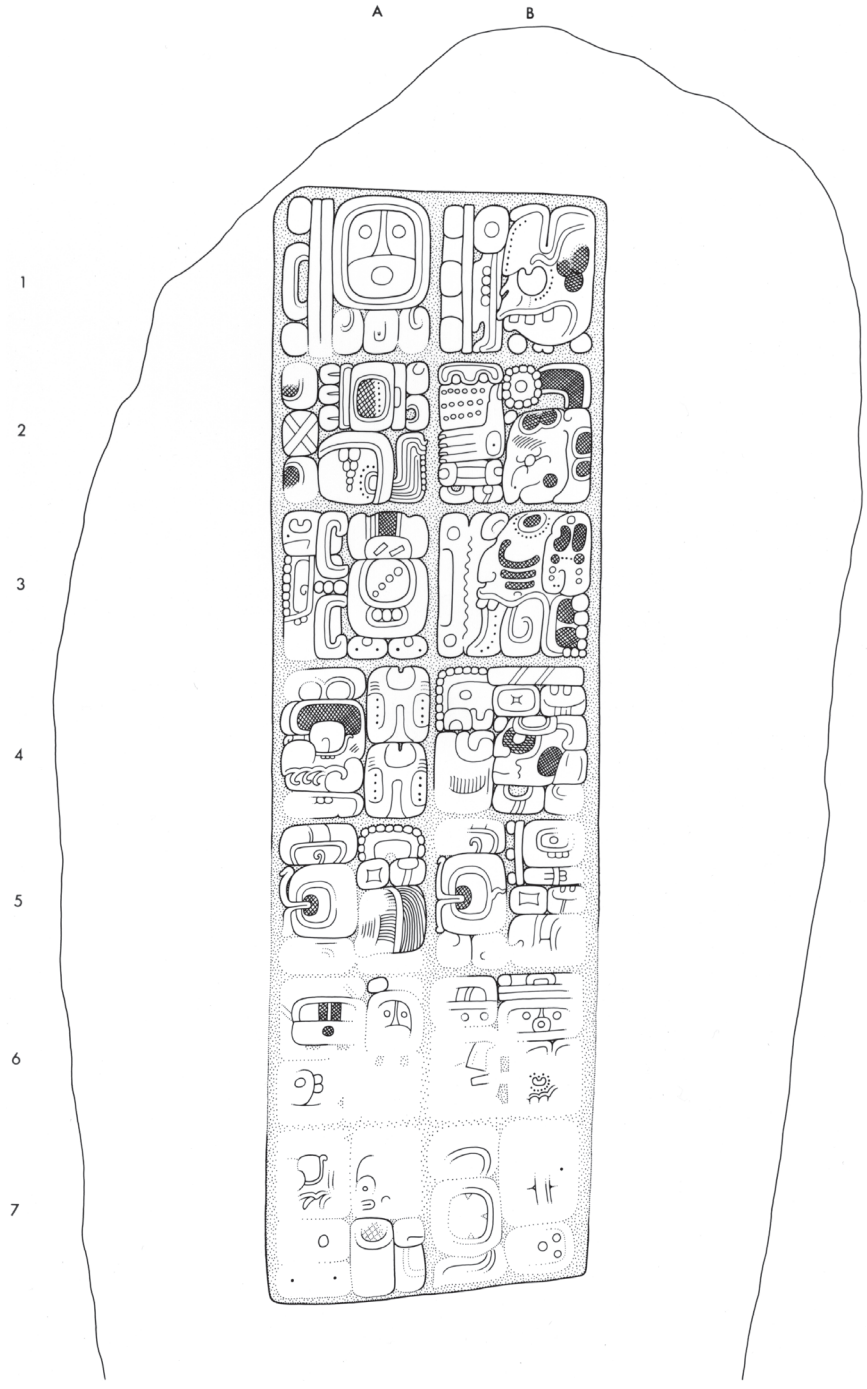

Fig. 2.2. Ixtutz, Stela 4, front. Drawing by Ian Graham. © President and Fellows of Harvard College, Peabody Museum of Archaeology and Ethnology, 2004.15.6.4.17.

Transcription of Ixtutz stela 4 (rows 1–5):

Left column:	**Right column:**
A1: 12-AJAW	**B1: 8-TE'-[PA']xi-la**
lajunchan?? ajaw	*waxakte' paxiil*
12 ajaw	8 pax (9.17.10.0.0)
A2: u-tz'a[pa]-wa TUN-ni	**B2: u-CHOK-ko-wa ch'a-ji**
utz'apaw tuun	*uchokow ch'aaj*
(he) planted/inserted the stone	(he) scattered droplets
A3: a-ya-YAX-ja-la	**B3: BAK-?**
aj yayaxjal?	*baak ...?*
Aj Yayaxjal?	Baak...?
A4: u-CHAN-na bo-bo	**B4: K'UH-lu 5-KAB-AJAW-wa**
ucha[']n bo[h]b	*k'uhul ho'kab ajaw*
guardian of Bohb	divine lord of Ho'kab
A5 : yi-IL-ji? K'UH-MUT-?-AJAW	**B5: yi-IL-a? 8-WINAK-ki-AJAW-TAK**
yila[a]j k'uhul mut[ul] ajaw	*yila? waxak winak ajawta[a]k*
(he) had seen it, the divine lord of Mutul	(they) saw it, the 28 lords

A very similar range of usage can be seen in **Anatolian hieroglyphs**, where a logographic sign can stand for the word it denotes as a whole unit within a sentence but can also stand for the phonetic sequence represented by the word, for example within a name; in some periods, the addition of small extra signs or inversions in sign direction could be used to help guide the reader as to whether a sign has a logographic or a phonographic value in a particular instance.[14] Phonetic complements are also in use in this script, alongside semantic classifiers or determinatives that stand outside of the sentence structure and are not 'read' as part of a sequence.[15] Again a high degree of iconicity is at play, as the signs maintained a (somewhat conventionalised) pictorial nature, especially in the monumental inscriptions. The integration of text and image is sometimes literal, as seen especially in the sign EGO ('I'), which typically appears at the beginning of inscriptions where an important person is speaking in the first person about their deeds, and can in some cases be represented by the full figure of the person or can interact with their image (as in Domuztepe 2, where the Storm God is holding the EGO sign in his hand).[16]

[14] See Weeden 2014 for further detail.
[15] See Payne 2017, 2018.
[16] See Payne 2016.

All three of the systems mentioned so far feature a kind of logographic writing where a logographic sign can be used in the place of a word in a sentence (which I will refer to as a *syntactic* use) or can represent the phonetic sequence associated with the word in other circumstances (which I will refer to as a *phonetic* use). It is perhaps helpful to think of the signs as therefore being polyvalent, rather than necessarily having one kind of usage privileged over the other, and in some cases, we can observe efforts to disambiguate types of usage.[17] Alongside high levels of iconicity in sign shapes, their orthography is highly variable, which owes a great deal to the polyvalency of the signs – as the next example will also demonstrate.

Another writing tradition (or rather a large and heterogeneous set of writing traditions) that must be considered is **cuneiform**. We will focus broadly here on Mesopotamian cuneiform, setting aside non- or partial-syllabographic traditions, such as Ugaritic or Old Persian. In the earliest phases of cuneiform used for Sumerian, logograms can appear to stand separate from the syntax of a phrase or sentence: in some early accounting documents, for example, we see logographic signs followed by numerals in clear records of quantities of commodities.[18] A perhaps similar usage has been observed in Linear B as 'instruments for counting', as we will see further on in this chapter (where the issue of whether such signs stand apart from syntax will be considered in more detail).[19] Later types of cuneiform then retain what are referred to in scholarship as 'Sumerograms', *i.e.* logographic signs based on the Sumerian value lexically, but often supplying the Akkadian (or similar) value phonetically as an alternative reading. Similarly, in Hittite cuneiform, which was used to write a completely different language again, the use of both Sumerograms and Akkadograms (similar to Sumerograms but based on Akkadian words) became an ingrained part of the writing tradition. A logographic sign based on a word for a thing in one of these other languages could therefore be used in a sentence in Hittite to refer to the concept in question and could even be accompanied by extra phonographic signs representing Hittite morphological forms.[20]

One of the most striking features of these cuneiform traditions is the polyvalency of signs (*i.e.* a given sign shape can have multiple different values) and the use of highly variable orthography (*i.e.* a given word can be spelt in multiple ways – aided by the fact that for a given syllable there could be multiple sign shapes that could be used).[21] The use of Sumerograms (and of Akkadograms in some traditions) adds

[17] See also Stauder 2018, focused mainly on Egyptian hieroglyphs but with implications for other systems.
[18] However, the degree to which they stand apart from syntax is questionable, since the layout of information follows syntactic structure even where morphological forms are not explicitly marked. The accompanying numerical notation also does a great deal of the work in representing the commodities recorded (see Woods 2015). I am indebted to Colton Siegmund for clarifying these points.
[19] Weilhartner 2017, 169.
[20] See Weeden 2011 on the function of logographic signs in Hittite cuneiform; see also Kudrinski and Yakubovich 2016 on the suggestion to refer to logographic signs in a language other than the main language of a text as 'heterograms'.
[21] However, it is worth pointing out that not all variants existed synchronically and that there were preferences for particular sets of values at certain places and in certain periods.

considerably to that polyvalency and variability, which was clearly highly prized by cuneiform writers, who sometimes deliberately chose more obscure syllabograms to demonstrate their literate skill. Again logographic signs could be used both syntactically and phonetically. They could also be used as semantic classifiers, where the logogram serves to specify the semantic field of the word it accompanies but otherwise stands apart from the sentence both syntactically and phonetically. Cuneiform scribal traditions relied heavily on the writing system's scope for both polyvalency and paranomasia, which is to say that they exploited the potential for the signs of a word to be read in different ways – not only reading them as either logogram (*e.g.* Sumerogram, determinative) or syllabogram, but also bringing out the potential for one word to be read as another (for instance Noegel cites the example in Enuma Elish of *maš-ka* 'skin, hide' also having the potential to be read as *pár-ka* 'dividing line', creating a double meaning that relies entirely on visual interaction with the written signs).[22]

This survey of a range of ancient writing systems shows a number of ways in which logographic signs might be used in practice, for example:

1. As a whole lexical unit integrated into the syntax of a sentence (syntactic).
2. As a whole phonetic unit, where the sound sequence represented by the word is integrated into a larger sound sequence (phonetic; rebus principle).
3. As a semantic unit specifying the semantic field of an associated word but otherwise standing in isolation from its sentence (semantic classifier).
4. As an indicator of a commodity being counted or measured in an administrative text (accounting).

Before moving on, we will take a moment to consider the terminology usually applied to signs with these sorts of functions. Literature on this topic may often seem to be very decisive, giving restrictive definitions for terms such as 'logogram' and 'ideogram'. Another option gaining popularity is 'morphogram', although this term does not exclusively refer to whole words but also to smaller morphological units (such as affixes in inflectional languages) and tends to be preferred for modern writing traditions, where logography proper is considered to be absent;[23] this term will not be considered further here, since a number of ancient writing systems clearly do use signs to represent whole lexical units in various ways, and it is important to use a terminology that reflects this.

In the Aegean scripts it has largely been the terms 'logogram', and 'ideogram' that have attracted attention: in an article on terminology used for Linear B signs, Thompson defines a logogram as 'a sign which stands for a lexeme, or more generally a morpheme, in a particular language', and an ideogram as 'a sign which directly reflects semantics without the mediation of a lexical item in a given language',

[22] Noegel 2021, 37–38 (and see this work more generally on the relationship between writing system features and the use of wordplay, and for further examples, see Finkel 2010).
[23] See Joyce 2011; Meletis and Dürscheid 2022 (esp. pp. 243–244).

representing a fairly typical view of the perceived distinction between these two terms.[24] But we immediately hit a problem in that it is very difficult to be certain what happens in the mind of an ancient writer or reader when encountering such signs – how do we know whether they think of the word for the thing in a given language or simply visualise the thing directly? Imagine, for comparison, the capital M used as a logo by the McDonald's food chain. When you see it, you may very well think of the word McDonald's, or your mind may be taken straight to the image of your future cheeseburger – in fact there is no reason why both values could not be valid for a single individual and crop up in different contexts. In the modern day we could even attempt to survey readers to try to understand the way they engage with and interpret the many signs that appear in their daily lives, which may very well reveal more complexities than will fit into a neat categorisation, though sadly we can't do that for the ancient world. There may indeed be a range of other associations with the sign, which go far beyond its basic value in the writing system, just as there might be with any image or visual artefact – the McDonald's M might variously be associated with the cheer of a night out, the guilt associated with unhealthy eating or even an element of hope in popular views of IVF treatment (where there is an urban myth that eating McDonald's fries aids implantation after embryo transfer), and an inverted version is sometimes seen representing 'sh' for the popular street food shawarma.

Would another term be better, to avoid such ambiguity? The word 'semasiogram' was introduced by Gelb as an alternative, for example, but only because he wanted to confine the term 'ideogram' to his so-called primitive systems that did not in his mind comprise 'true' writing – an unhealthy evolutionary approach to writing that has thankfully now gone largely out of fashion.[25] A better term might be sematogram, which has been defended in the particular context of Linear B writing and is intended to act as a more neutral label in the midst of the ideogram vs. logogram debate (while also neatly sidestepping Gelbian associations).[26] The word 'sematogram' indicates obviously that the sign has a direct relationship with lexical meaning, and could be taken as a catch-all term for signs that represent whole words or concepts directly, irrespective of whether reference is made to a specific word in a specific language. As we will see, for the Aegean scripts we are dealing with, there is the further complication of multilingual situations, where a given sign might well make specific reference to a word in one language in one tradition, but then be borrowed for use by another language group, maintaining its semantic association without necessarily retaining its reference to the word in the other language.[27] The only problem is that the category of sematograms would usually be seen to include signs other than ones

[24] Thompson 2012, 545–546.

[25] Gelb 1969.

[26] See especially Petrakis 2017a (whose 'non-phonographic sign' is another neutral alternative, if a slightly more clumsy one); cf Bennett 1972.

[27] Thompson makes this argument in relation to the sematographic use of *NI* for 'figs', borrowed from Linear A into Linear B, for example: Thompson 2012, 552. Such linguistic transfers also occur in other systems, for example the Sumerograms, as mentioned above, that continued to be used in Akkadian

usually labelled as logograms or syllabograms, such as numerals and measurement signs,[28] making it more useful for a wider categorisation.

For our present purposes I am not so much concerned with terminology (on which no doubt debates will continue) as with the different ways in which signs standing for whole words or concepts work, and with their sometimes quite obviously different origins. However, I do want to maintain focus on the signs standing for whole words or concepts, and so I am going to use the term 'logogram' across the board for all types of signs that might fall within this category in the Aegean scripts while we examine their uses and developments over time and within different writing traditions. For the most part I'll remain agnostic as to whether direct reference is made to the word for a thing in a particular language, though such matters may sometimes be interesting to discuss. An issue of more potential interest is the phonetisation of signs, for example how some signs have come to have both logographic and syllabographic values, as well as features such as abbreviation and the compounding or ligaturing of signs. We will begin with Linear B, since it is the most deciphered member of this writing system 'family', offering the advantage of well-understood documents and contexts, and where it is immediately obvious that not all logograms work in the same way or have the same history.

Linear B

Linear B tablets most often consist of both syllabographic sequences and logographic signs, laid out in such a way that the logographic signs have clear 'slots'[29] standing apart from the syllabographic sequences. The exact layout depends on the size and shape of the tablet and the nature and complexity of the information presented. For longer tablets it is quite typical to have some introductory phrasing, followed by a list structure in which individual entries are accompanied by logograms (for example, following the heading, a list of people or places with logograms for the commodities and amounts relevant to each one). These structural features are very consistent, especially within a given series of tablets on a particular subject, suggesting that the way in which textual information was laid out was an important element of training for the administrators writing the tablets. Outside of the tablets, which form the overwhelming majority of surviving epigraphy, we also see logograms used in some other document types, such as sealings and labels, though they do not occur on the inscribed stirrup jars (ISJs).

language texts or the interaction between Mayan and other language traditions outside of the southern lowland region where it was spoken.

[28] Arguably numerals and measurement signs could also be thought of as logographic in some circumstances. However, there are also differences in their paths of development, especially in the case of numerals (see recently Overmann 2023 for both cognitive and material aspects of this problem; also Valério and Ferrara 2020).

[29] See Petrakis 2017a, 127–128.

An overview of the types of logogram used in Linear B immediately shows that they do not all work in the same way, and some almost certainly have developed from different types of precursors in earlier writing traditions. We will begin with the function of these signs within Linear B writing traditions, before exploring the development of different categories. This raises an important question about the nature of a writing tradition and the degree to which it is adaptable by its users – do they see the system as a tool, providing a number of fixed choices over signs that could be used to convey the information they want to, or do they have freedom to innovate as they write? Does the writing system itself have a certain agency in empowering writers to convey new, perhaps untested or unexplored complexities in information? By asking such questions we are straddling a borderline between structuralist and practice-based approaches,[30] both of which provide useful lenses through which to try to view the remains of Aegean writing traditions. We tend to think of ancient languages and writing systems as things that can be learnt in their entirety, because their remains (not counting possible future archaeological discoveries) are finite: all the innovations that were ever made in these systems have already been made, so it is unsurprising that they may appear more static than dynamic. We think of such systems as having clear and unbreakable rules, based on the examples of text that we know of, but we cannot account for the unrecoverable factor of dynamic usage that has been lost to us due to selective survival of documents. What innovations might a writer have made in documents that have not survived? Or, conversely, could (to us) extraneous-looking features in surviving documents be evidence for the dynamic and changeable aspects of writing practice?

When trying to categorise the signs, descriptions of logograms in Linear B have often started by separating the so-called iconic ones from the non-iconic ones. Iconic logograms would be ones that obviously look like the thing they represent, such as some of the animal ideograms (pigs, horses and deer are particularly iconic) or those for items of armour and weaponry. There is certainly an important historical value in studying the shapes and visual properties of such logograms, which help us to understand the relationship between these depictions, wider Minoan/Mycenaean iconography and material culture as attested in the archaeological record[31] – though for this chapter we are more concerned with their place in the overall logographic system. The non-iconic logograms, then, would be ones where 'the sign is neither an obvious image of the object (its real referent), nor its phonetic designation'.[32] There is obviously a certain amount of subjectivity here, given that it is difficult to know what visual referent would be appropriate in the mind of an ancient writer, especially in

[30] On these approaches to writing systems research, particularly in the context of the CREWS project, see Boyes, Steele and Elvira Astoreca 2021.

[31] See Vandenabeele and Olivier 1979; Weilhartner 2014, 2017. Palaima even suggests that the logogram for 'deer' (CERVUS) could have used wall paintings in the administrative complex at Pylos as a visual inspiration and template for the design of the sign, and that there was thus a very close link between iconographic representation and sign creation (1992, 73–74).

[32] Melena 2014, 128.

areas of material culture that are poorly preserved in the archaeological record – or, in other words, whether some of the 'abstract' logograms are actually visual depictions of things that are simply not obvious to us today. It is also entirely possible for an abstract-looking symbol to carry a very particular visual meaning – think of the euro, pound and dollar signs (€, £, $), which do not look like money but unfailingly convey the idea of a monetary unit (usually followed by a numeral specifying the amount).

Salgarella suggests that, in Linear A at least, it could be that a complex sign such as *MA+RU* (= LANA, used logographically for 'wool' in Linear A and B), was created out of phonetic signs (syllabograms) simply because the concept of wool is difficult to depict visually, hence the creation of a monogram;[33] a similar argument might be made for AREPA (*A+RE+PA*, *aleiphar* 'unguent'), which encodes a Greek word in Linear B. But is wool really a difficult concept or item to depict visually? Consider the many signs associated with visual depictions of concepts related with woolwork and weaving in Cretan Hieroglyphic, where the iconography was evidently highly systematic and well developed.[34] Perhaps a better way of thinking of this whole logographic system is to see both iconicity and language-sound elements as playing an important role, whether historically (*i.e.* in traditions earlier than Linear B) or synchronically (*i.e.* still ongoing in Linear B). On the latter, it is worth noting that numerous syllabograms in Linear B (not to mention Linear A, as we will see) can be used in a logographic way in some sense, whether they have a continued life as both syllabogram and logogram (such as *ni*, *au*, *qi*, *mu*, etc) or whether they can act as abbreviations for whole words and so act as logograms. We will return to these problems frequently throughout this chapter.

If we concentrate on function, the use of logographic signs in Linear B is very consistent. In the overwhelming majority of cases, the logogram stands for a commodity (taken loosely to incorporate objects, workers, animals, land, etc) that has been counted and/or measured and is recorded alongside numerals and sometimes measurement signs in a document. Linear B tends to be laid out in such a way that information slots are visibly separate from each other, although this remains quite a sweeping statement as layout is very much dependent on the amount and type of information being recorded, the size and shape of the document and the nature of the commodity. Compare Figures 2.3 and 2.4. In Figure 2.3 (PY Cc 665), we can see a very straightforward version of the laying out of textual information, with syllabic sequences at the beginning (in this case a personal name followed

Fig. 2.3. PY Cc 665, a record of sheep and pigs from Pylos. Photo courtesy of The Pylos Digital Tablets Project, Palace of Nestor Excavations, The Department of Classics, University of Cincinnati.

Transcription of PY Cc 665:
ne-wo-pe-o , po-ti-ni-ja OVIS^{m} 100 SUS 190

[33] Salgarella 2020, 53.
[34] See Nosch and Ulanowska 2021.

Fig. 2.4. PY Ta 641, a record of vessels from Pylos. Photo courtesy of The Pylos Digital Tablets Project, Palace of Nestor Excavations, The Department of Classics, University of Cincinnati.

Transcription of PY Ta 641:

.1a , ke-re-a2 , *202[VAS]

.1b ti-ri-po-de , a3-ke-u , ke-re-si-jo , we-ke *201[VAS] 2 ti-ri-po , e-me , po-de , o-wo-we *201[VAS] 1 ti-ri-po , ke-re-si-jo , we-ke , a-pu , ke-ka-u-me-ṇọ[

.2 qe-to *203[VAS] 3 di-pa , me-zo-e , qe-to-ro-we *202[VAS] 1 di-pa-e , me-zo-e , ti-ri-o-we-e *202[VAS] 2 di-pa , me-wi-jo , qe-to-ro-we *202[VAS] 1 [

.3 di-pa , me-wi-jo , ti-ri-jo-we *202[VAS] 1 di-pa , me-wi-jo , a-no-we *202[VAS] 1

in smaller signs by the name of the goddess Potnia), then large logograms with more space either side, each one followed by numerals (100 male sheep and 190 pigs). In Figure 2.4, on the other hand, rather a lot of complex information is gathered in one elongated tablet, with multiple entries per line, and so logograms effectively fall 'inline' rather than having clearly demarcated spaces on the tablet; this is an issue we will return to when we come to the behaviour of logographic signs in Linear A.

Any type of logogram can fill the logogram slot on a given tablet, theoretically. While scholars have often tried to distinguish between iconic, abstract and acrophonic logograms, the fact that they all behave in the same way suggests that they have the same status in the writing practice of a Mycenaean administrator writing the documents. Some categories can even overlap: the syllabograms *ni*, *qi* and *au* can respectively act as logograms for 'figs', 'sheep' and 'pigs', concepts with which they have strong visual resemblances (making them iconic logograms), and the fact that they double as syllabograms does not mean that they are any less iconic. Indeed, it is somewhat inconsistent that the logogram for 'figs' is usually transcribed in scholarship as *NI* while the logograms for 'sheep' and 'pigs' are transcribed respectively as OVIS and SUS, which rather implies a difference in status that doesn't exist. We would probably be better placed seeking the derivation of such signs in the phonetisation of logograms in earlier writing traditions, whether through an acrophonic principle (*ni* from *nikuleon*) or an onomatopoeic principle (*au* for a pig's grunt? cf. *mu*, which has the same shape as the logogram for a cow, transcribed BOS). The undeciphered Linear B signs that share both syllabographic and logographic values, *22/CAP ('goat')

and **65*/FAR ('flour'), should also probably be thought of in this way, as they both have antecedents in Linear A; **22* is used logographically and syllabographically in Linear A, but for **65* only the syllabogram is attested with certainty.[35]

A note of caution is necessary on the concepts of acrophonic logograms and abbreviations, as signs often classified in these ways can be understood to fulfil a range of subtly different functions. Here it makes sense to draw a distinction between syllabographic abbreviations that can act as logograms in their own right (which we can demonstrate, for example, if they can be followed immediately by numerals or measurement signs) and syllabographic abbreviations that act as modifiers to other logograms. The number of syllabographic abbreviations functioning as logograms is actually quite limited in Linear B, especially if we discount ones used for herbs and spices (on which see below). There are a few where we can guess the word that may be abbreviated, such as *RI* standing for *linon* 'flax', *DA* for *damar* 'steward', *WE* for *wetalon* 'yearling (animal)'. There are also other syllabograms used in the same way where it is difficult to guess the word abbreviated, such as some signs used in flax records (*SA*, *KE*). In a slightly different context, the syllabograms *MO* and *ZE* can be used in counting to represent the words *monwos* and *dzeugos*, 'single' and 'pair'. The abbreviations we can identify tend to be ones where we can etymologise them because they are Greek, meaning that they will also presumably be innovations in Linear B writing practice; but we cannot rule out that some unidentifiable abbreviations could represent non-Greek words, whether they are words in Minoan that have remained from Linear A usage or words in Minoan or any other contemporary language spoken alongside Greek in the Mycenaean world.

Syllabographic abbreviations used as modifiers seem to work differently from the first group and can be found either just before a logogram (usually termed 'adjuncts') or incorporated into the logogram itself (as ligatures or compound signs). All certain examples of adjunct-type modifier syllabograms are attested at only a single site each, although as before it is difficult to be certain whether this distribution is significant and points towards localised practices. There are some ligatured modifiers, on the other hand, that are attested at multiple sites, including OLE+*A* (*agrios* 'wild oil'?), SUS+*SI* (*sihalos* 'fatted pig', also written out as *si-a$_2$-ro*), **154+WI* (*wrinos* 'leather', also written out as *wi-ri-no*) and TELA+*PA* (*pharwos/pharweha*, a particular type of cloth, also written in the plural as *pa-we-a$_{(2)}$*), as well as others only attested at a single site so far. In most cases it appears that the modifying abbreviation (whether as a compound sign or adjunct) narrows down the category of a generic logogram to a specific type of that commodity or object; however, again we often have to make informed guesses as to what a given abbreviation stands for. Rarely, a logogram can also be modified by another logogram, for example in the case of vessels with the AES 'bronze' or AUR 'gold' logogram added to specify their material, and in wool records with OVIS^{m} or OVIS^{f} before LANA to specify whether the wool came from a male or female sheep.

[35] See Judson 2020b.

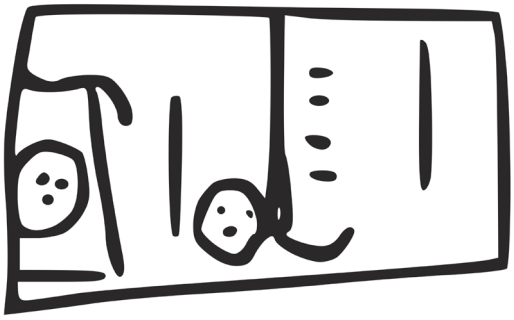

Fig. 2.5. Tablet fragment KN Sc 266, listing pieces of armour. Drawing by the author.

Sometimes the same abbreviation can apparently be used as both a logogram in its own right and a modifier for another logogram: for example, we find the syllabogram *WE* acting as a logogram at Pylos, Knossos and Thebes, while at Thebes there is an example where it acts as an adjunct-modifier (TH Wu 74), in all cases assumed to stand for *wetalon* 'yearling'. This is perhaps another hint that we should be cautious, because, by imposing categories on sign types in Linear B, we may not be making the same distinctions that a Linear B writer would themself have in mind. Sometimes we also find tablets where the distinctions are somewhat blurred, and it is difficult even to force our modern framework to fit the examples. In the tablet fragment KN Sc 266 from Knossos (Fig. 2.5), we can see the use of a compound logogram made up of TUN (the logogram for a breastplate) with a sign *qe* inside, perhaps denoting a specific type of 'corselet' that is elsewhere written out as *qe-ro*$_2$ (*sk*^{w}*ellon*). This is followed by a numeral 1, and then there is the *ZE* sign denoting a pair, with the numeral 1 again. Before the *ZE* sign, another *qe* has been squeezed in by the writer, apparently after they had already written the *ZE*, but it is unclear how to take this *qe* – if it stands for the same word abbreviated by the *qe* in the TUN+*QE* compound logogram, then why write it again? Perhaps the writer thought they should have added the whole compound logogram again, but could only fit the *qe* at this point? Given that whatever exactly is being recorded is not written simply as three units of one type of object, presumably we have one unit of TUN+*QE* plus one pair of something else abbreviated by the second *qe* (which may therefore be seen as acting as a logogram in its own right), but we may wonder why the writer had not made this clear before adding the *ZE*. Another possibility is that TUN+*QE* represents an object that can come in pairs, like chariot wheels or horses, hence counting it as one + a pair, and the second *qe* could then represent clarity anxiety on the part of the writer. But these will have to remain speculations.

But the distinctions outlined so far may not be quite as clear cut as we would like, and we can even find single tablets with syllabographic abbreviations functioning both alongside and in the place of logograms. A tablet from Mycenae listing condiments and spices, MY Ge 603, provides some examples (transcription below). In the first main line, the logogram AROM is used as a generic sign for condiments and spices. Before it is a syllabogram, *ko*, which stands apart from the other syllabic sequences and is actually modifying AROM – we know that the *ko* stands for 'coriander' (sometimes

spelt out in full as *ko-ri-ja-do-no*, *ko-ri-ja-da-na* or *ko-ri-a*$_2$*-da-na*).[36] Because this *ko* modifies AROM directly ('a condiment/spice namely coriander' *vel sim.*), it is usually transcribed in lowercase italics to denote this special function. But *ko* also appears on subsequent lines without AROM, where it clearly acts in the same way as the *ko*+AROM combination but is transcribed in italic capitals, as *KO*. This is a convention used to denote syllabographic signs acting as logograms in their own right on the acrophonic principle (*i.e.* they stand for the initial sound of the word denoted) – though remember that the same convention has been used for *NI* even though that seems to be a historical acrophonic abbreviation rather than a synchronic one in Linear B writing.

Transcription of MY Ge 603:

.1a [ ]ka-ra-to *155^{VAS} 1
.1 ke-po , *ko* AROM T 2 / ka-na-ko , re-u-ka V 1 da-ra[ ]ṃị-ta-qe 20 ḳạ-ṇạ-ko , e-ru-ta-ra M 1
.2a ka-na-ko M 1 *155^{VAS} 1
.2 pu-ke-o *KO* T 2 *KU* V 2 *MA* Z 2 *SA* Z 2 ko-no 10 e-ne-me-na 1[
.3 i-na-o *KO* T 2 *KU* V 1 ⟦*MI* 20⟧ ko-no 10 *E* 1 ka-na-ko e-ru M 1 [ ] *vac.*
.4 ra-ke-da-no *KO* T 2 *KU* V 2 ⟦*MI*⟧ ko-no 12 *Ẹ* 1 *155^{VAS} 1
.5 a-ke-re-wi-jo *KO* T 2 *KU* V 1 *MA* V 1 no-ko 10 *DẸ*[ ] *155^{VAS} 1
.6 pe-ke-u *KO* T 2 *KU* V 1 Z 2 *MA* V 1 ko-no 10 *E* 1 ka-na-ko M 2 *155^{VAS} 1
.7 pu-wo *KO* T 2 *KU* V 2 *MA* V 1[ ] ko-no *DE* 1 *155^{VAS} 1
→
v.
.1 pẹ-[ ]2
reliqua pars sine regulis

You could say that in subsequent lines, the *KO* stands for the *ko*+AROM combination and is simply a way of saving space, which is probably the right way of thinking about it. But *KO* is far from the only syllabogram used in this way in this tablet. We also find *KU* for *kuminon* 'cumin', *MA* for *marathwon* 'fennel', *SA* for *sasama* 'sesame', erased examples of *MI* for *mintha* 'mint', *E* as an abbreviation for *e-ne-me-na* (which apparently describes some type of *ko-no*, *skhoinos*, perhaps 'ginger grass'?) and *DE* as an abbreviation perhaps for *desma* (a 'bundle', used to measure *skhoinos*).[37] Most of these seem to be standing in the place of a regular logogram in that they are followed by numerals and measurement signs; if this was a single entry tablet, we might indeed expect combinations of the abbreviation with the AROM sign as in this tablet's line 1. At the end of most lines there is also another logogram, transcribed *155^{VAS}, which apparently refers to the container (perhaps a basket) in which the listed quantities

[36] Elsewhere we also see AROM with the *ko* written inside, clearly performing the same function as when *ko* is written in front of the AROM.
[37] Ventris and Chadwick 1973, 225–231, remains an instructive treatment of these terms.

of condiments or spices are stored (X amount of spices in Y number of baskets?). While this tablet offers some slightly more complex examples, it does show the use of syllabograms in place of logograms, which in other tablets can occur without examples of ligatured logograms. A syllabographic sign can also come before a logogram without being ligatured to it, in which case it is usually transcribed differently, but we can assume that it would work in a similar way by modifying the reading of the logogram (again as an acrophonic abbreviation), in most cases probably to make the commodity more specific.

The tablet just discussed makes it quite clear that we need to approach the nature and usage of logograms in Linear B with an open mind. In particular, the practice of abbreviating words to their first syllable and using a single syllabogram to stand in for them (hereafter 'acrophonic abbreviation'), evidently interacts with the use of logograms that act as direct visual references to commodities. Abbreviations are very common, although they tend to be transcribed in slightly different ways by modern scholars, based on perceived functional differences – though as we have already seen in the case of *NI*, such assumptions may be open to question. We may also wonder why, for example, something like the very common abbreviation *o* for *o-pe-ro* (*ophellon* 'owing', marking a deficit) continues to be transcribed with a lowercase letter even though it behaves rather more like signs transcribed in upper case, which are seen as acting logographically and tend to be followed by numerals and/or measurement signs, as *o* generally is. Traditional approaches to breaking up Linear B logograms into categories are almost certainly making some distinctions that would not necessarily have been present in a tablet writer's mind. Petrakis, for example, calls into question the difference between iconic and abstract logograms (already mentioned above), and points out that our criteria for making distinctions may be rather more etic (and therefore anachronistic) than emic; he groups all types of logogram under the category of 'object-sign', except for signs that specifically modify another ('modifier-signs'), either as ligature (where the modifying sign is incorporated into a logogram) or adjunct (where the modifying sign is usually written before the logogram but is separate from it – as with *ko*+AROM above).[38]

Another aspect that needs to be mentioned is that in at least some Linear B writing traditions, logograms appear to be non-obligatory – which is to say that a numeral can be inserted after a syllabographic sequence with no logogram, even apparently a sequence representing a concept for which we know there existed a logographic sign. So in MY Ue 611, a record of vessels, we find the terms *a-po-re-we* and *qe-to* among other sequences that are each followed by a numeral, counting the number of each type of vessel. Why not use the known ideograms *209^{VAS}(+A) (attested at Knossos and Pylos) and *203^{VAS} (attested at Pylos), for both of which we have very good evidence that they were associated with these specific words? Is it that the scribe

[38] See Pertakis 2017a, esp. pp. 130–140. Cf. the schemata proposed in Bennett 1963, 1972; Ventris and Chadwick 1973, 48–53; Melena 2014, 128–163.

had a free choice as to whether to use the logogram or spell it out as a syllabographic sequence?[39] There are surely other ways of explaining the choices made in this particular tablet, however. One possibility is that the logograms in question were not in use at Mycenae – they are not attested there, though with only a relatively very small number of inscriptions surviving from this site, we cannot assume that the lacuna is representative.[40] A better explanation is that the writer has the job of recording around 12 different types of vessel in this tablet, and for most of them we do not know of a corresponding logographic sign existing in Linear B; writing two as logograms (or as syllabographic sequences with logograms accompanying them), and the rest as syllabographic sequences alone, would create an obvious internal inconsistency in the way the commodities were recorded. We know that this writer was not averse to logograms, given that the other side of the tablet (on inspection perhaps better understood as the recto, although it is usually listed as the verso) uses logograms for olives (OLIV, OLIV+TI), figs (NI) and wine (VIN), perhaps in the context of a religious rite, though the sense is obscure.[41]

Transcription of MY Ue 611:

.0] *vacat*
.1]pe-ra 4 a-po-re-we 2 pe-ri-ke 3
.2]ka-ra-te-ra 1 po-ro-ko-wo 4 a-ta-ra 10
.3]pa-ke-te-re 30 ka-na-to 5 qe-ti-ja 10
.4]qẹ-to 2 ti-ri-po-di-ko 8 ka-ra-ti-ri-jo ?
.5]*vac.*[
inf. mut.
→
v.
.1 • pi-ro-qe-mo , a-ke
.2 OLIV+*TI* 3 OLIV 1 *NI* 2 VIN S 2[
.3 *vacat* [
inf. mut.

Other tablets suggest that writers had a certain amount of freedom or room to innovate in at least some circumstances. Perhaps the best known example comes in PY Ta 641 (see above, Fig. 2.4), where the logogram that we label as *202[VAS] has some small visual alterations to reflect differences also mentioned in the syllabographic sequences describing the objects: some of these vessels are listed as *qe-to-ro-we* ('four-eared' *i.e.* 'four-handled'), *ti-ri-o-we-e* ('three-handled') or *a-no-we* ('without handles'), and the ideograms in each case show four, three or no handles, respectively. This

[39] As implied by Palaima 2005, 274, in his discussion of this example.
[40] Cf. Petrakis's discussion of possible regionalism in the use of logograms: Petrakis 2017a, 140ff.
[41] For discussion, see Duhoux 2008, 285–289.

is a rare example of logograms being visibly adapted to reflect properties of the commodities recorded, and it is impossible to say whether this is an ad hoc, playful innovation of the writer in this case. Perhaps the practice would recur if we had more documents, but with more than 6,000 in Linear B, we do have a sample that is overall of good quantity and quality. Perhaps we would be best to see this as a peculiarity of the particular context of the Pylos Ta series, which records a number of high-status luxury goods, often with lengthy descriptions.[42] It has also often been mentioned that the tripods in the very same tablet (the ones that so famously confirmed the decipherment of Linear B as Greek) are not visually distinguished in their three-legged, two-handled logograms, even though in the descriptions we find mention of a missing leg and handle: there is apparently no interest in distinguishing these accidental properties of the vessels, despite the attention to detail with the *202[VAS] logograms. Many logograms in the Linear B corpus show some degree of variation in form, but for the most part these are probably to be seen as stylistic variations rather than meaningful adaptations of the base sign (for example different numbers of lines at the base of the TELA logogram denoting fabric, or different versions of the VIR logogram that seem to show slight variations in physiological characteristics).[43]

So there remain some question marks over the status of logographic signs, and the degree to which individual administrators writing the tablets might have been able to make choices about how and when to use them. The next question to ask is which logographic writing practices were or remained productive in the Mycenaean administrations and which ones were inherited without much amendment. Logograms in Linear B have sometimes been thought of as an inherited feature from Linear A, and at an extreme perhaps one that they unthinkingly continued whether they needed it or not. In Palaima's words, some might have assumed that 'after the invention of Linear B, writers of Linear B lurched onward, administrative period after administrative period, like Bronze Age William Burroughses, wanting to kick their ideographic habits, but not being able to do so'.[44] Putting this light-hearted comment aside, we should at least ask to what extent Greek speakers were buying into a 'package' of administrative techniques when they borrowed writing practices and adapted them for new uses. And just as we should see that the Mycenaeans made significant innovations in areas such as tablet shape and layout and sealing practices,[45] so we should also see Mycenaean agency in the development of the writing system and practices associated with its use (on the adoption of the syllabographic repertoire, see Chapter 1: Exploring Script Adoption). Having a look at where innovations seem to have been made – and, conversely, where older features seem to have been retained without much adaptation – will help us to understand what Mycenaeans were borrowing from as much as what they ended up creating.

[42] Lengthy for Linear B!
[43] For discussion, see Weilhartner 2017.
[44] Palaima 2005, 272.
[45] See Tomas 2003, 2008, 2011, 2012, 2017b.

The monograms (*i.e.* effectively single signs composed from more than one syllabogram) offer some instructive parallels, as well as shining a helpful mirror on our approaches to the use of logograms generally. What we officially transcribe as LANA 'wool' is very clearly a monogram composed originally from the signs *ma* and *ru*, which we can be certain of because it is also attested in Linear A. Comparable words in Hesiod (*mallos* for 'fleece') and Hesychius (*mallukes* glossed as *trikhes*) confirm the reading, as well as confirming the shared sound values of the relevant syllabic signs in both Linear A and B.[46] In Linear B, it has usually been argued that the LANA logogram has lost its reference to an originally Minoan word, not least because some variants of the sign look more like a ligature of *ma* and *re* or *ma* and *ro*, suggesting that what was originally a ligature of two signs had become a single logogram that writers or readers no longer broke down into its constituent parts.[47] More recently, however, Nosch and Weilhartner have argued that the use of *ro* and *re* in this ligatured sign are deliberate reflections of Mycenaean Greek usage of a borrowed Minoan word, suggesting in particular that the use of *ro* reflects a substitution of /u/ with /o/ in the word's ending to bring it in line with Greek morphology.[48] The oscillation between endings in *-u* in Linear A and *-o* in Linear B is also observed in personal names written in both systems, making the argument all the more convincing.[49] If the LANA logogram does indeed demonstrate adaptation to the new language, this would be remarkable evidence that the ligature of two syllabograms remained analytic for Linear B writers, *i.e.* that they could break it down into its components and adapt it as needed. This would somewhat undermine Petrakis's argument that the creation of monograms is a movement *away* from phonetic readings of signs as the syllabographic sequences become incorporated into a single logographic sign ('reverse phonetisation', in his words), which he even takes to imply a 'retreat in literacy'.[50] An ability to break down the constituent parts of a monogram and adapt them would clearly suggest quite the opposite, that writers and the expected readership of the documents were literate enough to encode and decode complex 'monographic' signs composed of syllabograms, and it would suggest also that new signs could be created at will.

A number of monograms in Linear B clearly encode words of Greek etymology and can therefore be assumed to be innovations. The practice, nevertheless, is a continuation of what we see in the long-lasting LANA monogram inherited from Linear A: two or three syllabograms are combined in one effective sign to form a whole word. Salgarella has suggested that the logographic 'revolution', where many compound signs are discontinued and some new ones are invented in Linear B, may point towards the Linear A compounds representing Minoan phonetic sequences for

[46] See Steele and Meißner 2017, 107.
[47] *E.g.* Killen 1962, 50; Nosch 2007, 15–21; Petrakis 2012, 529–531; Thompson 2012, 555–556; Weilhartner 2017, 170–171.
[48] Nosch and Weilhartner forthcoming.
[49] See Steele and Meißner 2017, 105–106.
[50] Petrakis 2012, quotes from p. 532.

words that are no longer used in a Greek setting (although there is the occasional Minoan word carried over, LANA = MA+RU being the obvious example).[51] What is striking about the distribution of the monograms is that almost all of them are attested at only one site. AREPA (*aleiphar* 'oil'), KAPO (*karpos* 'fruit'?)) and TURO$_2$ (*turyon* 'cheese') are attested only at Pylos, KANAKO (*knakos* 'safflower') only at Mycenae, DIPTE (*diphther* 'parchment'?) only at Knossos and MERI (*meli* 'honey') only on Crete but at both Knossos and Khania. It is impossible to be certain that this distribution reflects more than simply an accident of survival, and the example of LANA shows us that at least one monogram was part of the writing system used at all major sites on both Crete and the mainland. But LANA is an inheritance from Linear A and so must have been part of Linear B writing from its point of creation, hence its very wide distribution. These other monograms based on words of Greek etymology have to be new creations, and if they are independently created at different sites, as the distribution compellingly suggests, then we can only take this to mean that the practice of making monograms out of syllabographic sequences must have been a part of the writing tradition at all sites, presumably inherited from the earliest developments of Linear B writing and spread along with the system itself, remaining a productive process. Although ligatures of logograms with syllabographic signs tend to be pigeonholed in a different category, there is good reason to think of them in a similar way, effectively as types of compound signs (a term we will return to when looking at Linear A). While their distributions are not quite so striking as those of the monograms, it is worth mentioning that there is considerable regional diversity in ligatured logograms as well as in acrophonic abbreviations used as either independent logograms or modifiers to other logograms: many examples are known at only one site, again pointing towards a dynamic writing tradition with room for innovation as needed.[52]

The feasting tablet PY Un 718 provides an insight into the function and use of monograms at Pylos, in that the writer has used both fully written-out syllabic sequences and monograms representing the same words in some places: they write *tu-ro$_2$* followed by the monogram TURO$_2$ (*turyon* 'cheese') and *a-re-<pa>* (actually *a-re-ro* where the *ro* is clearly a mistake for *pa*, *i.e.* they have missed one of the horizontal strokes; *aleiphar* 'unguent') followed by the monogram AREPA, as well as *ko-wo* followed by a ligatured logogram **154+KO* (sometimes written as *153; *ko-wo* 'fleece').[53] In each case, the numerals involved are written after the monogram or logogram. We can see here that the ligatured logogram fills the same 'slot' as the monogram, meaning that they are both functioning as the same type of sign, but writing the full words

[51] Salgarella 2020, 297. However, this may be questionable in the context of the early adaptation of Linear B from Linear A, where we have every reason to think that there may have been a high level of bilingualism, perhaps even with Greek being a second language of people who were originally Minoan speakers in some cases (on these issues, see Chapter 1: Exploring Script Adoption).

[52] See also Petrakis 2017a, 134–146.

[53] See the discussion in Palaima 2004, 272.

for *tu-ro*$_2$ and *a-re-pa* is exceptional and perhaps the mark of a 'remarkably attentive writer'[54] (Hand 24 in this case), who felt the need to make clear what each functionally logographic sign meant. This could also reinforce the idea that monograms (composed of syllabographic signs), alongside ligatures (by which I mean logographic signs with syllabographic signs incorporated into them) were a dynamic and adaptable feature of Linear B associated with advanced writing competence – *i.e.* that they could be created ad hoc by an administrator when they were deemed necessary or useful, which would explain why different sites have produced different examples.[55] So while the individual monograms are not shared between the sites (as far as we know in surviving texts at least), the practice of producing them certainly seems to be. This would also explain why the LANA logogram may very well continue to exist as an analytic form that could be broken down into component parts, since writers would have had an idea how to go about combining signs to make a monogram. Further, Thompson suggests that there are some compositional rules governing the creation of monograms, which could again be seen as part of a dynamic but locally consistent practice of creating new signs where needed.[56]

The important points to take away from the discussion of Linear B are that there are several types of sign that act logographically, but that their functional role is shared, whether they originate as simple logograms (whether iconic or not), acrophonic abbreviations or monograms formed from syllabographic signs. We will finish this section on Linear B by asking a further important theoretical question: was it possible for a Linear B logogram to play a role in syntax, *i.e.* to replace a word in a sentence (as seen in some other writing systems, as mentioned above)? The answer overwhelmingly looks like a no, or at least we can say that there are zero (or almost zero) examples where a logogram might be interpreted as being used in this way. The only disputed case is a sealing from Knossos, KN Ws 8493 (Fig. 2.6): on one side of the sealing we find the place name *se-to-i-ja*, which is well known elsewhere, while on the other side it is very difficult to construe the exact relationship between the large LANA logogram (in this case composed of *ma* + *re* and modified by a preceding *TE*,

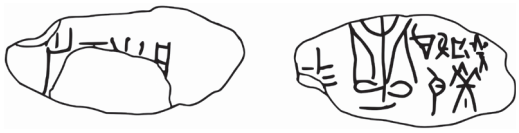

Fig. 2.6. Sealing from Knossos, KN Ws 8493. Drawing by the author.

[54] Petrakis 2017a, 155. Hands 2 and 6 also use the AREPA monogram, but there are variations in its shape, as the three syllabograms can read bottom to top or top to bottom.

[55] See Shelmerdine 2021, 297–298, who also proposes that the double writing in the cited case could suggest the creation of a new sign that would be passed on to other writers as a logogram not necessarily intended to be read as a syllabographic sequence. For Thompson 2012, 556, 'they are not intended to be read as sequences of phonograms but recognised by shape, again exactly as other sematograms'. However, we may remain cautious as to the degree to which they may remain analytic, *i.e.* could be broken down into meaningful units (as mentioned in the case of MA+RU, above).

[56] Thompson 2012, 554–556.

which is reminiscent of the TELA+TE compound logogram) and the sign sequences following it over two lines, *ki-ri-ta-de* above and *do-ke* below.[57] The whole text is difficult to interpret, because *ki-ri-ta-de* rather looks like an allative form in *-de* of a place name *ki-ri-ta* (a word that is attested elsewhere but with uncertain meaning), and if *se-to-i-ja* on the other side is not part of the syntax, then *do-ke* ('s/he gave') has no obvious subject; meanwhile, it could be taken that LANA acts as the verb's object since no other object is expressed. However, this does not seem a very compelling reading for several reasons, as Thompson has argued.[58] We would be better to see the logogram as a sort of heading, in an unusual abbreviated arrangement ('Se-to-i-ja: wool + TE: contributed to ki-ri-ta', or perhaps if *ki-ri-ta-de* is instead a personal name, 'Se-to-i-ja: wool + TE: ki-ri-ta-de contributed').[59]

This tour of Linear B logograms is not intended to be exhaustive but rather to be illustrative of the functions fulfilled by what we think of as logographic signs, as well as their different types (remembering that modern scholarship may often categorise them in ways that their authors would not recognise). One way of grouping them would be to say that there are two main functions, each of which can be realised in multiple ways:

1. Substantive logogram (which can be followed directly by numerals or measurement signs).
   a. Iconic or abstract visual representation of a commodity, which may or may not have shared its origins with a syllabographic sign (on which, see further discussion in the rest of the chapter).
   b. Syllabographic, acrophonic abbreviation for the word for a commodity.
   c. Complex sign (monogram) composed of syllabographic signs that together form a whole word.
2. Modifier (which has a close relationship with another logographic sign and will almost always consist of an acrophonic abbreviation).
   a. Syllabographic, acrophonic abbreviation for a modifying word, placed before a logogram (adjunct).
   b. Syllabographic, acrophobic abbreviation for a modifying word incorporated into a logographic sign (compound or ligature).

What is really striking is that most renderings of logographic signs, whether they are substantive logograms or modifiers, are strongly anchored in the phonetic realisations of words, either turning the whole sequence into a single sign (monograms) or, more

[57] See Driessen 2000, 209; Palaima 2005, 271.
[58] Thompson 2012, 551.
[59] I am grateful to Torsten Meissner (pers. comm.) for a further suggestion, namely that the *-de* of the first line could be read over to the next line, giving *de-do-ke* (so, '*ki-ri-ta* has given'). This would be highly unusual in a Linear B context, but a possible parallel for breaking up a word in an unexpected way in the limited space of a sealing is paralleled in MY Wt 503 with *ke-ni-qe* on face β and then *te-we* on face γ: /khernikwte:we(s)/.

frequently, using an acrophonic abbreviation to stand for a word (some of which we can recover from other comparative or contextual information, and others we cannot). The fact that there are so many different examples of abbreviations, and that so many are site-specific in so far as we know from current attestations, points towards abbreviation as a dynamic process practised regularly by Linear B writers in the course of their day-to-day work. Some abbreviations may have been well established (for example those attested across multiple sites), while others may have been created ad hoc for a particular administrative need. Sometimes the writers may have encountered difficult cases where they had to make a snap decision how to represent something most clearly, or where they chose to save space by reducing the number of signs written. But I think it's a mistake to see Linear B writers as using logograms in a fixed or unthinking way as signs that are purely there as visual prompts. Certainly document layouts were developed in such a way as to aid the arrangement of and access to information, and logograms played a considerable role in making it immediately obvious what a tablet was about, identifying individual entries and their values and calculating totals where this was relevant. Different subjects or commodities evidently have different requirements for the ways in which information is laid out (think of Figs 2.3 and 2.4 earlier in this section), and the writers had to be able to adapt their documents to record different levels of specificity in relation to the commodities. In doing this they had not only a fixed set of logographic signs at their disposal, but also the potential to use syllabographic signs as abbreviations to stand in place of logograms or to add specificity to particular entries. It remains to consider whether this was a new outlook on record keeping (going hand-in-hand with changes in document format and layout) or whether it built on earlier practices.

What's clear is that the logographic signs, whatever their type, have the status of accounting devices, with primarily visual strategies employed to keep them separate from syntax and allow them to act independently as reference aids. As Palaima has pointed out, logograms in Linear B never form part of syntactical units, and this observation also helps us to understand the so-called 'double writing' of logograms alongside syllabographic sequences spelling out the word they represent: arguably such examples of 'double writing' are in fact examples of a writer deliberately ensuring the record contains enough information by using either the logogram or the syllabographic sequence to narrow down a generic meaning or add a specification (grain GRA that is specifically wheat *pe-ma* for example,[60] or fatted animals *si-a*$_2$*-ro* that are specifically pigs SUS+SI).[61] Such dynamic practice in fact makes it possible for the writer to use both the syntax of the description of commodities or transactions and the logogram representing the main commodity (with numerals and measurement signs) to nuance the information recorded in a given document. As Shelmerdine points out, the practice is particularly associated with writers with high-level administrative

[60] On the problems with identifying wheat and barley in the Linear B tablets, see Palmer 2008.
[61] Palaima 2005.

duties and correspondingly with very high levels of writing competence.[62] The separation of the logogram as a visual accounting device from the syntax of the description is crucial to this practice.[63]

It has sometimes been suggested that logograms used as accounting devices are somehow primitive, harking back to pre-literate accounting methods, such as those identified as token use in the Ancient Near East, which itself grew into more developed writing practice over time.[64] Ferioli and Fiandra associated logogram use in sealing practices, for example, with such a stage of development of administrative techniques by comparison with the Near East.[65] This would make logograms-as-accounting-devices in Linear B a sort of relic of earlier practices. But what I am going to argue – and I hope it will become apparent why as we look more closely at logography in Linear A and Cretan Hieroglyphic – is that this kind of usage is in fact an innovation of Linear B writing practice,[66] not a relic at all.

Linear A

When describing the logograms of Linear B, Melena stated that 'the logogrammatic repertory was used on similar lines as those inherited from Linear A but in an improved way',[67] which sums up quite nicely a very common approach to Linear A information management. Greek-speaking Mycenaeans are generally held to have made improvements to record keeping to suit their administrative needs, introducing new tablet shapes, neater layouts with more consistent tablet ruling and arrangements that made logograms more effective by placing them in visually distinct slots: a 'tidying up process' in Salgarella's words.[68] For Pluta, 'such an orderly appearance [as in Linear B] is never seen in Linear A', and 'One would expect Mycenaean newcomers to this system also to be intimidated by the lack of organization, and establish a system whereby greater clarity was introduced'.[69] For Montecchi, the Linear A tablets can be divided between ones with better organisational layout or totalling records and ones that were messily written preliminary notes made by non-professionals of some sort

[62] Shelmerdine 2021, 294–297.

[63] Bennet 2004, 101, further suggests, tentatively, that 'the layout of Linear B texts with their extensive range of highly representational "commodity signs" or "logograms"... is suggestive of a pre-dominately oral environment linked to images' – although this is an idea that could be broken down in various ways, as we have already begun to see through the various examples cited in this chapter.

[64] On token use, see especially Schmandt-Besserat 1992.

[65] Ferioli and Fiandra 1996.

[66] Karnava (2021, 254) reaches a similar conclusion for Linear B, though on a slightly different basis to what is argued here.

[67] Melena 2014, 130, n. 185.

[68] Salgarella 2020, 150.

[69] Pluta 2011, 234, my insertion, and 235. He further suggests that neatness had earlier been a feature of Cretan Hieroglyphic writing (mainly in the clay bars, though note that these have very restricted writing spaces) and that in Linear A the 'format became looser' as administrators became accustomed to the practice of writing (p. 236).

(which may also be taken to imply that there was an administrative standard to fall short of).[70] But did Mycenaeans really invent neatness? I'd like to turn this question around and think about whether there might have been some positive reasons for the choices made by Minoan scribes when they laid out text in Linear A in the way they did.[71] First, however, we need to compare logography in Linear A with what we have seen in Linear B, in order to find the beginnings of an answer to this question.

When investigating logographic signs in Linear A, we must remember that we are now dealing with a writing tradition (or set of traditions) with far fewer attestations than we have for Linear B, written in a language that remains largely mysterious. We have fewer documents, those that survive are often significantly shorter than the average Linear B document, and although we can be reasonably certain of approximate values of most syllabographic signs,[72] it is often very difficult to understand anything of the content of the documents. One of the best clues is the use of logograms, making it possible to identify the subject of many administrative texts. Conversely, logograms are usually identified as such based on two criteria: formal similarity with Linear B logograms (which is not an infallible method and is at the mercy of palaeographic variation) and context (mainly whether the sign is followed by numerals, usually seen as necessary to be certain a sign is a logogram[73]). As we will see, it may be a strategic mistake to assume that we can use the same criteria to identify logography in Linear A as we can use in Linear B, and indeed it is very difficult to be certain we are comparing like with like. Consani has suggested, for example, that Linear A shows no sign of the Linear B practice of 'double writing' of logograms and words for the same commodities or concepts (on which, see the previous section), suggesting different approaches to accounting practice, although he admits that the state of the Linear A evidence makes certainty difficult.[74]

Linear A accounting shows some clear differences from Linear B accounting, and it is not only the messiness vs. neatness of document layout that tells us that. Tablet types, shapes and sizes change between the Linear A and B writing traditions (although they also change within Linear B itself, perhaps more so, depending on find spots), and along with these changes there are changes in the way information is distributed between different types, while sealing practices also experience a marked shift.[75] It is difficult to be certain exactly what information is provided

[70] Montecchi 2019.

[71] And remember also, as argued in the previous chapter, that we may well need to envision Linear A writers themselves being involved in at least the earliest stages of development of Linear B (see Chapter 1: Exploring Script Adoption), so pre-existing administrators may have been changing their own practices (rather than newcomers being horrified and introducing new types of standards).

[72] See Steele and Meißner 2017 and Chapter 1 of this book (Exploring Script Adoption) for further discussion.

[73] *E.g.* Schoep 2002, 37. On the development of Aegean counting practices involving numerals and fractions, see Montecchi 2017.

[74] Consani 2002.

[75] See Tomas 2003, 2008, 2011, 2012, 2017b.

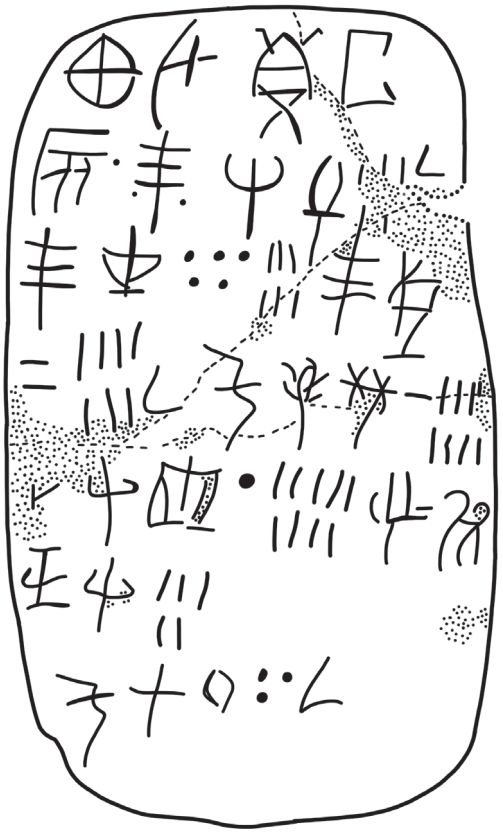

Fig. 2.7. Linear A tablet from Haghia Triada, HT 13. Drawing by Ester Salgarella.

Transcription:
.1 *ka-u-de-ta*
.2 VIN[a] , ˑ *TE* ˑ *re-za* **5̣ J**
.3 *te-tu* **56** *te-ki*
.4 **27 J** *ku-*79-ni* **18**
.5 *da-si-*118* **19** *i-du*
.6 *ne-si* **5**
.7 *ku-ro* **130 J**

alongside the logograms and accompanying numerals and measurement signs, since the language of the tablets remains largely inaccessible. Nevertheless, we can identify words related to totalling amounts in the tablets: *ku-ro* 'total' and *po-to-ku-ro* 'grand total'. In addition to differences in the layout of information, Linear A features a very different set of fractional measurement signs, as well as so-called transaction signs, which are separated from other signs and sequences in a tablet by two flanking dots – these may also act in a similar way to logograms and abbreviations, so should be considered alongside them. Linear A administrative inscriptions are always written left to right (as are the Linear B ones), although among the non-administrative inscriptions there is one example of right-to-left writing and one example of boustrophedon.

Strikingly, all sequences, logograms, numerals, measurement signs and transaction signs in Linear A are written 'inline', *i.e.* the text continues in lines, without visibly separate 'slots' for different kinds of information; sequences can also run over from one line to the next, or a logogram and numeral on the beginning of a line can follow on from and presumably relate to the word at the end of the previous line. The tablet in Figure 2.7, with its accompanying transcription, illustrates some of these features nicely.[76] The logographic sign VIN[a] ('wine') appears at the beginning of a line following the syllabographic sequence that must in some way qualify or contextualise

[76] Syllabographic signs are transcribed using Linear B values where possible (on the validity of which, see Chapter 1: Exploring Script Adoption) and otherwise (*i.e.* where there is no definite Linear B parallel) are given their standard numbering prefaced by an asterisk. Numerals and fractions appear in boldface to aid the reader in visually breaking up the individual entries.

it, and itself is followed by a divider and then a transaction sign (TE) flanked by two dots. The numerals found throughout the tablet, which presumably all record measures of wine, can be variously found at the end, at the beginning or in the middle of a line, each one following a syllabographic sequence (and sometimes with an accompanying fractional sign marked as J). At the bottom is the totalling word *ku-ro*, which is deliberately written on a new line – the only information slot marked out for special treatment in this way – and is followed by the numerical total (130 J) of the preceding sets of numerals.

Using the criteria mentioned above, namely appearance alongside numerals and the existence of comparable signs in Linear B where available, it is possible to identify a number of logographic signs in Linear A. Here we see many features that will look familiar from our tour of Linear B logograms, for instance a mixture of iconic and abstract-looking logograms, the logographic use of syllabographic signs (presumably as acrophonic abbreviations) and the compounding of logograms by ligaturing or by joining them with syllabographic or other logographic signs. Salgarella has recently put forward a new approach to the functional classification of Linear A, beginning by dividing the repertoire into simple signs and composite signs, and then considering whether their function is phonetic, sematographic, sematophonetic or suprastructural. She admits, however, that a clear-cut functional classification is unrealistic because the situation in Linear A looks quite complex, with the only obvious distinction lying between the multi-functionality of simple signs (which can often act syllabographically or logographically) and the mono-functionality of composite signs (many of which are hapax forms or site-restricted).[77]

Whereas in Linear B we could be mostly very certain as to whether a single sign had both logographic and syllabographic values or only one or the other, in Linear A we have a different situation. The signs can be divided up into a number of categories on the basis of their formal and functional properties:

(1) Iconic logograms (including a number shared with Linear B where they also have syllabographic values) that can be used either syllabographically or logographically in Linear A:

OVIS/qi 'sheep', BOS/mu 'cow', SUS/au 'pig', CAP/*22 'goat', NI/ni 'figs', TELA/wa 'cloth'

We will return shortly to the question of how these signs came to have both syllabographic and logographic values, and whether or how we can determine which came first. The idea that some of these signs could derive their values from Minoan words for the animals or items is reinforced by the fact that their retained semantic values in Linear B do not match Greek words for them – as is probably also the case

[77] Salgarella 2020, 52–54, forthcoming.

with the saffron logogram (CROC/ra_3), which is not yet attested in Linear A but resembles a sign in Cretan Hieroglyphic (023).[78]

(2) Iconic logograms that are certainly or probably shared with Linear B (where they have only logographic values and cannot act syllabographically); some are perhaps more obviously iconic than others (VIR as a cartoonish stick figure for example, or VIN as a sort of grape trellis):

> VIR 'man', GRA 'grain' (used for land measurement in Linear B), OLIV 'olives', AROM 'spice', VIN 'wine', OLE 'oil' and a number of vessel logograms that are very similar to ones found in Linear B (*e.g.* *410^{VAS}, which looks like the Linear B tripod cauldron *201^{VAS}, and the probable bull's head rhyton *418^{VAS}, which has some similarities with Linear B *227^{VAS})

Of these, it is striking that some can apparently act as syllabograms in Linear A: VIR occasionally appears within syllabographic sequences, and AROM seems to appear only within syllabographic sequences (in cases where it is followed by a numeral, it has been interpreted to be the final sign in a sequence, so is not interpreted as logographic: HT 9a-b, HT 39, ZA 20; see further below). Should these ones perhaps be treated like the signs in the previous category, which share their form with Linear B parallels and have dual logographic or syllabographic values in both scripts? Do they have similar origins or not? We will return to this question shortly.

(3) Syllabographic signs (confirmed as such through their use in sequences and usually their correspondence with Linear B syllabographic signs) that can be used as 'single signs', *i.e.* with a probable logographic or abbreviating function, standing apart from sign groups:[79]

> AB 03 (*pa*), AB 07 (*di*), AB 27 (*re*), AB 67 (*ki*, perhaps in at least one example an abbreviation for *ki-ro*, interpreted by context as referring to a deficit[80]), AB 56, A 301 (not attested in Linear B), A 305 (not attested in Linear B); signs AB 188 and AB 86 (which can also appear together as a two-sign group) should perhaps be counted here, although for Schoep they are unconvincing examples of syllabographic signs[81]

Some transaction signs, which are uniquely marked out as standing alone by preceding and following dots, may also be considered here, especially in the case of ones known to act syllabographically elsewhere:

> AB 04 (*te*), AB 28 (*i*), A 307 (also appearing in a doubled variant between dots = A 638), probably A318 (a simple sign attested apparently as part of a two-sign sequence in HT 94a), and A 516 (a compound sign perhaps attested as part of a sequence in HT 34)[82]

[78] See Day 2011 for further discussion on saffron.
[79] Their functional roles are, however, difficult to be certain of given the nature of the evidence: see Salgarella 2020, 299.
[80] See Schoep 2002, 139–140.
[81] Schoep 2002, 135–136.
[82] On transaction signs, see especially Schoep 2002, 140–142.

An inscription from the island of Kea could be seen as a further example, with the sign AB 67 *ki* appearing on its own, but in this context almost certainly as a sort of visual joke, since it is incised (pre-firing) on the side of a conical cup almost identical in shape to the sign itself (KE Zb 3).[83] The same might perhaps be said of the same sign appearing on the base of another conical cup, from Rethymno, on Crete, although its position is less accessible except when the cup is upended.[84] The sequence *ki-ru* also appears on a fragmentary vessel base found on Melos (MI Zb 1), perhaps giving us the whole word for this vessel type and giving a rare insight into the way a syllabographic sign value was derived. But how should we read the single-sign attestations? The representation is not just a doodle, it is a perfect match for the formation of the sign as found in Linear A writing (except that it is inverted on the vertical axis to match the shape of the vessel in the case of the Kea example) and thus certainly related to literacy. Is it an abbreviation for the whole word and/or should we think of it as logographic?

(4) Compound signs that can be used logographically (as is usually demonstrable by their position and appearance with numerals etc), composed of combinations of logographic and/or syllabographic signs:

> Signs numbered A 501 upwards. There are almost certainly some important functional differences in the many signs in this group, for instance signs composed purely of syllabograms spelling out whole or partial words (the only deciphered example being MA+RU = 'wool', as continued into Linear B) vs. signs composed out of logograms with extra syllabographic or logographic signs that somehow modify their value (like the adjuncts and ligatures used to modify Linear B logograms, of which the only two attested in both Linear A and B are TELA + KU = Linear A compound sign A 535 and TELA + ZO = Linear A compound sign A 536, both appearing in a single Linear A document HT 38).[85] However, given the difficulties often associated with identifying whether a given Linear A sign has a syllabographic or logographic value or both, I will not attempt to break down this category further here. Salgarella's exhaustive analysis demonstrates not only the compositional principles employed but also the degree to which sign compounding resulted in many site-specific signs (*i.e.* the rules of compounding were widespread, but the individual instantiations varied depending perhaps on local preferences or needs).[86]

It is no easy task to untangle the categories listed above in the hope of working out how logographic signs developed in Linear A, but we can begin with some more obvious observations. Following Salgarella's important formal division into single and compound signs, there are perhaps three processes behind the distribution we see:

[83] Palaima 1988a, 301; Nash 2021, 217. This object is discussed further in Chapter 3: Exploring Vitality.
[84] Tzigounaki and Karnava 2020, 321.
[85] See Nosch and Weilhartner forthcoming on the wool and textile compound logograms.
[86] Salgarella 2020, esp. pp. 54–150 and fig. 17 on 154–155. Also Salgarella forthcoming: the writers of compound logograms show 'deep shared knowledge of the inner workings of the Linear A writing system as a whole, despite some apparent local combination preferences'.

(1) Single signs deriving their form from a depiction of a real-world thing can sometimes be used as a logogram and sometimes also as a syllabogram. The standard assumption would be that they derive the syllabographic value from the first sound of the word for the thing, which may recall a common early stage in script phonetisation,[87] although in some cases perhaps another principle is at play (onomatopoeia, perhaps, in the case of an association such as 'cattle' = *mu*?). It is clear that both the whole word and the first syllable derived from it remain current values for many such signs in Linear A.[88] We might be reminded of the useful polyvalency of signs in other writing systems discussed earlier on in this chapter.

(2) Single syllabographic signs seem also to be able to stand alone as logograms or transaction signs, which recalls the use of such signs as abbreviations in Linear B. The process of abbreviating seems to work in the opposite direction to the process of phonetisation described in (1). Instead, the syllabogram gives the basic sound value, which is short-hand for a longer word beginning with that syllable (*ki* for what is elsewhere written as *ki-ro* might be a good example). Here there is no recourse to iconicity, because it is only the sound of the word that is being referred to.

(3) Compound signs bring syllabographic signs together to spell out words (as in MA+RU) to produce non-iconic logograms (*i.e.* logograms that do not visually resemble the thing they represent), or they combine a logographic sign with one or more syllabographic signs (or indeed perhaps in some cases another logogram). The former is a practice that remains productive in Linear B and so must be passed on (cf. A+RE+PA for *aleiphar*), while the latter resembles the modification of logograms with adjuncts and ligatures in Linear B and surely also involves abbreviation of modifying words to their first syllable (so incorporating something of process (2)).

It is not at all clear that these three processes account for all attested signs in Linear A, but these are the ones we can tease out using the combination of internal and comparative evidence we have, leaning particularly heavily on Linear B to try to interpret the roles of individual signs. We may indeed ask whether this tells the whole story of how Linear A signs can function.

Looking outside of the administrative clay documents, it is possible to find occasional uses of logographic signs and numerals: a large vase and pithos from Knossos bear logograms (KN Zb <27> and KN Zb 35), while another pithos from the same site and a jar from Kea bear logographic compound signs composed of the wine logogram and a syllabogram (KN Zb 34 and KE Zb 5, combining AB 131[a] with *te* and *ra* respectively). A further pithos from Zakros has an ideogram for wine followed by a numeral and two lines of text, with some resemblance to words found in the libation formula (see further below). All of these objects should probably be interpreted

[87] See Valério and Ferrara 2020.

[88] Karnava (2021, 252) argues for a higher level of phoneticism in Linear A: 'a writing system that is preponderantly phonetic because it allows for such an interplay between sign functions' (*i.e.* between syllabographic and logographic functions).

as having an administrative function related to the storage and movement of commodities in large vessels. However, two further finds, in these cases with religious contexts, give important evidence for non-administrative use of logographic signs.

The first of these important objects is the ivory 'sceptre' (composed of a ring and handle) discovered in the cult centre of Knossos, which bears long Linear A inscriptions (83 certain signs plus traces of others) and includes signs that must be interpreted as logographic.[89] On one side of the ring, the surface is divided into compartments, or 'metopes', some containing figures of animals (the left half) and others containing depictions of differently shaped vessels, some of which are ligatured with syllabographic signs (the right half). There are no numerals here, and neither are there any sign sequences – the individual vessel depictions are separated in their compartments in the same way as the animal depictions, the only differences being the ligatures with syllabograms, and the fact that the vessels look like elaborate versions of the signs that can be used logographically in Linear A and B writing. The animal depictions meanwhile are detailed and realistic, featuring full figures, and are very unlike the writing signs used to represent animals in documents. There is clearly some blurring here of the lines between what constitutes writing and what constitutes artistic depiction, although we must always remember that the lines may be ours rather than anything a contemporary individual might have envisioned: this object is perhaps the best evidence in the Linear A corpus that writing and art could share an overlapping visually communicative repertoire. The vessel depictions seem to act like logograms that can be 'read', in the sense that they can be ligatured with syllabographic signs that must be there to modify or clarify their linguistic values (phonetic complements confirming the first sound of the vessel name, or narrowing down to a particular type of a generic vessel perhaps, or indeed specifying some other property). But they are also highly decorative and are equated explicitly with the animal depictions on the other half of the same surface of the ring. Might we even wonder whether the animal depictions could in some cases have been 'read' as full-figure variants of writing signs based on animals, similar to what we see in Mayan full-figure glyphs?[90]

On the other side and on the rim of the so-called sceptre's ring are numerous sign groups and the occasional compound sign (such as *a* + *ka*) and logogram. The rim also has a number of compound textile logograms, which look very similar to

[89] Still unpublished at the time of writing. However, the object was presented in some detail at the online Mycenological colloquium in 2021, in the paper 'An archaeological and epigraphical overview of the inscriptions of the cult centre of the city of Knossos' by Athanasia Kanta, Dimitri Nakassis, Thomas G. Palaima and Massimo Perna.

[90] The suggestion is highly hypothetical. Although many of the animal depictions are quite damaged, it is clear in some cases that the sex is distinguished anatomically, paralleling distinctions made in writing; but if the vessel signs can be ligatured, perhaps it is odd that the animal depictions do not feature anything similar and use a purely artistic means of representing sex.

regular script signs but are divided into sections in a similar way to the 'metopes' of the first side. Though the handle is quite badly damaged, we can see that it features syllabographic and logographic signs, including again some compounded vessel signs, though these have a different aspect palaeographically, appearing much closer to the linear shapes of signs as found in clay documents and less elaborate than the vessel depictions on the ring. Again this raises the question of how writing and other kinds of visual representation interact with each other, and this single object shows us more than one possible answer. Most important for our purposes in this chapter is the visual value of the logographic signs, which can be seen on this object to exist in a very different context to clay administrative documents, where logograms are usually assumed to act as counting devices. It seems likely that the individual items represented by the signs are somehow listed, without numeration, and perhaps would have been 'read out' or displayed in the context of ritual practices.

The second of these important objects is a libation bowl from Kato Symi (SY Za2, Fig. 2.8) from a presumably religious context, which contains logographic signs used in a way that looks completely out of place in the context of practices generally assumed to be similar to those of Linear B. Firstly, these logographic signs do not appear next to numerals, which goes against the usual requirement that a sign should appear with a numeral in order to be interpreted as logographic (see above). But these are signs whose usage is unquestionably logographic in all other attestations, the signs for olives[91] (AB 122) and for olive oil (AB 302), and which carry on this usage into Linear B. Therefore they cannot be syllabograms here.[92] Secondly, these logograms appear in a formula that is attested elsewhere, which means that we can compare the whole sequence: the so-called 'libation formula' appears in a number of variant forms on objects associated with ritual activity, usually stone vessels and ladles originating from sites that are not strongly associated with administrative record keeping and in which writing seems to have a different, and religious, context.[93] Below we can see

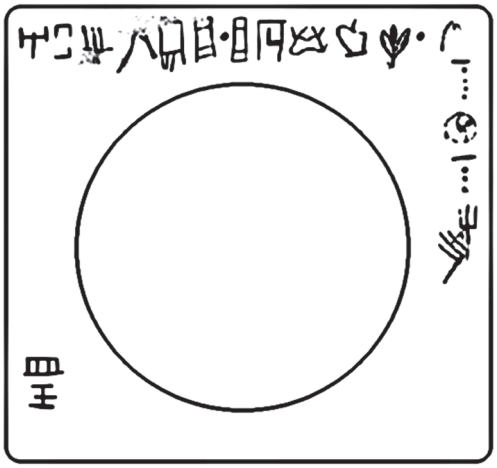

Fig. 2.8. Libation bowl from Kato Symi, SY Za 2. Drawing by the author.

[91] Thomas 2020, 4 n. 7, suggests that this sign could be interpreted otherwise as the syllabogram *re* (AB 27), but this seems to me very unlikely given its very different appearance from any known palaeographic variant of the *re* sign.

[92] See Schoep 2002, 97 n. 36. Montecchi 2022, 102–105, does, however, argue for a syllabographic reading in this inscription.

[93] On the context of these objects and their inscriptions, see particularly Schoep 1994; Davis 2014; Karnava 2014.

how the Kato Symi bowl compares with a few other instances of the libation formula. What will become immediately obvious is that this 'formula' has quite a high degree of variation: it tends to contain a number of words that are evidently the same (albeit with some apparently morphological variation in their forms) alongside others that are specific to one or more inscriptions but do not appear in the majority of the examples, and there is also some variation in the word order. Theoretically these might relate to different named individuals, place names, deity names, actions or offerings involved in the presumed ritual context of the objects' use. I will not spend any time here speculating about the syntax of the formula or the roles of individual words,[94] but I will point out what I think is nevertheless clear: the logograms in the Kato Symi bowl stand in places that could otherwise be filled by words spelt out in syllabographic sequences.[95]

Kato Symi bowl (SY Za2):
*a-ta-i-*301-wa-ja* ¦ *ja-su-ma-tu* OLIVES *u-na-ka-na-si* OLIVE OIL *a-ja*

Troullos ladle (TL Za 1):
*a-ta-i-*301-wa-ja* ¦ *o-su-qa-re* ¦ *ja-sa-sa-ra-me u-na-ka-ṇạ-ṣị*[*i-pi*]*-na-ma si-ṛụ*[*-te*

Palaikastro bowl/altar (PK Za 11):
*a-ta-i-*301-wa-e* ¦ *a-di-ki-te-te* [.....]*-ṛẹ* ¦ *pi-te-ṛị* ¦ *a-ko-ạ-ṇẹ* ¦ *ạ-sa-sa-ra-me* ¦ *u-na-ru-ka-na-ti* ¦ *i-pi-ṇạ-mị-ṇạ* [...] *si-ru*-[...] ¦ *i-na-ja-pa-qa*

Kophinas stone base (KO Za 1):
*a-ta-i-*301-wa-ja tu-ru-sa* ¦ *ḍụ-*3̣14-ṛẹ* ¦ *i-da-a* ¦ *u-na-ka-na-si* ¦ *i-pi-na-ma* ¦ *si-ru-te*

We may ask why the two logograms are not separated by word dividers from preceding and following sequences in the Kato Symi bowl if they essentially represent words within a sentence. But this treatment matches that of logograms elsewhere, and perhaps purely logographic signs are functionally distinct enough in the mind of a writer not to need the addition of a word divider. While the first logogram is more or less in line with a line of text written left to right, the second appears at the bottom of a column of signs written top to bottom and is not quite in line with the signs above it (in fact it is skewed to the left and partly touches the sign above it at the end of the columnar syllabographic sequence). We should of course also bear in mind that the context of writing, in the case of this and other inscriptions belonging to the religious sphere, was presumably different from that of the majority of administrative archives.[96] The many

[94] See *e.g.* Grumach 1968; Duhoux 1992; Davis 2013; Thomas 2020 for sober reflections on these questions.
[95] The variations in the 'formula' make it difficult to speculate as to what word could be replaced by the olive logogram here, but it is tempting to suggest that the olive oil replaces the sequence *i-pi-na-ma*, which is found frequently following the preceding sequence, *u-na-ka-si*. However, this is sufficiently speculative to relegate to a footnote.
[96] See Steele 2017.

unknowns surrounding the extent and types of literacy in the Minoan world will be revisited in Chapter 3: Exploring Vitality, but it is important to be aware that writing in the Minoan world probably constituted a range of practices in different contexts, which in turn may have involved different kinds of writers (and indeed readers[97]).

This libation bowl from Kato Symi gives cause to look at logograms in a completely different way, and crucially a way that departs significantly from the impression we have of Linear B usage. These two logograms are acting in the place of words within a sentence, which is to say that they are incorporated into syntax, something that is never attested in Linear B. This opens the door to a new and different understanding of what logograms *can* do in Linear A, and if they can participate in syntax in this inscription, we have to ask whether they do the same in any other attested inscriptions. The state of our understanding of Minoan language will necessarily restrict the degree of certainty with which we can try to reconstruct the role of logographic signs within sentences, particularly given that in the administrative documents it is very difficult to break down syntax in order to assess the roles of particular words in overarching sentence structure – indeed, we do not know the degree to which administrative records in particular may have employed simplified phrasing, perhaps eliding verbs or repeated subjects or objects (which are often a feature of Linear B writing). In some cases it is hard to tell where one word ends and another begins, with the insertion of numerals acting as the primary means by which we can tell that administrative documents must be divided into separate phrases or transactions. Nevertheless, we have enough material to conduct some preliminary analysis and create some working hypotheses.

We must acknowledge that our difficulty in analysing the role of a given sign or sequence is related not only to the undeciphered status of Linear A (particularly in that we do not understand the underlying language(s)), but also to our fundamental inability to state with certainty how different kinds of signs functioned, creating something of a vicious circle. When attempting to identify which signs are logograms, the main criteria used have been comparison with Linear B logography (which, however, did not apparently inherit the majority of Linear A logographic signs) and the occurrence of a sign with a numeral. What do we do with signs that observe one of these two criteria but break the other, as in the case of the logographic signs in the Kato Symi bowl? Sign AB 123, which in Linear B appears only as the logogram AROM (a generic spice or similar substance), is usually interpreted only as a syllabogram in its appearances in Linear A (which should mean, going by the above reasoning, that it is not followed by a numeral and appears in sign sequences).[98] But actually what we find if we look at the individual attestations of this sign is that it does appear just before numerals in four out of seven examples (HT 9 twice, HT 39, ZA 20) – it is only in the other three examples that it looks more compellingly like part of a syllabographic

[97] On this question, see Finlayson forthcoming.
[98] See also Schoep 2002, 91.

Fig. 2.9. Linear A tablets HT 15, HT 96a, KH 53. Drawings by Ester Salgarella.

sequence, as shown (Fig. 2.9: sixth sign in the top line of HT 15, fourth sign on the second line of HT 96a, third sign in the fragmentary KH 53).

In HT 15, we can read *u-*34-si* followed by what is assumed to be a logogram because of its resemblance to Linear B GRA (AB 120), then *du* followed by AB 123 and finally *a*. The next line begins with a numeral (684) presumably counting what has just been expressed in the first line, which is then followed by a compound sign (AB 120 with two L fractional signs), and presumably the numeral on the following line relates to whatever this compound sign represents (580). In the last line, an assumed transaction sign (AB 188, with a dot visible after but not before it, perhaps due to tablet damage) is followed by *ki-ro*, which we know marks a deficit, and a numeral (400). How should we try to break down the information provided by this tablet? The first three signs, *u-*34-si*, may spell out a sequence used as a sort of headword, perhaps a person, place or other word that is significant and specific to the transactions recorded. Looking closely at the size and spacing of the following signs, it is tempting to read them as logographic signs followed by (perhaps even loosely compounded with) syllabographic signs: effectively GRA+du and AROM+a. The fact that these would be unprecedented is not significant within a small corpus with such a high level of variability in sign compounding. If this is plausible, then we could read here a sort of elliptical sentence: *u-*34-si* [contributes, *vel sim*.] GRA+du and AROM+a in 684 units. Perhaps this could represent some sort of mixed or pre-prepared commodity. These remarks are highly tentative and do not entirely shed light on the rest of the tablet (what is 120+L+L, what does the transaction sign represent and what is there a 400-unit deficit of?). But we could read here two logograms in the top line that do not appear directly next to numerals and that act effectively as a complex object of an abbreviated sentence (much as any logogram after a sequence and before a numeral might).

Taken at face value, the second example in HT 96a looks like a straightforward case of sign AB 123 in the middle of a syllabographic sequence. But there are some

similarities here, including the juxtaposition with *a* (here the sign before rather than after it) and the appearance close in the text of the AB 120 (GRA) sign (which is in the following line and is followed by a numeral, 5). The sign after AB 123 is a *te*, but given that *te* appears elsewhere as a transaction sign, we might ask whether we are sure it is syllabographic in this case (and note that two appearances of A 323 in this tablet, each one following a numeral, are usually assumed to be transaction signs even though they are followed by dots but not preceded by them). We could also question whether the *ni* of the first apparent sign group in line 1 (*i-ti-ti-ku-ni*) is correctly read as a syllabogram. Further down on face a and on face b of this tablet, we see counts of figs using the same sign (AB 30) logographically – might we also have the logographic value of this sign in the first line following a syllabographic sequence *i-ti-ti-ku*? I intend to raise possibilities here rather than to provide any particular interpretation, but I hope it is clear to what extent our 'readings' of Linear A texts depend on making (possibly inaccurate, possibly even anachronistic) snap decisions as to what the function of a given sign is. Reinterpretation of any one sign can radically change the way we think information in a document is distributed, which reinforces the fragility of our 'understanding' of Linear A.

The third example above is too fragmentary to offer any kind of analysis, and all we can say is that the AB 123 sign appears at the end of a sequence consisting of]*a-me* (broken at the left, so perhaps originally longer), and is followed by a word divider and then a *ne* before the break. At the end of a sequence it is perhaps less compelling to assume that AB 123 is syllabographic, raising the possibility of a logographic interpretation despite the lack of a numeral. Perhaps we could even suggest that the small stroke assumed to be a word divider is actually a numeral 1 – although its size and placement are a little out of place for such an interpretation. Meanwhile, the examples of AB 123 that do appear with following numerals could surely be thought of as logographic, perhaps even in ZA 20, where there is only one syllabographic sign before it (a *te*, maybe a transaction sign or an abbreviation?).

Another sign that gives the appearance of being a logogram but has been seen as being used syllabographically is AB 131a, a variant of what in Linear B will be the VIN logogram (where it cannot be used in any other way). In two tablets this sign appears after *pu* (AB 50): see Figure 2.10 (second sign in the top line of HT 14, second sign in the third line of HT 123a). In HT 14, AB 131a appears after *pu* (written over an erased *a*) as the second sign in the tablet, and it is followed by a transaction sign (*te*) flanked by two word dividers, which is in turn followed by the logogram AB 120 (GRA) and a numeral (30). Could this perhaps be reinterpreted as an abbreviated word *pu* followed by a logogram? Given that HT 14 is a mixed-commodity tablet and contains very little phrasing other than the logograms, it is difficult to speculate. HT 123, meanwhile, is a long and complex document dealing mostly with quantities of olives as well as another commodity represented by a logographic sign A 308. Sign AB 131a appears on the third line, again following *pu* and in this case followed by the olive logogram (AB 122) and a numeral and fraction sign (31 L). This is more difficult to disentangle, and perhaps interpretation as a syllabogram should be preferred.

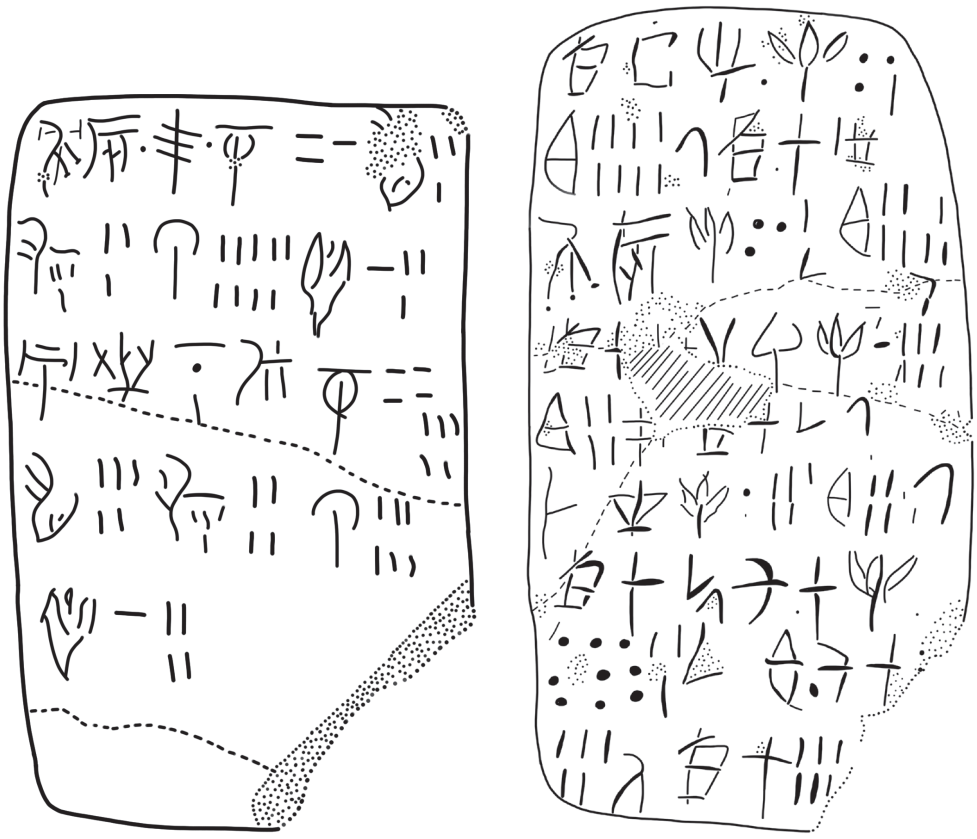

Fig. 2.10. Linear A tablets HT 14, HT 123a. Drawings by Ester Salgarella.

While we are exploring all possibilities, is it worth considering whether a Linear A logogram could play a role in the expression of sound sequences? It is often assumed that the rebus principle played a role in the early phonetisation of numerous writing systems, as seen perhaps most obviously in the earliest phases of Egyptian hieroglyphic writing (such as the Narmer palette, mentioned above and shown in detail in Figure 2.11, where the pharaoh's name is represented by a catfish and chisel, *n'r* + *mr*). But is there a chance that this principle could be at play in Linear A writing? For instance, in HT 14 and/or HT 123a above, could it be that the sequence of *pu* followed by AB 131a could represent a word consisting of a sound along the lines of *pu* (whatever the exact phonetic realisation), followed by a sound or sound sequence homophonous with a word for wine in Minoan? Perhaps such a suggestion should be considered outrageous – but given that there are so many unknowns surrounding the function of individual signs in Linear A, perhaps it is nevertheless worth saying it aloud.[99]

[99] In fact Montecchi 2022 argues for just such a function of some signs in Linear A.

Fig. 2.11. Detail from the recto of the Narmer palette. Public domain image, Wikipedia Commons.

The practice of compounding signs in Linear A may indeed encompass a number of strategies to make meaning clearer. For instance, there may be a distinction between signs added to modify a logogram by supplying extra contextual information and signs added to a logogram to specify the word or commodity intended by the writer (perhaps narrowing down a range of possibilities). Modifiers such as adjectives or genitive phrases could follow a natural linguistic pattern, apparently coming before the noun in Minoan as hinted by phrases such as di-ki-te-te du-pu-re ('lord of Mt Dikte'?[100]) and *po-to-ku-ro* ('grand total'), thus resulting in a syllabogram placed to the left in combination with a logogram.[101] Further, Salgarella suggests that some compound signs represent the addition of a phonetic complement (written usually using a syllabogram of smaller size) to a logographic sign, in order to specify a morphological form, such as a word ending, or a choice of vocabulary item identified by its first sound.[102] An example of the latter might be the compound signs A 591–592 (A 131a with *wa* to the right, *i.e.* VIN+WA) and A 594–5 (A 131a with *ra* on top oriented one way or the other, *i.e.* VIN+RA), suggested already by Neumann to incorporate a word for 'wine' starting with *wa* (for him perhaps related to Hittite *-wiyan* and a Semitic root **wainu*) and a word for 'beer' starting with *ra* (perhaps related to the Greek word of non-Greek etymology ῥάξ).[103] Modifiers evidently survive into Linear B in some sense, in the use of syllabographic abbreviations with logograms (whose placement before the logogram could recall Minoan syntax given that it is at odds with Greek syntax), while the use of phonetic complementation could also be argued to be carried over in the use of syllabograms to specify types of commodity when paired with generic logograms (for example *KO* for 'coriander' with AROM, the generic spice logogram; or *PA* for *pharwe(h)a*, a type of cloth, with TELA, the generic textile logogram). However, the use of phonetic complementation seems to be a widespread and highly varied practice in Linear A, as far as we can tell, and there may indeed be some restriction as to what combinations are possible in Linear B accounting practices. There are no examples of modifying signs that represent morphological distinctions, for example. If we compare other writing

[100] For this interpretation, see Valério 2007.
[101] Torsten Meissner, pers. comm., specifically advocating a modifier-head word order; Salgarella forthcoming.
[102] Salgarella forthcoming.
[103] Neumann 1977.

systems, such as Mesopotamian cuneiform, Egyptian hieroglyphs and Mayan writing (and indeed a modern system, such as the use of okurigana in Japanese writing), what we find is that phonetic complementation is used more often to narrow down a range of possibilities for a given sign (especially for polyvalent signs) or simply to reinforce the pronunciation, or the morphological form, rather than to specify a meaning for a generic sign. It is quite conceivable that Linear A employed such wider uses of phonetic complementation.

From our survey of what Linear A logograms *might* be able to do, it is clear from the administrative documents that there are too many potential variable factors, in records that are too short and give only limited amounts of information, to achieve any certainty on the range of logographic functions. That is why reading backwards from Linear B accounting practices has necessarily formed the backbone of attempts to reconstruct logographic practice in Linear A. But what if Linear A logograms could function differently? Internal analysis of the inscriptions gives us very little to go on, but as I have argued above, the Kato Symi bowl may just be an unusual hint towards a function that did not survive into Linear B, namely the participation of logograms in syntax. This would not at all look out of place in other historical writing systems of the Mediterranean, Near East and beyond, as the survey at the beginning of this chapter shows – in fact it is Linear B's restricted usage of logograms that looks unusual when considered in a broader context. We may perhaps be able to hypothesise about the origins of a syntactic role for Linear A logograms by looking towards Cretan Hieroglyphic (on which see below). Likewise, the possible appearance of phonetic complements in Linear A would again point towards a functional range more in-keeping with other partially logographic writing systems but not continued into Linear B.

Ultimately what is new looking about Linear B is that information layout is approached in a visually analytic way, so that tablets tend to have headings or headwords, and then information related to numbers and quantities of commodities is given a distinctive slot (usually towards the right-hand side of the tablet or of a line or column entry of text), prefaced by information about the people and places involved in the transaction and sometimes details of its particular context. What I want to argue is that Linear B writers are only able to do this because the role of logographic signs has been restricted: now a logogram is exclusively an accounting device used in combination with numerals and measurement signs, effectively in a short-hand system that simply expresses the quantities being recorded by the administrative centre. Records of Linear B are more loquacious than those of Linear A, and it may be relevant that the Cretan Linear B administration covers a much wider geographical area than any one Linear A archive, and consequently needs to express a wider range of commodities, transactions and economic interests.[104] At least we can say that moving towards a single, main, centralised site of administration at Knossos

[104] Though, *contra*, see Schoep 2002, 89–90; also Palmer 1995.

must have changed the way in which economic interests were controlled and relevant information was gathered, as the previously independent centres around the island became 'second-order' sites at a lower level of the overall administrative hierarchy.[105] Could this have been a driving force behind the regulation of the use of logographic signs, such that they could act as quick-to-access references within an administrative system of increased capacity and perhaps increased turnover speed?

It is possible that the usage of logograms in Linear B, particularly their placement at the end of whole documents or lines of text in most cases, is a sort of hangover from their natural placement in Linear A owing to the structure of the underlying language. It has been argued that Minoan word order was VSO (verb-subject-object), unlike Mycenaean Greek, which evidently inherited SOV (subject-object-verb) word order from Proto-Indo-European.[106] Although the evidence used to support such an argument could be questioned or interpreted in other ways, there remains a high likelihood that word order in Minoan was significantly different from that in Greek. Given that a commodity being contributed (or similar) would be very likely to be a grammatical object, this could linguistically place words for commodities – and so the signs used to represent them – at the end of a given sentence (along with the numeral counting them or with the associated fractional sign).

We might assume that Linear B accounting practices developed with some considerable input from Linear A writers, given the extensive similarities in not only the signs of the writing system (especially the syllabographic core), but also the context of the practices themselves, which would surely have been facilitated by a degree of bilingualism. Although I am not usually a fan of trying to reconstruct the exact circumstances in which a particular writing-related change happened and the people involved in it,[107] it is nevertheless quite tempting to imagine a Minoan speaker explaining an administrative document entry as *e.g.* 'X contributed 1 goat' and a Greek speaker reanalysing this as three distinctive slots in the administrative record (Slot 1: X the contributor; Slot 2: 'contributed', the transaction; Slot 3: 1 goat, the commodity), even though they don't match the natural Greek word order (which would be something like 'X – 1 goat – contributed'). Or perhaps a better way of looking at it might be to see the bilingualism of some of the writers involved in the transitional stages as key to the way in which sign functions were reanalysed: if a Minoan speaker became increasingly proficient in Greek, for example, the differences between the two languages could be a source of both interest and confusion, encouraging an analytical approach to the way information might be expressed in the new language of administration. Could this be the origin of Linear B document layout? And could this explain a move from logographic signs being able to occupy a syntactic position in a Minoan sentence to their usage outside of sentences in Mycenaean Greek?

[105] Discussed by Bennet 1990, where a comparative perspective is adopted to consider how the landscape and resources of Crete were controlled in other attested periods.

[106] See Davis 2013, forthcoming; Thomas 2020.

[107] Cf. Powell's single inventor of the Greek alphabet borrowing from a Phoenician speaker (1991, 25–27).

This could also be another way of explaining why in Linear B we quite often find what has been termed 'double writing' (see also above), where a word for a commodity is written out in syllabographic signs before the logogram recording the commodity and its quantity or measurement: the syllabographic sequence completed the sentence (though perhaps with a suppressed verb or otherwise abbreviated format), whereas the logogram and any following numerals and measurement signs were a visual and quickly accessed record of the amounts accounted for in the document. Pluta specifically connects this phenomenon with the layout of Linear B tablets, with 'descriptive and quantitative elements' of a given entry always kept separate, making double writing thus 'a consequence of the highly descriptive character, and internal order, of Linear B tablets'.[108] In this situation, it is only the descriptive part of an entry that is syntactic, while the quantitative part is necessarily separable and sits outside of any syntactic unit.

So Linear B has a very narrow functional range for logographic signs, albeit within a context of writing practices that allow administrators considerable freedom to innovate and to give supplementary information about specific commodities and transactions. This narrow functional range allows administrative documents to be laid out in visually distinctive information slots, and hence to take on the visage of neatness and organisation. But we have no reason to think that Linear A accounting practices were disorganised, and if logographic signs had a broader functional range, then it could explain why Minoan administrators laid out information in the way they did – essentially, perhaps, as a series of abbreviated sentences in which the object of the transaction occupied the last slot and in many but not all cases was followed by numerals and perhaps fractional signs. A further motivation for the continuous layout of Linear A tablets could perhaps involve a degree of orality in accounting practices, for instance if a set of transactions or values were related orally by one administrator to another who had to write them down as they heard them. That could lend some weight to the suggestion that the position of logographic signs at the end of individual entries reflected the position of the object in a sentence, which in turn could help us to understand how a logogram could act both as an accounting device (*i.e.* a commodity to be counted) and as a functioning syntactic unit within a sentence.

We turn now to the final piece of the puzzle, in particular the question of whether we can trace the origins of logography through the small corpus of documents grouped under the label 'Cretan Hieroglyphic'.

Cretan Hieroglyphic

What we call Cretan Hieroglyphic writing encompasses two quite different groups of inscriptions: those on seal stones (attested directly or through seal impressions left on other objects) and those written directly on clay documents. The seals seem

[108] Pluta 2011, 240.

to represent the earliest instances of writing, growing out of a long iconographic tradition,[109] in which seal stones bore a range of visual devices, whether pictorial, emblematic, communicative or indeed a blend of all three; attempts to distinguish between such categories may indeed be somewhat anachronistic.[110] The direct representation of language seems to go back to the so-called Archanes script, attested in the 3rd millennium BCE,[111] which records a remarkable possible correspondence with a sequence in the Linear A libation formula, *a-sa-sa-ra-me*.[112] Certainly by the early 2nd millennium BCE this visual system of meaning making, or something closely related to it, was being used consistently to represent language in identifiable sign sequences – although it is no easy task to try to define the typology of signs used in the seals, while in the clay documents the existence of syllabographic sequences is easier to determine. How closely intertwined writing on seals and writing on clay may have been remains open to question,[113] although the fact that seals bearing writing were used within the same administrative settings as the clay documents makes very clear that these traditions were complementary and mutually meaningful.

I have argued elsewhere[114] that the move from writing on seals to writing directly on clay involved some quite radical cognitive developments that affected the way signs were used and the ways information was laid out. While the seals are marked by a distinct lack of linearity, with signs lying in arrangements that include highly variable orientation in relation to one other, some of the documents show a move towards defined lines of text. The clay documents also typically involve a larger number of signs than a seal. There may indeed have been a concomitant shift in literacy, from the use of pre-made seal sequences (originally made presumably by craftspeople) that were impressed on other objects without any option to vary the message they contained,[115] to the ability to write new combinations of signs in any configuration as desired on the clay documents. This is not, however, a shift from one situation to another, but rather a growing range of literate engagement.[116] It is furthermore difficult to tell from surviving examples whether inscribed seals were used in administration before the development of writing directly on clay, or whether these practices grew up together. What is notable elsewhere is that the use of inscribed

[109] See Jasink 2009 and Salgarella 2021 on the development of writing signs from visual motifs and Karnava 2015 on the miniaturisation of images in writing as paralleled in other areas of material culture.
[110] See *inter alia* Sbonias 1995; Flouda 2013; Ferrara 2015a; Ferrara and Jasink 2017; Ferrara 2018; McGowan 2018; Civitillo forthcoming. More broadly, on an archaeological approach to art and visual culture, see Robb 2017.
[111] For the definition of this term and an analysis of its small corpus, see Decorte 2018a.
[112] For discussion of this correspondence and its implications, see Ferrara, Montecchi and Valério 2021.
[113] See Meißner and Salgarella forthcoming, first section; also Olivier 1990.
[114] Steele forthcoming b.
[115] On which, see Civitillo 2021b. Note, however, that some seal types with multiple faces did offer a choice between predetermined sequences to impress on a given object depending on the context, the nature of the transaction, etc.
[116] On literacy and its context in Cretan Hieroglyphic, see Civitillo 2021a.

seals is confined to Cretan Hieroglyphic and does not play a role in either Linear A or Linear B, which seem to borrow only the direct application of writing to clay documents (and in Linear A, to a wider range of objects outside of administration).

When examining the function of signs in Cretan Hieroglyphic in search of logography, we need to separate the seals from the clay documents and examine them separately because of the very significant differences between them.[117] It is no longer seen as valid to use the 'obvious', 'true' writing of the clay documents to define the categorisation of signs in the seals,[118] and such approaches have been observed to have severely restricted earlier understandings of the repertoire of Cretan Hieroglyphic signs: it is clear that there are a number of signs belonging to the script repertoire whose identification has been delayed, and a new, comprehensive corpus is much needed.[119] In the face of a repertoire that still lacks formal documentation, the identification of sign functions in the seals is indeed fraught with some difficulty. From the time of Evans, the idea that some signs may act in a logographic way (for him pictographic, hence the 'hieroglyphic' label) has been entertained in the study of Cretan Hieroglyphic inscriptions, beginning with his 'formulas' of the type 'keeper of the swine' or 'overseer of the builders', formed with a simple juxtaposition of signs.[120] Although since Evans's time there has been a certain backlash against reading Cretan Hieroglyphic as a primitive pictographic script,[121] ironically he may not have been so far from the mark when guessing that such sign groups on seals involve recourse to iconicity and so to writing that may have been essentially logographic in character (perhaps representing administrative duties or transactions).[122] This could represent a different kind of usage for logographic signs: rather than being used as accounting devices to count commodities, or indeed taking part in wider sentence syntax alongside syllabographic sequences, perhaps some of the two- or three-sign sequences in Cretan Hieroglyphic seals represent the juxtaposition of logograms to create a phrase. Further, Civitillo argues for a sort of multi-modality whereby signs could act on both an iconic and a linguistic level at the same time: 'if a graphic sign could be used for its potential to refer to a linguistic expression, in the meantime it was the bearer of a direct reference to the cognitive encyclopedia of the culture that had invented and used it', thus leading to independent but parallel meanings developing and perhaps having different levels of relevance to difference audiences.[123]

---

[117] For earlier attempts to identify functional differentiation in sign usage, see *e.g.* Grumach 1964; Weingarten 1995.

[118] As in Olivier and Godart 1996.

[119] See Jasink 2009; Decorte 2017, 2018a, 2018b; Nosch and Ulanowska 2021; Ferrara, Montecchi and Valério 2023.

[120] *E.g.* Evans 1909, 245–247.

[121] See *e.g.* Olivier 1989, 1990.

[122] See Civitillo 2016b, 158–159, 200–201, on 'iconic' readings of signs, and more broadly on their administrative context; Ferrara and Weingarten 2022; Meißner and Salgarella forthcoming.

[123] Civitillo 2023, quotation from p. 106.

Ferrara has recently attempted to identify some functional differences in the way individual signs were used in seals, with recourse to marking strategies, such as the X mark (which seems to indicate the beginning of text in clay documents but has a different distribution in the seals) and ornamentation surrounding particular signs to 'highlight' them (which she likens to Egyptian cartouches), as well as sign rotation.[124] Such strategies, she suggests, could be intended to indicate how a sign should be read, perhaps as a logogram or determinative rather than a syllabogram, thus opening up the possibilities for what types of sign may have existed in the earliest stages of writing in Crete – which may indeed stretch beyond the model usually followed by analogy with the way Linear B writing works. The idea that signs could be polyvalent not only matches the dual syllabographic or logographic values that turn up in both Linear A and Linear B, but also looks quite in-keeping with other writing systems around the world. However, there remain some areas of uncertainty that are exacerbated by the relatively small size of the seal corpus as well as the brevity of the inscriptions.

Turning to the administrative documents written directly on clay, we can see clearer evidence for the use of logograms-as-accounting-devices alongside numerals. Clay tablets are rare and should perhaps be seen as examples of Linear A rather than Cretan Hieroglyphic,[125] but numerous inscriptions on nodules, medallions and crescents (probably attached directly to objects) and on *lames*, cones and bars (archival records of commodities) show the use of numerals and attest directly to administrative practices. For Olivier and Godart, it is only in these administrative contexts that logograms are demonstrably present, and their identification of such signs seems to depend partly on visual correspondence with signs in Linear A and B (for some signs) as well as their appearance alongside numerals and fraction signs; they also include a list of 10 syllabographic signs that can double as logograms, although they give each instantiation a separate numeration on the sign grid even though the shapes tend to be palaeographically close or identical.[126]

The signs that can act as either syllabograms or logograms, dependent largely on interpretation of their context (especially whether they appear amid sequences or with numerals), are themselves quite telling. One of these is a sign (024) corresponding clearly with AB 30 *ni*, whose logographic value 'figs' appears to remain stable throughout the three scripts (and derives from its highly iconic shape, a depiction of a fig tree or branch), and whose syllabographic value *ni* is evidently related to the logographic usage: *ni* appears to be derived from a non-Greek word (perhaps Minoan, perhaps another language of Crete) that surfaces in later Greek as νικύλεον (cited in Athenaeus *Deipnosophistae* 76e as a gloss of Hermonax: τὸ σῦκον ἐν ταῖς Κρητικαῖς γλώσσαις, 'the fig in the Cretan tongues').[127] But out of its limited number

[124] Ferrara 2018, 2021.
[125] Petrakis 2017b.
[126] Olivier and Godart 1996, 13, 16. For an early review article discussing Olivier and Godart's assembly of the corpus, see Younger 1996–97.
[127] Neumann 1962.

of attestations, almost all appear with fraction signs or numerals, suggesting a logographic function. It is only in one clay medallion from Knossos (#043) that we see it apparently in a sign group (024–050), and of its appearances on seals there is one (#206 β) where it is in a box alongside a smaller sign (not transcribed by Olivier and Godart).[128] So we have here a very small amount of evidence perhaps pointing towards a syllabographic function for this sign, while the majority of the evidence is in favour of a logographic reading. Should we see this as a case of a polyvalent sign in Cretan Hieroglyphic, sometimes syllabographic and sometimes logographic, or not? Ferrara, Montecchi and Valério suggest that it may only have acted as a logogram in Cretan Hieroglyphic, placing its phonetisation (*i.e.* ability to act also as a syllabographic sign) in Linear A on the strength of its much more frequent appearance in sign groups.[129] But in such a small Cretan Hieroglyphic corpus, can we be sure that the numbers of attestations are representative? And how do we explain the appearance of this sign in what looks like a two-sign sequence in the medallion #043? Had the sign already become phonetised, or not? There is no easy answer to these questions, and uncertainties about the ways signs could function in the seals (see above) muddy the waters further.

The other syllabographic or logographic signs could perhaps be elucidated by looking for related signs in Linear A and B, although some do not have correspondences. The sign 031/*174 is equated by Olivier and Godart with *re* in Linear A and B, where it never has a logographic function. Its logographic value, however, is only listed for a medallion from Knossos, #045, where it appears alone with an apparent numeral 1 on one face and could perhaps be interpreted differently (a syllabographic abbreviation, perhaps?); elsewhere it is well attested as part of sign groups in the clay documents as well as making frequent appearances in the corpus of seals. Similarly, sign 042/*175 is equated with *a* in Linear A and B, where it never has a logographic function (unless the double axe logogram now attested at Ayios Vasileios is related to it). Again its logographic function is listed only once for a tablet from Knossos (#068), a doubtful example of Cretan Hieroglyphic anyway, where the 042 sign looks palaeographically very unusual for Cretan Hieroglyphic and much closer to the more linear shape found in Linear A; elsewhere, 042 is widely attested in sign groups on clay documents (with a marked variability in orientation) and is well attested in the seal corpus. The sign 054/*160, meanwhile, is likened to a logographic-only vessel sign, such as *209^{VAS} in Linear B, but the similarity in shape could easily be superficial in this case, given that the shape is absent from Linear A (note also that variants of 054/*160 can have or lack handles, perhaps suggesting writers were not attempting to reproduce an accurate image of a single type of vessel). While the logographic value is listed only twice in a single document (#053), damage

[128] The untransliterated sign, however, is also transcribed alongside every other sign on the seal, and the seals are divided into individual 'boxes', perhaps suggesting that the sign has another role (a determinative or marker of some sort; for example see Ferrara 2018).
[129] Ferrara, Montecchi and Valério 2022, 89.

to this object makes it very difficult to identify any trait that would mark is clearly as logographic (such as numerals to its right); elsewhere, 054 appears quite frequently in sign groups on clay documents and makes a number of appearances in the seal corpus. Finally, the Cretan Hieroglyphic sign 023/*159bis is suggested by Olivier and Godart to correspond to Linear B ra_3/CROC (the latter being the logogram for 'saffron'), but this looks quite unlikely palaeographically,[130] and the logographic value of the sign is suggested only for one nodule from Knossos (#023). The Linear B sign looks more like it might have originated from a Linear A–style compound, perhaps a logogram or syllabogram combined with *te*. These examples give a somewhat unclear picture of the possible co-existence of syllabographic and logographic values for individual signs and can often be questioned.

What is perhaps most striking when we look at the distribution of numerals in the clay documents is that there are many examples where a numeral appears to follow a sign sequence rather than a single logographic sign. On the face of it this looks very different from Linear B especially, where documents quite rarely lack logograms acting as accounting devices for counting commodities. Single-sign logograms do undoubtedly appear in the clay documents, largely identifiable from their juxtaposition with numerals, and most easily recognisable when they have a clear correspondence with logographic signs in Linear A and B: for example, *154 = AB 122 'olives', *156 = AB 131 'wine', *157 = AB 123 'spice', *158 = AB 302 'olive oil' and *163 (which appears once in a medallion from Malia) has at least a superficial resemblance with AB 54 'cloth' (also the syllabogram *wa*); *163 should surely be seen as related to the syllabographic sign 041, which has a very similar appearance.[131] Sign sequences followed by numerals could perhaps represent commodities (however interpreted) that did not have a single logographic sign and needed to be spelt out. However, we could perhaps read this in the opposite direction: the use of numerals was always possible with spelt-out sequences, and the use of logograms in such a position was the innovation (inspired perhaps by the polyvalency of signs in seal writing, where logographic signs could stand for whole words and concepts in phrases related to economic functions and social roles?).

If we compare Cretan Hieroglyphic with Linear A, there seem to be some significant differences in the kinds of sign or sign sequence that can stand before a numeral (or a fractional sign). Cretan Hieroglyphic certainly had both logographic and syllabographic signs, and we can tentatively suggest that seal writing may have employed strategies such as juxtaposing logograms to convey a concept (as opposed to use as accounting devices), and perhaps even determinatives or similar marking strategies to show a sign's function. Meanwhile Linear A used both logographic and syllabographic signs – but it also particularly seems to have employed syllabographic

[130] Judson 2017, 120 n. 26.

[131] See Nosch and Ulanowska 2021, 94–95. Olivier and Godart 1996, 16, do not include *163/041 in their list of signs with dual syllabographic/logographic values.

abbreviations and, notably, compound signs that in some cases probably spelt out the word (or part of the word) for a given commodity in syllabograms and in others expressed some modified meaning by combining a logographic sign with one or more syllabograms (see the previous section). We have already seen that such practices influenced the development of logography and accounting methods in Linear B, but, judging by the small amount of evidence we have, they appear to be absent from Cretan Hieroglyphic accounting. This further suggests that logography works differently in Cretan Hieroglyphic, and that the development of abbreviating and compounding practices happened internally in Linear A. Crucially, logographic signs in Cretan Hieroglyphic do not appear to have grown out of a marking and counting system in the same way as that reconstructed for early writing in the Near East,[132] and I would suggest that such a use is instead secondary, growing out of such signs' ability to stand for whole words or concepts in other usage.

Understanding logography in the Bronze Age Aegean

I hope that this survey of logographic writing in the Bronze Age Aegean scripts has gone some way to highlight the potential differences between each branch of this writing family. It is understandable that Linear B, which is deciphered and whose workings are well understood, should have provided a template for trying to classify sign functions in the earlier scripts. But as detailed contextual studies of Cretan Hieroglyphic and Linear A progress, it is becoming clearer that the label 'logo-syllabic' when applied to all these systems disguises some very significant differences in the way writing works. These differences are not purely symptomatic of an evolution of writing, in the Gelbian model, from pictography to phonography – in fact, they sometimes seem to take a somewhat unpredictable path, and are strongly dependent on the context of use of each system. The three stages of logography among the Aegean scripts, then, would look something like this, based on the best possible analysis of the surviving inscriptions we have and their context:

(1) In Cretan Hieroglyphic, the coeval and overlapping traditions of inscribed seal use and writing on clay documents may present numerous difficulties of interpretation, but we can at least be certain that we can identify some syllabographic signs used to spell out words in sequences and some logographic signs used to count commodities. However, in the seals especially, it seems very likely that signs could sometimes have a logographic function not related to counting, and this may indeed have been the original context in which logography grew up. There is no clear evidence in favour of the existence of syllabographic abbreviations or sign compounding. In the seals, single signs and short sequences may sometimes have had syllabographic readings, but we may suspect that logographic readings (including sequences of logograms) represented roles or transactions with administrative and perhaps social significance.

[132] See Schmandt-Besserat 1992.

Logograms should therefore be thought of as having a wider range of functions than use as accounting devices.

(2) In Linear A, the significance of logograms in accounting seems to be expanded in comparison with Cretan Hieroglyphic. As well as single-sign logograms, there is a widespread practice of using compound signs with logographic readings, some composed of multiple syllabograms to represent words and others employing syllabographic modifiers attached to logographic signs, presumably to add specificity of meaning. The appearance of syllabograms with apparent logographic function also suggests the use of abbreviations. Beyond accounting practices, there are some indications that logograms may have had a syntactic function, with the ability to replace a word in a sentence. The position of logograms at the end of entries in administrative documents could perhaps reflect Minoan word order, and perhaps this (alongside oral practices in accounting?) could explain why Linear A tablets are written continuously, without any visual strategies to organise entries into separate units.

(3) In Linear B, logograms have a very narrow range of functions and act solely as accounting devices. Strategies such as abbreviation, modification and compounding were inherited from Linear A and resulted in a dynamic practice where administrators had several tools at their disposal to create detailed and nuanced records of commodities and transactions. The fact that word order in Greek evidently works rather differently from word order in Minoan may be responsible for a reanalysis of the ways in which logographic signs could work, explaining why commodities that ought to be the natural object of a sentence were listed at the end of an entry and why modifiers came before the logograms rather than after. In the graphic and oral contexts of changing administrative practices and language use,[133] this reanalysis also allowed writers to interpret any transaction as having separate 'slots' and to separate them visually on the documents. In this way you could perhaps say that neatness was invented for Mycenaean Greek administration, but only via a reinterpretation of the accounting methods that were being adapted from Linear A.

Rather than representing an eventual outcome of a straightforward development process, we could indeed see Linear B writing as taking an unexpected turn by restricting the way logographic signs work, a development that can only be understood in the linguistic and administrative context of the transition from what we think of as Minoan to Mycenaean writing. This may indeed also have been related to wider changes in the writing landscape of the Mycenaean world: the extent to which literacy in Linear B may have been restricted, in particular to administrative usage, will be an important topic in the following chapter.

[133] Remembering also that we need to question the degree to which writing in the Bronze Age Aegean involved the notation of speech, as Finlayson 2021 reminds us, a factor that may indeed have involved different relationships between the oral and the written over time.

Chapter 3

Exploring vitality

The syllabic scripts of the Bronze Age Aegean, and their Cypriot cousins, make a very good test case for talking about the vitality of writing systems. Which ones lasted for shorter or longer periods of time in use, what conditions made them thrive and what conditions eventually brought about their demise? This is a particularly important issue for the modern world, where perhaps as many as 80% of the world's writing systems are under threat (according to the ongoing Red List efforts of the Endangered Alphabets Project[1]) and research on the vitality of writing remains somewhat underrepresented in scholarship. Turning our attention to ancient writing systems has the advantage that we can often examine the long-term trajectory of writing, offering opportunities to make links between particular conditions and times of high or low vitality, as well as the eventual loss of many systems in antiquity. In order to explore this question further and to probe potential causative factors, we first need to think about what vitality means – both in general, and specifically in the context of writing.

Vitality is a concept more often linked with languages than with writing, and language endangerment or loss (sometimes abbreviated as LEL) can be linked directly with factors that affect a language's vitality over time. These are recognised as significant concerns in the modern day, with 3,045 languages considered to be endangered at the time of writing (data from Ethnologue[2]). We can look for signs of decreasing vitality in documented lost languages of the pre-modern world to help inform efforts to revitalise modern endangered languages. As Mufwene has pointed out,[3] it is important to take account not only of what we can observe in current language traditions, but also of historical language loss and the factors that may have led to it, thus strengthening the theoretical basis on which we understand ongoing cases – and ultimately enhancing the effectiveness of intervention strategies. Generally, investigations into lost languages have concentrated on recent losses, such as documented examples that died out within the last 100–200 years, but scholarship on the ancient world has shown interest in many languages that were lost far earlier.

[1] https://www.endangeredalphabets.com/, https://www.endangeredalphabets.net/
[2] https://www.ethnologue.com/guides/how-many-languages-endangered
[3] Mufwene 2017.

Here we should draw a distinction between languages that survived in other forms subsequently categorised as separate traditions (Latin and its descendants in the Romance languages being an obvious example[4]) and ones that died out completely in antiquity. A famous piece of ancient anecdotal evidence for language loss comes from the Roman writer Livy (40.43), who tells us that the citizens of Cumae (near modern Naples) were granted permission, at their own request, to use Latin in public assemblies and auctions. The implication is clear: they were moving away from a previous linguistic tradition (Greek most likely being the 'official' language up to that point, although Oscan would also have been spoken locally) out of a positive choice to use a different language in certain areas of life. Sure enough, Cumae was to become predominantly Latin speaking, and Greek dwindled there (though of course it lived on in other Greek-speaking areas of the Mediterranean) while the Oscan language died out completely. This is one anecdote that can help us to understand how Latin came to be the dominant language of the previously linguistically diverse Italian peninsula by the end of the 1st century BCE:[5] speakers of numerous other languages witnessing the political rise of Rome saw efficacy in learning and speaking Latin, and in establishing its use where they would previously have spoken other languages.

While language loss can often be a consequence of what seem to be positive choices, the outcome is, obviously, negative in terms of the language's existence, and a decline in language vitality can be closely associated with the loss of other areas of culture and identity for a given group of people. Some important questions could be raised here as to whether and in what circumstances loss of a language (or any other aspect of culture) is harmful, detrimental or disadvantageous – to use some quite loaded terms. Mufwene has, perhaps quite controversially, argued that language loss needs to be understood in the specific context of any language ecosystem and that some examples may be and historically have been helpful or useful for people and communities;[6] this may be a factor in the success or otherwise of efforts to maintain languages or to counteract processes of loss, although those involved in language advocacy or revitalisation would typically stress that they are acting in cases where there is an explicit wish to try to save the language in question.[7] From

[4] As I always try to explain to my Classics students, Latin is not actually a dead language!

[5] See Adams 2007, 189–202.

[6] Mufwene 2017.

[7] As Bowern 2017, 250–251, points out, revitalisation efforts tend to centre around the desire of speakers to preserve their language, and 'language reclamation is worth fostering' where it is a genuine choice of speaker communities. There is also growing evidence pointing towards positive effects on physical wellbeing where indigenous language traditions are maintained (Whaley, Moss and Baldwin 2016), and, conversely, the contribution of language oppression to physical death (Roche 2022); the Covid-19 pandemic has further prompted calls for better access to health information for minority and indigenous communities, who were often disproportionately affected by the crisis because of failures of communication (*e.g.* Dreisbach and Mendoza-Dreisbach 2021). In fact Global Language Advocacy Day in 2023 focused specifically on the theme 'Language Rights Save Lives', to reflect increasing recognition of these issues.

a historical perspective, it is important to see loss as a complex process taking place over a long-term trajectory and bound up with not only survival of certain cultural features, but also successful adaptation (or otherwise) to new social, economic, environmental and political situations.[8] Any given loss may also, clearly, be negative for one person or group at the same time as it may be positive for another. There are many issues to engage with here that are peripheral to the present investigation into the 'vitality' of writing traditions in the Bronze Age Aegean, and I do not intend to argue that any of these lost systems *should* have survived or that their loss was necessarily either bad or good for the people involved; indeed, the decisive switch to Greek as the language of administration under Linear B was evidently driven by some perception that this was a positive change, with benefits for at least some members of society, as we will see (and see also Chapter 1: Exploring Script Adoption). From our perspective, the loss of these writing traditions is in many ways simply a historical fact. However, what I do hope to show is that understanding how and why writing traditions were lost in antiquity may have benefits for the world today, in particular for modern communities that are trying to maintain local languages in danger of loss, and associated writing systems.

The social and cultural contexts of language use are key to understanding processes of loss, since 'the factors leading to language death are non-linguistic rather than linguistic'.[9] Language revitalisation efforts, although often starting out from a linguistic perspective,[10] are therefore often concerned with attempting to redress some of the social factors that lead to language loss, such as issues of group identity, competition with other globally or supra-regionally popular languages, political oppression, breakdown of social units and patterns of communication, lack of materials or resources to pass the language tradition on to subsequent generations and lack of visibility (or underrepresentation) of the language in writing. As the last point shows, writing can be (but need not be) bound up with language vitality, and indeed one crucial factor for many (though not necessarily all) endangered languages today is trying to ensure that they are represented in writing and can find written visibility both among their speaker communities and for the wider world (especially online).

To begin constructing criteria to assess writing system vitality, it makes sense to use as a starting point the more prominent research that has been done on language vitality, though bearing in mind from the outset that writing and language are not the same thing, even if they are often closely linked. At the International Expert Meeting on the UNESCO Programme Safeguarding of Endangered Languages, held in Paris in 2003, a set of guidelines on language vitality and endangerment were adopted, outlining nine factors that can be used to assess the vitality of a given language:[11]

[8] Tainter 1988 is the seminal work on the complexity of the concept of collapse.
[9] Wolfram 2004, 767.
[10] On which, see recently Bradley 2022.
[11] https://unesdoc.unesco.org/ark:/48223/pf0000183699

1. Intergenerational Language Transmission (are older generations passing the language on to new generations? – generally held to be the most important factor).
2. Absolute Number of Speakers (how many current speakers are there?).
3. Proportion of Speakers within the Total Population (how does the number of speakers compare with the size of the population?).
4. Shifts in Domains of Language Use (is the language used in all areas of life, or only some?).
5. Response to New Domains and Media (does the language feature in new areas of usage, such as the media and the internet, or is it restricted to more traditional areas of life?).
6. Availability of Materials for Language Education and Literacy (do teaching or training materials exist?).
7. Governmental and Institutional Language Attitudes and Policies, Including Official Status and Use (does the language have official and/or political endorsement or support?).
8. Community Members' Attitudes towards Their Own Language (do speakers value their language as an important aspect of their culture; do they want to promote it?).
9. Type and Quality of Documentation (how much recorded information is there about the language without having to ask speakers?).

For many of the above factors, we could perhaps begin by changing the word 'language' to 'writing system' to make a series of potentially useful criteria for assessing the vitality of a living writing tradition, although some adjustments might be needed. For a historical writing tradition, on the other hand, there are some factors here that would be very difficult to recover, such as the total number and proportion of users. A number of other measurement scales along similar lines have been proposed, such as the Language Endangerment Index, which simplifies the categories to four (intergenerational transmission, absolute speaker numbers, speaker number trends and domains of use) in order to create a more easily comparable scoring system to assess endangerment in (relatively) absolute terms.[12] These methods of judging language vulnerability are strongly dependent on the availability of data, often making them ineffective for languages that do not have extensive up-to-date documentation, and also often fail to distinguish strongly between causes and symptoms of endangerment.[13] Recent research has also emphasised that contextual factors, such as the geographical distribution of endangered languages, must also be taken into account, with isolated languages, for example, tending to be more critically endangered than those towards the centre of spatial groups of endangered languages.[14]

[12] See Lee and Van Way 2018.
[13] See for example Smith 2016 for an evaluation of Papapana in Papua New Guinea's Bougainville islands via four different frameworks, highlighting numerous interpretive problems.
[14] Lee, Siew and Ng 2022.

There are also important differences in the ways that languages and writing systems function that could make it useful to amend some of the criteria listed above or to look at different ways of assessing vitality and vulnerability.[15] The Language Sustainability Toolkit produced by the Living Tongues Institute for Endangered Languages asks a range of more nuanced questions surrounding the use of a language and community attitudes towards it, in order to allow communities to assess the vitality of their own languages and develop strategies for preserving or promoting them.[16] These questions involve, for example, who uses the language and how they learn it, how interested the community is in the language, whether other languages have begun to take over in some areas of life, and so on. It is important to note that writing is often considered an essential part of efforts to maintain or revitalise a language, except in cases where there is some ideological objection to writing on the part of the speaker community, on the basis that this will lend a higher degree of social visibility and acceptance to the language itself. This typically leads to efforts to develop new systems or more often new orthographies in existing (often majority) systems to represent the language in question. Linguists working with communities of endangered language speakers may indeed find that they have to suppress instincts to develop a full linguistic orthography (reflecting closely the phonemic inventory of the language, for example) in order to follow the community's wishes where there is already a traditional, 'non-ideal' orthographic system in place[17] – showing that writing is more than a vehicle for the language and can have its own relationship with the community's expression of identity.

Despite the tendency and temptation to link writing very closely with language, it is important to look beyond language as the sole comparandum when it comes to vitality in writing traditions – particularly given that writing is strongly determined by social and material factors as much as by linguistic ones. Even though terminology surrounding language vitality is in general more comprehensive and better established, there have been influential studies of vitality in relation to other areas of cultural heritage, which make particularly apt comparanda because writing is so strongly rooted in socio-cultural traditions and embodied practices. We might expect everyone in a society to speak, for example, but we do not necessarily expect everyone in a society to write, depending on levels and types of literacy and access to teaching and resources, as well as broader attitudes towards writing. To take one example of a relevant non-linguistic cultural tradition, studies of music endangerment have in recent years developed a framework structured around five domains of sustainability: these comprise systems of learning, the position or status

[15] See especially Houston, Baines and Cooper 2003 on the significant differences between language loss and writing system loss in historical contexts. Seeing writing as more than a simple transfer of the spoken word to a more permanent medium is crucial to understanding its features as well as its sustainability; see Finlayson 2021 for a recent discussion focusing on the Bronze Age Aegean scripts.

[16] https://livingtongues.org/language-sustainability-toolkit/

[17] Bradley and Bradley 2019, 220.

of a tradition in communities, contexts or constructs, infrastructure (including spaces for performance and collaboration) and media.[18] While further developments of this framework have explicitly looked towards studies of language vitality for inspiration, they have established that there are some crucial differences at play: for instance, music has distinct social roles from language, requires different types of resources and has a far greater reliance on media industries and technological access.[19] Some of the same observations could be made for writing, particularly in terms of resources and technology.

While music, like language, is usually considered as intangible cultural heritage, writing has unquestionably tangible aspects – not only does it have a social and a performative context, but it also leaves behind tangible remains, however ephemeral they may be, depending on the chosen media.[20] UNESCO's List of Intangible Cultural Heritage[21] includes a number of writing systems and particularly writing traditions, including Arabic, Armenian, Mongolian and Chinese calligraphy, emphasising their dynamic and symbolic roles in contemporary communities. It also includes various languages, not in isolation but typically in the context of their oral performance as part of cultural practices (for instance Bakhshi art in Uzbekistan, Corsican cantu in paghjella, Hezhen Yimakan storytelling in northeastern China and the Ugandan Koogere oral tradition, to name just a few that involve local linguistic traditions). Seeing writing and language as part of contextualised communal practices is a welcome development in the way these aspects of life are perceived, albeit that such approaches have still had only limited impact on the ways in which writing and language are typically researched.

Another question is the extent to which elements of culture can be measured, and so assessed for their vitality or vulnerability. The Urban Institute's Arts and Culture Indicators Project has sought ways of measuring cultural heritage, which it defines as 'the evidence of creating, disseminating, validating, and supporting arts and culture as a dimension of everyday life in communities',[22] in order to inform policy on city and neighbourhood development. The concept of measuring culture is what is relevant here, with emphasis placed on four factors: the presence of an aspect of culture in a community setting, the participation of members of the community in its creation or practice, the impacts of the aspect of culture on the community, and the systems of support and resources needed to make participation possible.[23] While this is some distance from efforts to measure or categorise language endangerment, it does give an idea of a way in which cultural traditions can be interrogated on

[18] Schippers 2010, 180–181.
[19] Grant 2014, especially chapter 2.
[20] On some of the problems of approaches to writing, see Boyes, Steele and Elvira Astoreca 2021. On writing as a practice that requires a social-archaeological approach, see Boyes 2021a, 2021b.
[21] https://ich.unesco.org/en/what-is-intangible-heritage-00003
[22] Jackson, Kabwasa-Green and Herranz 2006, 13.
[23] Jackson and Herranz 2002.

their own terms rather than applying the frameworks developed to assess languages (as in the example of music vitality above). The focus on participation, visibility and (material and social) accessibility is particularly telling and could be seen as highly relevant to the use of writing too.

Just as is the case with the loss of language, the loss of a cultural tradition can be linked with positive choices by community members: 'cultural extinction can embody decisions by individuals (voluntary or involuntary) to stop practising and stop passing on to the next generation the traditional ways of life that were once neutral or adaptive in the local ecology but had become unattractive or maladaptive or just impossible in a new environment'.[24] But this is not the only reason for change, and studies of cultural trauma and loss have emphasised that detailed research is needed to understand how circumstances of cultural conflict (which may not necessarily be physically violent), for example, can lead to the erosion of many areas of culture, including physical and spatial practices, religion, shared history, language and even the ways states or societies are organised and their economic vitality.[25] Studies of cultural endangerment are indeed complicated by the multi-faceted nature of culture itself, and have not yet developed the more targeted sets of resources seen in research on language endangerment and revitalisation.

Turning back to writing specifically, it is clearly important to consider any given writing system within its broader context of use, along with the situations, activities, resources and attitudes that support and sustain it. One immediate factor that may make us wary of simply mapping writing onto language is that there are known cases of languages outlasting writing systems. In ancient Italy, to pick up an example already mentioned, 'indigenous scripts disappear before the non-Latin languages they are used to write',[26] while the languages themselves begin to be written in the Latin alphabet for a while before they go out of use. Greek is an even better example, as we will see throughout this chapter: Linear B disappeared around the end of the 13th century BCE, but the language resurfaced in the surviving epigraphic record, first in Cyprus around the turn of the 1st millennium BCE (in a Cypriot syllabic system) and then in mainland Greece and the Greek islands in the 8th century BCE (in the Phoenician-derived alphabet). An important question, therefore, will also revolve around the relationship between language use and writing, and the degree to which language can adapt to potentially survive changes in the graphic landscape, or otherwise. The issue of social visibility, for instance whether writing appears in a community's wider visible landscape and how much access groups and individuals may have to it,[27] will also be an important factor in the present enquiry and will be argued to contribute significantly to the writing tradition's vitality. In fact, social

[24] Zhang and Mace 2021, 15.
[25] See Hudnall Stamm *et al.* 2003.
[26] Lomas 2008, 125.
[27] On the use of monumental inscriptions in the ancient Greek world, and their status in comparison with other modes of writing and orality, see Thomas 1992, 78–88.

visibility of writing should be judged as important as, if not more important than, the question of literacy[28] – usually seen to boil down to how many people in a society could write competently, but widely acknowledged to be a question of degree rather than an absolute state of being, since many individuals may have been only partially literate.

Boyes asks an enlightening set of questions, albeit ones that are difficult to answer in the present state of evidence, of the loss of Ugaritic writing traditions (including the use of the cuneiform alphabet to write a local language) that co-occurred with the fall of Ugarit in the Late Bronze Age: 'When was alphabetic cuneiform gone? In a single day or two, when the city fell and the political structure that created and sustained its writing culture collapsed? Days or weeks later when the city was burnt down? When a literate survivor gave up trying to persuade anyone in his new community that the script was worth using? When someone impressed a wedge for the last time? When the last person decided not to pass the script on to their children? When the last person who could read or write it died?'[29] We are rarely allowed to glimpse the very last throes of a dying writing tradition, and so the process or processes by which it is lost are very difficult to reconstruct. However, particularly in situations where multiple groups of people may be literate or have exposure to literacy, it is entirely possible that a set of writing traditions will undergo a series of 'small deaths', in Houston's words,[30] as different people make different choices about what is passed on and what is no longer of significant value or relevance to them. As we will see, the range of uses, users and audiences for writing may therefore make an important difference to the vitality of a given writing tradition, because the more limited the outlook on its existence and usefulness, the greater its vulnerability to loss (which will be particularly relevant in the case of Linear B).

When dealing with writing systems (and indeed languages) of the past, we also need to be sensitive to issues of archaeological visibility, since what survives may not be as representative of usage as we would like. In particular, the nature and selectiveness of excavation can result in very uneven documentation over periods that might be crucial to understanding long-term processes, with some features very difficult to date either absolutely or relatively, while some archaeological deposits may give only a very limited 'snapshot' of a particular situation, frozen in time. Anatolian hieroglyphs are a famous cautionary tale, as their apparent disappearance

[28] On literacy in the ancient world (mostly focused on the Mediterranean), see for a range of different perspectives, from the quantitative to the qualitative (*inter multa alia*): Baines 1983; Harris 1989; Thomas 1992; Robb 1994; Sickinger 1999; Veldhuis 2012; McDonald 2019; Steele 2019b; Mullen 2021; Mandell 2023 and the papers in Bowman and Woolf (eds) 1994; Johnson and Parker (eds) 2011; Kolb (ed.) 2018. Woolf 2015 concludes that modern conceptions of literacy and illiteracy are anachronistic when applied to the ancient world and that, given our inability to quantify literacy in past societies effectively, 'perhaps there are more interesting questions to ask' (quotation p. 41).

[29] Boyes 2021a, 271.

[30] Houston 2008.

in the Hittite heartland around the 13th century BCE is followed by their striking re-emergence in the Neo-Hittite states of southern Anatolia by the 10th century BCE, with very few attested snippets in between to help us understand how, where and why this system remained in use over the intervening centuries.[31] We might wonder whether an idea (for instance the basic concept of the writing system and the meanings associated with signs) can itself survive a radical change in usage or even periods where its usage becomes severely restricted or non-existent. A modern comparison can be found in Andean khipus, knotted cords that had been used most famously during the Inca empire to record both narrative and numerical information, continuing in administrative use into the 20th century. Modern Christian usage in other contexts often associated these items with religious and funerary ritual. It had been thought that the practice of khipu-making was dying out, as the last known practitioner died in 2014, but more recently it was discovered that there was a remarkable resurgence during the COVID-19 pandemic as communities struggled to deal with rising death rates and turned to khipus as a way to 'control their grief'.[32] Such examples caution us that the continuation of practices like writing (ignoring the fact that visual meaning-making systems like khipus are often excluded from unhelpfully narrow definitions of writing[33]) may display complex patterns of usage over time and may be difficult to document continuously. Likewise, although the destruction of a given archaeological site can be associated with the loss of its language and writing traditions, there is 'no one-to-one correlation between site destruction and changes in linguistic or writing practices', as shown in certain continuities across the eastern Mediterranean and Levant in the Late Bronze to Early Iron Age transition.[34]

Closely linked with archaeological visibility is the physical durability of writing, which is an important variable factor when looking at the historical attestation of writing traditions. We know that many people of the ancient world wrote on materials that are very unlikely to survive in most soil climates, such as papyrus, parchment and wood, and it is only in exceptional circumstances (the dry heat of Egypt, the boggy ground of Britain, the carbonisation effect of the eruption of Vesuvius) that we have access to writing on such materials in any meaningful quantity. Anecdotal and pictorial evidence can to some degree help to fill in the picture, but only in those societies where it is available: for example, we know of scribes of the Hittite kingdom who were said to work specifically with wood (^{LÚ}DUB.SAR.GIŠ),[35] and there are many depictions of wooden writing tablets and/or scrolls in art across ancient Greece, Rome, Etruria, Egypt, the Near East and other places. Writing on such materials is

[31] See Hawkins 2008.
[32] Hyland, Lee and Aldave Palacios 2021, 13. Generally on the history of khipus, see Salomon 2004, 2008; Brokaw 2010.
[33] On khipus and especially khipus boards (where the link with language is more explicit), see Hyland, Bennison and Hyland 2021.
[34] Boyes 2021, 262.
[35] See Waal 2011, 2022.

always going to be severely underrepresented in the archaeological record, leaving us with gaps and often a skewed picture of what written culture looked like in any given society. This opens the way for many arguments as to whether or not perishable materials were used for writing in societies where there is little or no evidence to support such an assumption, with claims sometimes resorting to questionable support, such as the appearance of text (Linear B appearing to be better suited to writing in ink than to writing on clay with a stylus, for example, as already claimed by Arthur Evans[36]). Some societies commonly wrote on more durable materials, such as stone and ceramics, which will then be far better represented and may give the appearance that writing was more restricted (palaeographically as well as in terms of domains of use) than it was. So we must be very careful to avoid mistaking lack of archaeological visibility for lack of vitality in a given historical writing tradition: absence of evidence is not, as the old adage goes, evidence of absence.

Returning to the question of what criteria we might be able to use to judge vitality in a writing system or tradition, it will pay not to be too restrictive as we begin our investigation. Indeed, one aim of examining and comparing the Aegean scripts is to help us to explore what vitality might mean for a writing tradition, as well as what factors may influence it positively or negatively. As we have already seen, and as the examples throughout this chapter will also show, it is not always straightforward to extrapolate from surviving attestations to understand the wider writing culture that once surrounded them. Building on criteria established for assessing language vitality and the vitality of other areas of culture, we will concentrate on the following factors:

1. Who wrote? Was writing restricted to certain groups?
2. What was writing used for? Was writing restricted to particular domains of everyday life?
3. How was writing done? Did writing require access to particular materials and media?
4. How was writing passed on? Was learning targeted at certain groups or uses?
5. What ideology surrounded writing? Was writing controlled or promoted by certain groups?
6. Were there detectable changes in any of the above factors over time?

With these factors in mind, we can now turn towards the evidence for writing practices among the Aegean family of scripts.

Cretan Hieroglyphic

Examples of Cretan Hieroglyphic writing can be divided broadly into two groups: the seals and the administrative documents on clay. The genesis of Cretan Hieroglyphic as we know it has to be understood as a development from practices that began

[36] Evans 1921, 638.

as pre-literate or proto-literate, stemming from iconographic repertoires where images themselves had systematic meanings, and moving from there towards an adaptable means of representing language. How this occurred is to some extent a concern of Chapter 2: Exploring Logography. Here we are more concerned with the established system that had emerged by around 1800 BCE, where seals continued to be produced and used meaningfully in literate contexts, while writing also appeared on clay documents and often interacted with the use of seals. While sealing offered a predetermined set of written expressions that could be added to documents, writing directly on clay offered considerably more room for innovation and varied expression, which may perhaps have lain at the heart of the 'clay turn', which saw clay becoming a primary vehicle for writing in the Bronze Age Aegean.[37]

The writers of the Aegean linear scripts are notoriously anonymous (though see below on identification of individual writers via palaeographical study in Linear B), and Cretan Hieroglyphic is no exception. We can, however, hypothesise at least two different groups of people who may have produced inscriptions:[38] seal engravers (usually thought of as craftspeople) and administrators who wrote on clay documents; the latter may also have impressed seals on documents and other objects in the course of their duties, although it is difficult to say how much overlap there might have been between seal owners and clay document writers. The extent to which seal engravers may have been literate has been seen as open to question, with craftspeople typically thought to be specialists in seal carving for whom literacy would have been a secondary concern if at all – they might even have been working from templates supplied by other, literate individuals (perhaps the person commissioning the inscription themself) rather than having competence in the writing system themselves. While this is quite a common outlook on the idea of craft literacy, it is quite difficult to substantiate in the case of Cretan Hieroglyphic seals. Another way of looking at their makers might be as artists skilled in reproducing a wide range of glyptic imagery, some of which involved sequences of signs whose iconic or linguistic value was intended to convey specific information in particular contexts.[39] Such craftspeople may have been somewhat cognisant in not only the graphic repertoire but also the context in which messages would have been conveyed, since they needed to produce accurate communicative devices – which may also have involved dynamic and creative use of various graphic elements to specify and nuance meaning.[40] In other words, the kind of literacy we envisage in the context of the seals may indeed have extended to their makers, who were involved in a process of encoding ideas

[37] Steele forthcoming b.

[38] On seal production, see Civitillo 2016b, 56–60, and on their distribution, Anastasiadou 2016. Finlayson forthcoming b encourages a closer look at the complexity of craft production and the people involved in it, especially their creativity within craft networks and their agency, factors usually set aside in black-and-white pictures of what counts as literacy or not in a craft context.

[39] See Ferrara and Weingarten 2018.

[40] See Ferrara 2018.

and information in visual form that also needed to be meaningful for the seal users, suggesting a shared understanding of the way the signs were arranged to make meaning.

The seal owners and users, typically assumed to be people of high status involved in the administration of elite affairs and resource control, were also involved in literate actions when they used the seals, since the application of the seal inscription to a document or other object itself involved meaning making – we need to remember that the 'meaning' of a seal inscription may also have depended considerably on context, enabling dynamic usage.[41] Some seals had multiple inscribed faces, allowing the seal user a choice as to which face (or which part of which face) to impress in a given context, with perhaps different configurations associated with different types of administrative role or duty, and/or different types of economic transaction.[42] The decorative and individualistic nature of seal inscriptions (with even recurring 'formulas' often taking different arrangements and appearances) might indicate their existence within a wider visual currency of writing, for instance as prestige objects playing a role in status display. This is supported by the wearing of some seal types (particularly the Petschaft) as pendants, which may indicate a wider social visibility for the seals and their agency in meaning making,[43] and the discovery of seals in tomb contexts within burial assemblages.

Writing on clay may have 'worked' in quite a different way. Rather than impressing a predetermined message, the writer of a clay document would be able to use the repertoire of signs to create a record on any possible subject – and since the script evidently involves a phonographic (specifically syllabographic) component, we may assume that there were theoretically no restrictions on what could be written out. However, the production of such documents was, obviously, bound by their context, which was undoubtedly administrative. Overall the clay documents have attracted somewhat less palaeographic interest than the seals, where the issue of which sign identification has proved particularly problematic because of the visual properties of seal inscriptions.[44] For Olivier and Godart, the clay inscriptions are the ones that present the most straightforward view of writing, one where syllabograms and logograms are most easily identified alongside the use of numerals, prompting them to impose the repertoire of signs attested in the clay documents onto the whole corpus of Cretan Hieroglyphic.[45] This is obviously methodologically questionable, and moreover it is quite possible that the seals and the clay documents, while obviously intelligible within the same administrative contexts where they both appear, do not

[41] See Poursat 2000. However, for Karnava (2000, 10), 'the possession of an inscribed seal does not guarantee a literate owner'.
[42] See *e.g.* Civitillo 2016b, 85–86.
[43] See Ferrara and Jasink 2017, 44.
[44] See further Chapter 2: Exploring Logography, and *inter alia* Civitillo 2016; Decorte 2017, 2018c; Ferrara 2018; Salgarella 2021; Ferrara, Montecchi and Valério 2023.
[45] Olivier and Godart 1996.

make use of one single repertoire of signs and show some divergences (for instance on how logographic signs might work, on which see Chapter 2: Exploring Logography).[46] However, the state of the evidence must be borne in mind, as with fewer than 400 short inscriptions surviving (perhaps to be expanded by including more examples of surviving seals than have usually been considered as examples of Cretan Hieroglyphic, though this will not make a great difference to the number of attested signs), this is a corpus that is likely to have some significant gaps in attestation. The signs attested in seals but not in clay documents (014, 048, 076, 095), for example, might indeed have been used in writing on clay but have no surviving examples; the same is very likely true of Linear A too, despite its larger corpus, as seen in the low numbers and sometimes non-attestation of examples of o-vowel signs.[47]

The small size of the corpus also leads to some questions over the degree to which it may be representative of bureaucratic practice, but, even from the sample we have, it is very clear that administration in Cretan Hieroglyphic looks somewhat different from what we know in Linear A and B. Clay tablets, for example, either are very rare or do not exist at all,[48] while the main clay document types – medallions, labels and bars – are mostly not shared by the other traditions; only the nodules bear any significant resemblance to document types found in Linear A and B.[49] Some of the Cretan Hieroglyphic documents (particularly bars and labels) are shaped in such a way that they show synergy with a growing degree of linearity in writing, *i.e.* writing in lines from one side of a document to the other, while others show some variation in the degree of linearity (particularly the medallions, where signs can be inscribed in straighter or more curved lines but can also show variable orientation comparable with writing in the seals).[50] Perhaps that linearity was motivated by the shapes of some document types, but on the other hand the document shapes may have been motivated by changes in attitudes towards information layout. For Ferrara and Jasink, a progression from more rounded seal types to the straight-sided prism seal, and from there to the similarly-shaped clay bars, shows an 'inclination towards the same typology of object' in both the seals and the clay documents that must have strongly correlated with the need to record complex information in sign sequences ('a tool particularly targeted to recording administrative transactions').[51] The use of writing on clay documents may indeed also have had some effect on the carving of seals, judging by five examples that display the unusual feature of signs incised in

[46] See Meißner and Salgarella forthcoming.
[47] See Chapter 1: Exploring Script Adoption; Meißner and Steele 2017.
[48] See Patrakis 2017b.
[49] For a comparison of document types in the three systems, see also Tomas 2017.
[50] See Steele forthcoming b. I am also grateful to Sarah Finlayson for the observation that embodied practice could make a difference too, for instance whether medallions were inscribed once they were already hanging from an object, which would entail a certain amount of manipulation in the hand.
[51] Ferrara and Jasink 2017, 50.

outline rather than fully sculpted, which is a notable feature of palaeography in the clay documents.[52]

We might assume that the growing use of writing in administration would have gone hand-in-hand with specialisation of some individuals in literate administration – though it is difficult to say what the status or social position of such individuals may have been, and whether they were themselves elites involved in resource centralisation and control or were working in the employ of such elites. While writing was evidently an important skill in this context and would have required some form of training,[53] there is no obvious reason to posit the existence of writing professionals as opposed to literate administrators, the latter being much closer to what we envisage for Linear B administrative writing.[54] Seal usage and writing on clay documents meet within the same administrative contexts, and can be assumed to have been done by or for people of high status for whom resource control was an important aspect of their authority; beyond this, there is little to help us reconstruct the range of social backgrounds from which writers of clay documents might have come.

The question of whether writing existed outside of administrative contexts is difficult to settle. However, a small number of inscriptions that are neither on seals nor on clay documents may be considered, comprising incised inscriptions on stone objects and vessels, alongside painted inscriptions on vessels. These are inscriptions applied directly to the object, as opposed to the application of a seal to the object, which has no functional overlap.[55] The most numerous examples are on eight small 'Chamaizi' pots, where almost all inscriptions appear in relatively large signs displayed on the vessel's shoulder, including one rendered in paint rather than incised (#322); one example has its inscription on the bottom of the vessel (#329). These largely seem designed to be visible, perhaps even decorative, and their find contexts are mostly from different areas of Malia, not only Quartier Mu and the palace, but also the town and necropolis. There are also a pithos, two pithos lids and an amphora handle, all bearing inscriptions that notably lack any clear logographic signs or numerals, although this does not guarantee that they do not relate to the storage or movement of the vessels' contents. A shallow dish with three incised signs has the appearance of simple tableware, and two further inscribed sherds are difficult to contextualise, although one comes from the base of a vessel and thus is in a similarly difficult-to-access position to one of the Chamaizi vessel inscriptions. It is impossible to comment in much detail on the writing of or audience for these vessel inscriptions, other than to say, tentatively, that they may point towards a wider context of literacy than is seen in the seals and clay documents.

One isolated find from Malia points towards a religious context for Cretan Hieroglyphic writing similar to that better attested for Linear A, a blue limestone

[52] See Karnava 2000, 233–234. The seals in question are #204, #207, #281, #294, #307.
[53] See Karnava 2000, 226–227.
[54] See Bennet 2001 and the section below on Linear B.
[55] Karnava 2000, 156.

libation bowl with a relatively long inscription in Cretan Hieroglyphic signs.[56] This is unique in a Cretan Hieroglyphic context: all other libation bowls bearing inscriptions are in Linear A, but for this example there can be no doubt that the signs are palaeographically very much in-keeping with the Cretan Hieroglyphic script. It may even be that the inscription shows some influence from the clay documents in the sense that it is strongly linear, its signs are arguably less 'iconic' than some found among the seals, and most significantly some signs are carved in outline – a feature known from the clay documents for signs that in the majority of seals would be fully engraved (*i.e.* the interior of the signs would be sculpted out).[57] However, there is no use of divider signs even though the inscription is presumably long enough to contain multiple words. The care with which the inscription has been added is evident from the use of at least two differently sized chisels to execute it. Could this intriguing object suggest a more socially visible use for literacy in Cretan Hieroglyphic, similar to what seems to be the case in Linear A? The discovery of the object at Malia, rather than at a site associated exclusively with religious practice (which is where most Linear A examples, and most libation bowls in general, are found), is nevertheless unusual (but is perhaps owed to the more extensive excavations at this site in comparison to others).

Another interesting piece of evidence for writing outside of the administrative centres is found at the sanctuary site of Kato Symi, which was in long-term use from the Proto-palatial period (19th/18th century BCE), for more than two thousand years. A fragmentary clay label was found at the site, bearing a small number of signs identified as Cretan Hieroglyphic and constituting a highly unusual discovery of a document with good administrative parallels (among both the labels from Malia and the bars from Malia and Knossos) at a large building complex whose primary function was apparently religious.[58] It is a matter of speculation why such a site might have made use of bureaucratic documentation of the kind found elsewhere only in administrative archives – because of some link with one such administrative centre, perhaps, or used by local officials of some sort who may have overseen the commodities required for religious rites and festivals?[59] Whatever the exact context, the existence of this isolated administrative-looking document suggests the presence at Kato Symi of one or more people who could read and perhaps write in Cretan Hieroglyphic.[60] Ultimately the small size of the Cretan Hieroglyphic corpus is the main barrier to drawing any conclusions about wider contexts of literacy, although these isolated finds caution us against assuming that literacy was restricted and visible purely to elite individuals and administrators.

[56] Chapouthier 1938.
[57] See Karnava 2000, 233–234.
[58] Lebessi, Muhly and Olivier 1995.
[59] See Lebessi, Muhly and Olivier 1995, 75–77.
[60] Karnava 2000, 225–226; Flouda 2013, 145.

Finally, the appearance of the sequence *a-sa-sa-ra-ne* on several seals (including one recent find from the centre at Knossos[61]) perhaps points towards a religious context for writing: this sequence or something very similar to it is connected both with the very early seal script attested at Archanes, preceding the main corpus of Cretan Hieroglyphic, and with the 'libation formula' found on Linear A stone vessels with a religious context (where the sequence is *a-sa-sa-ra-me*: see further the next section). The main questions surround the meaning of the sequence, for which we have no direct evidence, and the context of its appearance on seals, which is presumably somewhat different from the Linear A appearances on ritual vessels. Perhaps again we are seeing some sort of relationship between administrative mechanisms and religious practice, although the evidence is very limited and open to interpretation.

The answers to the question of when Cretan Hieroglyphic writing disappeared from Crete's literate landscape are somewhat disputed, although it is clear that it did not have the longevity of Linear A. The production of inscribed seals was apparently a phenomenon limited to the period between MM IA and MM IIB, after which there is no evidence that production continued, although they remained in use as objects and quite possibly as heirlooms.[62] This change presumably corresponded with some change in the range and context of literacy, as the craftspeople who engraved the seals must have ceased to engage in this literate output,[63] and presumably this related to a loss of demand for newly made seals. This could also arguably be read as a decline in the perception of seals as dynamic meaning-makers, once the possibility of having a new graphic configuration engraved on a seal disappeared. The use of clay documents, along with the practice of sealing itself, continued through the MM III period, but the date of the Hieroglyphic Deposit at Knossos has been questioned and suggested particularly by Pini to stretch potentially into LM IA.[64] It has even been suggested that Cretan Hieroglyphic practices remained in currency long enough for Linear B to have adopted and adapted some key features of the administrative system and documents types, since in many ways they provide a better match than those of Linear A (which, on the other hand, clearly provided the syllabographic repertoire adapted for Linear B).[65] A certain amount of chronological and even geographical overlap in the use of Cretan Hieroglyphic and Linear A may prompt us to question the relationship between the two systems and the motivation for the loss of Cretan Hieroglyphic. Could it be that we have two groups in competition, one becoming marginalised while the other establishes its foothold?[66] Overlaps between Cretan Hieroglyphic and Linear A

[61] Kanta, Palaima and Perna 2022.
[62] Indeed, one seal (#293) was found in a much later, Geometric tomb.
[63] Though it is perhaps not a huge leap to suggest that some individuals could have been involved in other literate output, such as inscriptions on stone vessels, as Sarah Finlayson has suggested (pers. comm.).
[64] Pini 2002, 6–7.
[65] Especially Tomas 2003, 2017a.
[66] *E.g.* Finlayson 2021, 254: 'the social, political, cultural and/or economic domination of the Linear A group'.

practice are difficult to explain, however, and are perhaps better thought of as a 'healthy symbiosis' of mutually intelligible sets of practices rather than evidence of competition.[67] The increasing favour shown to Linear A administrative and sealing practices could indeed correspond with changing preferences on the part of elite groups who sought to establish their power and control in new ways as a response to changing social dynamics. The anonymity of the writers is frustrating here because we can do very little to reconstruct their identities and social interrelationships in the current state of evidence. However, it seems very likely that there were at least two shifts in Cretan Hieroglyphic literacy, one corresponding with the cessation of inscribed seal production and one corresponding with the eventual loss of the administrative system. This also implies that Cretan Hieroglyphic writing was in some sense dynamic enough to survive the first shift, while it seems to have succumbed to the second.

Linear A

Writers of Linear A evidently adopted, or contributed to the development of, writing on clay documents as a major forum for literacy, which accounts for the overwhelming majority of surviving inscriptions. The use of inscribed seals was never part of the Linear A administrative package, which looks quite different in many of its details from what existed in Cretan Hieroglyphic: sealing practices only used seals with pictorial motifs (not obviously connected with writing in any sense), the range of clay document types was different and the forms of numerals were also dissimilar in part.[68] In Linear A it is the clay tablets (typically oriented like Linear B page-shaped tablets but considerably smaller) that are the most numerous documents, co-existing with clay bars and a range of sealing types, roundels and nodules. In this case, each document type may have something interesting and different to tell us about the literate context of their use, and so we will begin with a survey of their apparent functions, before considering a range of inscribed objects that seem to attest a broader potential range of literacy and social visibility of writing. Schoep divides possible areas of writing practice into 'pinacological' (writing on clay documents), 'epigraphic' (writing on stone with tools such as chisels) and 'papyrological' (more cursive-style writing in paint, for example), pointing out that this range looks much more expansive than what we have evidence for in Linear B (on which, see the next section).[69]

First it may be helpful to take note of the geographical distribution of Linear A, and the degree to which writing practices may have been regionally determined in line with the political diversity of the island. In the Proto-palatial period, in MM II,

[67] Karnava 2007, 200.
[68] Cretan Hieroglyphic also preserves a smaller range of fractional signs than Linear A, although the ones attested are of similar shapes. On numerals, fraction and measurement signs and ways of counting across all three systems, see Montecchi 2017.
[69] Schoep 2002, 13.

Linear A documents seem to be limited to Phaistos, in the south-central part of Crete, while Cretan Hieroglyphic was being used predominantly in the north and north-east. By the Neo-palatial period, in MM III, Linear A is attested more widely, and for a while seems to co-exist with Cretan Hieroglyphic at Knossos and Malia, judging by particular deposits at these sites where both systems have been found together. Meanwhile sealing practices and the range of sealed document types seem to have evolved, before reaching their full development in the Neo-palatial period.[70] The documents from the palaces of Phaistos, Knossos and Malia all date earlier than LM IB, for which period the largest numbers of documents have been found at Haghia Triada, followed by Khania and Zakro (with a handful also from Petras, Myrtos-Pyrgos, Archanes, Tylissos and Palaikastro). The expansion of writing from the MM period to LM IA suggests certain socio-political and administrative changes, which may have had further effects on the spread of literacy, and the level of variation seen in accounting across the different sites (in counting, sign composition, document content, etc) lends weight to the view of these administrations as operating out of 'a mosaic of semi-independent centres'.[71] Notably, some of the documents (particularly in the later period) come from buildings that have been interpreted as non-palatial, including 'town houses', although clearly this does not mean that they lay completely outside of the administrative sphere. Our notion of 'administrative' vs. 'private' contexts may be somewhat anachronistic. Inscriptions including administrative documents have also been found outside Crete in the islands (Kea, Melos, Samothrace and Thera), attesting both to relations with Crete and to the adoption of administrative writing practices in new cultural settings.[72]

The tablets are sometimes seen as the simplest kind of document to attempt to interpret, since we tend to begin with an assumption that they worked in ways broadly comparable to Linear B practice. It is clear that they deal with economic transactions, recording amounts of a range of commodities (including livestock, foodstuffs and raw materials) that the authorities in administrative centres were in some sense controlling.[73] The main tablet shape was page-shaped, and that shape clearly became a standard across multiple administrative centres (although with occasional differences in manufacture, resulting in convex or flattened forms) by LM IB, although the earlier periods see some variation: the use of some horizontally elongated tablet forms, which disappear before LM I, and also the use of two-sided and four-sided clay bars in the Cretan Hieroglyphic style (mainly at Knossos and Malia, where both systems are attested in proximity with each other, as well as Phaistos). The overlaps with Cretan Hieroglyphic administrative practice are difficult to contextualise and explain (see the previous section), but what is clear is that the Linear A administrative system was successful and became a widely used standard around the island – and with it

[70] See Weingarten 1986, 1988; Hallager 1996.
[71] See Drissen and Schoep 1995, 659–662 (quotation from p. 662).
[72] See Karnava 2008; Nash 2021.
[73] On the rise of administration as a way of securing supply of essential goods to local social groups, and on its development, see *e.g.* Halstead 1981; Brannigan 1989; Palaima 1990.

the use of clay tablets for recording information in longer format. The rise of the small page-shaped tablet must have gone hand-in-hand with a new outlook on how to arrange information from a visual perspective, in a way that involved combining multiple administrative entries in continuous narrative, which, I would suggest, might be related to some level of orality in accounting practice (on which see in more detail Chapter 2: Exploring Logography). Montecchi sees the tablets as being divisible into three types: totalling records (where we see the term *ku-ro* used in totalling amounts), processed copies and preliminary notes (seen as written hastily or messily), the last category accounting for the majority of examples.[74] As with the other administrative systems, we might assume that writers were trained and that they were probably not professional writers but, rather, literate individuals with other bureaucratic roles. There seems to be some standardisation in the tools used for writing as well as in the shapes of the documents, with a particularly sharply pointed, round stylus proving compatible with the incisions visible in the documents (perhaps something like a thorn?),[75] somewhat sharper than seems to have been used for Cretan Hieroglyphic.[76] In general, there is little we can say about this area of literacy beyond that there was obviously an administrative context to the use of tablets.

Sealings, meanwhile, are often assumed to correspond to short-term documents used to gather information that would be copied or summarised in longer documents, as can be shown to be the case for Linear B.[77] Clearly there was some synergy between the sealings and the tablets, but this connection seems to differ significantly from the situation in Linear B, and it is more productive to examine the sealing types and practices on their own terms.[78] Indeed, any sealing is the result of an action or transaction, apparently involving multiple individuals, and so strongly associated with the negotiation of identities and social relationships as well as the events and processes people were participating in. For Schoep, this means that seal use and sealing practices were 'paramount in propagating, maintaining and reinforcing a social order'.[79] Although the seals themselves were not bearers of inscriptions, the context of many acts of sealing would have involved some degree of literacy, as seen in the numerous inscribed objects bearing seal impressions, with inscription and seal impression done presumably around the same time, while the clay was soft enough.[80] Sealings therefore offer an important opportunity to consider how a wider range of interactions involving writing may have related to literacy within and outside of the administrative centres.

[74] See Montecchi 2019.
[75] See Steele 2020, 6–7, and for the suggested use of thorns (though for Linear B rather than Linear A), see Chadwick 1976a, 18.
[76] On Cretan Hieroglyphic styli, see Karnava 2000, 98–109.
[77] See *e.g.* Militello 1991.
[78] See *e.g.* Montecchi 2020.
[79] Schoep 2017, 93. See also Schoep 2021.
[80] See also Pope 1960, 205–206, who suggests transactions were between local individuals and the administrative centre, which may (at a 'mere guess') have had a sort of banking function.

Roundels are typically thought of as receipts that both record and guarantee the delivery of a particular commodity to the administrative centre. They consist of a piece of clay shaped into a rounded, thick disc, almost always with one or more inscribed signs and with one or more seal impressions around the outside of the object. What is really striking about these inscriptions is not only their typical brevity, but also the fact that they very rarely include numerals, and it is usually understood that the number of times a seal was impressed around the edge of a given document corresponded to the number of items of a particular commodity that were being taken account of for an individual, thus making a sort of 'receipt'.[81] Although they seem to come from centralised contexts, there is no evidence that information from roundels would have been redacted on other surviving document types, marking a significant difference from Linear B practice (where sealings do seem to operate at this level; see further the next section).[82] Weingarten has argued that the features of these documents suggest one party in their use would have been functionally illiterate – unable to use numerals as employed in other accounting documents, and having exposure to the barest amount of inscribed information, so perhaps a seal user interacting with an administrator in a predominantly non-written form that prevented dishonesty or inaccuracy[83] or perhaps a non-administrator interacting with an administrator. This leaves open the question of who these individuals may have been, and whether the non-administrative party would have been some sort of worker for instance. Although such parties could be argued to be illiterate, it is important to take a nuanced view of what literacy means in the context of the act of writing and sealing. Here we seem to have interactions that involve an important performative aspect, where the marking of the type of commodity on the face of the roundel and the act of impressing the seal the correct number of times around its edge presumably needed to be witnessed by both parties in order to guarantee the details of the transaction. It is possible that these performative acts were geared towards the illiterate, since they involved little requirement to understand the content of writing, but nevertheless the non-administrative party to the transaction was witnessing an act of literacy and presumably knew enough to interpret it (and probably enough to recognise the shape of the logogram used for the commodity). Remembering that literacy is a scale, not a yes-or-no situation, this does suggest wider access to some very basic level of literacy, and also points towards a higher level of social visibility for literate practice.

Minoan sealings are also remarkable in preserving direct evidence for the use of perishable materials in administrative contexts: flat-based nodules were evidently formed in such a way that they would seal folded pieces of a material, such as parchment.[84] The parchment itself has not survived, though impressions from the

[81] See Hallager 1996, 117.
[82] Schoep 2002, 195–196.
[83] Weingarten 2017.
[84] See Hallager 1996, 135–158.

pores on the cleaned parchment and thin fibres from bindings are found in the clay; it is perhaps also worth noting that hides appear to be recorded in documents from Malia and Phaistos (using the logogram AB 180, with or without modification), although there is a range of possible uses for leather beyond parchment.[85] The only indications we have in regard to these lost parchment documents' content is the administrative context of their placement, which clearly existed within the wider matrix of bureaucratic writing and sealing practices. Most scholars have assumed that their content would therefore have been administrative too, perhaps representing the sort of information that may be missing if we were to compare Linear A and Linear B accounting with each other. Linear A documents, particularly tablets, record considerably less information than their Linear B counterparts, which could suggest that other records were being kept in another medium[86] – although we should not forget that Linear A and Linear B administrations were working across different scales and/or geographical ranges, which may have impacted the type and amount of information being recorded. It has even been suggested that the messiness of Linear A information layout (on which, however, see Chapter 2: Exploring Logography) could indicate that clay documents are rough copies and the documents on perishable materials would therefore have represented fair copies of similar information for long-term storage.[87] In general, it is a common assumption that writing on parchment may account for a range of unseen administrative documentation, perhaps helping to fill some of the possible gaps implied by the differences in information quantity and quality between the Linear A and Linear B administrations.[88] Of course, it could also be that parchment would have been used for subjects unparalleled in the surviving Aegean epigraphic record, such as letters, legal texts, diplomatic correspondence or even literature – but we are in the realms of guesswork here, and it is very difficult to make a specific case for any such suggestions. However, the extensive evidence from Akrotiri, Thera, for sealing types that would have been used for parchment documents (made from non-local clay and thus probably sent from Crete) does point towards records or messages of a type that could travel long-distance.[89] Further, Krzyszkowska has suggested internal networks of communication among elites, using parchment sealed with gold rings.[90] Whatever the content of parchment documents, it appears that the flat-based nodules were used to seal them, which could imply a means of keeping them safe but might further suggest that the attachment of the sealing (and the impression of the seal on it) was a way of verifying or guaranteeing the contained information (perhaps lending weight to the suggestion of administrative context and content). Some relationship with higher-status officials can perhaps be deduced

[85] See also the discussion of possible parchment use in Linear B below.
[86] *E.g. inter alia* Perna 2014, 258.
[87] Pluta 2011, 123–124, 233–235.
[88] See *e.g.* Schoep 2002, 193–197.
[89] See Karnava 2018.
[90] Krzyszkowska 2005, 189–192, picking up the suggestion of Betts 1967 and others.

from the use of metal rings to seal flat-based nodules, often with 'elite' iconography (such as bull leaping, combat scenes and architecture), and it is notable that some examples seem to be composed of non-local clay, thus pointing towards the mobility of the sealings, if not the people themselves.[91]

Another sealing type, the hanging nodule, has also been suggested to attest to the presence of documents on perishable materials, although the evidence is somewhat more circumstantial. Hanging nodules are found in two types: single-hole and two-hole. Given that they are designed to hang from a string, this raises the question of what they would have been suspended from, and while it is not impossible that they could have hung from particular items or commodities, their find contexts have been used to argue for a use in labelling documents in perishable materials, such as parchment or papyrus.[92] It is notable, however, that most hanging nodule inscriptions consist of a single sign, thus suggesting a closed, abbreviated context of use, perhaps some sort of filing system – but nothing so informative as the labels sometimes found from baskets of Linear B tablets,[93] for instance. In one case, an impression of papyrus has been identified on a single-hole nodule found at Phaistos.[94] This is potentially significant, as it suggests that two kinds of perishable material may have been in use, both parchment and papyrus, and we might assume that each of these might have presented different challenges in terms of securing materials, not to mention storage, whether short-term or long-term, and may perhaps have been used for different ranges of subject matter. A third possible perishable material could be wood, although the evidence here is very limited – some bronze hinges from Zakros, found in association with Linear A clay tablets, could theoretically come from wooden writing tablets (on which see further the next section, on Linear B), although they have typically been interpreted as box hinges.[95] But again we meet the main problem with lost documents, namely that there is no way of recovering their contents, leaving us to reconstruct, more or less plausibly, where they might have fitted into the general picture of literate output in this period.

Before we leave behind the clay documents, it is worth mentioning that occasionally these have been found in some rather odd-looking find spots. An intriguing example is the assemblage of artefacts found in two large cists, perhaps MM III or LM IA in date, known as the Knossian Temple Repositories. Although they are often interpreted as the remains of an accidentally destroyed shrine, Hatzaki has argued that these finds should be seen as 'the remains of a carefully planned ritual in which specific objects were chosen for disposal and were in effect removed from

[91] See Hallager 1996, 153; Schoep 1999, 214–217; 2000, 195; Goren and Panagiotopoulos 2009.
[92] Hallager 1996, 197–199; 2000, 251–260.
[93] On which, see Shelmerdine 2021, 298–299, who sees the labels as falling 'at the upper end of a hierarchy of Mycenaean literacy' (quotation from p. 299).
[94] Fiandra 1994, 17.
[95] Platon 1971, 148–151, 159; Hallager 1996, 75–77.

circulation'.[96] The finds include female figurines, including one of the Snake Goddess, faience cups and beads, some 6,000 shells, ivory objects, stone libation bowls and stone hammers, alongside animal or foodstuff remains (fish vertebrae, antlers and carbonised cereal). But of most interest for our present purposes is the discovery in this same assemblage of numerous nodules (30 flat-based, 12 hanging and 45 noduli), six roundels and a clay tablet. What are these administrative documents doing in a ritual deposition? Although the content of the documents remains somewhat elusive, and so difficult to connect with whatever events led to their deposition, it is plausible to read them as a tangible and performed component of the ritual event staged by elites (perhaps with as many as 6,000 attendees if the shells are to be seen as objects contributed by individuals to the ceremony).[97] But it is perhaps still odd that the clay documents are administrative in character, suggesting some meeting of administrative practice with ritual practice (and we might add that the flat-based nodules particularly suggest that there would have been further documents on perishable materials participating in the event). Perhaps they were present as a symbol of economic power or control?[98] As we will see, other inscriptions from ritual contexts look far less administrative in character, although the presence of writing in religious practice is something that we can easily reconstruct for the Minoan world.

Out of the three main Aegean writing traditions, Linear A is the one that presents us with the broadest range of inscribed material on objects other than clay administrative documents, giving the best opportunity to witness writing in other contexts. Some of these inscriptions may indeed have belonged to the wider administrative sphere even though, unlike clay documents, they were not designed as carriers for writing: at Knossos a large, two-handled jar with the logogram for wine and a numeral (KN Zb <27>) and a pithos with logograms for olive oil and figs alongside numerals (KN Zb 35), plus a pithos with a single compound sign of the cloth logogram with the syllabogram *te* inside; at Zakros, a pithos with a long, two-line inscription headed with the wine logogram and a numeral (ZA Zb 3); and from the island of Kea a vessel fragment marked with a compound sign comprising the wine logogram with the syllabogram *ra* on top. There are also some fragments with isolated signs that are likely to have a logographic function.[99] It is no stretch to interpret such inscriptions as relating to the storage and movement of goods, and thus in some sense administrative; numerous inscribed storage vessels, most of them pithoi from various sites, should be viewed in the same context even where they do not feature (or preserve) logographic signs or numerals.[100]

[96] Hatzaki 2009, 20.

[97] See Hatzaki 2009; Finlayson 2021b, 264–265; and on the general evidence for the social and performative aspects of religion in a Mycenaean context, Bendall 2004.

[98] I am grateful to Sarah Finlayson for the suggestion.

[99] From Knossos, KN Zb <36>, KN Zb <37>, KN Zb <38>, KN Zb <39>; from Khania probably also KH Zb 1 (Andreadaki-Vlasaki and Hallager 2007).

[100] On the inscribed clay vessels, see the survey in Montecchi 2020b.

Fig. 3.1. Inscribed conical cup from Kea (KE Zb 3). Drawing by the author.

Another vessel from Kea, a conical cup with a handle (KE Zb 3: Fig. 3.1), looks peculiar in that is bears a sign on its side that mimics its shape (the sign is used as the syllabogram *ki*), perhaps a visual pun rather than useful information for the reader,[101] and perhaps better interpreted in the context of the reception and performance of literacy in the Cyclades.[102] The same sign appears on the bottom of a fragmentary conical cup (too damaged to tell if it had a handle) found at Kalo Chorafi, in Rethymno, in a less visible position (except when the cup was raised for draining perhaps) but nevertheless with a similar relationship between vessel and sign.[103] A fragmentary vessel base found at Melos (MI Zb 1), with its inscription again on the base, perhaps provides the whole word for this cup type, *ki-ru*, thus also providing a plausible acrophonic origin for the value of the syllabographic sign. While it is difficult to tell whether these vessels had an administrative context, the first example looks particularly playful and shows an interaction between writing and the visual properties of the vessel itself. The sign has also been flipped from its usual direction so that the handles of both graphic sign and tangible cup are in the same orientation and line up with each other (though we might perhaps wonder why the author did not simply add the sign on the other side of the vessel, the usual way round – perhaps an issue of handedness if it was thought likely the cup would be picked up with the right hand?).

Painted inscriptions also appear on three cups, two from Knossos and one from Palaikastro (the latter only a small fragment preserving three signs). The two Knossos examples are noticeably different in appearance, despite similarities in manufacture of the vessels: one has relatively cursive signs arranged in a spiral from the centre of the inside of the cup (KN Zc 6), while the other has much less cursive signs arranged in two neat lines around the cup's inside lip (KN Zc 7). Not only are these intentionally decorative items, the placement of the inscriptions inside the cup suggests that they were intended to be engaged with interactively by the cups' users, becoming visible only as they were drained and presenting challenges in how to read their text (which presumably would have required some rotation of the cup). This points towards literate engagement outside of the administrative sphere, perhaps aimed at elite owners and users of these decorative vessels.

[101] See Palaima 1988a, 301; Nash 2021, 217.
[102] See for context Abell 2016.
[103] Tzigounaki and Karnava 2020, 321.

A question of writing visibility is raised by the survival of a few inscriptions on architectural supports, where the text may have been in some sense on display for a wider audience than its primary writers or readers. Some inscriptions on wall plaster found at Haghia Triada may arguably have an administrative function of some sort, given that one example (HT Zd 156) seems to contain logographic signs alongside numerals and various fraction signs.[104] The possible logographic signs in this inscription sadly do not help us to understand what its subject was, as one seems to be a syllabographic sign used presumably as an abbreviation (*ne*, in a visually simplified form) and the other (sign 319) is not very well attested, appearing in these plaster texts and also as a probable transaction sign in a clay tablet from the same site (HT 132). The undeniable numerals and fraction signs point towards some sort of accounting practice, nevertheless. These graffiti are located in a sort of stairwell in the columned portico at one corner of the site's Villa and are positioned very low (probably inscribed by a seated, crouching or kneeling person), apparently before painted decoration was applied to the wall, since the paint had seeped into the incisions.[105] This does not suggest the inscriptions were made deliberately for the purpose of display. Pope's suggestion of a sort of reckoning device (with sets of numerals and fractions laid out perhaps for calculation purposes) must remain highly speculative;[106] perhaps the inscriptions related somehow to the furnishing or embellishment of the area, if they were indeed added at a point before the plaster had been painted (though it is also possible that it was repainted over time). The wider area surrounding that in which they were found is marked by a number of other pieces of writing, both administrative inscriptions (tablets and sealings) and inscribed vessels, and so these inscriptions are in-keeping with a broader literate sphere although their function is very difficult to reconstruct. There are also architectural graffiti on stone, one in the Palace at Mallia (MA Ze 11), the other on a tholos tomb at Knossos (KN Ze 16), where we can only guess that it may have related to a burial event (and so have had some visibility in the context of communal mortuary ritual?). The tomb inscription has often been seen as questionable example of Linear A because of its apparent late date (LM II), and its two signs (*a-pi*) would look equally at home in Linear B from a palaeographical perspective, although this would be a highly unusual inscription type for Linear B writing traditions as attested from surviving epigraphy (on which see below). Perhaps this could be a rare glimpse of a period of transition between Linear A and B writing practices before writing became more restricted under the latter regime.[107]

[104] It is difficult to tell whether the inscriptions form one or multiple texts, but HT Zd 156 may arguably be a continuation of HT Zd 157: John G. Younger, published online (http://people.ku.edu/~jyounger/LinearA/HTtexts.html).

[105] Cameron 1965, 14.

[106] Pope 1960, 204: a 'ready reckoner', which he also says 'can hardly have been a devotional text or a cathartic outburst'.

[107] Bennet (2008, 20) suggests it could even be read in Greek as 'Go away!'.

A number of the non-clay-document inscriptions on other supports are demonstrably non-administrative in context. The most obvious and most regularly attested objects in this group are the inscribed stone libation vessels, comprising 49 examples that are very often found at sanctuary sites, such as Iouktas, Kato Symi, Kophinas, Petsophas and Vrysinas, although some also occur in domestic contexts at sites such as Apodoulou, Knossos and Prasa.[108] The number of inscribed examples accounts for only a small proportion of some 900 libation vessels mostly found at extra-urban sanctuaries, making the inscription probably an added embellishment rather than a functionally necessary element of the object. Libation vessels feature a sculpted bowl or receptacle but display a certain level of variation in size and shape. Also related are the roughly heart-shaped objects usually classified as 'ladles'. What exactly a 'libation' would have consisted of is open to question, and beyond the scope of this chapter, except to say that we can be certain that associated religious practice was evidently communal and concentrated at a number of presumably sacred sites.[109] Many of the vessels are quite plain and made of soft stone, suggesting that the objects may have been manufactured in multiple workshops and been relatively accessible to a wide social spectrum; however, the existence of elaborate examples on more expensive stones, some with particularly decorative inscriptions, points towards this area of religious practice offering a forum for status display and social stratification.[110] Regardless of who commissioned and/or could read the inscriptions, there must have been a far wider group of individuals who were exposed to literacy in these communal religious settings.[111] But it is not the case that all inscribed bowls are of the more elaborate type, as inscriptions sometimes appear on some very plain vessels on common soft stones, such as PK Za 12 and PR Za 1, which rather suggests that literacy was not only affordable to the wealthiest worshippers, and perhaps that it was not the only way of adding value to an offering.

Another inscribed object whose context is clearly related to religion also needs to be considered: an ivory 'sceptre', discovered in the cult centre of Knossos, bearing long Linear A inscriptions (83 certain signs plus traces of others).[112] Although it is often referred to as a sceptre, the exact typology of this object is somewhat uncertain: it consists of a large ring (diameter 13.5–14 cm), inscribed on the front and back as well as the rim, with a long handle inscribed on all four sides. Similar objects can be seen in Minoan iconography, particularly in some seals (including a Cretan

[108] See Davis 2014 for a contextual account of the vessels and their inscriptions.
[109] For discussion of this problem, see Davis 2014, especially 99–107, with a set of lively reconstructed 'narrative scenarios' at 125–141.
[110] See Davis 2014, 109; Schoep 2002, 14.
[111] See Schoep 1994 for further discussion and Adams 2004 on the organisation of and participation in Minoan religion.
[112] Still unpublished at the time of writing. However, the object was presented in some detail at the online Mycenological colloquium in 2021, in the paper 'An archaeological and epigraphical overview of the inscriptions of the cult centre of the city of Knossos', by Athanasia Kanta, Dimitri Nakassis, Thomas G. Palaima and Massimo Perna.

Hieroglyphic inscribed seal, #145), sometimes in the hands of a person who may be a priestess (or a goddess?). On one side, the surface is divided into compartments, or 'metopes', some containing figures of animals, others containing depictions of differently shaped vessels, some of which are ligatured with syllabographic signs and so perhaps have a logographic function in some sense (see Chapter 2: Exploring Logography, where this object is also discussed). On the other side and on the rim of the ring are numerous sign groups and occasional compound signs, and the rim also has a number of compound textile logograms. The script signs are particularly ornamental around the ring, with comparable shapes to the most elaborate sign variants attested in other inscriptions, whereas those on the handle (which features syllabographic and logographic signs, including some compounded vessel signs) are generally more linear and less elaborate, suggesting either that they were cut by a different craftsperson or that a single craftsperson was deliberately distinguishing between more and less elaborate sign variants for different purposes. Of particular interest is the way in which the vessel signs in the 'metopes' on one side of the ring are visually equated with the animal depictions that occupy the same surface, suggesting that the concepts of writing and art are not as visually separate as we might tend to assume. This could also suggest a range of ways of engaging with the object depending on the nature and extent of literacy of any given individual, and their experience of the iconographic repertoire. How exactly this object was used remains somewhat mysterious, but it is clear that the inscription is an important, highly visible and probably functional element, presumably playing some role in the performance of rituals. It is tempting here to see the priestess interacting with the object, as Meißner suggests:[113] as a literate individual, engaging in literate interaction in the performance of ritual.

Inscriptions on figurines, of which two examples survive, can also probably be included in the wider sphere of religious practice. One, found at Tylissos, is a miniature human figure with signs incised deeply (presumably before firing) up one side of the front of the body such that it would be necessary to turn the figure on its side to read (or indeed write) them. The other, found at Poros, is dated as late as LM IIIA 1 by context – but in the opinion of the editors of the inscription is undoubtedly written in Linear A (and not Linear B) on the basis of the palaeography of the signs.[114] Remarkably, the painted inscription around the skirt of the figurine preserves a partial sequence *a-sa-sa-ra* (preceded by *ri-qe-ti* and followed by a further sign of unknown value, since it is unattested in Linear B), which is strongly reminiscent of a key word in the 'libation formula' as attested on stone vessels with ritual contexts. This sequence could have a long-lasting relevance, perhaps of a religious nature, given that something very similar also appears in the Archanes Script (the earliest seal-based writing,

[113] Meißner 2023, 216.

[114] Dimopoulou, Olivier and Réthémiotakis 1993, 512. It is not impossible that the object was created at an earlier date, but it apparently still had value in this late period.

possibly related to the inception of what we call Cretan Hieroglyphic). This may be a rare piece of evidence for the presence of writing in religious practices around the time when Linear B must have been adapted from Linear A, before literacy became restricted and no longer appeared in the religious sphere.[115] However, these are the only two figurines with inscriptions, and so are more difficult to contextualise than, for example, the libation vessels.

The evident existence of literacy in the religious sphere raises numerous possibilities. Firstly, we may ask how many people outside of administrative employment would have been able to write competently (only craftspeople, or others too?), how many might have been able to comprehend an inscription (particularly a formulaic one) and how many might have had some appreciation of what writing was even if they could not read at all. It seems likely that some religious officials (such as the priestess who might have used the 'sceptre' described above?) would have been competent in reading, particularly if inscriptions were read out or bore a close relationship with oral aspects of ritual performance. If libation vessels with inscriptions were commissioned by individuals (as suggested by the variety of forms and inscriptions), then that surely militates against any suggestion that writing was seen as too sacred for use by normal humans,[116] for instance something whose meaning was shared by deities and religious officials but deliberately arcane to worshippers. This suggests that writing was widely meaningful, and that its high degree of social visibility in religious settings was an important element of its significance.

As we will see, there must have been some considerable changes in religious practice between the periods when Linear A and Linear B were in use, because there is no evidence whatsoever for the use of Linear B in religious settings. Another difference is that under Linear B administration there was extensive documentation of religious festivals and dedications and of the commodities involved in them, as well as of religious personnel and their landholdings (remembering of course that each Mycenaean centre has preserved different amounts and types of information on these matters), while in Linear A we have no clear evidence for the recording of information related to religious practice as far as we can tell (though admittedly we cannot rule this out completely given our limited understanding of the underlying language).[117] Perhaps this suggests a shift from independently or semi-independently administered religious practice towards centrally organised religious practice, as well as a shift from writing in a context of high social visibility towards restricted literacy (on which see the next section).

Finally, a small number of objects made from precious metals and from bronze should be considered, apparently associated with status display or 'conspicuous

[115] See also Schoep 2002, 20.
[116] *E.g.* for Driessen and Schoep 1995, 659 and n. 83, apparent limitations in overall literacy might be 'indicative that writing partly kept a sacred character'.
[117] Tomas 2010.

consumption'[118]. From the hoard of similar items found at the Arkalokhori cave, two axes (one made of gold and one made of silver) bear the same four-sign Linear A sequence, *i-ta-ma-te*, and probably belong to a longstanding tradition of votive deposits at this site. The context of a bronze inscribed axe from Kardamoutsa is more difficult. Two highly decorative pieces of jewellery, a ring with a spiral inscription on its large bezel and a silver pin, come from burial contexts at Knossos, while a silver pin from Platanos also comes from a tomb and is the only certain example of writing from right to left in Linear A. A further pin in gold is of unknown provenance, and a bronze bowl from Kophinas is unparalleled among other inscribed objects. Perhaps this is a motley collection of disparate items, but there are good indications here of high-quality manufacture, and of personal and social value attached to inscribed prestige goods. The spiral writing of the gold ring (quite similar to that seen in one of the painted cup inscriptions from Knossos) and the unusual right-to-left direction of the Platanos silver pin inscription also suggest some flexibility or experimentation with the visual aspects of writing, which in turn suggests a kind of visibility even on small personal items.[119]

We can conclude, in brief, that Linear A writing had something of a wider potential audience than seems to have existed for Linear B, as we will see in the next section. The overwhelming majority of the evidence (most of which is on clay administrative documents) clearly points towards usage connected with elite status and particularly with resource control, which may in turn suggest a limited group of writers and other 'users' of writing for whom it held a group–internally substantiated value, as Finlayson has recently argued.[120] However, there are also clear indications of potentially wider social visibility for writing, especially in religious practice, where participation may indeed have been socially stratified but may have offered opportunities for a wider range of people (many of whom may not themselves have been able to read) to encounter writing. The ways in which writing could be incorporated into ritual and magical practice shows decided regional variation in contemporary and near-contemporary societies around the Mediterranean. These ways are much better documented for areas such as Egypt and the Near East,[121] but we should consider that Linear A may have held interest, power and value for wider groups of people, for whom it may have been one part of their religious experiences. We should also remember that in the Aegean, social visibility may have meant something quite different from what it might mean in other areas (especially somewhere like Egypt, with its emphatically large-scale visual depictions). The Aegean shows no sign of large monumental statues or inscriptions, and many ritual and other objects in fact

[118] Schoep 2002, 14.
[119] See Steele 2017, 167.
[120] Finlayson 2021, 265–266. See also Schoep 1994, 1999, 2007.
[121] See *e.g.* Boyes 2022.

are very modest in size, sometimes deliberately miniaturising – a process perhaps also relevant to the development of writing itself.[122]

In the end, Linear A writing disappeared – or, in Bennet's words, it 'did not simply disappear; rather it was killed' – and the culprit was not the Greek-speaking Mycenaean 'invaders' of traditional accounts but rather the script's own users, who were realigning to new socio-political realities, developing ways of writing a new language and adapting administrative practices at the same time.[123] The differences in usage between Linear A and Linear B writing are all the more striking in this context, as it is not only the minutiae of administrative processes that changed (and the scale at which they functioned as Knossos expanded its direct control over more of the island), but also the range of purposes for which writing seems to have been thought useful. Some of the last attested uses of Linear A (*e.g.* the Poros figurine and the tomb inscription from Knossos) may well date to the period of transition, and indicate that the restriction of writing practices did not happen immediately, though we will see that in the end the changes in usage were quite drastic – and had a considerable effect on the vitality of writing.

Linear B

The picture for Linear B literacy looks very different in several respects from that of Linear A. In both cases we might say that the overwhelming majority of surviving inscriptions are clay administrative documents, but one major difference lies in the typology of inscriptions outside of this categorisation: for Linear A there are a wide range of non-administrative texts, particularly ones that can be interpreted as religious in context or that are associated with prestige objects and status display, while for Linear B there are almost no demonstrably non-administrative examples of writing (see below for discussion of these few objects).[124] The evidence for writing on perishable materials is also different in quality and context, and, notably, there is no certain direct evidence occurring within administrative contexts (comparable with the flat-based nodules used in Linear A administration). This section will explore what we can say (and what we can't say) about Mycenaean literacy, beginning with the writers themselves.

While the writers of Linear B documents are just as anonymous as those of the other traditions in the sense that they did not sign their documents and no member of personnel is ever named as a writer or similar, the very advanced palaeographic studies of the Mycenaean archives do allow us to track individual writers and the documents they wrote. There are even two writers at Pylos whose names can perhaps be ascertained by contextual study: *pu$_2$-ke-qi-ri* (= Hand 2?) who is said in PY Ta 711 to have observed listed equipment, and so could theoretically be the writer of the

[122] Karnava 2015.
[123] Bennet 2008, 22. See also Chapter 1: Exploring Script Adoption.
[124] See recently Meißner 2023 for an assessment of the extent of Mycenaean literacy based on these finds.

document itself,[125] and *a-ko-so-ta* (= Hand 1?) who plays a key role in a number of documents by a single writer.[126] But while these palaeographical studies have made a huge contribution to our understanding of the workings of Mycenaean bureaucracy, they do little to help us understand who the writers of the documents were – beyond that they were clearly highly trained administrators. There is some indication of hierarchy in terms of the range of duties of an individual, and perhaps the ability to correct the work of other writers (although in many cases the contributions of a second writer in a document may involve updating information or regular collaboration[127]). Shelmerdine has made a persuasive case for a correlation between the types and ranges of duties undertaken by these administrators and their respective levels of literacy, with some particularly high-profile writers having a tendency to be more expansive in the way they recorded information, using a range of literate tools at their disposal (including document structure and layout, amounts and types of information, logograms, etc) – thus indicating 'a familiarity and comfort with the medium of writing and a high level of writing ability'.[128]

But we have no direct evidence for the writers' social status, no information about their lives, no material remains of their existence other than the documents they left behind. Theoretically, some writers who worked with high-level administration could have been members of an elite associated with the control of resources and invested in status display, even if we cannot make the connection directly based on surviving evidence.[129] Literate administrators working for the centralised bureaucratic organ of these 'palatial' economies may indeed have had some social privileges even if they were not members of a dominant or ruling elite, and it seems likely that there was a spectrum of social status for people involved in these activities, as well as possible differences in the demographic from site to site. At Knossos at least it seems very likely that speakers of different languages and/or multilingual individuals may have been involved in administration, especially in the early stages of the development of a bureaucratic system based on a Minoan template. However, correlating status and language use (or indeed any other possible indicator of ethnicity in as much as we can detect such things[130]) is far from straightforward anyway, and for some scholars the original 'Mycenaean' Greek–speaking elite who first appropriated writing for their bureaucratic purposes have been recast as a 'Minoan' elite looking to develop their profile in relation to mainland practices that included Greek language use.[131] Tsipopoulou's innovative term Mycenoans may indeed deserve wider usage![132]

[125] Bennet 2001, 31.
[126] Kyriakidis 1996–97, 220.
[127] See Judson 2020a, 533–534. On Hand 1's corrections and implications for a supervisory role over other writers, see Palaima 1988b, 51–52; 2003.
[128] Shelmerdine 1988, 2021; quotation from 2021, 294.
[129] See Finlayson 2021, 257.
[130] For various perspectives, see *inter alia* Cadogan 2006; Blakolmer 2012; Galanakis 2015.
[131] See Driessen and Langohr 2007, 181–187; Bennet 2008, 20; Galanakis, Tsitsa and Günkel-Maschek 2017; Galanakis 2022.
[132] Tsipopoulou 2005.

From a social perspective, then, it is very difficult to say who the writers of certain documents were. We should also be open to the possibility that there was some geographical and indeed chronological variation at play, even if any details are very difficult to recover. The wider question of literacy, however, also relies on discussion of the evidence for domains of writing use. The question of how restricted writing in Linear B may have been has attracted some very strong and polarised views on both sides: even from the earliest scholarship following the decipherment, for some it is taken as a given that the surviving Linear B documents are *not* fully representative of the broader contemporary writing culture (assuming the existence of writing on perishable materials),[133] while for others the exclusively administrative Linear B writing that has survived (in contrast with a wider range of writing contexts in Linear A for example) encompasses the whole, restricted spectrum of Mycenaean literacy.[134] There is more at stake here than a simple question of whether perishable materials were used or not, so I am going to spend some time discussing the evidence we have, different ways of interpreting it and further possible evidence for its wider context – and I am going to argue that, in comparison with Linear A, the usage of Linear B *was* restricted primarily to administrative usage.

We can begin with the evidence we do have. The overwhelming majority of surviving writing in Linear B is on clay administrative documents whose primary purpose is to carry written records: mostly clay tablets of various shapes and sizes, alongside sealings, nodules and labels. It should not be forgotten that the clay documents we have are themselves an accidental survival of burnt destructions, probably representing a snapshot at one particular time in the administrative year, and it is quite likely that if we had access to all records written in a given centre for a whole year or two then we might see that the range of subjects was somewhat broader. The clay documents are also the only surviving evidence of objects designed primarily as carriers of written messages. The clay tablets were used to record and store information, with examples such as the landholding series at Pylos showing that information from one tablet type could be redacted to or summarised in another, just as elsewhere it is evident that the information in tablets could be collected from sealings. These relationships between document types are somewhat different from what we see in Linear A, as has already been discussed above.

Sealings were presumably used for a range of more immediate, single transactions, and the most common type was a three-sided nodule sealed on one face and inscribed on one or more, suspended on a string that would presumably have been tied around an object and so related to the collection and movement of commodities. Although it is likely that these documents were created by administrators in the course of their duties, it is important to note that it is very rare to find a sealing inscription in a known hand (*i.e.* written by an individual identified as a writer of other documents), which

[133] *E.g.* Wace 1953.
[134] *E.g.* Dow 1954.

could perhaps indicate the literate participation of individuals from other contexts (such as officials who worked outside the administrative centres?). The transactions will have involved a range of individuals making contributions, who may have been present when the item was recorded and when the sealing was applied by one of the parties. This suggests a short-term event in which writing and sealing may have had a non-administrative audience, and thus potential for higher social visibility, if briefly (but perhaps happening regularly for certain individuals).

Mycenaean sealing practices look somewhat different from Linear A sealing practices (on which see the previous section), and Schoep has argued that the contextual associations and the relationship with wider literacy change over time, until under the Linear B administration the practice of sealing is clearly auxiliary to that of documentation through tablets.[135] The degree to which, in this period, the sealing was a meaningful object for a non-administrative party involved in the transaction is therefore more doubtful, and we may add that Mycenaean sealings are found in centralised contexts (unlike many cases in Cretan Hieroglyphic and Linear A). Palaima has viewed Mycenaean sealings as contractual records verifying the contribution of individuals,[136] but while they may have functioned at least partially in this way for the central administration (certainly they record individual contributors' names), there is no evidence to suggest that they could be referred to by non-administrative parties to prove the fulfilment of their obligations, an element in which document sealing differs drastically from that of Near Eastern administrations for example.[137] That does not mean that an element of performance (involving writing and sealing) was not part of the transactional process, and the inscription types themselves and the find spots of sealings (for example in centrally controlled workshops and administrative spaces) point towards a context in 'second-level' administration, at the interface between central bureaucracy and outlying individuals and groups.[138] It looks as though in a centralised context, the information recorded in the sealings would have been redacted onto other document types, as suggested for example by the remarkable overlaps in types and quantities of information between sealings found at Thebes and feasting records in tablets elsewhere.[139] Uninscribed nodules bearing a seal impression, which must again have been a product of interaction between personnel in the administrative centres and outside parties, seem to have existed within a similar context but functioned somewhat differently, as shown by their deliberate breaking at the point of discard (unlike inscribed sealings) and their discovery in doorways where they were left as the commodity was moved on.[140]

[135] Schoep 2021, 269–271. See also Palaima 2003.
[136] Palaima 1987b, 259–260; 2000, 221.
[137] Steele 2008, 40–41; 2011b, 123–124.
[138] Palaima 2000, 220.
[139] See Killen 1994; also Piteros, Olivier and Melena 1990.
[140] See Shelmerdine 2012; 2021, 302.

Beyond the administrative documents, the most numerous inscriptions are found on clay vessels, plus there are a small number of isolated objects whose context and date are more difficult to ascertain. The largest group of texts comprises the Inscribed Stirrup Jars (ISJs), with around 180 examples altogether, of which around 120 have identifiable and indisputably Linear B inscriptions (some single-sign, many recording a sequence of signs, and a handful recording more than one word).[141] These are objects that are not designed to bear writing, and indeed the inscribed examples make up only a very small proportion of extant stirrup jars.

The ISJs merit a separate discussion because a range of interpretations of the context of these inscriptions have been put forward, with a majority agreeing on their administrative context in transporting contained substances and some arguing for elite, diplomatic usage (as guest gifts, for example, or markers of prestige) or a decorative function. Another common thread has been the suggestion that some of the writers of these inscriptions may not have been fully literate, because of a small number of palaeographic oddities – but analysis of the whole corpus shows conclusively that these are outliers (only two are arguably pseudo-inscriptions) that do not compromise the overall communicative value of this kind of inscription.[142] The ISJs could particularly be used to argue for lasting literate output from workshops in western Crete in the LM IIIB period, since this seems to be the main centre of production, and for ongoing contact between Crete and the mainland at this time (though note the dearth of examples from Pylos, one of the best excavated mainland sites). But we need to look beyond the writers to the wider literate context of the objects' consumption (both their expected consumption and their actual consumption) to further our understanding of their potential relationship with social literacy.[143] The inscriptions themselves are quite formulaic, usually containing personal names, with some of the longer examples reminiscent of administrative records listing a producer + a place + a 'collector' (an individual involved in higher-level control of industries overseen by the palace) or the word /wanakteros/ 'royal' (or its abbreviation). This could be taken to support an administrative context for their consumption too – except for the fact that these objects seem to be intended for long-term preservation of the writing, which was added before firing of the vessel (very different from the temporary nature of the clay documents), their deliberately decorative nature and the discovery of a couple of examples in tomb contexts, where they would particularly appear to be valued as prestige items.[144] The idea that they may have been intended for the consumption of mainland Mycenaean elites would also conform with the geographical distribution of finds, with 80% from the Greek

[141] See Hallager 1987; van Alfen 1996–97, 2008; Zurbach 2006; Duhoux 2011a; Judson 2013; Godart and Sacconi 2017.
[142] See Judson 2013, 71–83.
[143] For theoretical perspectives on the consumption of writing, see Civitillo 2021b; Piquette 2021; Finlayson forthcoming a.
[144] See Zurbach 2006; Duhoux 2011a; Judson 2013, 85–93 for discussion.

mainland and no confirmed examples outside of the Aegean. Duhoux has suggested that these objects are evidence of gift exchange,[145] while for Judson 'the investigation of the inscriptions' secondary functions has revealed a wide range of possible functions outside of an administrative context, from decoration to marker of identity or prestige, giving a much more varied view of possible responses to writing in different contexts and at different levels of society than would be suggested by the restricted nature of Mycenaean literacy'.[146] The ISJs need to be treated with some caution, but they are the best indication (albeit rather limited) that literacy might have had some value outside of the administrative contexts of its main attestations. They may also have had considerably greater visibility than administrative documents in that they would presumably have moved through spaces occupied by illiterate and non-elite people.

There is also a diverse group of 10 inscriptions painted on various vessels other than stirrup jars from Knossos, Khania, Mycenae and Tiryns: some perhaps recording personal names, with one (KN Z 1715) representing a pseudo-inscription (and so indicating that the idea of writing held some visual currency for those whose level of literacy was low or non-existent?). Pluta argues that these represent some prestige attached to writing, making them 'special, status-enhancing goods' and crucially non-administrative in context.[147] However, such a limited and varied sample is difficult to assess conclusively. It is also difficult to see these dipinti as existing in the same sphere of usage as the ISJs given that they represent quite unusual pieces of tableware rather than storage vessels, with presumably quite different users and potential audiences.

If we look away from the main centres of Linear B usage, we see a few isolated examples of possible or probable writing that deserve some attention – though given their unique and isolated nature, it is difficult to know what to make of them. At Dimini, in northern Greece, two inscriptions have survived:[148] a sherd from a kylix with two incised signs and remains of a third, probably an ostracon written after the vessel was broken, since the inscription is on its inside surface; and a pierced piece of stone with three incised signs, perhaps used as a weight of some sort. Writing in Linear B in this area should not surprise us, given that two fragments of Linear B tablets (one with excellent preservation, the other badly damaged) have been found at nearby Volos and give clear evidence of administrative literacy,[149] but these examples of writing from Dimini look very unusual in the wider context of Linear B usage. Should they perhaps be seen as related to administration or industry? Their short and obscure inscriptions give us no clues. Pluta suggests that we should see northern areas of Greece as having 'developed their own ethos regarding the use of writing and their reaction to it', with a looser connection to the administrative networks of the

[145] Duhoux 2011a.
[146] Judson 2013, 102.
[147] Pluta 2011, 101–106 (quotation from p. 106).
[148] See Adrimi-Sismani and Godart 2005; Pluta 2011, 112–114.
[149] See Skafida, Karnava and Olivier 2012.

Fig. 3.2. Inscribed lentoid seal from Medeon, in impression. Corpus der minoischen und mykenischen Siegel (CMS) V.415. Image from the Arachne database, reproduced with a Creative Commons licence (creativecommons.org/licenses/by-nc-nd/3.0/de).

Peloponnese and Boeotia[150] – although the tablet fragments from Volos do suggest that the 'classic' administrative framework used further south had at least some foothold in this area.

The now quite notorious Kafkania Pebble, a rounded stone with an inscription on one side and a depiction of a double axe on the other supposedly from a very early context (Middle Helladic), is largely considered to be a modern fake and will not be discussed further here.[151] Two Baltic amber objects found at Bernstorf in Germany, bearing inscriptions superficially resembling Linear B, are equally difficult and have been suspected not to be genuine.[152] The problem is not that we should not be open to expanding the envisaged chronological or geographical scope of Linear B writing if we had good reason to, but rather that these isolated objects are too doubtful to build any theory upon them. There is also a small fragment of a clay object found at Pylos whose context suggests it is genuine, but whose 'inscription' (if that is what it is) is by no means a certain example of Linear B writing.[153] At Knossos, Evans reported Linear B graffiti on the wall of the Room of the Two Cists, subsequently destroyed by a storm and surviving only in Evans's sketch,[154] and there is one further sign (*pu*) painted on wall plaster from the Area of the Toreador frescoes,[155] pointing very tentatively to the possibility of writing appearing on walls – although this is a practice that would look much more in-keeping with Linear A writing practice. Finally, the inscribed bone seal from Medeon, near Olympia, is a noteworthy but again an entirely isolated example, the only surviving seal to bear writing that is apparently Linear B, going by its sign shapes (Fig. 3.2). Its sign sequence, *e-ko-ja*, or *ja-ko-e* in impression (perhaps *ja-mo-ko-e* if we read the small sign emanating from the top of the *ko* as a *mo*, perhaps somehow ligatured with the *ko*), is unparalleled.

[150] Pluta 2011, 114; see also Papadimitriou 2008.
[151] See Palaima 2002–03 for discussion.
[152] I do not find Janko's reanalysis of the clear sequence *pa-nwa-ti* (or *ti-nwa-pa* if intended to be read in impression) as **ti-nwa-to* (a place name attested at Pylos) very convincing: Janko 2015.
[153] Judson, Bennet, Davis and Stocker 2019, 120–122.
[154] See Evans 1909, 50–51.
[155] See Palaima 1981.

The object itself is difficult to date though apparently from an LH IIIC context, and it is typologically odd by any standard applied to contemporary seals found in other contexts. It is also impossible to reconstruct the context of its use given that there is otherwise no evidence whatsoever that seals bearing Linear B inscriptions were ever used in the Mycenaean world. Marazzi suggests it may have been some sort of amulet rather than a seal for use in administrative contexts.[156]

The very few Linear B inscriptions that are not written on clay administrative documents throw into sharp relief the extent of what seems to be missing from this epigraphic record. For instance, we do not see graffiti of the sort where a person might scratch their name on a piece of pottery to mark ownership or record a short message – an inscription type very common in later alphabetic Greek and indeed typologically common across the world. Nor do we see prestige objects or items made of precious metals marked with names, nothing akin to the gold and silver jewellery items or axes with Linear A inscriptions (see further the previous section above on Linear A); in Bronze Age Cyprus we see a comparable but even wider range of such 'private'-looking examples of writing.[157] Bennet may be right that the distinction between administrative and non-administrative uses of writing that seems so sharp in our modern minds may not have held true for people in the ancient Aegean, for whom writing was perhaps 'bound up with practices of the elite, who may well have seen no distinction between recording on clay and inscribing on metal or stone'.[158] But in Linear B the contrast does look rather stark, given how little evidence there is for writing outside the administrative sphere, and given the possibility of interpreting the few possible examples as, presumably, meaningful mainly among the very elite whose position was maintained by the administrative economy.

One particular forum for writing that seems to be missing for Linear B is religious usage. We have seen that Linear A writing seems to have had an important role in religious practice, with inscriptions on votive items as well as objects best interpreted as part of ritual process (the libation bowls, and the so-called 'sceptre' from Knossos): everything points towards writing in such a context having considerable social visibility, even if literacy itself (in the sense of writing competence) may have been more restricted. The transition from Minoan to Mycenaean religion on Crete is marked by a certain continuity in the central belief system (as witnessed for instance in figures of goddesses and their attributes) but with new external manifestations of the way religion was practised.[159] In this new landscape, it seems, the place of writing in religious expression was lost, and such writing presumably was never a feature

[156] Marazzi 2009, 142. For Meißner 2023, 213 this casts doubt on its status as an inscription, suggesting it could be imitative of writing.
[157] See Steele 2017.
[158] Bennet 2008, 9.
[159] See *e.g.* Marinatos 1993, 221–241. Without linguistic evidence, for all we know some aspects of religion could have continued to be practised in the Minoan language, at least on Crete.

of religious practice on the mainland.[160] This may have meant a significant lack of opportunities for those not involved in administration or resource control (non-elites, if that is a meaningful way of expressing it) to witness the existence or the 'power' of writing, and thus corresponded with a severe social restriction of writing's visibility.[161] This may help us to understand why the examples of writing that are not on clay administrative documents are so meagre for Linear B compared with Linear A.

In order to complete any survey of Linear B literacy, we must return to the 'elephant in the room', namely the widespread suggestion that we can fill in some gaps in literate production by hypothesising that now-missing genres (private letters? legal texts? diplomatic correspondence? other administrative texts?) would have existed on perishable materials, such as parchment, papyrus or wood, and so left no trace in the archaeological record. One piece of evidence adduced to support such a view is the possible reference to writing in the *Iliad*, which could theoretically testify to the existence of writing on perishable materials in or around the Mycenaean period.[162] The episode comes in Book 6 (Il. 6.160–179), when Diomedes and Glaucus meet on the battlefield and realise they are ancestral guest friends, and Glaucus tells the story of his grandfather Bellerophon. Bellerophon has been visiting king Proetus in Tiryns (itself a centre where Linear B writing has been found, thus strengthening the hypothetical connection) and has angered Proetus's wife by refusing to accept her advances. She persuades her husband to do away with Bellerophon, but he is afraid of killing the warrior himself, so he devises a plan where he sends Bellerophon to his wife's father, king Iobates in Lycia, with a folding writing tablet to deliver. The tablet contains a message in 'deadly signs' (σήματα λυγρὰ γράψας ἐν πίνακι πτυκτῷ[163]) to kill the bearer, implying that it would have been sealed (Bellerophon, if he was literate, clearly does not read the message) and that the message could be conveyed from one king to the other in writing alone, without oral intervention (note also that the kings appear to read and write for themselves). This is all well and good, and surely this is a reference to writing[164] – but unfortunately the history of composition and transmission of the Homeric epics, from a probably Bronze Age oral tradition

[160] Hallager's suggestion for a ritual context for some painted inscriptions on vessels other than ISJs (see Hallager 1983, 72–73) has been convincingly refuted by Pluta 2011, 104–105.

[161] Meißner 2023, 216: perhaps the limitation of writing as a corollary of its lack of usefulness in the religious sphere.

[162] See *e.g.* Perna 2007. The scene in *Iliad* Book 7 where warriors are marking their lots with signs could refer to emblems rather than written signs (Il. 7.175–176), albeit that such a distinction is in some cases difficult to negotiate (as we have seen for Cretan Hieroglyphic seals, for example).

[163] 'Having engraved deadly signs in a folded tablet', where the word γράψας could theoretically refer to drawing, carving or engraving as much as writing (which only becomes the primary established meaning of the verb much later).

[164] Opinions are divided on this matter, however, and even in antiquity, Aristonicus in the Homeric scholia argued that this was not a reference to writing. For Graziosi and Haubold (2010, on 6.169–170), '... in Homer, the word σῆμα can apply to a range of phenomena... The verb (γράψας) does not settle the question of whether Proitos wrote, used some other kind of code or made a drawing...'. See further Nagy 1983 on Homeric *sēmata*.

through hundreds of years to a written 'canon' version by the 6th century BCE (and beyond), does not help us to pin down this reference to writing to any particular period. Nor does the poem tell us what sorts of signs were written in the folding tablet, and there is no guarantee that they were in Linear B – the writing might equally have been in the Greek alphabet (*i.e.* a system contemporary with later stages of the oral tradition[165]) or indeed another internationally travelling script, such as cuneiform or the Phoenician alphabet.

Fig. 3.3. The signs incised on the Ulu Burun diptych. Drawing by the author from a photograph.

While the *Iliad* episode does not help us directly, the existence of wooden folding writing tablets (often referred to as 'diptychs') in the Mycenaean period is entirely possible and by no means anachronistic, as is shown by the recovery of a well-preserved example in the 14th century BCE Ulu Burun shipwreck (found off the coast of southern Anatolia). The Ulu Burun diptych is made of wood, with ivory hinges that would have been attached with wooden nails, and has recesses carved into each side that would have been filled with wax to bear a message.[166] The wax obviously does not survive, nor does any trace of any writing in the recesses (which can sometimes leave an impression from the metal stylus, as preserved in numerous Roman examples). However, three shapes on the inner face of one side of the diptych, carved on the edge of the wood around the wax recess, look tantalisingly as though they may originate from a contemporary writing system (Fig. 3.3): perhaps Anatolian hieroglyphs, perhaps even Linear B,[167] although only one of the signs has a reasonably plausible Linear B parallel (with the numeral for 1,000, though it does seem to have a double circle, rather than the single circle found in the Linear B sign). I wonder whether a wider marking tradition might be a better match than one of these writing systems well established within localised traditions, such as the small groups of signs commonly seen in Bronze Age and Early Iron Age Mediterranean trading contexts, particularly ones involving Cyprus; however, I could not find any particularly close parallels for the sign shapes among attested examples.[168] The signs could have been incised with the sharp point of whatever stylus was used to write on the wax, perhaps, but their context and possible affiliation with any known script eludes us.

[165] There isn't space here to engage with the suggestion that the Greek alphabet was created hundreds of years before its first attestations in the 8th century BCE, but for recent arguments in favour of such a position, see Waal 2018, 2019.

[166] For detailed descriptions and discussion, see Payton 1991; Warnock and Pendleton 1991.

[167] See *e.g.* Dillo 2021.

[168] I am grateful to Cassie Donnelly for her help on this question. On 'potmarks' and similar inscriptions found in trading contexts, and their relationship with Cypro-Minoan writing, see Donnelly 2021, 2022.

But the Ulu Burun diptych has a wider significance, because it strongly points towards literacy in the context of trade networks along the northeastern Mediterranean coastlines, in this case heading most probably from the Levant westwards (probably via Cyprus, given some of the cargo, which included a quantity of copper ingots alongside a variety of luxury items) and so perhaps to the Aegean.[169] It is difficult to say whether the diptych would have been used by a merchant or another wealthy traveller on the ship (perhaps even a person from the Mycenaean world?[170]), or whether it was being carried between a sender and recipient, neither of whom was necessarily aboard, or indeed whether it was a part of the cargo for sale. The quality of construction and the use of ivory for the hinges might suggest, at least, that this was a relatively high-status object. Any Mycenaean involvement in this particular find is obviously a matter of pure conjecture. But even if literacy within Mycenaean elite and administrative circles was restricted, as I would argue, that does not mean that there would have been no awareness of the wider literate atmosphere of the eastern Mediterranean and the societies living around its shorelines and beyond: there is every reason to think that the Aegean would have been in sustained contact with Mediterranean societies using writing of different kinds for a range of purposes. On the same basis, it is also entirely possible that even a Mycenaean might have used a writing system other than Linear B in this kind of context, perhaps one with a more international appeal or usability.

There may even be some evidence for the use of wooden writing tablets in the Mycenaean administrative centres, although this depends on interpretation of a small number of finds. Shear has argued that some bronze hinges found at Knossos and Pylos, associated with burnt wood deposits, should be seen not as box hinges (as sometimes assumed) but as hinges from wooden writing tablets that would have functioned similarly to the ivory hinges of the Ulu Burun example.[171] At Pylos the hinges were found in Room 8 of the Archives Complex, in the context of a suite of rooms known to deal with the transfer and storage of information in clay documents, while at Knossos they were found among the Armoury deposit and again in the context of numerous clay documents.[172] While this again could be taken as evidence for the use of perishable materials for writing, there are too many questions surrounding these objects – not least whether they were used for wooden tablets or for some other hinged object – to be certain that this interpretation is correct. We might also wonder why so few examples (seven hinges at Pylos, seven at Knossos) have been found if these testify to a supposedly widespread writing medium (and note that hinges made of bronze ought to survive in other contexts, whereas clay documents in the Aegean are mainly found in burnt destructions).

[169] For accessible overviews of the shipwreck and its route and cargo, see Pulak 1998, 2008, 2012.
[170] See Pulak 2005.
[171] Shear 1998.
[172] See Blegen and Rawson 1966, 95–100.

It has recently been suggested by Waal that another perishable material should be assumed to have been in use in the Mycenaean world, namely palm leaves.[173] She argues that Herodotus's reference to the Greek alphabet as *phoinikeia grammata* (Hdt 5.58.1-2), interpreted as 'Phoenician letters' / 'letters originating from Phoenicia' and accompanied by a myth linked to the Phoenician leader Kadmos, was the result of a sort of creative reinterpretation of a lingering cultural memory of Linear B writing; in support she offers that Greek φοῖνιξ can refer to a palm tree or to the colour red, and is not only used as an ethnic for people in the northern Levant and their colonies. Palm leaves (or more properly the ribs of palm leaves) are well attested as a writing material in southern and eastern Asia, but are so far unattested directly in the Mediterranean,[174] so this is a difficult proposition to evaluate and relies strongly on marshalling circumstantial evidence. Looking at the use of clay 'palmleaf' documents in surviving Mycenaean archives, Waal does not expand on her suggestion that 'an obvious explanation for why the clay was shaped into this form would be that it was imitating an already existing type of document, namely one written on palm leaves'.[175] Would this mean that they had overlapping uses or different ones, in a situation where they are presumably supposed to have co-existed with each other? And what would be the motivation for imitating one type of document in another medium? The theory would benefit from further exploration of such questions.

Another, perhaps more obvious, possibility is that writing on parchment, as directly attested in Minoan administration through the impressions on flat-based nodules, might have continued under Linear B administration. The flat-based nodules themselves ceased to be used, with the only surviving examples from a Mycenaean context coming from the early deposit in the Room of the Chariot Tablets at Knossos, although these objects are not typologically identical to the Minoan ones.[176] But this does not necessarily mean that parchment was not used as a writing material.[177] One possible source of support for such an argument could be that significant numbers of animal hides were recorded in Linear B tablets. There are of course numerous uses for these by-products of animal husbandry, including clothing and military equipment, but this does not rule out their potential usefulness as a source of writing materials. One tablet from Pylos, PY On 300 (whose upper part, including any possible heading information, is unfortunately badly damaged), seems to record the allocation of hides to high-level officials. The officials listed are particularly those involved in regional

[173] Waal 2022a.

[174] Except in some claims by later writers that they had once been used: see Waal 2022a, 237–238. Cf. also Aeneas's appeal to the Sibyl not to write down her prophecies on leaves, which are easily scattered to the wind (Aen. 6.74–6).

[175] Waal 2022a, 235. On p. 237: 'when the Linear B scribes ... happened to write on clay, they stuck to the same scribal conventions, including the shape of the documents'.

[176] Hallager 2005, 252.

[177] Nagy 2020, for example, suggests that 'fair copies' of written documents might have been made on parchment.

administration of areas lying outside of the administrative centre, including a number with the title *ko-re-te koreter*, and the hides are usually assumed to constitute a payment of high value for their services to the state.[178] But could these hides rather be seen as raw materials to be used in the execution of the officials' duties, which may indeed have involved writing, and perhaps in quite different contexts from those of the centralised administrative documentation on clay?[179] This possible evidence is open to interpretation, and I only intend to offer a very tentative suggestion.[180] However, if parchment were used in the Mycenaean world, then its status as a high-quality writing medium, requiring considerable effort and craft expertise to transform and make ready for writing on, could conceivably make it worth recording the raw materials (and perhaps even the finished product) in the archives.

Finally, there has been a strangely quite frequent argument that Linear B is better suited to writing with ink or paint (and so to use on materials such as parchment or papyrus) than with a stylus on clay, which has been used to support theories about the existence of writing on perishable materials in the Mycenaean world.[181] But such a claim is oddly out of step with the palaeographic evidence. Firstly, the original genesis of this writing system, from a long tradition of sealing practices (where signs were engraved in various stones) leading to Cretan Hieroglyphic, which was accompanied by the use of clay in administration for a range of document types at an early stage, is undeniable. There is no evidence that these sign shapes were developed initially for any other material, and indeed the weight of evidence is against such an assumption. Secondly, when Linear B does appear written in paint in the ISJ inscriptions, it often shows a different palaeographical style from what we see on the tablets, with

[178] *E.g.* Nakassis 2010, 132. It is unclear whether all the officials listed are recipients of the hides, since the dative is used for some (*ko-re-te-ri*) but not for all, but it is possible the writer changed from the explicit dative to the 'nominative of rubric' (*i.e.* the use of the nominative as a base form in a list, not intended to express a syntactic role).

[179] It is perhaps also worth noting that further individuals with the official title *ko-re-te* are listed in a tablet from Knossos, KN C 902, alongside the cattle logogram (not sexed), a syllabographic abbreviation *ne* (probably for *newos*, either 'new' or, perhaps, 'young') and a further logographic sign labelled as *170 that has been suggested by Baumbach 1992, 61, to refer to calves (although other interpretations have also been proposed); see also Palaima 1989, 91, on a possible connection with hides, and Melena 1983, 275–281, on further parallels in sealings. This could be significant in that young animals and especially calves seem historically to have been preferred for parchment production because of their supple skin, particularly where a high-quality finish is desired. Calves are also recorded in the (at the time of writing still unpublished) archives from Ayios Vasileios and are also found in iconographic representation as victims of hunting and perhaps also as a 'symbol of the leather working industry' (Loughlin 2004, quotation p. 184). However, this would be highly circumstantial evidence, if that, and should be considered in more detail in a future study; I simply cite the possible relevance here. Finally, it may also be relevant that the monogram DIPTE (*di+pte*, presumably *diphther*, 'parchment' or simply 'leather'?) is attested in one or perhaps two tablet fragments from Knossos (KN U 8210 and perhaps KN X 9740).

[180] I would like to thank Paul Halstead and Matthew Collins for talking through these ideas with me (though the possibilities suggested tentatively here remain my own thoughts).

[181] For this position, see *e.g.* already Evans 1921, 638; Ventris and Chadwick 1973, 109; Palaima 1987a, 499–500; 2003, 171. Waal makes the same claim in support of the use of palm leaves (2022a, 236).

some vertically lengthened shapes and a greater degree of cursiveness[182] – which suggests that the sign shapes of the clay documents are neither themselves a cursive, nor necessarily identical to what might have been written in ink or paint. Most importantly, the sign shapes of Linear B are in fact very well suited to being written with a stylus in clay: developments in sign shapes show accommodation to writing in this medium, and stylus use seems to have adapted over time too as we see evidence for a change from a rounded, sharp-pointed stylus to a bladed stylus (though whether the distribution favours a chronological and/or a geographical interpretation of such change remains to be seen and requires detailed further study).[183] Cyprus meanwhile provides some important parallels for the continued efficacy of writing these sorts of linear shapes on clay, even with changes in writing practice (including the use of a less sharply pointed stylus and experimentation with cuneiform-inspired methods of writing by primarily impressing the stylus, reducing but not eliminating the need to draw it through the clay).[184]

As we have seen, there are various reasons why the existence of writing on perishable materials cannot be ruled out, including wooden writing tablets, for which the evidence is perhaps strongest, and possibly even parchment. Indeed, it would involve taking an extremely narrow view of the Mycenaean outlook on writing to think that administration on clay was all that they were aware of. We also have good reason to think that the Mycenaean world or some part of it may have played a role in international diplomatic correspondence around the eastern half of the Mediterranean in the Late Bronze Age, which would open up a completely different sphere of literate engagement than any attested directly in the Aegean archaeological record. The argument particularly stems from the discovery of 26 letters at 15th–13th century BCE Hattusha, the Hittite capital, mentioning a place called Ahhijawa, which has been argued to be related to the term Achaea as found in Homer for instance.[185] There is not space here to engage in any detail with the 'Ahhiyawa question', and I do not intend to offer any new interpretations. Ongoing discussions have revolved around the validity of the linguistic identification of the word as well as the geographical location of this land that was apparently located to the west of Hattusha, although it is difficult to say whether that places it in western Anatolia or further to the west in the Aegean and perhaps on the Greek mainland itself (although alternative explanations

[182] See Hallager 1987, 172–176. Godart and Sacconi 2017 even go to the lengths of ascribing ISJs to individual writers, although based on very small palaeographic samples.

[183] Steele 2020. This question would have been central to the Exploring Palaeography chapter that sadly had to be abandoned for the present publication (see further the Introduction). The rounded styli do not survive in the archaeological record (perhaps because they were fashioned from an organic material such as a thorn?), but bone examples of the bladed styli (plus one possible in bronze) are attested at Tiryns and Mycenae (Godart 1988) as well as one at Thebes found in the vicinity of inscribed clay nodules (Olivier, Melena and Piteros 1990).

[184] See Steele and Boyes 2023.

[185] First in Forrer 1924.

have also been proposed).[186] From the Aegean perspective, it is sometimes thought of as problematic that the Mycenaean administrative centres seem to have operated as independent centres, leaving little room for an overarching power that might have played a role in international diplomacy. But this thinking is a little inward looking – after all, the small island of Cyprus, with its apparently decentralised political structure and economic interests that revolved around the control and trade of mineral resources, not only seems to have participated in international diplomacy (named as Alashiya in the correspondence), but did so on a level equal to the Egyptian pharaoh (referred to by the Alashiyan king as his 'brother', a diplomatic indication of status equality).[187] Whatever the political structure of the Mycenaean world,[188] it seems entirely possible, even likely, that some part of it was maintaining long-distance correspondence with the great powers around the eastern Mediterranean.

But if such correspondence did exist, there is every reason to think that it might have been transmitted in cuneiform writing, as used in other centres, whether they regularly used cuneiform for other purposes (the Hittite empire, Ugarit) as well as several where they did not (Egypt, Cyprus, the southern Levant). This could have involved Mycenaean elites (or more likely their functionaries?) developing skills in cuneiform writing and knowledge of Akkadian, the *lingua franca* associated with international diplomacy, or they may have made use of peripatetic cuneiform writers. On the latter possibility, one document from Ugarit (tablet RS 94.2177), where the writer has added a personal message on the back of the official letter from the Alashiyan king, is quite telling, as the writer makes clear that he is an Ugaritian official stationed in Cyprus (where facilitating correspondence in cuneiform was presumably one of his main duties) and asks for some good-quality furniture to be sent over to him in the course of his work.[189] The existence of wide-ranging diplomatic networks using cuneiform may indeed have prompted some individuals to specialise in such a way, and to take up positions in the administrative centres of rulers or elite groups involved. There is no evidence that cuneiform was used in or around the Mycenaean administrative centres (other than an isolated find of an Ugaritic cuneiform inscription from Tiryns[190]), and so these possibilities are difficult to evaluate. In any case, it seems highly unlikely that Linear B would have been

[186] On the history of and developments in the Ahhiyawa Question, see Fischer 2010; Beckman, Bryce and Cline 2011, 1–8; Beckman 2016; Kelder 2019; for an argument that Ahhiya is the island of Chios and Ahhiyawa relates to its expanding relationship with the wider Aegean, see Egetmeyer 2022; most recently, see Meißner 2023 for further thoughts on this problem and its implications for Mycenaean literacy.

[187] The Alashiya identification still elicits some negative (*e.g.* Merrillees 1987, 2011) or agnostic (Gilbert 2017) responses but has been considered largely settled by many (*e.g.* Muhly 1972; Knapp 1985; Steele and Boyes 2023); for an attempt to settle the argument with scientific analysis of clay fabrics, see Goren, Bunimovitz, Finkelstein and Na'aman 2003. On the political decentralisation (or otherwise) of Bronze Age Cyprus, see Knapp 2013, 432–438, for a summary.

[188] This is a very wide-ranging topic with a long history, but for a range of recent (sometimes challenging) views, with references, see the papers in Kelder and Waal (eds.) 2019.

[189] See Ferrara 2016.

[190] Cohen, Maran and Vetters 2010.

involved in such correspondence, and while it is theoretically possible, we have no evidence that it was used for initial drafts of diplomatic letters or similar writings.

This survey has opened up a number of possibilities that might help us to envisage a wider 'scriptworld'[191] for Linear B than the purely administrative and strongly centralised clay records that make up the overwhelming majority of our direct evidence for writing in the Mycenaean world. At this point it is important to remember that in any given society, it is very unlikely that there will be one single outlook on literacy; there will be a whole spectrum of views and opportunities for any given community member depending on their personal and social circumstances. In many societies in the modern world, for example, there is a strong correlation between lower literacy levels and economic disadvantage, while in certain circumstances the ability to engage in basic reading and writing may be taken for granted. In some societies, the ability or need to read and write may be associated with negative aspects of colonialism, particularly where speakers of indigenous languages lack the means for written expression in their own language and have sustained oral traditions.[192] In others, a severely restricted literacy may be accepted by many members of a community but rejected by others. To take just one example, in Odisha state in India, speakers of the Sora language using the Sora Sompeng alphabet will often engage with writing in religious contexts but in such a way that only a few individuals develop full literacy (typically male community members in positions of religious authority), while others may worship and perhaps even learn to reproduce the signs of the script (which represent individual spirits) without being able to read it; but for some, this situation is not acceptable, and some expansion of the uses of the script is desired (particularly for individuals with exposure to education in other scripts and languages).[193] This is intended to be a brief illustrative overview of some possibilities, rather than any comprehensive account of different attitudes towards literacy, but the point is that we need to open to complexities in literate situations rather than painting these situations as homogeneous or monolithic.

It is clear that the bureaucracies of the Mycenaean centres were a major forum for literacy and one in which administrators were highly trained in using the Linear B writing system for these purposes:[194] not only in the phonographic elements with which they could write out individual words and phrases, and the logographic and metrical or counting elements, but also in the layout of information and format of documents, such that economic information was recorded in a systematic way (though allowing for a certain degree of inventiveness on the part of writers where

[191] A term coined by Damrosch 2007 and used by Donnelly 2021 in her discussion of Cypriot literacy and the traditions of potmarks and similar signs used in trading networks that have usually (unhelpfully) been excluded from research on Cypriot writing.
[192] See *e.g.* Fee 1997.
[193] Guillaume-Pey 2021, and more recently in discussion following the Endangered Alphabets seminar 'Alphabets of the Spirits: A Conversation with French Anthropologist Cécile Guillaume-Pey', 23 April 2023.
[194] On Mycenaean writers as literate administrators, not professional scribes, see Bennet 2001.

needed for clarification). The very high degree of standardisation in language use and orthography across the Mycenaean administrative centres is itself testament to some sort of rigorous training curriculum, and Judson has shown that, at Pylos at least, this was not subject to variation by group[195] but rather involved 'a single tradition, learned by all writers at Pylos, which included certain acceptable and normal forms of orthographic variation'.[196] We do not know how or where writers were trained, and no examples of teaching texts (such as are common in cuneiform, for example) survive.[197] There may indeed have been some variation from site to site, given that we can trace children's handprints on some documents from Knossos, suggesting perhaps that literate education began at a young age, while at Pylos adults seem to have shaped the documents for writing.[198] The production and shaping of the documents was indeed very closely related with the needs of writers and with considerations of the future treatment of the documents (for example, folding for stability when inscribing in wet clay, or using a central string to keep the fragments together if a tablet was broken in transit), which might suggest that in at least some circumstances the administrators were shaping their own documents before writing them – although this is difficult to confirm, and it is possible that document shaping was sometimes or often done by other individuals in close collaboration with the writers.[199]

What is distinctive about bureaucratic writing on clay is that it was being done *by* small groups within the administrative centres, *for* small groups within the administrative centres.[200] There can be no doubt that this was a closed and restricted context of writing. What value writing may have had outside of this sphere is very difficult to reconstruct, as we have seen,[201] but there is little that points beyond usage by people of elite status and/or involved in the control of resources. The ISJs perhaps suggest both a potentially decorative usage of Linear B and, more importantly, groups of elite consumers for whom the script may have held some ideological value as a visual representation of resource control, which may have lain at the heart of their own claim to authority. However, in the performance of their authority, writing does not seem to have had a visible presence, for example in the structured environment of the megaron or in feasting or religious festivals.[202] There is no evidence for wider societal access to writing, as might be reconstructed for Linear A usage in the context of religious practice, and no indication that people could or wanted to write their

[195] As suggested for instance by Duhoux 1986. On other variable factors in spelling, see Meißner 2007.
[196] Judson 2022, 27.
[197] See Duhoux 2011b.
[198] Sjöquist and Åström 1985, 1991.
[199] See Judson 2023, which includes results from experimental research on tablet-making techniques.
[200] Mycenaean documents seem to have been 'unilateral' in this sense, rather than also acting as *e.g.* receipts to be consulted by individuals contributing resources or duties: see Steele 2008, 2011b.
[201] It is also worth bearing in mind that orality must also have played a role in wider administrative networks and processes, alongside writing: see *inter alia* Steele 2008, 2011b and recently Varias García 2023; Greco 2023.
[202] See *e.g.* Bennet 2007 on the way the Mycenaean ruler framed themself iconographically, while written evidence comes from closed administrative archives rather than performative contexts. Also Bennet 2017.

names or messages on everyday objects as an ad hoc practice, unusually for writing systems of the ancient Mediterranean. Traders and others with external economic interests are perhaps more likely to have been involved in broader Mediterranean writing traditions, such as the marking systems associated with Cypriot literacy that make their mark in trade far and wide, rather than the Linear B script, whose usage appears to be restricted to the contexts outlined above. Writing on perishable materials will always be an unknown possibility, but the direct evidence we do have points towards a far more restricted existence and usage for Linear B than we saw for Linear A.

Syllabic writing in Cyprus

Although writing in Cyprus is not a primary focus of this book,[203] it will prove an important comparandum in the context of the current discussion on the vitality of writing traditions. One reason for choosing Cyprus for comparison is that the syllabic writing systems that were used there are very closely related to those of the Aegean, with an adoption of Linear A (very likely via transmission through trading contexts in the Cyclades[204]) paving the way for an innovative adaptation of writing practices in the Cypriot Late Bronze Age.[205] Although there came to be numerous differences in the ways writing was used, the basic format of the Aegean syllabaries was maintained, in particular the 'linear' shapes of signs (which remained reasonably complex outline shapes comprising lines and curves) – so much so that the similarity of Cypriot syllabic writing to Linear B was apparent long before the latter's decipherment, and the clear comparability of some sign shapes was one factor that provided testable sign values during this process. Given the proximity of Cyprus to the writing traditions of the Near East, particularly the use of cuneiform, Cypriot experiments with writing these signs in more cuneiform-like ways on clay (impressing the stylus for some strokes rather than always drawing the tip through the clay) resulted in some wide variations in palaeographic style.[206] The systems are also structurally similar, in particular the limitation to signs representing open syllables (vowel-only, consonant-vowel and, rarely, consonant-consonant-vowel), meaning that they present the same challenges for writing a language like Greek, with its frequent final consonants and consonant clusters – so we cannot say, for example, that the Cypriot syllabic system is better suited to Greek than Linear B, a suggestion often made for the Greek alphabet.[207] This is helpful because it neutralises some possible reasons for the relative success of a

[203] Not least because this is a subject I have already written rather a lot about, *e.g.* Steele 2013, 2018.
[204] See Donnelly forthcoming.
[205] See Steele 2018, 4–44.
[206] See Steele and Boyes 2023.
[207] On the 'fit' of Greek to Linear B, see Consani 2003, 2016. Consani 2021 sees the spelling strategies of Cypriot writing in this respect as drawing on Linear A orthographic practice while Linear B innovated in its partial spellings; however, on the problems related to this view, and more broadly on orthographic comparisons, see Chapter 1: Exploring Script Adoption.

system, for instance its suitability to a given language, the suitability of its signs to a given medium or method of writing or how complex or otherwise they were to use.[208] In other words, we cannot say that Linear B was less successful or more vulnerable to loss than Cypriot syllabic writing because of its structure or sign repertoire, so we must seek explanations elsewhere (primarily in usage and the social context of writing).

Bearing in mind the above, we will focus here on what we can say about who used writing in Cyprus, and what they used it for. In the Bronze Age the surviving inscriptions, classified as Cypro-Minoan and still undeciphered, show a remarkable degree of diversity in material and object type as well as palaeography, which presents some challenges for trying to understand the whole corpus and its overall repertoire of signs and sign shapes (to the extent that it has often been broken into multiple traditions: CM1, CM2 and CM3).[209] Remarkably, while administrative-looking clay documents of various kinds are attested, they make up less than half of the surviving corpus of around 250 inscriptions, the most prevalent type being the distinctively Cypriot clay ball with a short inscription incised around the body (representing around a third of the whole corpus). The clay balls, and another document type of which a handful of examples survive, namely the clay cylinder, are very different to any documents known in the Aegean and are not particularly close to any of the cuneiform world either. There are a few Cypriot clay tablets, but their sizes and shapes again do not conform closely with Aegean types. Near Eastern tablet shapes provide occasional parallels, particularly for the Cypro-Minoan documents found at Ugarit. But Cypriot tablet shapes and layouts show no signs of standardisation and as yet do not survive in archival contexts. The lack of standardisation, the concentration of finds at the well-excavated site of Enkomi and the limited repertoire of document types, coupled with a lack of evidence for sealing practices (despite the apparent popularity of Near Eastern–type cylinder seals[210]), all seem quite in-keeping with the apparently diverse political landscape of Cyprus.[211] Also notable is a distinct lack of signs that could be logographic and a general lack of numerals among surviving inscriptions, again pointing away from the kinds of centralised bureaucratic practices seen in the Aegean; the frequent appearance of isolated signs in texts such as the clay balls clearly is not a dedicated system of logography, and looks instead like an adaptable practice of abbreviating.[212]

[208] The latter is frequently assumed to be a reason for the 'success' of alphabets over syllabic or logosyllabic systems: *e.g.* Woolf 2015, 41.

[209] See Steele 2012; 2018, 119–127, on the variety of inscription types. For a recent palaeographic study of numerous inscription types incorporating 3D imaging techniques, see Polig 2022; and for a deep learning–based neural model exploring the variation in sign shapes, see Corazza, Tamburini, Valério and Ferrara 2022.

[210] Webb 1999, 306; Smith 2002. See also Webb 2005, arguing for the seals (among other objects) as markers of social power and status.

[211] See *inter alia* Peltenburg 2012; Knapp 2013, 432–438; Steele and Boyes 2023, 38–39.

[212] See Steele 2018, 111–114; Donnelly 2022. Ferrara 2015b, 111, suggests tentatively that the isolated signs could represent commodities, but abbreviations for onomastic elements or role descriptions are perhaps more likely.

Whatever the social set-up in Bronze Age Cyprus, one thing is clear: writing could be used for many purposes by an apparently wide range of people. Some are high-quality objects associated with status, such as two elaborately inscribed gold rings from a wealthy tomb at Kalavassos, bowls made of bronze and silver with inscriptions around the rim and bronze stand rings featuring writing alongside elaborate hunting-themed decoration. Some ivory items have been associated particularly with religious practice, including a plaque depicting the Egyptian god Bes, and an inscribed clay figurine of a bull or zebu again probably belongs in the religious sphere, although it is a one-off inscribed example (the inscription was added before firing, so was part of its manufacture) among many, many uninscribed examples of figurines. Three inscriptions on miniature copper ingots have been argued to represent a 'branding' of Cypriot copper on items used for quality assurance.[213] There is also a wide range of inscriptions on vessels and vessel fragments, some broadly to be classed as graffiti, including ones apparently incised (and in one example painted) on sherds that were already broken, suggesting the use of ostraca – broken pottery as a supply of something akin to 'note paper'. Perhaps most strikingly, literacy stretches to the world of trade, with both single-sign and multi-sign inscriptions appearing on storage vessels of various kinds that would have been used to transport commodities through the island's extensive economic networks. Despite lingering uncertainty as to whether inscriptions of this kind are 'true writing',[214] it can be conclusively shown that 'potmarks' do bear a close relationship with signs of the Cypro-Minoan repertoire,[215] and if some odd-looking shapes occur in this context, this only reinforces the difficulties seen in other areas of Cypro-Minoan palaeography. Donnelly has stressed the ways in which the common Cypro-Minoan abbreviating and marking practices may have straddled a border between literate and illiterate engagement, holding meaning for groups and individuals in different circumstances.[216]

There is very limited evidence for the use of perishable materials in Bronze Age Cypriot writing, although the wooden writing tablet from the Ulu Burun diptych, found on a shipwreck with very clear links to Cyprus, could point in this direction (just as it may do for writing in the Aegean). Papasavvas has identified some bronze tools from Late Bronze Age contexts as styli of the kind that would be used to write on wooden writing tablets of this type.[217] A reasonably high degree of social visibility for writing can be inferred from the use of writing in status display and religion, and even more so from the graffiti and the evidence for literacy in trading contexts. Unlike in the Aegean, for Cyprus we can comfortably reconstruct a range of social literacy that goes beyond elites, not only in exposure to writing (as for example in communal religious contexts) but also in writing competence as part of everyday

[213] Ferrara and Bell 2016.
[214] Single-sign inscriptions in particular are rejected in the corpora of Olivier 2007 and Ferrara 2012–13 vol. 2.
[215] Donnelly 2021. See also Hirschfeld 1992, 1999, 2014.
[216] Donnelly 2019.
[217] Papasavvas 2003.

activities. Obviously this is not to say that everyone in Late Bronze Age Cypriot society could write, but the far wider outlook on who might be able to write and what writing was good for, resulting in the diversity of the surviving epigraphic corpus, must have been an important element in its longevity. Cyprus was not immune to the widespread economic catastrophes that affected wide areas of the Mediterranean around the early 12th century BCE (and around the time when the administrative centres of the Mycenaean world disappeared),[218] as shown by some site destructions and abandonments and a certain amount of restructuring, but what is clear is that literacy continued in spite of the upheaval.[219] It is no great leap to suggest that the far broader range of literacy resulted in a far higher vitality for Cypro-Minoan writing than for Linear B, leading to the survival of the former and the death of the latter.

The survival of writing in the later part of the Late Bronze Age is only the first stage in its longevity. Writing is quite sparsely attested in the Early Iron Age, perhaps reflecting shifts in literacy alongside other changes in the socio-political landscape, but some particularly important inscriptions are found in Cypro-Geometric tomb contexts, including the first attestation of the Greek language written in a Cypriot syllabic system.[220] By the time writing becomes more visible again, in the 8th–7th centuries BCE, further changes in the writing landscape are evident, quite apart from the fact that Greek is now a dominant language across the island, and Phoenician also appears (written in its own alphabet). The local Greek dialect was written in a syllabic system descended from Cypro-Minoan,[221] now usually labelled in scholarship as the 'Cypriot syllabary' or similar, although there are still inscriptions in at least one non-Greek language that may be a survival of a language written in Cypro-Minoan.[222] At this time, writing became a sort of 'signature' for the island's royal dynasties,[223] and for the first time it became even more highly socially visible in monumental inscriptions, including political declarations and religious dedications by royal figures – an inscription type entirely absent from Bronze Age spheres of literacy (in Cyprus and in the Aegean too). That social visibility was also evident in the religious landscape more generally as dedications on stone, often accompanying sculptures and statues, became a means for religious expression and social display, representing a context in which wealth and social stratification could be demonstrated. Another new type of inscription was the funerary monument, perhaps a somewhat more democratic medium but again allowing for more or less elaborate examples depending on wealth

[218] For an accessible account, see Cline 2014.
[219] See Sherratt 2003; Steele 2011a.
[220] See Steele 2018, 45–94.
[221] Perhaps by a deliberate reform of the system, although this is difficult to substantiate: see Egetmeyer 2013.
[222] On the linguistic landscape, see Steele 2013. Iacovou 2006 argues for a mutually stable relationship between the political and linguistic divisions of the island's city kingdoms and their writing traditions.
[223] See Iacovou 2013. Administrative inscriptions appear too, but in small numbers and on ephemeral materials, such as ostraca (perhaps suggesting that perishable materials, such as wood or papyrus, would also have been used).

and status. These new inscription types represent a certain level of static presence of writing in the visible landscape, whether in civic centres or religious spaces.

At the same time, writing of a more 'private' character was also on the rise, with numerous graffiti on a wide range of object types, of which writing on pottery is best attested. There are at least 1,200 inscriptions surviving in Cypriot syllabic writing of the 1st millennium BCE, probably 1,500 or more, with a very wide range of inscribed object typologies.[224] Perhaps one of the most telling sets of graffiti are those found not in Cyprus but in Egypt, where they were added to Egyptian monuments (including the Great Pyramid of Khufu) by Cypriots abroad – a practice that was clearly quite widespread given the number of graffiti in different languages and writing systems that have been added to Egyptian monuments. What is important in this case is that these Cypriots are unlikely to have been of high status, and at least for some it is very likely that we are dealing with mercenaries employed in the pharaoh's armies: a particularly persuasive case can be made for the set of graffiti left on the walls of the Temple of Achoris at Karnak, which avoid overlap with each other and were probably made by a group of individuals present at the same time.[225] These individuals knew the Cypriot writing system well enough to write their own names and their towns of origin, and they knew its conventions, including the preference for direction depending on whether they were writing in the Paphian (left-to-right) or Common (right-to-left) variant; some could even write in the Greek alphabet too.

Another source of evidence for writing in Cyprus comes from contemporary art, where we find depictions of people writing or carrying written objects – a phenomenon entirely unknown in the Bronze Age in either Cyprus or the Aegean.[226] This is a valuable if disparate source of information that has potential to tell us more about the social and visual value attached to writing, postures involved in its embodied practice and materials that might otherwise be missing from the archaeological record. A clay figurine dating from the 6th century BCE shows a figure seated on a stool with a scroll pulled across the knees and wearing an elaborate hat or headdress[227]; the headdress is unusual, but this posture is common among other statues depicting writing. Also from the Archaic period come some stone examples possibly wearing masks or in the guise of an Egyptian god, such as Horus or (more likely?) Thoth, one seated in a throne-like chair with armrests and another standing, both probably holding writing tablets of some kind.[228] Another stone statuette that seems to

[224] At the time of writing, an up-to-date corpus of Cypriot syllabic inscriptions of the 1st millennium BCE is still in progress, with a first volume having appeared in Karnava, Perna and Egetmeyer 2020 (focusing on the sites of Amathus, Kourion and Marion). For a provisional list of inscriptions, with references and transcriptions, see Egetmeyer 2010, vol. 2. Masson 1983 collects a significant number of inscriptions but is now out of date and records only a relatively small proportion of the surviving corpus.

[225] See Steele 2018, 213–219.

[226] See Vandenabeele 2009 for a detailed treatment of most of the examples discussed here.

[227] Museum of Cycladic Art, no. Z0379. https://cycladic.gr/en/exhibit/z0379-idolio-grafea?cat=kipriakos-politismos

[228] Vandenabeele 2009, 126–127 (a third example is too damaged to be certain it was holding a writing tablet).

Fig. 3.4. Limestone statuette of a seated beardless male votary writing on a scroll. Metropolitan Museum New York, no. 74.51.2695: The Cesnola Collection, purchased by subscription, 1874–76. Public domain image.

depict Horus, originating from Idalion, could also be interpreted as carrying a writing tablet, although the posture in this example is very stiff and lacking in detail.[229] However, Faegersten points out that a scribe statue in the guise of Horus would be unusual from an Egyptian perspective as well as a Cypriot one.[230] It is difficult to interpret this evidence, but it could point towards some paraphernalia associated with writing activity or the social status of someone who could write or who wrote professionally, and/or perhaps links with religious or cultic roles, beginning in the Archaic period. An Egyptianising element would fit in with wider trends in iconography and especially sculpture at this time, however, making it difficult to know to what extent writing specifically is bound up with other features of these pieces. Although there are some similarities in posture and in the position of the papyrus scroll, the cross-legged pose most strongly associated with Egyptian scribe statues is absent here.

Further examples in stone are concentrated in the Classical period, 5th–4th centuries BCE. Four nearly identical seated writers wear a chiton and himation, with sandals on their feet and a wreath of leaves around their head, and hold the left end of a papyrus scroll in their left hand while allowing the main part to rest over their knees and spill over the right-hand side, with a pen or brush in their right hand poised in the midst of the act of writing. These examples are notable in that the scroll bears some markings in most of them, not apparently writing signs nor reminiscent of them, but rather lines and rectangles outlined in red; Vandenabeele even suggests that these may be depictions of architects, rather than writers or schoolboys as variously interpreted, based on the geometric nature of these markings.[231] Their dress, on the other hand, could perhaps be associated with status and/or with religious activity (this statue type often being known as a 'temple boy'). A similarly dressed individual, seated in a chair with armrests and holding a scroll but no pen or brush, also belongs to the 4th century BCE, and a further example seated on a stool but more roughly carved, with little detail on the figure's features or dress (although traces of paint suggest that detail may once have been filled in with colour), dates from the late 5th or early 4th century BCE (Fig. 3.4). A unique statuette from Salamis (Toumba tou Michali), probably of a similar period, remarkably shows the writer (now headless)

[229] British Museum, no. 1855,1101.24. https://www.britishmuseum.org/collection/object/G_1855-1101-24
[230] Faegersten 2003, 27, 219.
[231] Vandenabeele 2009, 128. See Karageorghis 2002, 222–223, on three of these objects and their interpretation and Hermary 1989, 293, for the fourth example, which lacks visible markings on the scroll.

Fig. 3.5. Cypriot limestone figure of a person sitting at a table, writing on a scroll. © The Fitzwilliam Museum, Cambridge, accession no. GR.24.1890. Photograph by Amy Jugg.

seated on a stool and hunched over a table on which a scroll rests (Fig. 3.5). Although damaged, it is possible to make out the writing hand of this individual, and there are traces of decoration on the furniture, including colour on the upper edge of the seat, suggesting that it would once have been a more elaborate item than it now appears. The curvature of the writer's back and unusual set-up with a stool and table suggest a certain innovative realism in this depiction.

Depictions of writing continue in the Hellenistic period and include both male and female figures. One stone figure from Golgoi looks very similar to the seated Classical examples of young men just discussed, with a scroll across the knee and holding a pen or brush. Women, meanwhile, appear among the terracotta figurines, seated with a writing tablet or set of writing tablets on the knee, and writing with a stylus in the right hand. The style is not confined to Cyprus, however, and may attest to a wider image of a literate and probably high-status woman at this time[232] – thus

[232] See Vandenabeele 2009, 129.

perhaps with a weaker possible link to Cypriot syllabic writing traditions (although we have evidence that these continued through a significant part of the Hellenistic period, on which see below).

What all these depictions of the act of writing share is that they do not depict the end product – if there was ever a depiction of what was being written in any of these examples, it is no longer visible. Based purely on the date range of the figures and their Cypriot provenance, it is likely that syllabic literacy was on the agenda for at least some of these examples. For the later period, however, it is possible that alphabetic literacy would have been on show – if indeed any distinction was being made about what writing system was being used. It remains an open question whether syllabic writing and alphabetic writing were conceptualised in the same way, and whether literacy in each system held the same value. As we will see, attitudes may indeed have changed over time as the balance between syllabic writing and alphabetic writing in Cyprus shifted.

A final piece of evidence comes from sculpture depicting the end product of the act of writing. A statue found at Voni, now headless but almost certainly depicting a woman despite some reluctance to identify her as such in scholarship, carries a writing tablet in her left hand.[233] The tablet bears a Cypriot syllabic inscription telling us that 'Kilikas son of Stasikretes erected me', and, oddly, features double writing of two vowels (*ki-li-ka-a-me* and *ka-te-e-se-ta-se*), the first a long vowel and the second short: these do not conform with the normal spelling rules of the syllabary, and are interpreted by Egetmeyer as a possible hypercorrection perhaps intended to characterise or even ridicule the depicted person's portrayal as a literate individual, since it seems an unlikely coincidence.[234] The writing tablet itself is a single board (not a hinged diptych) and would presumably have been made of wood, but the type is known from other representations in more durable materials: it resembles the shape of the Idalion Bronze, a treaty cast in bronze and the longest-surviving Cypriot syllabic text, as well as a stone example from Amathus with a fragmentary inscription, both bearing a handle at one end (the Idalion Bronze has a loop through the handle for suspension) although they are written in different orientations (the Idalion Bronze in 'landscape', the Amathus fragment in 'portrait'). There are also two statues (one fragmentary) of young men holding scrolls, both dating from the Hellenistic period and found at the same sanctuary site as the Archaic statue discussed above, but these do not depict any written signs and are more difficult to link with syllabic literacy specifically because of their date.

Taken together, these pieces of sculpture help us to reconstruct something of the wider picture of Cypriot literacy. Where surviving inscriptions are typically on durable media, the sculptures suggest that the act of writing was bound up with the use of perishable materials from an iconographic point of view: in some sense we

[233] See Vandenabeele 2009, 130 ('The clothing could be male but the breasts are well indicated'), following Ohnefalsch-Richter 1893, 5.

[234] Egetmeyer 2010, vol. 2, 816 (Voni 1). On the inscription, see also Masson 1983, no. 251.

could see perceptions of literacy as concentrated on the use of pens or brushes with papyrus, and the use of styli with wooden writing tablets, and much less with craft processes, such as the act of cutting stone, painting on pottery or casting bronze. The sorts of scratched inscriptions seen widely in graffiti on pottery are not depicted either. The sculptures also remind us that writing on perishable materials could take multiple forms and thus required access to a range of materials and tools, in particular papyrus (presumably the material of the depicted scrolls, although parchment is also possible) and wooden writing tablets, which would have required different methods of writing, with ink and by incision on wax respectively. Writing tablets are also attested indirectly through bronze styli of a type widely used around the Mediterranean. These depictions also give us a glimpse of literate women, one of whom is explicitly linked with Cypriot syllabic writing, and we see a certain amount of variation in the quality of sculpture that suggests they did not all originate from especially wealthy individuals, thus perhaps showing more of a social spectrum.

How Cypriot syllabic writing was passed on is another open question. We have no references to the ways writing might have been taught, no teaching texts or evidence of schools. Masson interpreted the word *diphtheraloiphos*, found in an Archaic or Classical funerary inscription of a man named Onasagoras son of Stasagoras, as having the meaning 'schoolmaster', following a gloss of Hesychius (Hsch. δ: διφθεραλοιφός· γραμματοδιδάσκαλος παρὰ Κυπρίοις).[235] However, there is no contextual information to confirm the interpretation in this particular case, and the base meaning of the word relates to someone who works with leather, so could be interpreted more broadly as someone in craft production, or someone associated with writing activity perhaps professionally (*i.e.* the use of parchment as a writing material).[236] As always, for references in Hesychius it is difficult to know to what period(s) the particular semantic association applied. At Kition, there are references to a 'chief of scribes' in Phoenician texts, which could point towards writing-related training in administrative contexts, a phenomenon that has been suggested, by extension, to apply to other city states across the island (including those with Greek administrations using the Cypriot syllabary).[237] Certainly there is direct evidence for accounting practices in Cypriot syllabic writing at Paphos that looks very similar in type to the large archives of accounting documents in Phoenician found at Idalion.[238] However, this professional context of writing is clearly just one area of daily life in which literacy was practised, as even the briefest survey of inscription types shows, which means that there must have been non-administrative contexts in which writing was proliferated, whether through schooling or other means.

[235] Masson 1983, no. 143. Quotation from Hesychius: 'Diphtheraloiphos: Schoolmaster in Cypriot'.
[236] Indeed, Nagy 2020 uses this very piece of Cypriot evidence to suggest the long-term survival of a Mycenaean term for a writer on parchment, thus giving evidence that such a writing material was used for Linear B.
[237] Pestarino 2022, 77–82, 101–104.
[238] On the recent discovery of an accounting document from Paphos, see Iacovou and Karnava 2019. On the Phoenician archives, see most recently Amadasi 2017; Amadasi and Zamora López 2020.

The picture presented so far sees Cypriot syllabic writing as thriving across the island throughout much of the 1st millennium BCE, with a wide range of uses for writing resulting in an equally wide range of inscription types (not to mention the clear indication that perishable materials were also written on) and evidence pointing towards a reasonably broad social spectrum of writers. These are surely markers of high vitality. So why did this system and the writing traditions associated with it fail to survive antiquity? This question is all the more crucial when we are trying to understand in general why writing systems may be lost, because it becomes clear that the concept of vitality is itself vulnerable to change, meaning that high vitality is dependent on the maintenance of the social and other factors that support it – and that vitality can be greatly reduced when the supporting factors undergo change or are lost. As we will see, Cypriot syllabic writing suffered two significant blows, one internally and one externally driven. These changes are significantly better documented than anything we can say about the demise of Bronze Age Aegean syllabic writing.

Beginning with internal factors, it is important to remember that the Cypriot syllabic writing tradition as used for Greek was highly unusual in a Mediterranean context: Greek speakers elsewhere had been using the alphabet since at least the 8th century BCE. The very few traces of alphabetic writing in Cyprus in the 7th and 6th centuries BCE do not give the impression that this system was widely used on the island yet, and two are digraphic and also feature Cypriot syllabic text.[239] As Cyprus became drawn ever closer into wider Greek-speaking Mediterranean networks, and particularly into the political situation surrounding the Persian wars, relationships with Athens and other Greek states began to feature higher on the agenda. The Cypriot king Evagoras I of Salamis was particularly known for his philhellenism, issuing coins bearing Greek alphabetic text (sometimes incorporated into syllabic text), and was even honoured at Athens in an inscription and a statue placed next to that of the Tyrannicides; he also featured in a work by the Athenian orator Isocrates, holding Evagoras up as an exemplar of good rulership for his own son Nicocles, who succeeded him as king of Salamis.[240] Evagoras was not the only Cypriot king to issue coins with alphabetic inscriptions from the late 5th century BCE onwards, with coins of the cities of Marion, Paphos and Soloi also coming to feature alphabetic text – though the use of digraphia in such contexts, and of open-syllabic abbreviations written in the alphabet (such as *MAPI=MARI* for Marion, *EYA=EUA* for Evagoras), further suggest that Cypriot syllabic writing remained dominant at this time.[241] Digraphia came to feature in a greater number of inscriptions, particularly state-issued ones, during the course of the 4th century BCE; these featured the Cypriot Greek dialect written in the syllabary alongside Koine Greek (*i.e.* a Mediterranean-wide variety that had become the international standard) written in the alphabet, and there is also at least one example from Amathus

[239] See Steele 2018, 220–223.
[240] On Evagoras and especially Nicocles's relationship with Athens, see Unruh 2023, 124–131.
[241] See further Steele 2018, 223–228.

featuring the Eteocypriot language in the syllabary alongside alphabetic Koine Greek. In general these can be seen as top-down changes that will not have filtered very far through society: the desires of kings to appeal to a wider Mediterranean context for their authority, arguably aimed at a local Cypriot audience, had little to do with ingrained writing practices throughout their kingdoms. Evidence for alphabetic writing across other social strata in this period is very scarce.[242]

Far more than the flirtations with alphabetisation shown by 5th–4th century BCE kings of city states, it was the Ptolemaic political annexation of Cyprus at the end of the 4th century that made a sudden and significant change to the island's epigraphic landscape. Under the Ptolemies, Greek alphabetic writing in the Koine became the standard for official inscriptions – which also happen to be one of the most durable types because of the use of stone monuments. We may suspect that the official policy of an external power would not have pervaded the whole of Cypriot society instantaneously, but the degree to which writing practices may have shifted as a result of this change should not be underestimated, particularly in administration, but also among members of the former ruling elite whose power base was shaken during the period of conflict between the Diadochoi before Ptolemy won out. It is also very likely that writing practices changed at different rates in different functional ranges, and this in turn has some effect on what has survived to be archaeologically visible to us today. If syllabic writing continued in force on perishable materials, for instance, we would have little or no evidence to recognise such a trend, while writing on stone and pottery inevitably will be better represented in the archaeological record.

The religious sphere proves to be the most telling environment for changing writing practices, showing both sides of the shift. On the one hand, alphabetic dedications suddenly became more popular, suggesting a deliberate choice to make a similar change to that seen in monumental epigraphy issued by administrative authorities. On the other hand, we have good evidence that syllabic writing was still in use for religious dedications during the 3rd century BCE and probably into the 2nd. Aside from a small number of monuments on stone and a few private-looking inscriptions,[243] it is particularly the pottery inscriptions from the shrine of the Nymph at Kafizin that show the alphabet and the syllabary in use together, with both digraphic texts and ones written in the syllabary alone (though both are outnumbered by the alphabetic-only texts).[244] Strikingly, the syllabic inscriptions are mostly found on utilitarian wares, while the alphabetic inscriptions are mostly found on decorated wares, pointing towards some differentiation in what syllabic and alphabetic writing were used for and perhaps corresponding differences in how they were perceived.[245] Now thought to belong to the early 2nd rather than the later 3rd century BCE,[246] these

[242] See Steele 2018, 231.
[243] See Steele 2018, 234–235.
[244] At least 242 alphabetic only, at least 32 syllabic only and at least 33 digraphic (numbers approximated because of uncertainties over a few damaged inscriptions). See Mitford 1980 for a corpus of these texts, plus Hermary 2006 for the publication of a further example.
[245] On the practices of the Nymph's cult and their broader context, see S. Lejeune 2009, 2014b.
[246] S. Lejeune 2014a.

texts show significant levels of contact between the local Cypriot dialect and the Koine dialect, as well as between the two systems used to write them.[247] This seems to be a snapshot of a period when syllabic literacy was still alive and well to some extent (particularly suggested by 'intelligent' use of the syllabary[248] and by syllabic influence on some alphabetic spellings), but alphabetic literacy was also evidently much more than a superficial veneer imposed by the state: we seem to be in the middle of a shift in preferences from one to the other, with overlapping competency in both.

Religious practice may perhaps be thought of as relatively 'private' in that it involves personal dedications and expressions of piety, but as a communal activity it was also a forum for social and personal competition and an opportunity to develop or reinforce group identities and their performance. So the tensions between syllabic and alphabetic writing that are still on the agenda for the worshippers at the Kafizin shrine are illuminating and give us a sense of both the attachment to long-lasting local traditions that represented a Cypriot identity and the pragmatic choices that led to a preference for the now pervasive alphabet and with it the Mediterranean Greek Koine dialect. The Cypriot syllabic script seems to have retained some visual value long enough for administrators in Roman period Nea Paphos (later 2nd or 1st century BCE) to use seals bearing syllabic signs in their day-to-day duties.[249] They may not have been producing new inscriptions, as far as we can tell at least, but this shows us that the syllabary had not been forgotten even at this late stage. However, beyond this point there is no further surviving evidence for the script's existence. For Mitford, it was from the Ptolemaic annexation onwards that 'Cyprus seemed to lose her soul', a perhaps romantic way of painting the loss of the syllabary and its attachment to the local dialect and local identity.[250]

In 2020–21, I had the pleasure of collaborating with an artist, Charles 'Pico' Rickleton, on an initiative that he called *Speculative Syllabic,* during his time as a Visiting Fellow of the CREWS project. This involved imagining an alternative history in which Cyprus had never lost its syllabic writing system, trying to create a range of visual forms for the script that might have resulted from its transfer to print and computer literacy over the ages, and depicting it in a range of contemporary scenarios in place of alphabetic writing (Fig. 3.6)[251] – and all the time with an envisioned close link to the modern local Cypriot dialect, which largely goes unwritten at least in formal media in the real world.[252] This initiative was incredibly intellectually

[247] See Consani 1986, 2015; Brixhe 1988.
[248] Mitford 1980, 264.
[249] Michaelidou-Nicolaou 1993; Steele 2018, 240–241.
[250] Mitford 1953, 90.
[251] Rickleton 2022.
[252] Standard Modern Greek is the language of education and formal literature in Cyprus today, while the local dialect is widely spoken in everyday settings: on related problems of diglossia and linguistic representation, see *inter alia* Sciriha 1996; Papapavlou and Pavlou 1998; Sophocleous and Wilks 2010; Sophocleous 2021.

stimulating, and I owe Pico a great debt for inspiring some of my more recent work on the vitality of writing systems (not least the present chapter), and the question of what makes one last, while another may dwindle and disappear. We did not flesh out the full story of the alternative history of the Cypriot syllabary, but it would certainly have involved attitudes to syllabic writing taking a different turn to that seen in the Hellenistic period.

Fig. 3.6. A modern skip with a Cypriot syllabic inscription, as imagined by Charles 'Pico' Rickleton in his Speculative Syllabic project. Printed with the artist's permission.

Relationships between writing and language vitality

While our goal here has been to evaluate the vitality of each of the Aegean writing systems, and so to explore the concept of vitality itself in connection with writing traditions, this is also a good point to consider how writing system vitality might also correspond (or fail to correspond) with language vitality. This investigation has given us some very good reasons for separating language and writing as separate phenomena, even though they inevitably have considerable overlap. As we have seen, there is little point in trying to assess the languages written in Cretan Hieroglyphic and Cypro-Minoan, since the quality and quantity of evidence is too limited to study linguistic features in any meaningful way. Linear A is generally considered undeciphered, but we understand the values of its signs well, and the surviving evidence is enough to reconstruct some features of the language (generally referred to as 'Minoan') even though we cannot ascertain its linguistic affiliation. Both Linear B and the Cypriot syllabary were used for Greek, and both had very close associations with dialects of that language, while the latter was also used to write at least one non-Greek Cypriot language (Eteocypriot, which may indeed have been a continuation of a language written in Cypro-Minoan).

There are indications that, when the Linear A writing tradition ended, or rather when it was developed into the Linear B writing tradition and writing came to be exclusively associated with the Greek language, the Minoan language underlying Linear A did not disappear altogether. A caveat is necessary, because we cannot be certain that the Minoan language (*i.e.* what is written in Linear A) was the only one

spoken in Bronze Age Crete. Cretan Hieroglyphic is sometimes thought to represent a separate language, for example, and in the Odyssey Homer tells us that the island was home to many languages (Od. 19.175).[253] Whatever the level of linguistic diversity, there is good reason to think that the Minoan language (and maybe others) survived the loss of Linear A and continued to be used during the Mycenaean period, when only Greek was written. Non-Greek names represent a very high proportion of the names written in Greek Linear B documents, especially at Knossos,[254] showing in some cases a regular correspondence with names attested in Linear A but with accommodation of Greek morphology.[255] There are also place names attested in both Linear A and B, showing another kind of continuity from the Minoan period onwards (in some cases down to the modern day). The level of onomastic continuity, although difficult to map onto language use, could be seen as a sign that Minoan language had continuing vitality, since 'personal and place names are another important expression of a group's identity and connection to their traditional families and land'.[256] Another hint of long-term survival of a language of Bronze Age Crete comes in the form of later alphabetic inscriptions in the 7th–3rd centuries BCE that are clearly not written in Greek but whose language (referred to by the ancient term 'Eteocretan') is otherwise unknown.[257] Despite some variation in the quality of the evidence, we can be reasonably certain that the loss of the Linear A writing tradition did not co-occur with the loss of the language written in it. That does not mean that there was not some change in the language's vitality, and multiple scenarios are possible here. Minoan speakers may have continued to play a role in administration in Crete, perhaps under some degree of bilingualism as Greek became the language of accounting – indeed, we need to assume this for some period during the early development of Linear B, which is exactly the sense in which Bennet claimed that Linear A had been 'killed' effectively by its own users.[258] Minoan speaker communities across the island (whether monolingual or multilingual), on the other hand, may well have continued with little interruption for a considerable time, explaining some level of onomastic continuity. Perhaps over time Minoan speakers saw the efficacy in speaking Greek in some areas of their lives, generating a noticeable language shift, but unfortunately the evidence is not very helpful on this point as direct documentation of Minoan ends with the loss of Linear A. At some point the island did become predominantly Greek speaking, as far as we can tell from alphabetic inscriptions from the 7th century BCE onwards, which were used for a local Doric dialect; but with a few hundred years with no surviving epigraphy, it is very difficult to reconstruct language changes and shifts over time – although the fact that very different Greek dialects were in use in the Bronze Age on the one

[253] See recently Duhoux 2020 on these issues.
[254] See Meißner 2019. On the methodology for studying such onomastic problems, see also Civitillo 2012.
[255] Steele and Meißner 2017, 100–102, 105–106.
[256] Bradley 2022, 58.
[257] Duhoux 1982.
[258] Bennet 2008, 22.

hand, and in the Archaic and Classical periods on the other, will be problematic, as we will see.

When it comes to the forms of Greek recorded in Linear B and the Cypriot syllabary, we have seen that these two scripts represent very different trajectories, but that nevertheless the Greek language survives. However, we need to be careful here about what we mean by Greek. In the Mycenaean period, our only direct evidence is for what we call the Mycenaean dialect, which, strangely, is very homogeneous across all its attestations despite their chronological and geographical span. By contrast, by the time we get to the Archaic period in Greece, when language becomes visible again, with the Greek alphabet's arrival, we are presented with a linguistic picture that is strongly variegated. Each area has its own dialect and its own version of the alphabet, and these have strong ties with local identities. Are we supposed to believe that the very homogeneous Greek found in Linear B is a close representation of spoken language in the areas of all the palaces, despite their wide geographical and chronological distribution? It has often been assumed that Mycenaean Greek is a somewhat fossilised language of administration, and so that it differed from spoken varieties. However, detailed study of linguistic features shows that the dialect of the tablets was in the process of innovating in such a way that would make it closer to some later dialects, clearly pointing towards a variety that was 'alive' and not at all fossilised or static.[259] Even so, this does not mean that there were not other spoken dialects of Greek nearby; we simply cannot prove their existence or map their geographical distribution (except in as much as other varieties must have existed somewhere, in order to explain why later dialects are not descended from Mycenaean Greek).[260]

Particularly striking is that Mycenaean Greek written in Linear B appears to belong to the East Greek group of dialects, as shown by the assibilation of *ti* > *si* in verbal forms (*e.g. di-do-si didonsi* rather than ˣ*di-do-ti didonti*, the original form) alongside a number of other changes of which some were still in progress. In the later period most of the areas where Mycenaean administrative centres had been located used a West Greek dialect, the majority being local forms of Doric (*i.e.* in Crete and the Peloponnese), which do not share this innovation. This could make it quite tempting to resort to a very old-fashioned explanation for the later dialectal situation, where waves of invaders speaking different dialects (Ionian, Achaean and then Doric according to the original theory) swept through Greece and radically altered the dialect map.[261] In something of a backlash against such theories, which completely ignore the evidence from the archaeological record and any nuanced interpretation of social change over time, John Chadwick proposed a perhaps ingenious but ultimately flawed alternative explanation: he picked up on some theories that Mycenaean Greek displayed small

[259] *E.g.* Thompson 1996–97, 331; 2002–03, 366.
[260] On some of the problems of reconstructing the dialect map in the 2nd millennium BCE, see Morpurgo Davies 1992; Ruijgh 1996.
[261] Kretschmer 1896, 1909.

amounts of evidence for dialectal variation,[262] and he suggested that Doric speakers had been living in these areas all along as a sort of underclass who spoke what was considered a substandard variety of Greek (which surfaced very occasionally in the Linear B tablets as writers slipped into their own dialect), and who eventually overthrew their Mycenaean overlords.[263] Unfortunately the linguistic evidence does not support such an interpretation, as more recent re-evaluations have shown that evidence formerly invoked to support the existence of multiple dialects in fact points towards a number of ongoing changes within the Mycenaean dialect itself.[264] This is not to say that Mycenaean Greek displays no signs of geographical variation – indeed, not only does the evidence suggest that the earlier sets of documents from Knossos preserve an earlier stage of some changes than the later archives of Pylos and other mainland sites (for instance in developments in case syncretism), but we can also see innovative changes that are not shared, particularly evidence for psilosis (loss of [h]) at Knossos.[265]

Although we can be certain that Mycenaean Greek was a 'living' variety of the language that was undergoing change over time, it remains unclear who its speakers were and how they were distributed. Were there other varieties of Greek nearby, or indeed other languages (especially in Crete but on the mainland too), and might individuals have been proficient in more than one? Was Mycenaean Greek a prestigious variety spoken by elites? Or was it simply the majority dialect in most or all of the areas where Linear B administration is attested? Without direct evidence for other varieties or other contemporary spoken languages, these questions cannot be answered. It is also problematic that we are not able to identify Mycenaean as an ancestor of any later dialect of Greek,[266] which means that it is possible that the Mycenaean dialect was lost at the same time as (or following) the fall of the administrations who used it for their bureaucratic records. Certainly we can be sure that major social changes followed the destructions of this period, and whatever prompted the change towards West Greek majority dialects in these areas may well have been a direct or indirect result of the major language shifts corresponding with shifts in power, prestige and perhaps in some cases actual movements of people (a popular explanation for the Cypriot dialect's relation to Arcadian in the central

[262] Especially Risch 1966; Nagy 1968.
[263] Chadwick 1976b.
[264] See Thompson 1996–97, 2002–03.
[265] See Meißner 2008, 15. Judson 2017, 119–120, also sees the use of the optional a_2 /ha/ sign, examples of which are considerably more numerous in relevant contexts at Pylos than at Knossos, as indicative of such a linguistic situation, while the use of a_2 is itself overmarking of a phoneme that is not otherwise written using a separate sign and can usually be indicated by omitting a glide. See also Pierini 2014. Nosch 2022 has recently argued that the a_2 sign was abandoned early at Knossos, perhaps in conjunction with the progression of psilosis.
[266] Thompson 1996–97, 331, does, however, suggest that this is a possibility. The most closely related later dialect appears to be Arcado-Cypriot, on which see Chadwick 1988 and Risch 1988, but Arcado-Cypriot does not seem to share all Mycenaean innovations.

Peloponnese, although I have argued elsewhere that population movements are not usually the best way of explaining such changes[267]).

Moving back to Cyprus, the situation is a little easier to read. The island's modern dialect is generally considered to be a descendant not of the ancient Cypriot dialect but of Koine Greek, albeit in a form that has developed in isolation for such a long time that it is far from being mutually intelligible with Standard Modern Greek. Brixhe has suggested that the presence of final nasals in certain forms may be a continuation from the ancient Cypriot dialect, which presumably survived through contact into the Koine variety spoken there.[268] However, the Kafizin inscriptions of the 2nd century BCE seem to point towards a situation where it was not only the syllabic writing system but also the local dialect associated with it that was in competition with alphabetic, Koine Greek.[269] This means that the Cypriot dialect must have been lost at around the same time as the syllabic writing system, although we can have only a very rough idea of the timescale, and it is not impossible that the dialect outlasted the syllabic system (while the opposite is very unlikely to be true). It is also the case that the Eteocypriot language did not survive this period, being lost probably on a similar trajectory although its last datable examples come from the later 4th century BCE.

The takeaway from these observations is not only that a writing system and the language or language variety it is used to write may share features of vitality and consequently become vulnerable to loss at around the same time. We may also see here a causative relationship, particularly in the case of Cyprus: the elimination of the local dialect written in its distinctive syllabic system from some areas of life (particularly ones with high social visibility, such as political and religious monuments) seems to have prompted a restricted range of usage for the writing system. I would suggest that the resultant reduction of visibility for the local dialect, which was tied very closely to its distinctive written form, may have motivated or at least contributed to the eventual loss of the dialect. For Linear B, our evidence is more difficult to interpret because we see only snapshots of writing preserved in destruction layers, making the loss of the writing system (and perhaps the language variety it was used to write) appear sudden. Whatever the range and vitality of the Mycenaean Greek dialect, one thing we can be sure of is that the Linear B script was in no position to contribute to its vitality because of the severely restricted usage of writing.

The vitality of writing traditions

Discussions of writing and literacy in the ancient world tend to take a rather gloomy position based mainly on assumptions about how many people could read competently (*i.e.* a high or well-developed level of literacy). Finkel, focusing mainly on cuneiform

[267] Steele 2016.
[268] Brixhe 1995.
[269] On the rise of the Koine more generally, see Horrocks 2010, 79–123; Colvin 2011.

writing, contends that: '"Literacy" as a social desideratum was on nobody's agenda in antiquity. In a world where hardly anyone could read, including the kings, reading ability conferred an undoubted power, and those who held it, with their access to ageold wisdom and other literary traditions, would have seen no merit whatsoever in the idea of "reading for the masses".'[270] But as we have seen, even just among the writing traditions of the Bronze Age Aegean and Iron Age Cyprus, the act of writing and its visible and tangible products could hold a range of social and cultural values for the users and for those experiencing the phenomenon. The values appear to be highly dependent on the individual society and its wider practices and attitudes towards what writing was good for and who was, and who was not, involved with it.[271] Crucially, the vitality of each tradition of writing has a complex relationship with the index of values associated with it – and as the quotation above also suggests, visual and experiential exposure to literacy can itself hold value even for those who cannot read and write themselves.

It is worth taking a moment to reflect on what it might mean for writing to be socially visible, a concept that has come up in this discussion numerous times. Studies of writing tend to be focused mainly on the writers and their output, and even questions surrounding reading and readability have yet to be explored as extensively as would be ideal.[272] But we can also go beyond the direct writing and reading of a text to try to get some handle on the issue of what it might mean for people in a community to be aware of writing without necessarily being able to participate in it themselves – whether because of a lack of competence, a lack of opportunity or indeed other factors. There are various aspects of writing that lend themselves to reception by an (illiterate or otherwise) audience, from the physical embodiment of the practice (with a physical location, sets of resources, assumed postures, and so on) and the material existence of written objects (which could be placed in spaces accessed by and accessible to a range of people), to aspects of performativity related to the way written objects are used (reading from or reciting a written text in a religious context, for instance, or oral practice in the consultation of and interaction with administrative documents). There are also ways in which wider networks of people would have participated in the production of writing without necessarily being writers themselves, for instance the people involved in gathering and refining the necessary raw materials destined for literate usage.[273] We have seen that there are reasons for assuming that writing held value to wider audiences in the Bronze

[270] Finkel 2010, 9.
[271] Cf. Morpurgo Davies 1986, 55: 'Do people acquire prestige because they can write or do they not? And vice versa do people lose prestige because they cannot write?'
[272] However, for the Bronze Age Aegean, there have been valuable studies by Flouda 2013; Civitillo 2021b; Finlayson forthcoming a.
[273] On this question of the 'wider world of writing', see Boyes 2023; see also Wendrich 2012 on the concept of 'communities of practice'.

Age Aegean, although the nature of the audience and the nature of the value may have varied greatly over time and depended on various social and cultural factors.

Linear A writing appears to have had a relatively high degree of vitality in comparison with Linear B. Most obviously, we can observe a wider range of use for Linear A, not only within administrative circles, where the control of resources was presumably a driving factor, but also in other areas of life, where writing would have had a considerably higher degree of social visibility, particularly religion. Just to say that Linear A writing was more widespread does not mean that everyone could read and write, and for any individual it is possible that they had limited or partial competence in either reading or writing, or none at all, whereas a more highly trained ability to write is most evident on the part of the writers of administrative documents (which also happen to make up the majority of the corpus of surviving Linear A epigraphy). It is perhaps also important to remember that administrative writing was itself not a single, homogeneous tradition but rather a series of sets of practices as employed at different regional centres, certainly making use of the same graphic principles but with idiosyncrasies too. But even those who could not read and write may have been exposed to writing as a valued aspect of their visual experiences, and for Linear A it seems to be especially in religious practice that we can make a strong claim for this. Libation vessels, mostly found at sites closely associated with religious activity (including the major peak sanctuaries), clearly played some role in ritual and show a considerable degree of variation in the materials and manner of their manufacture, which is further suggestive of the participation of individuals coming from a range of social backgrounds. Other finds, such as the Knossos 'sceptre', also give the impression that writing played a role in religious performance, with perhaps both visual and oral components. Even non-literate people or people of limited literacy could play a role in a 'textual community' such as that envisaged for Minoan ritual, as has been argued powerfully by Stock for the medieval world, where wider groups would organise themselves around individuals who were able to interpret relevant texts.[274] Another 'venue' for social display, perhaps ironically, comes from tomb contexts, where valuable items with inscriptions could sometimes be interred with a deceased individual (particularly worn items of jewellery), and where again we can envisage the deposition or funerary ceremony as a participatory event involving a wider sector of the community and thus an audience for the written objects. We should not underestimate these factors of social visibility in their relevance to the vitality of a writing tradition, even though they may typically be discounted from or overlooked in discussions of social literacy.

The vitality of Linear A was also evidently high enough to withstand significant social and political changes as the ruling elites at Knossos widened their control over the island and at the same time sought to legitimate their power base with recourse to not only Cretan but also mainland values and traditions. This must be the point at

[274] See Stock 1983, 1996. See also Mandell 2023 on wider script communities in the ancient world.

which Greek became a language of choice for administration on the island, and we could perhaps recast the development of Linear B in terms of the creation of a new orthography for writing Greek in Linear A (see further Chapter 1: Exploring Script Adoption). The changes in writing at this juncture are more obvious in the logographic repertoire than the syllabographic repertoire, where considerable continuity is clear even though there will have been a minimal amount of creation of new signs and abandonment of old ones to suit the new target language (though to a far lesser extent than has often been suggested).[275] Given that logographic writing is very closely bound up with administrative practice (on which point, see further Chapter 2: Exploring Logography), this is perhaps unsurprising as administrative practices underwent some considerable changes. The loss of writing from wider spheres, particularly religious practice, perhaps followed in response to other changing social functions and ways of expressing and exercising power and control.

Linear B writing appears to have been restricted to administrative usage and to have had very low social visibility, with minimal evidence to suggest that it may have been meaningful to controlling elites (who may or may not have intersected with people involved in administration) and no evidence at all pointing towards any social value outside of this context. What Linear B shows us is that a writing tradition with a very limited outlook on literacy can nevertheless be both successful (it spread throughout the independent Late Bronze Age administrations of Crete and mainland Greece) and long lasting (attested for a good 200–250 years). However, the restrictions in its usage also led to its being vulnerable to loss because it was dependent on very specific contexts, in particular the centralised bureaucracies of the administrative centres, with their role in supporting and enabling the localisation of wealth and power by Mycenaean elites. Writing was therefore tied to these groups and their grasp on authority and resources, and when sudden and radical socio-economic changes shook the Mycenaean world around the end of the 13th and beginning of the 12th centuries BCE, the loss of their power bases led to a situation that Linear B writing could not survive.[276] This is strongly reminiscent of the fall of Ugarit and loss of its writing practices, an amalgamation of Ugaritic-alphabetic and Akkadian-syllabic cuneiform as used for various document types: the administrative systems where it was primarily used were lost suddenly, and the association of these writing practices with the former elite of the fallen city may have made them a 'tainted brand' in the following period.[277] We could see here an analogous situation to the tendency for social inequality to contribute to language endangerment and loss,[278] as the restriction of

[275] See Steele and Meißner 2017.

[276] Cf. Pope 1961–1962, 311.

[277] Boyes 2021a, 270–271 (quotation p. 270). He also notes (271, n. 23) that there may have been a significant emotional impact associated with the cultural loss that occurred at this time; see also Hitchcock 2013 on this wider theme, which has received only limited attention in archaeological scholarship.

[278] *E.g.* Philips 2004, 490: it tends to be the more valued modes or varieties that are allowed to contribute to 'the ongoing process of the creation of social realities that is characteristic of human communication'.

writing to people involved in resource control, and perhaps the elite circles associated with it, is fundamentally an issue of inequality in the Mycenaean world. Unlike the situation for Linear A, there was no visibility for Linear B writing in wider communal religious practice, and everything points towards the majority of Mycenaean society's membership being cut off from any access to writing traditions.

Epilogue: writing for the future

I began this chapter by contextualising the problem of 'vitality' through the lens of modern social and cultural concerns. I want to finish both the chapter and the book by asking whether this kind of research on the ancient world, and these case studies focusing on the Bronze Age Aegean in particular, could have the power to do some good in the world. Do they teach us anything that could be useful for modern efforts to maintain languages and writing traditions under threat? I hope that we can offer a tentative 'yes' to this question – although this study is obviously limited, and further research on historical writing traditions across the world is needed to explore the issues further and to confirm, refute or build on the conclusions presented here.

Some of the observations that come out of the discussion in this chapter will not seem like anything new. No great leap of the imagination is needed to confirm that the vitality of a writing tradition relies on factors such as the spread of literacy, the circles in which writing is controlled and passed on, the available resources and the extent of official or administrative support. But other insights may be more valuable. What writing is used for (or the 'domains' of writing) is very important to its survival and depends largely on cultural attitudes. Those attitudes both reflect and are affected by the degree of social visibility that a writing tradition has. If the Aegean scripts teach us anything it is that writing *can* survive long-term even in quite closed contexts, but it requires stability – or in the absence of stability, it requires some resilience to changing circumstances. Linear B was self-sustaining for a long time within the closed networks of elite administrative practice, but drastic social changes meant that its restriction was ultimately its downfall as it was not ready to be adapted for use outside of the administrative centres. Cyprus tells a different story, where a much more generous outlook on what writing was good for, and an ever closer relationship between a distinctive writing system and visibly Cypriot identity, seem to have helped it to survive processes of change and to develop new domains of use. But even with widespread and varied literacy and other advantages, syllabic writing on Cyprus nevertheless eventually succumbed to changing attitudes both within and outside of its user communities. Another factor of interest is that the supposed suitability (or lack of suitability) of these writing systems to the represented languages does not seem to have played any significant role in their vitality: especially in the cases of Mycenaean and Cypriot Greek, where we can best judge the degree of phonological representation, these systems continued on with underrepresented consonant phonemes and syllabification problems throughout their not insignificant existence.

How can such observations be translated into practical measures that might help in efforts to develop or maintain writing traditions associated with endangered, minority and/or indigenous languages? Efforts to preserve languages often see literacy as a crucial weapon in the arsenal, but it is not the case that creating or trying to proliferate a writing system for the language will automatically ensure that it is passed on to new generations through education, nor that the whole community will be invested in using it. Community investment requires that members of the community place value on the concept and that they have the resources necessary to participate in it. That means more than simply developing a system or orthography and providing a typeface. It means discussing what writing is for, how it will be done, who will take responsibility for it and what advantages it may offer to the community. In this context I would like, tentatively, to suggest the following steps be incorporated into language and writing tradition preservation:

1. That communities are involved in the creation or design of a new writing system (where relevant), based on their needs and views rather than a linguistic template aimed at achieving a high level of phonological representation. Progress has already been made in this area in a number of recent efforts
2. That the development of educational materials is also based on the way they will be used and provides a spectrum of writing-related activities (whether aimed at children, adults or both)
3. That communities are encouraged to consider the ways their writing system is used and what it is useful for, and to develop norms and expectations as well as ambitions for expanding into new domains of use where desired
4. That social visibility is high on the agenda, for instance what kind of exposure community members have day to day or presence in everyday visible landscapes
5. That typographic resources go beyond the basics of character mapping and Unicode encoding to provide multiple typefaces and the ability to alter the visual appearance of text
6. That maintenance efforts remain sensitive to community views, in order to ensure continued investment in the writing traditions as they develop (which also includes respecting decisions to maintain older traditions or to develop new ones as desired)

These are just a few starting thoughts, but I hope that they may raise some fruitful new discussion of the ways we might strategise when thinking about ensuring that a writing tradition has the vitality and resilience to support the maintenance of a given language.

So in the end I hope that we can see more in an exploration of the vitality of early writing systems than a series of historical 'facts' about why and how ancient writing traditions died out: the why and the how are important because they are potentially applicable to other situations in other periods, including the present day. One positive step is that this discussion has led me to set up a new venture, the Endangered Writing Network, intended to bring together a wide spectrum of people with

interests in language and writing, including linguists, epigraphists, anthropologists, archaeologists, language activists, typographers and affected community members themselves; to raise awareness of modern-day threatened writing traditions and languages; to create fora for further discussion of the issues raised here and the sharing of relevant information and research; and to develop opportunities for collaboration and action.[279] I hope that further research and discussion will help us to build on some foundations laid in this book.

[279] The Endangered Writing Network is currently being developed as part of the VIEWS project and will, I hope, continue beyond that. For further information, visit the Endangered Writing Network webpage: https://viewsproject.wordpress.com/endangered-writing-network/

Bibliography

Abell, N. (2016) 'Minoanisation in the Middle Bronze Age: Evaluating the role of Cycladic producers and consumers', *Annual of the British School at Athens* 111, 71–93.

Adams, E. (2004) 'Power and ritual in Neopalatial Crete: A regional comparison', *World Archaeology* 36.1, 26–42.

Adams, J.N. (2007) *The Regional Diversification of Latin, 200 BC–AD 600*, Cambridge.

Adrimi-Sismani, V. and Godart, L. (2005) 'Les inscriptions en linéaire B de Dimini/Iolkos et leur context archéologique', *Annuario della Scuola archeologica di Atene e delle missioni italiane in Oriente* 83, 47–70.

Amadasi, M.G. (2017) 'The Idalion Archive: 2 The Phoenician inscriptions' in Papademetriou, N. and Tole, M. (eds) *ΑΡΧΑΙΑ ΚΥΠΡΟΣ Πρόσφατες εξελίξεις στην αρχαιολογία της ανατολικής Μεσογείου,* Athens, 274–284.

Amadasi, M.G. and Zamora López, J.A. (2020) 'Pratiques administratives phéniciennes à Idalion', *Cahiers du Centre d'Études Chypriotes* 50, 137–155.

Anastasiadou, M. (2016) 'Drawing the line: Seals, script, and regionalism in Protopalatial Crete', *American Journal of Archaeology* 120.2, 159–193.

Andreadaki-Vlasaki, M. and Hallager, E. (2007) 'New and unpublished Linear A and Linear B inscriptions from Khania' in Hallager, E. and Jensen, J.T. (eds) *Proceedings of the Danish Institute at Athens V*, Athens, 7–22.

Aravantinos, V. and Vasilogamvrou, A. (2012) 'The first Linear B documents from Ayios Vasileios (Laconia)' in Carlier, P., De Lamberterie, C., Egetmeyer, M., Guilleux, N., Rougemont, F. and Zurbach, J. (eds) *Études mycéniennes 2010 : Actes du XIIIe colloque international sur les textes égéens*, Pisa-Rome, 41–54.

Baines, J. (1983) 'Literacy and Ancient Egyptian Society', *Man* n.s. 18.3, 572–599.

Baines, J. (2007) *Visual and Written Culture in Ancient Egypt*, Oxford.

Baumbach, L. (1992) 'The people of Knossos: Further thoughts on the personal names' in Olivier, J.-P. (ed.) *Mykenaïka*, Paris, 57–63.

Beckman, G. (2016) 'Ahhijawa und kein Ende: The Battle over Mycenaeans in Anatolia' in Byrd, A.M., DeLisi, J. and Wenthe, M. (eds) *Tavet Tat Satyam: Studies in Honor of Jared S. Klein*, Ann Arbor, 1–12.

Beckman, G., Bryce, T. and Cline, E. (2011) *The Ahhiyawa Texts*, Atlanta.

Bendall, L. (2004) 'Fit for a King? Hierarchy, exclusion, aspiration and desire in the social structure of Mycenaean banqueting' in Halstead, P. and Barrett, J.C. (eds) *Food, Cuisine and Society in Prehistoric Greece*, Oxford, 105–135.

Bennet, J. (1985) 'The structure of the Linear B administration at Knossos', *American Journal of Archaeology* 89, 231–249.

Bennet, J. (1990) 'Knossos in context: Comparative perspectives on the Linear B administration of LM II–III Crete', *American Journal of Archaeology* 94.2, 193–211.

Bennet, J. (2001) 'Agency and bureaucracy: Thoughts on the nature and extent of administration in Bronze Age Pylos' in Voutsaki, S. and Killen, J. (eds) *Economy and Politics in the Mycenaean Palace States*, Cambridge, 25–37.

Bennet, J. (2004) 'Iconographies of value: Words, people and things in the Late Bronze Age Aegean' in Barrett, J. and Halstead, P. (eds) *The Emergence of Civilisation Revisited*, Oxford, 90–106.

Bennet, J. (2005) 'Response to Erik Hallager' in D'Agata, A.-L., Moody, J. and Williams, E. (eds) *Ariadne's Threads: Connections Between Crete and the Greek Mainland in Late Minoan III (LM IIIA2 to LM IIIC)*, Athens, 267–272.

Bennet, J. (2007) 'Representations of power in Mycenaean Pylos: Script, orality, iconography' in Lang, F., Reinholdt, C. and Weilhartner, J. (eds) *ΣΤΕΦΑΝΟΣ ΑΡΙΣΤΕΙΟΣ. Archäologische Forschungen zwischen Nil und Istros. Festschrift für Stefan Hiller zum 65. Geburtstag*, Vienna, 11–22.

Bennet, J. (2008) 'Now you see it; now you don't! The disappearance of the Linear A script on Crete' in Baines, J., Bennet, J. and Houston, S. (eds) *The Disappearance of Writing Systems: Perspectives on Literacy and Communication*, London, 1–29.

Bennet, J. (2011) 'The geography of the Mycenaean kingdoms' in Duhoux Y. and Morpurgo Davies A. (eds) *A Companion to Linear B: Mycenaean Greek Texts and Their World*, vol. 2, Louvain-la-Neuve, 137–168.

Bennet, J. (2017) 'Gelb and Gell in the Aegean: Thoughts on the relations between "writing" and "art"' in Knodell, A.R. (ed.) *Regional Approaches to Society and Complexity*, Sheffield, 59–74.

Bennett, E.L. (1963) 'Names for Linear B writing and for its signs', *Kadmos* 2.2, 98–123.

Bennett, E.L. (1972) 'Linear B sematographic signs' in Ruipérez, M.S. (ed.) *Acta Mycenaea,* vol. 1, Salamanca, 55–72.

Betts, J.H. (1967) 'New light on Minoan bureaucracy: A re-examination of some Cretan sealings', *Kadmos* 6, 15–40.

Blakolmer, F. (2012) 'The missing "Barbarians": Some thoughts on ethnicity and identity in Aegean Bronze Age iconography', *Talanta* 44, 53–77.

Blegen, C.W. and Rawson, M. (1966) *The Palace of Nestor in Western Messenia*, vol. I, Princeton NJ.

Blommaert, J. (2004) 'Writing as a problem: African grassroots writing, economies of literacy, and globalization', *Language in Society* 33, 643–671.

Bowern, C. (2017) 'Language vitality: Theorizing language loss, shift, and reclamation (response to Mufwene)', *Language* 93.4, 243–253.

Bowman, A.K. and Woolf, G. (eds) (1994) *Literacy and Power in the Ancient World*, Cambridge.

Boyes, P.J. (2021a) *Script and Society: The Social Context of Writing Practices in Late Bronze Age Ugarit*, Oxford.

Boyes, P.J. (2021b) 'Towards a social archaeology of writing practices' in Boyes, P.J. and Steele, P.M. (eds) *Understanding Relations Between Scripts II: Early Alphabets*, Oxford, 19–36.

Boyes, P.J. (2022) 'Writing and social diversity in Late Bronze Age Ugarit', *Papers from the Institute of Archaeology* 33, 1–25.

Boyes, P.J. (2023) 'The wider world of writing: Networks of people, practice and culture underpinning writing in Late Bronze Age Ugarit', *Cambridge Archaeological Journal* 33.2, 181–192.

Boyes, P.J. and Steele, P.M. (2019) 'Introduction: Issues in studying early alphabets' in Boyes, P.J. and Steele, P.M. (eds) *Understanding Relations Between Scripts II: Early Alphabets*, Oxford, 1–18.

Boyes, P.J., Steele, P.M. and Elvira Astoreca, N. (2021) 'Introduction: Writing practices in socio-cultural context' in Boyes, P.J., Steele, P.M. and Elvira Astoreca, N. (eds) *The Social and Cultural Contexts of Historic Writing Practices*, Oxford, 1–18.

Bradley, D. (2022) 'Language endangerment and reclamation' in Völkel, S. and Nassenstein, N. (eds) *Approaches to Language and Culture: Anthropological Linguistics*, vol. 1, Berlin-Boston, 53–76.

Bradley, D. and Bradley, M. (2019) *Language Endangerment*, Cambridge.

Branigan, K. (1988) *Social Security and the State in Middle Bronze Age Crete*, *Aegaeum* 2, Liège, 11–16.

Brixhe, C. (1988) 'Dialecte et Koiné à Kafizin' in Karageorghis, J. and Masson, O. (eds) *The History of the Greek language in Cyprus*, Nicosia, 167–180.

Brixhe, C. (1995) 'Continuité hellénique : le cas des nasales chypriotes' in *La langue, la littérature, l'histoire et la civilisation chypriotes*, Nancy, 36–52.

Brokaw, G. (2010) *A History of the Khipu*, Cambridge.

Cadogan, G. (2006) 'From Mycenaean to Minoan: An exercise in myth making' in Darcque, P., Fotiadis, M. and Polychronopoulou, O. (eds) *Mythos. La préhistoire égéenne du XIX eau XXI e siècle après J.-C.*, *Bulletin de Correspondence Hellénique,* supplement 46, Paris, 49–55.
Cahill, M. and Karan, E. (2008) *Factors in Designing Effective Orthographies for Unwritten Languages*, SIL Electronic Working Papers 2008-001, February 2008, 1–15.
Cameron, M.A.S. (1965) 'Four fragments of wall paintings with Linear A Inscriptions', *Kadmos* 4.1, 7–15.
Chadwick, J. (1959) 'Minoan Linear A: A provisional balance sheet', *Antiquity* 33, 269–278.
Chadwick, J. (1976a) *The Mycenaean World*, Cambridge.
Chadwick, J. (1976b) 'Who were the Dorians?', *Parola del Passato* 31, 103–117.
Chadwick, J. (1988) 'Differences and similarities between Cypriot and the other Greek dialects' in Karageorghis, J. and Masson, O. (eds) *The History of the Greek language in Cyprus: Proceedings of an International Symposium Sponsored by the Pierides Foundation, Larnaca, Cyprus, 8–13 September, 1986*, Nicosia, 55–66.
Chapouthier, F. (1938) 'Inscription hiéroglyphique minoenne gravée sur un bloc de calcaire', *Bulletin de Correspondence Hellénique* 62, 104–109.
Civitillo, M. (2012) 'Ethnicity and language: A view from Knossos personal names' in Carlier, P., De Lamberterie, C., Egetmeyer, M., Guilleux, N., Rougemont, F. and Zurbach, J. (eds) *Études mycéniennes 2010 : Actes du XIIIe colloque international sur les textes égéens*, Pisa-Rome, 177–194.
Civitillo, M. (2016a) 'La cosiddetta "formula di Archanes" nel contesto della glittica minoica pre- e proto-palaziale: Analisi comparata', *L'Incidenza dell'Antico. Dialoghi di Storia Greca* 14.2, 71–116.
Civitillo, M. (2016b) *La scrittura geroglifica minoica sui sigilli. Il messaggio della glittica protopalaziale*, *Biblioteca di Pasiphae* XII, Pisa-Rome.
Civitillo, M. (2021a) 'Discussing writing in Cretan Hieroglyphic script from an anthropological perspective', *Polygraphia* 3, 179–210.
Civitillo, M. (2021b) 'R.E.A.D.I.N.G. Cretan Hieroglyphic inscriptions on seals', *Pasiphae* 15, 83–108.
Civitillo, M. (2023) 'Orality and writing in Cretan Hieroglyphic script', *Pasiphae* 17, 95–110.
Civitillo, M. (forthcoming) 'Orality and writing in the so-called "Archanes script" seals'.
Cline, E. (2014) *1177 B.C.: The Year Civilization Collapsed*, Princeton NJ.
Cohen, C., Maran, J. and Vetters, M. (2010) 'an ivory rod with a Cuneiform inscription, most probably Ugaritic, from a final Palatial workshop in the Lower Citadel of Tiryns', *Archäologischer Anzeiger* 2, 1–22.
Colvin, S. (2011) 'The Koine: A new language for a new world' in Erskine, A. and Llewellyn-Jones, L. (eds) *Creating a Hellenistic World*, Swansea, 31–46.
Consani, C. (1986) *Persistenze dialettale e diffusione della KOINH a Cipro*, Pisa.
Consani, C. (2002) '"Double writings" in Minoan Linear A', *Collectanea Philologica* 4, 15–25.
Consani, C. (2003) *Sillabe e sillabari fra competenza fonologica e pratica scrittoria*, Alessandria.
Consani, C. (2015) 'Ritorno a Kafizin: Esiti del contatto fra lingue e scritture nella Cipro ellenistica' in Consani, C. (ed.) *Contatto interlinguistico fra presente e passato*, Milan, 133–148.
Consani, C. (2016) 'In search of the "perfect fit" between speech and writing: The case of the Linear B writing' in Cotticelli-Kurras, P. and Rizza, A. (eds) *Variation within and among Writing Systems: Concepts and Methods in the Analysis of Ancient Written Documents*, Wiesbaden, 89–104.
Consani, C. (2021) 'Sillaba e sillabazione nelle scritture sillabiche egee con particolare riferimento alla lineare A', *Studi e Saggi Linguistici* 59.1, 25–74.
Consani, C. (2022) 'Aspetti paleografici e strutturali delle scritture lineari A e B: Considerazioni a margine di una recente pubblicazione', *Pasiphae* 16, 65–80.
Corazza, M., Tamburini, F., Valério, M. and Ferrara, S. (2022) 'Unsupervised deep learning supports reclassification of Bronze Age Cypriot writing system', *PLoS ONE* 17.7, e0269544.
Crellin, R. (2022) *The Semantics of Word Division in Northwest Semitic Writing Systems: Ugaritic, Phoenician, Hebrew, Moabite and Greek*, Oxford.

Crellin, R. and Tamponi, L. (2020) 'Vowel quantity and quality in Neo-Punic and Latin inscriptions from Africa and Sardinia' in Hornkohl, A. and Khan, G. (eds) *Studies in Semitic Vocalisation and Reading Traditions*, Cambridge, 1–53.

Damrosch, D. (2007) 'Scriptworlds: Writing systems and the formation of world literature', *Modern Language Quarterly* 68.2, 195–219.

Daniels, P.T. and Bright, W. (1996) *The World's Writing Systems*, Oxford.

Davis, B. (2013) 'Syntax in Linear A: The word order of the libation formula', *Kadmos* 52.1, 35–52.

Davis, B. (2014) *Minoan Stone Vessels with Linear A Inscriptions*, *Aegaeum* 36, Leuven.

Davis, B. (forthcoming) 'Recent linguistics-based advances in the study of Linear A' in Salgarella, E. (ed.) *The Wor(l)ds of Linear A*.

Day, J. (2011) 'Counting threads: Saffron in Aegean Bronze Age writing and society', *Oxford Journal of Archaeology* 30.4, 369–391.

Decorte, R.P.-J.E. (2017) 'Cretan Hieroglyphic and the nature of script' in Steele, P.M. (ed.) *Understanding Relations Between Scripts: The Aegean Writing Systems*, Oxford, 33–56.

Decorte, R.P.-J.E. (2018a) 'The first "European" writing: Redefining the Archanes Script', *Oxford Journal of Archaeology* 37.4, 341–372.

Decorte, R.P.-J.E. (2018b) 'The origins of Bronze Age Aegean writing: Linear A, Cretan Hieroglyphic and a new proposed pathway of script formation' in Ferrara, S. and Valério, M. (eds) *Paths into Script Formation in the Ancient Mediterranean*, *Studi Micenei ed Egeo-Anatolici* n.s., supplement 1, Rome, 13–49.

Decorte, R.P.-J.E. (2018c) *The Origins of Writing and Its Relation to Art on Bronze Age Crete*, unpublished doctoral dissertation, University of Cambridge.

De Saussure, F. (1983 [1916]) *Course in General Linguistics* (edited by Bally, C. and Sechehaye, A., translated by Harris, R.), London.

Dillo, M. (2021) 'Do the Uluburun signs represent Mycenaean numerals?' in Bianconi, M. (ed.) *Culture and History of the Ancient Near East; Linguistic and Cultural Interactions Between Greece and Anatolia. In Search of the Golden Fleece*, Leiden, 221–224.

Dimopoulou, N., Olivier, J.-P. and Réthémiotakis, G. (1993) 'Une statuette en argile MR IIIA de Poros Irakliou avec inscription en linéaire A', *Bulletin de Correspondence Hellénique* 117, 501–521.

Donnelly, C. (2019) 'Repetition, sortition, and abbreviations in the Cypro-Minoan Script' in Beck, D. (ed.) *Repetition, Communication, and Meaning in the Ancient World*, Leiden-Boston, 93–118.

Donnelly, C. (2021) *Signs of Writing? Writing and Trade in the Late Bronze Age Eastern Mediterranean,* unpublished doctoral dissertation, University of Texas at Austin.

Donnelly, C. (2022) 'Cypro-Minoan and its potmarks and vessel inscriptions as challenges to Aegean Scripts corpora' in Steele, P.M. and Boyes, P.J. (eds) *Writing around the Ancient Mediterranean: Practices and Adaptations*, Oxford, 49–73.

Donnelly, C. (forthcoming) 'Cycladic Linear A and connections between scripts' in Salgarella, E. (ed.) *The Wor(l)ds of Linear A: An integrated approach to Linear A documents and script*.

Dow, S. (1954) 'Minoan writing', *American Journal of Archaeology* 58, 77–129.

Dreisbach, J.L. and Mendoza-Dreisbach, S. (2021) 'The integration of emergency language services in COVID-19 response: a call for the linguistic turn in public health', *Journal of Public Health* 43.2, e248–e249.

Driessen J. (1987) 'Observations on "simili-joins" in Room of the Chariot tablets at Knossos' in Killen J.T., Melena J.L. and Olivier J.-P. (eds) *Studies in Mycenaean and Classical Greek Presented to John Chadwick*, *Minos* 20.2, 151–162.

Driessen, J. (2000) *The Scribes of the Room of the Chariot Tablets at Knossos: Interdisciplinary Approach to the Study of a Linear B Deposit*, *Suplementos a Minos* 15, Salamanca.

Driessen, J. (2001) 'Centre and periphery: Some observations on the administration of the Kingdom of Knossos' in Voutsaki, S. and Killen, J. (eds) *Economy and Politics in the Mycenaean Palace States*, Cambridge, 96–112.

Driessen, J. and Mouthuy, O. (2022) 'The LM II–IIIA2 Kingdom of Knossos as reflected by its Linear B archives' in D'Agata, A.L., Girella, L., Papadopoulou, E. and Aquini, D.G. (eds) *One State, Many Worlds: Crete in the Late Minoan II–IIIA2 Early Period*, *Studi Micenei ed Egeo-Anatolici* n.s., supplement 2, Rome, 71–84.

Driessen, J. and Schoep, I. (1995) 'The architect and the scribe: Political implications of architectural and administrative changes on MM II–LM IIIA Crete' in Laffineur, R. and Niemeier, W.-D. (eds) *Politeia, Society and State in the Aegean Bronze Age: Proceedings of the 5th International Aegean Conference, University of Heidelberg, Archäologisches Institut, 10–13 April, 1994*, *Aegaeum* 12, Liège, 649–664.

Duhoux, Y. (1982) *L'Étéocrétois : les textes – la langue*, Amsterdam.

Duhoux, Y. (1986) 'The teaching of orthography in Mycenaean Pylos', *Kadmos* 25.2, 147–154.

Duhoux, Y. (1989) 'Le linéaire A : problèmes de déchiffrement' in Duhoux, Y., Palaima, T.G. and Bennet, J. (eds) *Problems in Decipherment*, Louvain-la-Neuve, 80–90.

Duhoux, Y. (1992) 'Variations morphosyntaxiques dans les textes votifs linéaires A', *Cretan Studies* 3, 65–88.

Duhoux, Y. (2008) 'Mycenaean anthology' in 'Mycenaean writing', in Duhoux Y. and Morpurgo Davies A. (eds) *A Companion to Linear B. Mycenaean Greek Texts and Their World*, vol. 1, Louvain-la-Neuve, 243–393.

Duhoux, Y. (2011a) 'La fonction des vases à étrier inscrits en linéaire B', *Kadmos* 49, 47–92.

Duhoux, Y. (2011b) 'How were the Mycenaean scribes taught?' in Kyriakidis, E. (ed.) *Proceedings of the International Colloquium "The Inner Workings of the Mycenaean Bureaucracy", University of Kent, Canterbury, 19–21 September 2008*, *Pasiphae* 5, Pisa-Rome, 95–118.

Duhoux, Y. (2020) 'Minoan language or languages?' in Davis, B. and Laffineur, R. (eds) *ΝΕΩΤΕΡΟΣ: Studies in Bronze Age Aegean Art and Archaeology in Honor of Professor John G. Younger on the Occasion of His Retirement*, Aegaeum 44, Liège-Austin, 15–22.

Egetmeyer, M. (2010) *Le Dialecte grec ancien de Chypre. Tome I: Grammaire. Tome II: Répertoire des inscriptions en syllabaire chypro-grec*, Berlin.

Egetmeyer, M. (2013) 'From the Cypro-Minoan to the Cypro-Greek syllabaries: Linguistic remarks on the script reform' in P.M. Steele (ed.) *Syllabic Writing on Cyprus and Its Context*, Cambridge, 107–131.

Egetmeyer, M. (2022) 'Woher kam der Mann von Ahhiya?', *Kadmos* 61, 1–36.

Elvira Astoreca, N. (2021) *Early Greek Alphabetic Writing: A Linguistic Approach*, Oxford.

Evans, A.J. (1909) *Scripta Minoa: The Written Documents of Minoan Crete with Special Reference to the Archives of Knossos*, vol. I, Oxford.

Evans, A.J. (1921) *The Palace of Minos: A Comparative Account of the Successive Stages of the Early Cretan Civilization as Illustrated by the Discoveries at Knossos*, vol. 1, London.

Faegersten, F. (2003) *The Egyptianizing, Male, Limestone Statuary from Cyprus – A Study of a Cross-cultural, Eastern Mediterranean Votive Type*, Lund.

Fee, M. (1997) 'Writing orality: Interpreting literature in English by aboriginal writers in North America, Australia and New Zealand', *Journal of Intercultural Studies* 18.1, 23–29.

Ferioli, P. and Fiandra, E. (1996) 'The continuance of more ancient bureaucratic-administrative criteria in the age of writing' in Ferioli, P., Fiandra, E. and Fissore, G.G. (eds) *Administration in Ancient Societies*, Turin, 87–97.

Ferrara, S. (2012–2013) *Cypro-Minoan Inscriptions, vol. 1: Analysis; vol. 2: Corpus*, Oxford.

Ferrara, S. (2015a) 'The beginnings of writing on Crete: Theory and context', *Annual of the British School at Athens* 110, 27–49.

Ferrara, S. (2015b) 'The royal and the layman? Possible onomastics on Late Bronze Age clay balls', *Studi Micenei ed Egeo-Anatolici* n.s. 1, 105–115.

Ferrara, S. (2016) 'Writing away: Mobility and versatility of scribes at the end of the Bronze Age', *Oxford Journal of Archaeology* 35.3, 227–245.

Ferrara, S. (2018) 'From icon to sign: Local iconography and the birth of the Cretan Hieroglyphic script', *Terrain* 70, http://journals.openedition.org/terrain/17225.

Ferrara, S. (2021) 'Icon, index, symbol: Language notation in the Cretan Hieroglyphic script' in Bennet, J. (ed.) *Representations: Material and Immaterial Modes of Communication in the Bronze Age Aegean*, Oxford, 211–240.

Ferrara, S. and Bell, C. (2016) 'Tracing copper in the Cypro-Minoan script', *Antiquity* 352, 1009–1021.

Ferrara, S. and Jasink, A.M. (2017) 'To have and to hold: Hieroglyphic seals as personal markers and objects of display' in Jasink, A.M., Weingarten, J. and Ferrara, S. (eds) *Non-scribal Communication Media in the Bronze Age Aegean and Surrounding Areas: The Semantics of A-literate and Proto-literate Media*, *Periploi* 9, Florence, 41–53.

Ferrara, S., Montecchi, B. and Valério, M. (2021) 'What is the "Archanes Formula"? Deconstructing and reconstructing the earliest attestation of writing in the Aegean', *Annual of the British School at Athens* 116, 43–62.

Ferrara, S., Montecchi, B. and Valério, M. (2022) 'The relationship between Cretan Hieroglyphic and Linear A: A palaeographic and structural approach', *Pasiphae* 16, 81–109.

Ferrara, S., Montecchi, B. and Valério, M. (2023) 'In search of lost signs: A new approach to the issue of writing and non-writing on Cretan Hieroglyphic seals', *Oxford Journal of Archaeology*, 1–24, https://onlinelibrary.wiley.com/doi/full/10.1111/ojoa.12265.

Ferrara, S. and Weingarten, J. (2022) 'Cretan Hieroglyphic seals and script: A view from the East', *Pasiphae* 16, 111–121.

Fiandra, E. (1994) 'La Cretula del vano 10 a Festòs e le sue implicazione nell' administarzione tra MM III e TM' in Rochetti, L. (ed.) *Sybrita: la valle di Amari fra bronzo e ferro*, *Incunabula Graeca* 96, 16–26.

Finkel, I.L. (2010) 'Strange byways in cuneiform writing' in de Voogt, A. and Finkel, I.L. (eds) *The Idea of Writing: Play and Complexity*, Leiden, 9–25.

Finlayson, S. (2021a) 'Redefining writing in the Bronze Age Aegean' in Bennet, J. (ed.) *Representations: Material and Immaterial Modes of Communication in the Bronze Age Aegean*, Oxford, 277–292.

Finlayson, S. (2021b) 'Writing and elite status in the Bronze Age Aegean' in Boyes, P.J., Steele, P.M. and Elvira Astoreca, N. (eds) *The Social and Cultural Contexts of Historic Writing Practices*, Oxford, 249–267.

Finlayson, S. (forthcoming a) 'Looking for readers in the Aegean Bronze Age' in Ferrara, S., Montecchi, B. and Valério, M. (eds) *Invention of Scripts and Their Beginnings*, Oxford.

Finlayson, S. (forthcoming b) 'Managing resources, sharing knowledge: Exploring theoretical models for contextualising pot-marks, masons' marks and other non-scribal communication practices' in Alberti, M.E. and Jasink, A.M. (eds) *Meaningful Practices: Non Scribal Communication in the Aegean and the Near East During the Bronze Age*, *Periploi* 12.

Firth, R.J. and Skelton, C. (2016) 'A study of the scribal hands of Knossos based on phylogenetics methods and find-place analysis: Parts I–III', *Minos* 39, 159–228.

Fischer, R. (2010) *Die Ahhijawa-Frage. Mit einer kommentierten Bibliographie*, *Dresdner Beiträge zur Hethitologie* 26, Wiesbaden.

Flouda, G. (2013) 'Materiality of Minoan writing: Modes of display and perception' in Piquette, K. and Whitehouse, R. (eds) *Writing as Material Practice: Substance, Surface and Medium*, London, 143–174.

Forrer, E. (1924) 'Vorhomerische Griechen in den Keilschrifttexten von Boghazköy', *MDOG* 63, 1–22.

Galanakis, Y. (2015) '"Islanders v. Mainlanders", "the Mycenae Wars", & other short stories' in Vogeikoff-Brogan, N., Florou, V. and Davis, J. (eds) *Carl W. Blegen: Personal and Archaeological Narratives*, Atlanta, 99–120.

Galanakis, Y. (2022) 'Neither Minoan nor Mycenaean: The burial record of Knossos and the materialisation of a new social order, 1600–1400' in D'Agata, A.L., Girella, L., Papadopoulou, E. and Aquini, D.G. (eds) *One State, Many Worlds: Crete in the Late Minoan II–IIIA2 Early Period*, *Studi Micenei ed Egeo-Anatolici* n.s., supplement 2, Rome, 139–178.

Galanakis, Y., Tsitsa, E. and Günkel-Maschek, U. (2017) 'The power of images: Re-examining the wall paintings from the Throne Room at Knossos', *Annual of the British School at Athens* 112, 47–98.
Gelb, I.J. (1969) *A Study of Writing*, revised edn (1st edn 1952), Chicago.
Gnanadesikan, A.E. (2012) 'Maldivian Thaana, Japanese kana, and the representation of moras in writing', *Writing Systems Research* 4, 91–102.
Gnanadesikan, A.E. (2021) 'S_1: The native script effect' in Haralambous, Y. (ed.) *Grapholinguistics in the 21st Century 2020. Proceedings, Grapholinguistics and Its Applications 4*, Brest, 103–123.
Godart, L. (1988) 'Autour des textes en linéaire B de Tirynthe. Ausgrabungen in Tiryns 1982/83', *Archäologischer Anzeiger* 1988, 245–252.
Godart, L. and Olivier, O. (1976–1985) *Recueil des inscriptions en Linéaire A*, *Études crétoises* 21, 5 vols, Athens.
Godart, L. and Sacconi, A. (2017) *Supplemento al Corpus delle iscrizioni vascolari in lineare B*, Pisa-Rome.
Goren, Y., Bunimovitz, S., Finkelstein, I. and Na'aman, N. (2003) 'The location of Alashiya: New evidence from petrographic investigation of Alashiyan tablets from El-Amarna and Ugarit', *American Journal of Archaeology* 107, 233–255.
Goren, Y. and Panagiotopoulos, D. (2009) 'The "Lords of the Rings": An analytical approach to the riddle of the "Knossian replica rings"', *Bulletin of the Institute of Classical Studies* 52, 257–258.
Grant, C. (2014) *Music Endangerment: How Language Maintenance Can Help*, New York.
Graziosi, B. and Haubold, J. (2010) *Homer: Iliad, Book VI, Cambridge Greek and Latin classics*, Cambridge.
Greco, A. (2023) 'Archivi centrali, archivi periferici e il ruolo dell'oralità nella trasmissione delle informazioni in epoca micenea', *Pasiphae* 17, 155–172.
Grumach, E. (1964) 'Studies in the structure of some ancient scripts III: The structure of the Cretan Hieroglyphic script', *Bulletin of the John Rylands Library Manchester* 46, 346–384.
Grumach, E. (1968) 'The Minoan libation formula – again', *Kadmos* 7, 7–26.
Guillaume-Pey, C. (2021) 'A script "good to drink": The invention of writing systems among the Sora and other tribes of India' in Boyes, P.J., Steele, P.M. and Elvira Astoreca, N. (eds) *The Social and Cultural Contexts of Historic Writing Practices*, Oxford, 159–184.
Hallager, E. (1987) 'The inscribed stirrup jars: Implications for Late Minoan IIIB Crete', *American Journal of Archaeology* 91.2, 171–190.
Hallager, E. (1996) *The Minoan Roundel and Other Sealed Documents in the Neopalatial Linear A Administration*, *Aegaeum* 14, Liège.
Hallager, E. (2000) 'The hanging nodules and their inscriptions' in Perna, M. (ed.) *Administrative Documents in the Aegean and Their Near Eastern Counterparts*, Turin, 251–260.
Hallager, E. (2005) 'The uniformity in seal use and sealing practice during the LH/LM III period' in D'Agata, A.L. and Moody, J. (eds) *Ariadne's Threads: Connections Between Crete and the Greek Mainland in Late Minoan III (LM IIIA2 to LM IIIC)*, Athens, 243–265.
Halstead, P. (1981) 'From determinism to uncertainty: Social storage and the rise of the Minoan palace' in Sheridan, A. and Bailey, G. (eds) *Economic Archaeology*, Oxford, 187–213.
Harris, W.V. (1989) *Ancient Literacy*, Cambridge MA.
Hatzaki, E. (2009) 'Structured deposition as ritual action at Knossos' in D'Agata, A.L. and Van de Moortel, A. (eds) *Archaeologies of Cult: Essays on Ritual and Cult in Crete in Honour of Geraldine C. Gesell*, *Hesperia,* supplement 42, Princeton NJ, 19–30.
Hawkins, J.D. (1986) 'Writing in Anatolia: Imported and indigenous systems', *World Archaeology* 17.3, 363–376.
Hawkins, J.D. (2008) 'The disappearance of writing systems: Hieroglyphic Luwian' in Baines, J., Bennet, J. and Houston, S. (eds) *The Disappearance of Writing Systems: Perspectives on Literacy and Communication*, London, 31–43.
Hermary, A. (1989) *Musée du Louvre. Catalogue des Antiquités de Chypre. Sculptures*, Paris.

Hermary, A. (2006) 'Un nouveau vase inscrit de Kafizin', *Cahiers du Centre d'Études Chypriotes* 36, 63–72.
Heubeck, A. (1982) 'L'origine della lineare B', *Studi Micenei ed Egeo-Anatolici* 23, 195–207.
Hirschfeld, N. (1992) 'Cypriot marks on Mycenaean pottery' in J.-P. Olivier (ed.) *Mykenaïka*, *Bulletin de Correspondence Hellénique,* supplement 25, Paris, 315–319.
Hirschfeld, N. (1999) *Potmarks of the Late Bronze Age Eastern Mediterranean*, unpublished doctoral dissertation, University of Texas at Austin.
Hirschfeld, N. (2014) 'Signs of writing? Red Lustrous wheelmade vases and Ashkelon amphorae' in Nakassis, D., Gulizio, J. and James, S.A. (eds) *Ke-ra-me-ja: Studies Presented to Cynthia W. Shelmerdine*, Philadelphia, 261–269.
Hitchcock, L.A. (2013) 'Destruction and identity: Trauma, migration, and performativity in the Late Bronze Age Mediterranean' in Driessen, J. (ed.) *Destruction: Archaeological, Philological and Historical Perspectives*, Leuven, 203–220.
Horrocks, G. (2010) *Greek: A History of the Language and Its Speakers*, London.
Houston, S. (2008) 'The small deaths of Maya writing' in Baines, J., Bennet, J. and Houston, S. (eds) *The Disappearance of Writing Systems: Perspectives on Literacy and Communication*, London, 231–252.
Houston, S., Baines, J. and Cooper, J.S. (2003) 'The last writing: Script obsolescence in Egypt, Mesopotamia, and Mesoamerica', *Comparative Studies in Society and History* 45, 430–479.
Houston, S. and Rojas, F. (2022) 'Sourcing novelty: On the "secondary invention" of writing', *Res* 77–78, 250–266.
Hudnall Stamm, B., Stamm, H.E., Hudnall, A.C. and Higson-Smith, C. (2003) 'Considering a theory of cultural trauma and loss', *Journal of Loss and Trauma* 9.1, 89–111.
Hull, K. (2017) 'When letters represent more than sounds: Ideology versus practicality in the development of a standard orthography for Ch'orti' Mayan' in Jones, M. and Mooney, D. (eds) (2017) *Creating Orthographies for Endangered Languages*, Cambridge, 142–154.
Hyland, S., Bennison, S. and Hyland, W.P. (2021) 'Khipus, khipu boards and sacred texts: Toward a philology of Andean knotted cords', *Latin American Research Review* 56.2, 400–416.
Hyland, S., Lee, C. and Aldave Palacios, R. (2021) 'Khipus to keep away the living dead', *Anthropology News*, October 22, https://www.anthropology-news.org/articles/khipus-to-keep-away-the-living-dead/
Iacovou, M. (2006) '"Greeks", "Phoenicians" and "Eteocypriots": Ethnic identities in the Cypriote kingdoms' in Chrysostomides, J. and Dendrinos, C. (eds) *'Sweet Land ...': Lectures on the History and Culture of Cyprus*, Camberley, 27–59.
Iacovou, M. (2013) 'The Cypriot syllabary as a royal signature: The political context of the syllabic script in the Iron Age' in Steele, P.M. (ed.) *Syllabic Writing on Cyprus and Its Context*, Cambridge, 133–152.
Iacovou, M. and Karnava, A. (2019) 'An administrative ostrakon from Kouklia-Hadjiabdoullah', *Cahiers du Centre d'Études Chypriotes* 49, 37–52.
Jackson, M.R., Kabwasa-Green, F. and Herranz, J. (2006) *Cultural Vitality in Communities: Interpretation and Indicators*, Washington DC.
Jackson, M.R. and Herranz, J. (2002) *Culture Counts in Communities: A Framework for Measurement*, Washington DC.
Janko, R. (2015) 'Amber inscribed in Linear B from Bernstorf in Bavaria: New Light on the Mycenaean Kingdom of Pylos', *Bavarian Studies in History and Culture*, https://www.bavarian-studies.org/2019/janko
Jasink, A.M. (2009) *Cretan Hieroglyphic Seals: A New Classification of Symbols and Ornamental/Filling Motifs*, *Biblioteca di Pasiphae* 13, Pisa-Rome.
Johnson, W.A. and Parker, H.N. (eds) (2011) *Ancient Literacies*, Oxford.
Jones, M. and Mooney, D. (eds) (2017) *Creating Orthographies for Endangered Languages*, Cambridge.
Joyce, T. (2011) 'The significance of the morphographic principle for the classification of writing systems', *Written Language & Literacy* 14.1, 58–81.

Judson, A.P. (2013) 'The Linear B inscribed stirrup jars', *Kadmos* 52.1, 69–110.
Judson, A.P. (2017a) 'The mystery of the Mycenaean "labyrinth": The value of Linear B pu_2 and related signs', *Studi Micenei ed Egeo-Anatolici* n.s. 3, 53–71.
Judson, A.P. (2017b) 'Processes of script adaptation and creation in Linear B: The evidence of the "extra" signs' in Steele, P.M. (ed.) *Understanding Relations Between Scripts: The Aegean Writing Systems*, Oxford, 111–126.
Judson, A.P. (2019) 'Orthographic variation as evidence for the development of the Linear B writing system', *Written Language and Literacy* 22.2, 179–197.
Judson, A.P. (2020a) 'Scribes as editors: Tracking changes in the Linear B documents', *American Journal of Archaeology* 124.4, 523–549.
Judson, A.P. (2020b) *The Undeciphered Signs of Linear B: Interpretation and Scribal Practices*, Cambridge.
Judson, A.P. (2022) 'Learning to spell in Linear B: Orthography and scribal training in Mycenaean Pylos', *Cambridge Classical Journal* 68, 133–163.
Judson, A.P. (2023) 'The tablet-makers of Pylos: An experimental investigation into the production of Linear B tablets', *Annual of the British School at Athens*, 1–24.
Judson, A.P., Bennet, J., Davis, J.L. and Stocker, S.R. (2019) 'Two new Linear B tablets and an enigmatic find from Bronze Age Pylos (Palace of Nestor)', *Kadmos* 58.1–2, 111–123.
Jung, R. and Kardamaki, E. (eds) (2022) *Synchronizing the Destructions of the Mycenaean Palaces*, *Mykenische Studien* 36, Vienna.
Kanta, A., Palaima, T.G. and Perna, M. (2022) 'A Hieroglyphic seal from the cult centre of the city of Knossos (KN S (4/4) 01)', *Kadmos* 61, 61–96.
Karageorghis, V. (2002) *Ancient Art from Cyprus in the Collection of George and Nefeli Giabra Pierides*, Athens.
Karnava, A. (2000) *The Cretan Hieroglyphic Script of the Second Millennium Before Our Times: Description, Analysis, Functions, and Decipherment Perspectives, unpublished doctoral dissertation*, Université Libre de Bruxelles.
Karnava, A. (2007) 'Tradition and innovation: The scripts in the Old Palatial period', *Bulletin of the Institute of Classical Studies* 50.1, 199–200.
Karnava, A. (2008) 'Written and stamped records in the Late Bronze Age Cyclades: The sea journeys of an administration' in Brodie, N.J., Doole, J., Gavalas, G. and Renfrew, C. (eds) *Horizons: A Colloquium on the Prehistory of the Cyclades*, Cambridge, 417–426.
Karnava, A. (2014) 'On sacred vocabulary and religious dedications: The Minoan "libation formula"' in Alram-Stern, E., Blakolmer, F.B., Deger-Jalkotzy, S., Laffineur, R. and Weilhartner, J. (eds) *Metaphysis: Ritual, Myth and Symbolism in the Aegean Bronze Age*, *Aegaeum* 39, Leuven-Liège, 345–355, pl. CVI–CVIII.
Karnava, A. (2015) 'In the land of Lilliput: Writing in the Bronze Age Aegean', *World Archaeology* 47.1, 137–157.
Karnava, A. (2018) *Seals, Sealings and Seal Impressions from Akrotiri in Thera*, *Corpus der minoischen und mykenischen Siegel* Beiheft 10, Heidelberg.
Karnava, A. (2021) '"Picture writing" and phoneticism after *Scripta Minoa* I' in Bennet, J. (ed.) *Representations: Material and Immaterial Modes of Communication in the Bronze Age Aegean*, Oxford, 241–258.
Karnava, A., Perna, M. and Egetmeyer, M. (2020) *Inscriptiones Cypri consilio et auctoritate Academiae Scientiarum Berolinensis et Brandenburgensis editae. Pars I: Inscriptiones Cypri Syllabicae. Fasciculus I: Inscriptiones Amathuntis Curii Marii*, Berlin-Boston.
Kelder, J.M. (2019) 'The Kingdom of Ahhiyawa: Facts, factoids and probabilities', *Studi Micenei ed Egeo-Anatolici* n.s. 4, 200–207.
Kelder, J.M. and Waal, W. (eds) (2019) *From 'LUGAL.GAL' to 'wanax': Kingship and Political Organisation in the Late Bronze Age Aegean*, Leiden.

Kelly, P. (2021) 'The Naasioi Otomaung alphabet of Bougainville: A preliminary sketch from afar' in Haralambous, Y. (ed.) *Grapholinguistics in the 21st Century 2020: Proceedings, Grapholinguistics and Its Applications 5*, Brest, 825–846.
Kettunen, H. and Helmke, C. (2014) *Introduction to Maya Hieroglyphs*, 14th edn, Bratislava.
Killen, J.T. (1962) 'The wool ideogram in Linear B texts', *Hermathena* 96, 38–72.
Killen, J.T. (1994) 'Thebes sealings, Knossos tablets, and Mycenaean state banquets', *Bulletin of the Institute of Classical Studies* 39, 67–84.
Knapp, A.B. (1985) 'Alašiya, Caphtor/Keftiu, and Eastern Mediterranean trade: Recent studies in Cypriote archaeology and history', *Journal of Field Archaeology* 12, 231–250.
Knapp, A.B. (2013) *The Archaeology of Cyprus: From Earliest Prehistory Through the Bronze Age*, Cambridge.
Kober, A.E. (1945) 'Evidence of inflection in the "Chariot" tablets from Knossos', *American Journal of Archaeology* 49.2, 143–151.
Kolb, A. *Literacy in Ancient Everyday Life*, Berlin-Boston.
Kretschmer, P. (1896) *Einleitung in die Geschichte der griechischen Sprache*, Göttingen.
Kretschmer, P. (1909) 'Zur Geschichte der griechischen Dialekte: I. Jonier und Achäer', *Glotta* 1, 9–34.
Krzyszkowska, O. (2005) *Aegean Seals: An Introduction*, *Bulletin of the Institute of Classical Studies,* supplement 85, London.
Kudrinski, M. and Yakubovich, I. (2016) 'Sumerograms and Akkadograms in Hittite: Ideograms, logograms, allograms, or heterograms?', *Altorientalische Forschungen* 43.1–2, 53–66.
Kyriakidis, E. (1996–1997) 'Some aspects of the rôle of scribes in Pylian palace administration', *Minos* 31–32, 201–229.
Lebessi, A., Muhly, P. and Olivier, J.-P. (1995) 'An inscription in the Hieroglyphic script from the Syme Sanctuary, Crete (Sy Hf 01)', *Kadmos* 34.1, 63–77.
Lee, N.H., Siew, C.S.Q. and Ng, N.H.N. (2022) 'The network nature of language endangerment hotspots', *Scientific Reports* 12, 10803.
Lee, N.H. and Van Way, J. (2018) 'The language endangerment index' in Campbell, L., Van Way, J. and Belew, A. (eds) *Cataloguing the World's Endangered Languages*, Oxford-New York, 66–78.
Lejeune, M. (1958) *Mémoires de philologie mycénienne*, Première série, Paris.
Lejeune, S. (2014b) 'Kafizin, portraits d'un nymphaion', *Cahiers du Centre d'Études Chypriotes* 39, 309–324.
Lejeune, S. (2014a) 'Le sanctuaire de Kafizin, nouvelles perspectives', *Bulletin de Correspondance Hellénique* 138.1, 245–327.
Lejeune, S. (2014b) 'La vaisselle cultuelle du sanctuaire de Kafizin', *Cahiers du Centre d'Études Chypriotes* 44, 365–372.
Li, D. (2006) 'Chinese as a Lingua Franca in Greater China', *Annual Review of Applied Linguistics* 26, 149–176.
Li, W. and Zhu, H. (2019) 'Tranßcripting: playful subversion with Chinese characters', *International Journal of Multilingualism* 16.2, 145–161.
Lomas, K. (2008) 'Script obsolescence in ancient Italy: From pre-Roman to Roman writing' in Baines, J., Bennet, J. and Houston, S. (eds) *The Disappearance of Writing Systems: Perspectives on Literacy and Communication*, London, 109–138.
Loughlin, E. (2004) 'The calf in Bronze Age Cretan art and society' in Santillo Frizell, B. (ed.) *PECUS: Man and Animal in Antiquity*, Rome, 183–189.
Luraghi, N. (2010) 'The local scripts from nature to culture', *Classical Antiquity* 29.1, 68–91.
Luraghi, N. (2021) 'Sounds, signs and boundaries: Perspectives on early Greek alphabetic writing' in Parker, R. and Steele, P.M. (eds) *The Early Greek Alphabets: Origin, Diffusion, Uses*, Oxford, 32–57.
Malafouris, L. (2004) 'The cognitive basis of material engagement: Where brain, body and culture conflate' in DeMarrais, E., Gosden, C. and Renfrew, C. (eds) *Rethinking Materiality: The Engagement of Mind with the Material World*, Cambridge MA, 53–61.

Malafouris, L. (2013) *How Things Shape the Mind: A Theory of Material Engagement*, Cambridge.
Mandell, A. (2023) 'Ancient literacy practices and script communities' in Duranti, A., George, R. and Conley Riner, R. (eds) *A New Companion to Linguistic Anthropology*, Hoboken NJ, 159–177.
Manning, S.W. (2010) 'Chronology and terminology' in Cline, E.H. (ed.) *The Oxford Handbook of the Bronze Age Aegean (ca. 3000–1000 BC)*, Oxford, 11–28.
Manning, S.W. and Bruce, M.J. (eds) (2009) *Tree-Rings, Kings, and Old World Archaeology and Environment: Papers Presented in Honor of Peter Ian Kuniholm*, Oxford-Oakville, CT.
Marazzi, M. (2009) 'Il corpus delle iscrizioni in Lineare B oggi: organizzazione e provenienze', *Pasiphae* 3, 121–154.
Marinatos, N. (1993) *Minoan Religion: Ritual, Image, and Symbol*, Columbia.
Masson, O. (1983) *Les inscriptions chypriotes syllabiques : receuil critique et commenté*, 2nd edn, Paris.
McDonald, K. (2019) 'Education and literacy in Ancient Italy: Evidence from the dedications to the Goddess Reitia', *Journal of Roman Studies* 109, 131–159.
McGowan, E. (2018) 'Cryptic Glyptic: Multivalency in Minoan Glyptic imagery' in Ameri, M., Costello, S., Jamison, G. and Scott, S. (eds) *Seals and Sealing in the Ancient World: Case Studies from the Near East, Egypt, the Aegean, and South Asia*, Cambridge, 368–386.
Meißner, T. (2007) 'Notes on Mycenaean spelling', *Cambridge Classical Journal* 53, 96–111.
Meißner, T. (2008) 'Notes on Mycenaean spelling' in Sacconi, A., Del Freo, M., Godart, L. and Negri, M. (eds) *Colloquium Romanum*, *Pasiphae* II, vol. 2, Pisa-Rome, 507–521.
Meißner, T. (2019) 'Greek or Minoan? Names and naming habits in the Aegean Bronze Age' in Parker, R. (ed.) *Changing Names: Tradition and Innovation in Ancient Greek Onomastics*, *Proceedings of the British Academy*, London, 21–46.
Meißner, T. (2023) 'Literacy in the Late Bronze Age Aegean: Some thoughts on the use of Linear A and Linear B', *Pasiphae* 17, 211–220.
Meißner, T. and Salgarella, E. (forthcoming) 'The relationship between Cretan Hieroglyphic and the other Cretan scripts' in Civitillo, M., Ferrara, S. and Meißner, T. (eds) *The Cretan Hieroglyphic Script in Context: Framing the Earliest Writing in Europe*.
Meißner, T. and Steele, P.M. (2017) 'Linear A and Linear B: Structural and contextual concerns' in Nosch, M.-L. and Landenius Enegren, H. (eds) *Aegean Scripts: Proceedings of the 14th Mycenological Colloquium 2–6 September, Copenhagen 2015*, *Incunabula Graeca* 105, vol. 1, Rome, 99–114.
Melena, J.L. (1983) 'Further thoughts on Mycenaean o-pa' in Heubeck, A. and Neumann, G. (eds) *Res Mycenaeae*, Göttingen, 258–286.
Melena, J.L. (2000–01) '24 joins and quasi-joins of fragments in the Linear B tablets from Pylos', *Minos* 35–36, 357–369.
Melena, J.L. (2014) 'Mycenaean writing' in Duhoux, Y. and Morpurgo Davies, A. (eds) *A Companion to Linear B: Mycenaean Greek Texts and Their World*, vol. 3, Louvain-la-Neuve, 1–187.
Meletis, D. (2020) *The Nature of Writing: A Theory of Grapholinguistics*, Brest.
Merrillees, R.S. (1987) *Alashia Revisited*, *Cahiers de la Revue Biblique 22*, Paris.
Merrillees, R.S. (2011) 'Alashiya: A scientific quest for its location' in Betancourt, P.P. and Ferrence, S.C. (eds) *Metallurgy: Undertanding How, Learning Why: Studies in Honor of James D. Muhly*, Philadelphia, 255–264.
Michaelidou-Nicolaou, I. (1993) 'Nouveaux documents pour le syllabaire chypriote', *Bulletin de Correspondence Hellénique* 117, 343–347.
Militello, P. (1991) 'Per una classificazione degli archivi nelmondo egeo', *Sileno* 17, 327–343.
Miller, J.S. (2022) 'Patterns and practices of sign-form variation: Selected Examples of the qjs logogram from the Fifth to Nineteenth Dynasties', *Zeitschrift für Ägyptische Sprache und Altertumskunde* 149.2, 213–227.
Mitford, T.B. (1953) 'The character of Ptolemaic rule in Cyprus', *Aegyptus* 33.1, 80–90.
Mitford, T.B. (1980) *The Nymphaeum of Kafizin: The Inscribed Pottery*, Berlin-New York.

Montecchi, B. (2017) 'The conceptualization of measuring and counting in the Bronze Age Aegean', *Annali dell'Istituto Italiano di Numismatica* 63, 9–34.

Montecchi, B. (2019) *Contare a Haghia Triada. Le tavolette in lineare A, i documenti sigillati e il sistema economico-amministrativo nel TM IB*, *Incunabula Graeca* 107, Rome.

Montecchi, B. (2020a) 'Counting, labelling and sealing: A fresh look at Linear A administrative practices' in Beck, J. (ed.) *Journée d'Études Égéennes*, Bern, 59–74.

Montecchi, B. (2020b) 'Distribution and functions of Minoan inscribed clay vessels and the consequences for the question of literacy in the Bronze Age Aegean', *Studi Micenei ed Egeo-Anatolici* n.s. 6, 49–66.

Montecchi, B. (2022) 'Rebus compositions in Linear A?', *Kadmos* 61.1–2, 97–106.

Morpurgo Davies, A. (1986) 'Forms of writing in the Ancient Mediterranean world' in Baumann, G. (ed.) *The Written Word: Literacy in Transmission*, Oxford, 51–77.

Morpurgo Davies, A. (1992) 'Mycenaean, Arcadian, Cyprian and some questions of methodology in dialectology' in Olivier, J.-P. (ed.) *Mykenaïka*, *Bulletin de Correspondence Hellénique,* supplement 25, Paris, 415–432.

Mufwene, S.S. (2017) 'Language vitality: The weak theoretical underpinnings of what can be an exciting research area', *Language* 93.4, 202–223.

Muhly, J.D. (1972) 'The land of Alašiya: References to Alašiya in the texts of the second millennium B.C., and the history of Cyprus in the Late Bronze Age' in Karageorghis, V. (ed.) *Acts of the First International Cyprological Congress*, Lefkosia, 201–219.

Mullen, A. (2021) 'Socio-literacy: An interdisciplinary approach to understanding literacy in the Roman North-West' in Ramírez, M. and Moncunill, N. (eds) *Aprender la escritura, olvidar la escritura*, Vitoria, 357–380.

Nagy, G. (1968) 'On dialectal anomalies in the Pylian texts' in *Atti e memorie del 1° Congresso Internazionale di Micenologia (Roma, 27 IX – 3 X, 1967)*, Rome, 663–679.

Nagy, G. (1983) 'Sema and Noesis: Some illustrations', *Arethusa* 16, 35–55.

Nagy, G. (2020) 'A Minoan-Mycenaean scribal legacy for converting rough copies into fair copies', *Classical Inquiries*, https://dash.harvard.edu/handle/1/42179628.

Nakassis, D. (2010) 'Reevaluating staple and wealth finance at Mycenaean Pylos' in Pullen, D.J. (ed.) *Political Economies of the Aegean Bronze Age*, Oxford, 127–148.

Nash, T. (2021) 'Cultures of writing: Rethinking the "spread" and "development" of writing systems in the Bronze Age Mediterranean' in Boyes, P.J., Steele, P.M. and Elvira Astoreca, N. (eds) *The Social and Cultural Contexts of Historic Writing Practices*, Oxford, 209–229.

Neef, M. (2012) 'Graphematics as part of a modular theory of phonographic writing systems', *Writing Systems Research* 4.2, 214–228.

Neef, M. (2015) 'Writing systems as modular objects: Proposals for theory design in grapholinguistics', *Open Linguistics* 1, 708–721.

Neumann, G. (1962) 'Nikuleon', *Glotta* 40, 51–54.

Neumann, G. (1977) 'Das Zeichen VINUM in den ägäischen Schriften', *Kadmos* 16, 124–130.

Noegel, S.B. (2021) *'Wordplay' in Ancient Near Eastern Texts*, Atlanta.

Nosch, M.-L.B. (2007) *The Knossos Od Series: An Epigraphical Study*, *Mykenische Studien* 20, Vienna.

Nosch, M.-L.B. (2016) 'What's in a name? What's in a sign? Writing wool, scripting shirts, lettering linen, wording wool, phrasing pants, typing tunics' in Flemestad, P., Weilgaard Christensen, L. and Lervad, S. (eds) *Verbal and Nonverbal Representation in Terminology: Proceedings of the TOTh Workshop 2013, Copenhagen – 8 November 2013*, Copenhagen, 93–115.

Nosch, M.-L.B. (2022) 'Observations on the Linear B sign a2- in the various chronological phases of the Knossos and the mainland archives' in Méndez Dosuna, J., Palaima, T.G. and Varias García, C. (eds) *TA-U-RO-QO-RO: Studies in Mycenaean Texts, Language and Culture in Honor of José Luis Melena Jiménez*, Cambridge MA, 141–171.

Nosch, M.-L.B. and Ulanowska, A. (2021) 'The materiality of the Cretan Hieroglyphic script: Textile production-related referents to hieroglyphic signs on seals and sealings from Middle Bronze Age Crete' in Boyes, P.J., Steele, P.M. and Elvira Astoreca, N. (eds) *The Social and Cultural Contexts of Historic Writing Practices*, Oxford, 73–100.

Nosch, M.-L.B. and Weilhartner, J. (forthcoming) 'The common thread: Textiles and wool logograms in Linear A' in Salgarella, E. (ed.) *The Wor(l)ds of Linear A*.

Ohnefalsch-Richter, M. (1893) *Kypros, die Babel und Homer*, Berlin.

Olivier, J.-P. (1975) '"Lire" le linéaire A?' in Bingen, J., Cambier, G. and Nachtergael, G. (eds), *Le monde grec : pensée, littérature, histoire, documents : hommages à Claire Préaux*, Brussels, 441–449.

Olivier, J.-P. (1989) 'The Possible Methods in Deciphering the Pictographic Cretan Script' in Duhoux, Y., Palaima, T.G. and Bennet, J. (eds) *Problems in Decipherment*, Louvain-la-Neuve, 39–58.

Olivier, J.-P. (1990) 'The Relation between Inscriptions on Hieroglyphic Seals and Those Written on Archival Documents' in Palaima, T.G. (ed.) *Aegean Seals, Sealing and Administration*, *Aegaeum* 5, Liège-Austin, 11–24.

Olivier, J.-P. (2007) *Edition holistique des textes chypro-minoens*, Pisa-Rome.

Olivier, J.-P. and Godart, L. (1996) *Corpus Hieroglyphicarum Inscriptionum Cretae*, *Études Crétoises* 31, Paris.

Olivier, J.-P., Melena, J.L. and Piteros, C. (1990) 'Les inscriptions en linéaire B des nodules de Thèbes (1982): La fouille, les documents, les possibilités d'interprétation', *Bulletin de Correspondence Hellénique* 114.1, 101–184.

Overmann, K.A. (2021) 'A cognitive archaeology of writing: Concepts, models, goals' in Boyes, P.J., Steele, P.M. and Elvira Astoreca, N. (eds) *The Social and Cultural Contexts of Historic Writing Practices*, Oxford, 55–72.

Overmann, K.A. (2023) *The Materiality of Numbers: Emergence and Elaboration from Prehistory to Present*, Cambridge.

Packard, D.W. (1974) *Minoan Linear A*, Berkeley-Los Angeles-London.

Palaima, T.G. (1981) 'On the painted Linear sign from a wall at Knossos', *Kadmos* 20, 79–82.

Palaima, T.G. (1987a) 'Comments on Mycenaean literacy' in Killen, J., Melena, J. and Olivier, J.-P. (eds) *Studies in Mycenaean and Classical Greek Presented to John Chadwick*, Salamanca, 499–510.

Palaima, T.G. (1987b) Mycenaean seals and sealings in their economic and administrative contexts, in Ilievski, P. and Crepajac, L. (eds) *Tractata Mycenaea: Proceedings of the Eighth International Colloquium on Mycenaean Studies*, Skopje, 249–266.

Palaima, T.G. (1988a) 'The development of the Mycenaean writing system' in Olivier, J.-P. and Palaima, T.G. (eds) *Texts, Tablets and Scribes: Studies in Mycenaean Epigraphy and Economy in Honor of Emmett L. Bennett, Jr.*, Salamanca, 269–342.

Palaima, T.G. (1988b) *The Scribes of Pylos*, Rome.

Palaima, T.G. (1989) 'Perspectives on the Pylos Oxen Tablets: Textual (and archaeological) evidence for the use and management of oxen in Late Bronze-Age Messenia (and Crete)' in Palaima, T.G., Shelmerdine, C.W. and Ilievski, P. (eds) *Studia Mycenaea 1988*, *Živa Antika* 7, Skopje, 85–124.

Palaima, T.G. (1990) 'Origin, development, transition and transformation: The purposes and techniques of administration in Minoan and Mycenaean society' in Palaima, T.G. (ed.) *Aegean Seals, Sealings, and Administration*, *Aegaeum* 5, Liège-Austin, 83–104.

Palaima, T.G. (1992) 'Mycenaean scribal aesthetics' in Laffineur, R. and Crowley, J.L. (eds) *EIKON Aegean Bronze Age Iconography: Shaping a Methodology*, *Aegaeum* 8, Liège, 63–74.

Palaima, T.G. (2000) 'The palaeography of Mycenaean inscribed sealings from Thebes and Pylos: Their place within the Mycenaean administrative system and their links with the extra-palatial sphere' in Pini, I. and Müller, W. (eds) *Minoisch-mykenische Glyptik: Stil, Ikonographie, Funktion. V. internationales Siegel-Symposium. Corpus der minoischen Siegel*, Beiheft 6, Berlin, 219–238.

Palaima, T.G. (2002–2003) 'OL Zh 1: Quousque tandem?', *Minos* 37–38, 373–385.

Palaima, T. G. (2003) '"Archives" and "Scribes" and information hierarchy in Mycenaean Greek Linear B records' in Brosius, M. (ed.) *Ancient Archives and Archival Traditions: Concepts of Record-Keeping in the Ancient World*, Oxford, 153–194.

Palaima, T.G. (2004) 'Syntax and context as tools for interpreting Mycenaean texts and scribal processes: Un 718, Ta 709 and K(1) 740' in Krisch, T., Lindner, T. and Müller, U. (eds) *Analecta Homini Universali Dicata = Festschrift Oswald Panagl*, *Stuttgarter Arbeiten zur Germanistik* 421, 268–278.

Palaima, T.G. (2005) 'Mycenaean ideograms and how they are used' in Perna, M. (ed.) *Studi in Onore di Enrica Fiandra: Contributi di archeologia egea e vicinorientale*, Paris, 267–283.

Palaima, T.G. (2011) 'Scribes, scribal hands and palaeography' in Duhoux, Y. and Morpurgo Davies, A. (eds) *A Companion to Linear B: Mycenaean Greek Texts and Their World*, vol. II, Louvain-la-Neuve, 33–136.

Palaima, T.G. and Sikkenga, E. (1999) 'Linear A > Linear B' in Betancourt, P.P., Karageorghis, V. and Laffineur, R. (eds) *Meletemata: Studies in Aegean Archaeology Presented to Malcolm H. Wiener as He Enters His 65th Year*, *Aegaeum* 20, vol. 2, Liège-Austin, 599–608.

Palmer, R. (1995) 'Linear A commodities: A comparison of resources' in Laffineur, R. and Niemeier, W.-D. (eds), *Politeia*, *Aegaeum* 12, Liège, 133–154.

Palmer, R. (2008) 'Wheat and barley in Mycenaean society 15 years later', *Pasiphae* 2, 621–639.

Papadimitriou, N. (2008) 'Both centre and periphery? Thessaly in the Mycenaean period' in Glegle, L. (ed.) *1st International Congress on the History and Culture of Thessaly, Congress Proceedings, Larissa, 9–11 November 2006*, vol. 1, Thessaloniki, 99–113.

Papapavlou, A.N. and Pavlou, P. (1998) 'A review of the sociolinguistic aspects of the Greek Cypriot dialect', *Journal of Multilingual and Multicultural Development* 19.3, 212–220.

Papasavvas, G. (2003) 'Writing on Cyprus: Some silent witnesses', *Report of the Department of Antiquities, Cyprus,* 2003, 79–94.

Payne, A.D. (2015) *Schrift und Schriftlichkeit. Die anatolische Hieroglyphenschrift*, Wiesbaden.

Payne, A.D. (2016) 'The hieroglyphic sign $EGO_{(2)}$' in Velhartická, Š. (ed.) *Audias fabulas veteres: Anatolian Studies in Honor of Jana Součková-Siegelová*, *Culture & History of the Ancient Near East,* vol. 79, Leiden-Boston, 282–295.

Payne, A.D. (2018) 'Determination in the Anatolian Hieroglyphic script: The late 10th and early 9th centuries BC', *Altorientalische Forschungen*, 45.1, 102–121.

Payne, A.D. (2017) 'Determination in the Anatolian Hieroglyphic script', *News from the Land of the Hittites*, 1, 101–112.

Payton, R. (1991) 'The Ulu Burun writing-board Set', *Anatolian Studies* 41, 99–106.

Peltenburg, E. (2012) 'Text meets material in Late Bronze Age Cyprus' in Georgiou, A. (ed.) *Cyprus: An Island Culture. Society and Social Relations from the Bronze Age to the Venetian Period*, Oxford, 1–23.

Perna, M. (2007) 'Homer and the "folded wooden tablets"' in Morris, S.P. and Laffineur, R. (eds) *EPOS, Proceedings of the 11th International Aegean Conference, Los Angeles, 20–23 April 2006*, *Aegaeum* 28, Liège, 225–229, pl. LVIII.

Perna, M. (2014) 'The birth of administration and writing in Minoan Crete: Some thoughts on hieroglyphics and Linear A' in Nakassis, D., Gulizio, J. and James, S.A. (eds) *KE-RA-ME-JA: Studies Presented to Cynthia W. Shelmerdine*, Philadelphia, 251–259.

Pestarino, B. (2022) *Kypriōn Politeia, the Political and Administrative Systems of the Classical Cypriot City-Kingdoms*, *Mnemosyne,* supplement 459, Leiden-Boston.

Petrakis, V. (2012) 'Reverse phonetisation? From syllabogram to sematogram in Aegean scripts' in Carlier, P., De Lamberterie, C., Egetmeyer, M., Guilleux, N., Rougemont, F. and Zurbach, J. (eds) *Études mycéniennes 2010. Actes du XIIIe colloque international sur les textes égéens. Sèvres, Paris, Nanterre, 20–23 septembre 2010*, Pisa-Rome, 523–536.

Petrakis, V. (2014) 'A tale of system reform: The genesis of the Third Palace Period Aegean literate administrations', The Mycenaean Seminar 2012–13, *Bulletin of the Institute of Classics Studies* 57.1, 129–130.

Petrakis, V. (2017a) 'Figures of speech? Observations on the non-phonographic component in the Linear B writing system' in Nosch, M.-L. and Landenius Enegren, H. (eds) *Aegean Scripts: Proceedings of the 14th International Colloquium on Mycenaean Studies Copenhagen, 2–5 September 2015*, Rome, 127–167.

Petrakis, V. (2017b) 'Reconstructing the matrix of the "Mycenaean" literate administrations' in Steele, P.M. (ed.) *Understanding Relations Between Scripts: The Aegean Writing Systems*, Oxford, 69–92.

Philips, S.U. (2004) 'Language and social inequality' in Duranti, A. (ed.) *A Companion to Linguistic Anthropology*, Malden MA, 474–495.

Pierini, R. (2014) 'Ricerche sul segno 25 del sillabario miceneo' in Bernabé, A. and Luján, E.R. (eds) *Donum Mycenologicum: Mycenaean Studies in Honour of Francisco Aura Jorro*, *Bibliothèque des Cahiers de l'Institut de Linguistique de Louvain 131*, Leuven, 105–137.

Pini, I. (2002) 'Einleitung', in Gill, M.A.V., Müller, W. and Pini, I. *Corpus der Minoischen und Mykenischen Siegel II.8.1. Iraklion, Archäologisches Museum. Die Siegelabdrücke von Knossos*, Mainz, 1–23.

Piquette, K.E. (2021) '"Reading" through the body in early Egypt: Meaning as mediated and modified' in Gnanadesikan, A.E. and Judson, A.P. (eds) *Diversity in Writing Systems: Embracing Multiple Perspectives*, *Written Language and Literacy* 24.2, 229–258.

Piteros, C., Olivier, J.-P. and Melena, J.L. (1990) 'Les inscriptions en linéaire B des nodules de Thèbes (1982)', *Bulletin de Correspondence Hellénique* 114, 103–184.

Pluta, K. (2011) *Aegean Bronze Age Literacy and Its Consequences*, unpublished doctoral dissertation, University of Texas at Austin.

Polig, M. (2022) *3D Approaches to Cypro-Minoan Writing: Advanced 3D Methods of Documentation, Visualization and Analysis*, unpublished doctoral dissertation, University of Ghent-Cyprus Institute, Nicosia.

Pope, M. (1960) 'The cretulae and the Linear A accounting system', *Annual of the British School at Athens* 55, 200–210.

Pope, M. (1961–1962) 'The date of Linear B', *Κρητικά Χρονικά. Πεπραγμένα του Α' Κρητολογικού Διεθνούς Συνεδρίου/Proceedings of the First International Cretological Congress, Heraklion 1962*, vol. 1, Heraklion, 310–319.

Poursat, J.-C. (2000) 'Les sceaux hiéroglyphiques dans l'administration minoenne : usage et fonction' in Perna, M. (ed.) *Administrative Documents in the Aegean and Their Near Eastern Counterparts*, Turin, 187–191.

Powell, B.B. (1991) *Homer and the Origin of the Greek Alphabet*, Cambridge.

Prager, C. (2021) 'Visual dimensions of Maya hieroglyphic writing: Meanings beyond the surface' in Boyes, P.J., Steele, P.M. and Elvira Astoreca, N. (eds) *The Social and Cultural Contexts of Historic Writing Practices*, Oxford, 101–124.

Prager, C.M. and Gronemeyer, S. (2018) 'Neue Ergebnisse in der Erforschung der Graphemik und Graphetik des Klassischen Maya' in Gülden, S.A., van der Moezel, K.V.J. and Verhoeven-van Elsbergen, U. (eds) *Ägyptologische 'Binsen'-Weisheiten III: Formen und Funktionen von Zeichenliste und Paläographie*, Stuttgart, 135–181.

Preston, L. (1999) 'Mortuary practices and the negotiation of social identities at LM II Knossos', *Annual of the British School at Athens* 94, 131–143.

Pulak, C. (1998) 'The Ulu Burun shipwreck: An overview' in*ternational Journal of Nautical Archaeology* 27.3, 188–224.

Pulak, C. (2005) 'Who were the Mycenaeans aboard the Ulu Burun ship?' in Laffineur, R. and Greco, E. (eds) *Emporia: Aegeans in the Central and Eastern Mediterranean*, *Aegaeum* 25, Liège, 295–312.

Pulak, C. (2008) 'The Ulu Burun shipwreck and Late Bronze Age trade' in Aruz, J., Benzel, K. and Evans, J. (eds) *Beyond Babylon: Art, Trade, and Diplomacy in the Second Millennium B.C.*, New York, 288–305.

Pulak, C. (2012) 'Uluburun shipwreck' in Cline, E. (ed.) *The Oxford Handbook of the Bronze Age Aegean*, Oxford, 862–876.

Rickleton, C.P. (2022) 'Speculative Syllabic' in Steele, P.M. and Boyes, P.J. (eds) *Writing Around the Ancient Mediterranean: Practices and Adaptations*, Oxford, 221–241.

Rieken, E. and Yakubovich, I. (2023) 'Encounters between scripts in Bronze Age Asia Minor' in Zsolnay, I. (ed.) *Seen not Heard: Composition, Iconicity, and the Classifier Systems of Logosyllabic Scripts*, Chicago, 205–235.

Risch, E. (1966) 'Les différences dialectales dans le mycénien' in Palmer, L.R. and Chadwick, J. (eds) *Proceedings of the Cambridge Colloquium on Mycenaean Studies*, Cambridge, 150–157.

Risch, E. (1988) 'Le développement du chypriote dans le cadre des dialectes grecs anciens' in Karageorghis, J. and Masson, O. (eds) *The History of the Greek language in Cyprus: Proceedings of an International Symposium Sponsored by the Pierides Foundation, Larnaca, Cyprus, 8–13 September, 1986,* Nicosia, 67–77.

Robb, K. (1994) *Literacy and Paideia in Ancient Greece*, Oxford.

Robb, J. (2017) '"Art" in archaeology and anthropology: An overview of the concept', *Cambridge Archaeological Journal* 27.4, 587–597.

Roche, G. (2022) 'The necropolitics of language oppression', *Annual Review of Anthropology* 51, 31–47.

Rogers, H. (2005) *Writing systems: A Linguistic Approach*, Oxford.

Ruijgh, C.J. (1966) 'Sur la position dialectale du mycénien' in De Miro, E., Godart, L. and Sacconi, A. (eds) *Atti e memorie del I congresso internazionale di micenologia*, Rome, I, 115–124.

Salgarella, E. (2019) 'Drawing lines: The palaeography of Linear A and Linear B', *Kadmos* 58, 61–92.

Salgarella, E. (2020) *Aegean Linear Script(s): Rethinking the Relationship Between Linear A and B*, Cambridge.

Salgarella, E. (2021) 'Imagining Cretan scripts: The influence of visual motifs on the creation of script-signs in Bronze Age Crete', *The Annual of the British School at Athens* 116, 63–94.

Salgarella, E. (forthcoming) 'Mix and match: A combinatory (re-)classification of Linear A signs', *Talanta* 54.

Salomon, F. (2004) *The Cord Keepers: Khipus and Cultural Life in a Peruvian Village*, Durham-London.

Salomon, F. (2008) 'Late khipu use' in Baines, J., Bennet, J. and Houston, S. (eds) *The Disappearance of Writing Systems: Perspectives on Literacy and Communication*, London, 285–310.

Sampson, G. (1985) *Writing Systems: A Linguistic Introduction*, London.

Sbonias, K. (1995) *Frühkretische Siegel: Ansätze für eine Interpretation der sozial-politischen Entwicklung auf Kreta während der Frühbronzezeit*, BAR International Series 620, Oxford.

Schippers, H. (2010) *Facing the Music: Shaping Music Education from a Global Perspective*, New York.

Schmandt-Besserat, D. (1992) *Before Writing*, Austin.

Schoep, I. (1994) 'Ritual, politics and script on Minoan Crete', *Aegean Archaeology* 1, 7–25.

Schoep, I. (1999) 'The origins of writing and administration on Crete', *Oxford Journal of Archaeology* 18, 265–276.

Schoep, I. (2001) 'The role of the Linear A tablets in Minoan administration', *Ktema* 26, 55–62.

Schoep, I. (2002) *The Administration of Neopalatial Crete: A Critical Assessment of the Linear A Tablets and Their Role in the Administrative Process*, *Suplementos a Minos* 17, Salamanca.

Schoep, I. (2007) 'The social and political context of Linear A writing on Crete' in Lomas, K. Whitehouse, R.D. and Wilkins, J.B. (eds) *Literacy and the State in the Ancient Mediterranean*, London, 53–62.

Schoep, I. (2017) 'The role of non-written communication in Minoan administrative practices' in Jasink, A.M., Weingarten, J. and Ferrara, S. (eds) *Non-scribal Communication Media in the Bronze*

Age Aegean and Surrounding Areas: The Semantics of A-literate and Proto-literate Media, *Periploi* 9, Florence, 81–97.
Schoep, I. (2021) 'Minoan seal-use and writing: From a functionalist to a more social approach' in Bennet, J. (ed.) *Representations: Material and Immaterial Modes of Communication in the Bronze Age Aegean*, Oxford, 259–276.
Schoep, I. (in prep) 'The impact of the Minoan chronological framework on the study of Minoan and Mycenaean writing and sealing practices' in Salgarella, E. (ed.) *The Wor(l)ds of Linear A*.
Sciriha, L. (1996) *A Question of Identity: Language Use in Cyprus*, Nicosia.
Shah, S. and Brenzinger, M. (2021) 'Writing our language' in Olko, J. and Sallabank, J. (eds) *Revitalizing Endangered Languages: A Practical Guide*, Cambridge, 220–234.
Sharypkin, S. (2008) 'Irrelevant phonetic features and the rules of the Linear B script' in Sacconi, A., del Freo, M., Godart, L. and Negri, M. (eds) *Colloquium Romanum. Atti del XII colloquio internazionale di micenologia, Roma 20–25 febbraio 2006*, vol. II, Pisa-Rome, 735–752.
Shear, I. (1998) 'Bellerophon Talets from the Mycenaean world? A tale of seven bronze hinges', *Journal of Hellenic Studies* 118, 187–189.
Shelmerdine, C.W. (1988) 'Scribal organization and administrative procedures' in Olivier, J.-P. and Palaima, T.G. (eds) *Texts, Tablets and Scribes: Studies in Mycenaean Epigraphy and Economy in Honor of Emmett L. Bennett, Jr.*, Salamanca, 343–384.
Shelmerdine, C.W. (2008) 'Background, sources, and methods' in Shelmerdine, C.W. (ed.) *The Cambridge Companion to the Aegean Bronze Age*, Cambridge, 1–18.
Shelmerdine, C.W. (2012) 'Pylos sealings and sealers' in Carlier, P., De Lamberterie, C., Egetmeyer, M., Guilleux, N., Rougemont, F. and Zurbach, J. (eds) *Études mycéniennes 2010. Actes du XIIIe colloque international sur les textes égéens. Sèvres, Paris, Nanterre, 20–23 septembre 2010*, Pisa-Rome, 383–402.
Shelmerdine, C.W. (2021) 'Mycenaean scribes and literacy' in Bennet, J. (ed.) *Representations: Material and Immaterial Modes of Communication in the Bronze Age Aegean*, Oxford, 293–308.
Shelton, K.S. (2002–03) 'A new Linear B tablet from Petsas House Mycenae', *Minos* 37–38, 387–396.
Sherratt, E.S. (2003) 'Visible writing: Questions of script and identity in Early Iron Age Greece and Cyprus', *Oxford Journal of Archaeology* 22, 225–242.
Sickinger, J. (1999) 'Literacy, documents, and archives in the Ancient Athenian Democracy', *The American Archivist* 62.2, 229–246.
Sjöquist, K.E. and Åström, P. (1985) *Pylos: Palmprints and Palmleaves*, Göteborg.
Sjöquist, K.E. and Åström, P. (1991) *Knossos, Keepers and Kneaders*, Göteborg.
Skafida, E., Karnava, A. and Olivier, J.-P. (2012) 'Two new Linear B tablets form the site of Kastro-Palaia in Volos' in Carlier, P., De Lamberterie, C., Egetmeyer, M., Guilleux, N., Rougemont, F. and Zurbach, J. (eds) *Études mycéniennes 2010. Actes du XIIIe colloque international sur les textes égéens. Sèvres, Paris, Nanterre, 20–23 septembre 2010*, Pisa-Rome, 55–73.
Skelton, C. (2010) 'Re-examining the Pylos Megaron Tablets', *Kadmos* 48, 107–123.
Smith, E. (2016) 'Measuring and understanding ethnolinguistic vitality in Papapana' in Filipović, L. and Pütz, M. (eds) *Endangered Languages and Languages in Danger: Issues of Documentation, Policy, and Language Rights*, Amsterdam, 249–279.
Smith, J. (2002) 'Problems and prospects in the study of script and seal use on Cyprus in the Bronze and Iron Ages' in Smith, J. (ed.) *Script and Seal Use on Cyprus in the Bronze and Iron Ages*, Boston, 1–47.
Sophocleous, A. (2021) 'Empowering dialect speakers in formal education: The case of the Greek Cypriot dialect in preschool education in Cyprus' in Blackwood, R. and Dunlevy, D.A. (eds) *Multilingualism in Public Spaces: Empowering and Transforming Communities*, London, 223–240.
Sophocleous, A. and Wilks, C. (2010) 'Standard Modern Greek and Greek-Cypriot dialect in kindergarten classroom interaction: Teachers' and learners' language attitudes and language use', *Language, Culture and Curriculum* 23.1, 51–69.

Stauder, A. (2018) 'On system-internal and differential iconicity in Egyptian Hieroglyphic writing', *Signata : Annales de Sémiotique* 9, 365–390.
Steele, P.M. (2008) 'A comparative look at Mycenaean and Near Eastern bureaucracies: "Bilateral" documentation in the Linear B archives?', *Kadmos* 47, 31–49.
Steele, P.M. (2011a) '"Gaps" in literacy: Social responses to economic crisis in the Late Bronze Age eastern Mediterranean', *Archaeological Review from Cambridge* 26.1, 53–63
Steele, P.M. (2011b) '"Legality" and Mycenaean scribes' in Kyriakidis, E. (ed.) *Proceedings of the International Colloquium 'The Inner Workings of the Mycenaean Bureaucracy', University of Kent, Canterbury, 19–21 September 2008*, *Pasiphae* 5, Pisa-Rome, 119–126.
Steele, P.M. (2012) 'The diversity of the Cypro-Minoan corpus' in Carlier, P., De Lamberterie, C., Egetmeyer, M., Guilleux, N., Rougemont, F. and Zurbach, J. (eds) *Études mycéniennes 2010. Actes du XIIIe colloque international sur les textes égéens*, Pisa-Rome, 537–544.
Steele, P.M. (2013) *A Linguistic History of Ancient Cyprus: The Non-Greek Languages, and Their Relations with Greek, c.1600–300 BC*, Cambridge.
Steele, P.M. (2014) 'The /d/, /t/, /l/ and /r/ series in Linear A and B, Cypro-Minoan and the Cypriot Syllabary', *Pasiphae* 8, 189–96.
Steele, P.M. (2016) 'A linguistic approach to population movements to Ancient Cyprus' in Maguire, R. and Chick, J. (eds) *Approaching Cyprus*, Cambridge, 2–17.
Steele, P.M. (2017) 'Writing "systems": Literacy and the transmission of writing in non-administrative contexts' in Jasink, E.M., Weingarten, J. and Ferrara, S. (eds) *Non-scribal Communication Media in the Bronze Age Aegean and Surrounding Areas: The Semantics of A-literate and Proto-literate Media*, *Periploi* 9, Florence, 153–172.
Steele, P.M. (2018) *Writing and Society in Ancient Cyprus*, Cambridge.
Steele, P.M. (2019a) 'The development of Greek alphabets: Fluctuations and standardisations' in Boyes, P.J. and Steele, P.M. (eds) *Understanding Relations Between Scripts II: Early Alphabets, Oxford*, 125–149.
Steele, P.M. (2019b) 'Script and literacy' in Lemos, I.S. and Kotsonas, A. (eds) *A Companion to the Archaeology of Early Greece and the Mediterranean*, Oxford, 247–269.
Steele, P.M. (2020) 'Material entanglements of writing practices in the Bronze Age Aegean and Cyprus' in Steel, L. (ed.) *Exploring Materiality in the Bronze Age*, *Sustainability* 12, 1–17.
Steele, P.M. (forthcoming a) 'Greece and Cyprus: Regional approaches to the development of writing systems, traditions and practices' in Alonso Déniz, A. (ed.) *Contacts linguistiques en Grèce ancienne : diachronie et synchronie*, Lyon.
Steele, P.M. (forthcoming b) 'Scribal practices, syntax and morphology' in Civitillo, M., Ferrara, S. and Meißner, T. (eds) *The Cretan Hieroglyphic Script in Context: Framing the Earliest Writing in Europe*.
Steele, P.M. and Boyes, P.J. (2023) 'A comparative approach to methods of inscribing clay tablets: Interaction and innovation in Cyprus and Ugarit' in Angliker, E. and Bultrighini, I. (eds) *New Approaches to the Materiality of Text in the Ancient Mediterranean: From Monuments and Buildings to Small Portable Objects*, *Archaeology of the Mediterranean World*, vol. 4, Turnhout, 35–52.
Steele, P.M. and Meißner, T. (2017) 'From Linear B to Linear A: The problem of the backward projection of sound values' in Steele, P.M. (ed.) *Understanding Relations Between Scripts: The Aegean Writing Systems*, Oxford, 93–110.
Stephens, L. and Justeson, J. (1978) 'Reconstructing "Minoan" phonology: The approach from universals of language and universals of writing systems', *Transactions of the American Philological Association* 108, 271–284.
Stock, B. (1983) *The Implications of Literacy: Written Language and Models of Interpretation in the Eleventh and Twelfth Centuries*, Princeton NJ.
Stock, B. (1996) *Listening for the Text: On the Uses of the Past*, Philadelphia.
Tainter, J.A. (1988) *The Collapse of Complex Societies*, Cambridge.
Thomas, R. (Rosalind) (1992) *Literacy and Orality in Ancient Greece*, Cambridge.

Thomas, R. (Rose) (2020) 'Some reflections on morphology in the language of the Linear A libation formula', *Kadmos* 59.1–2, 1–23.

Thompson, R.J.E. (1996–97) 'Dialects in Mycenaean and Mycenaean among the dialects', *Minos* 31–32, 313–333.

Thompson, R.J.E. (1998) 'Instrumentals, datives, locatives αnd ablatives: The -φι case form in Mycenaean and Homer', *Proceedings of the Cambridge Philological Society* 44, 219–250.

Thompson, R.J.E. (2002–03) 'Special vs. Normal Mycenaean revisited', *Minos* 37–38, 337–369.

Thompson, R.J.E. (2008) 'Mycenaean nonassibilation and its significance for the prehistory of the Greek dialects' in Sacconi, A., del Freo, M., Godart, L. and Negri, M. (eds) *Colloquium Romanum. Atti del XII colloquio internazionale di micenologia, Roma 20–25 febbraio 2006*, vol. II, Pisa-Rome, 753–766.

Thompson, R.J.E. (2012) 'In defence of ideograms' in Carlier, P., De Lamberterie, C., Egetmeyer, M., Guilleux, N., Rougemont, F. and Zurbach, J. (eds) *Études mycéniennes 2010 : Actes du XIIIe colloque international sur les textes égéens : Sèvres, Paris, Nanterre, 20–23 septembre 2010*, Pisa-Rome, 545–561.

Tomas, H. (2003) *Understanding the Transition Between Linear A and Linear B Script*, unpublished doctoral dissertation, University of Oxford.

Tomas, H. (2008) 'Comparing Linear A and Linear B administrative systems: The case of the roundel and the elongated tablet' in Sacconi, A., Del Freo, M., Godart, L. and Negri, M. (eds) *Colloquium Romanum*, *Pasiphae* II, vol. 2, Pisa-Rome, 767–774.

Tomas, H. (2010) 'Linear A versus Linear B administrative systems in the sphere of religious matters' in Boehm, I. and Müller-Celka, S. (eds) *Espace civil, espace religieux en Égée durant la période mycénienne. Approches épigraphique, linguistique et archéologique*, Lyon, 121–133.

Tomas, H. (2011) 'Linear A tablet ≠ Linear B tablet', in Andreadaki-Vlazaki, M. and Papadopoulou, E. (eds) *Πεπραγμένα του Ι' Κρητολογικού Διεθνούς Συνεδρίου / Proceedings of the 10th Cretological Conference, Chania, 1–8 October 2006*, vol. A1, Chania, 331–343.

Tomas, H. (2012), 'The transition from the Linear A to the Linear B sealing system' in Regulski, I., Duistermaat, K. and Verkinderen, P. (eds) *Seals and Sealing Practices in the Near East: Developments in Administration and Magic from Prehistory to the Islamic Period*, *Orientalia Lovaniensia Analecta* 219, Leuven-Paris-Walpole MA, 33–49.

Tomas, H. (2013) 'Saving on clay: The Linear B practice of cutting tablets' in Piquette, K.E. and Whitehouse, R.D. (eds) *Writing as Material Practice: Substance, Surface and Medium*, London, 175–191.

Tomas, H. (2017a) 'Linear B script and Linear B administrative system – different patterns in their development' in Steele, P.M. (ed.) *Understanding Relations Between Scripts: The Aegean Writing Systems*, Oxford, 57–68.

Tomas, H. (2017b) 'From Minoan to Mycenaean elongated tablets: Defining the shape of Aegean tablets' in Nosch, M.-L. and Landenius Enegren, H. (eds) *Aegean Scripts: Proceedings of the 14th Mycenological Colloquium 2–6 September, Copenhagen 2015*, *Incunabula Graeca* 105, vol. 1, Rome, 115–126.

Tsipopoulou, M. (2005) '"Mycenoans" at the isthmus of Ierapetra: Some (preliminary) thoughts on the foundation of the (Eteo)Cretan cultural identity' in d'Agata, A.L. and Moody, J. (eds) *Ariadne's Threads: Connections Between Crete and the Greek Mainland in Late Minoan III (LM IIIA2 to LM IIIC)*, Athens, 303–133.

Tzigounaki, A. and Karnava, A. (2020) 'Incised and impressed objects from Kalo Chorafi, Mylopotamos in Rethymno' in Stampolidis, N.C. and Giannopoulou, M. (eds) *Eleutherna, Crete and the Outside World*, Athens, 319–328.

Unruh, D. (2023) *Talking to Tyrants in Classical Greek Thought*, Liverpool.

Valério, M. (2007) '"Diktaian Master": A Minoan predecessor of Diktaian Zeus in Linear A?', *Kadmos* 46, 3–14.

Valério, M. (2016) *Investigating the Signs and Sounds of Cypro-Minoan*, unpublished doctoral thesis, University of Barcelona.

Valério, M. (2017) 'Script comparison in the investigation of Cypro-Minoan' in Steele, P.M. (ed.) *Understanding Relations Between Scripts: The Aegean Writing Systems*, Oxford, 127–161.
Valério, M. and Ferrara, S. (2020) 'Numeracy at the dawn of writing: Mesopotamia and beyond', *Historia Mathematica* 59, 1–19.
Valério, M. and Ferrara, S. (2020b) 'Rebus and acrophony in invented writing', *Writing Systems Research* 11.1, 66–93.
van Alfen, P.G. (1996–1997) The Linear B inscribed stirrup jars as links in an administrative chain, *Minos* 31–32, 251–274.
van Alfen, P.G. (2008) 'The Linear B inscribed vases' in Duhoux, Y. and Morpurgo Davies, A. (eds) *A Companion to Linear B: Mycenaean Greek Texts and Their World*, vol. I, Louvain-la-Neuve, 235–243.
Vandelabeele, F. (2009) 'Representations of Cypriote scribes and carriers of written documents: A link with Egypt?' in Merrillees, R., Michaelides, D. and Kassianidou, V. (eds) *Cyprus and Egypt in Antiquity*, Oxford, 125–133.
Vandenabeele, F. and Olivier, J.P. (1979) *Les idéogrammes archéologiques du linéaire B*, Paris.
Varias García, C. (2023) 'The oral component of the Mycenaean inscriptions: Some notable examples', *Pasiphae* 17, 267–274.
Vasilogamvrou, A., Kardamaki, E. and Karadimas, N. (2022) 'The destruction at the Palace of Ayios Vasileios and its synchronisms' in Jung, R. and Kardamaki, E. (eds) *Synchronizing the Destructions of the Mycenaean Palaces*, *Mykenische Studien* 36, Vienna, 161–192.
Veldhuis, N. (2012) 'Levels of literacy', in Radner, K. and Robson, E. (eds) *Oxford Handbook of Cuneiform Culture*, Oxford, 68–89.
Ventris, M. and Chadwick, J. (1973) *Documents in Mycenaean Greek*, 2nd edn, Cambridge.
Vitale, S., Stocker, S.R. and Davis, J.L. (2022) 'The destructions of the Palace of Nestor at Pylos and its LH IIIA predecessor as a methodological case study' in Jung, R. and Kardamaki, E. (eds) *Synchronizing the Destructions of the Mycenaean Palaces*, *Mykenische Studien* 36, Vienna, 121–148.
Waal, W. (2011) 'They wrote on wood: The case for a hieroglyphic scribal tradition in Hittite Anatolia', *Anatolian Studies* 61, 21–35.
Waal, W. (2012) 'Writing in Anatolia: The origins of the Anatolian Hieroglyphs and the introductions of the Cuneiform script', *Altorientalische Forschungen* 39.2, 287–315.
Waal, W. (2018) 'On the "Phoenician letters": The case for an early transmission of the Greek alphabet from an archaeological, epigraphic, and linguistic perspective', *Aegean Studies* 1, 83–125.
Waal, W. (2019) 'Mother or sister? Rethinking the origins of the Greek alphabet and its relation to the other "western" alphabets' in Boyes, P.J. and Steele, P.M. (eds) *Understanding Relations Between Scripts II: Early Alphabets*, Oxford, 109–124.
Waal, W. (2021) 'Distorted reflections? Writing in the Late Bronze Age Aegean in the mirror of Anatolia' in Bianconi, M. (ed.) *Culture and History of the Ancient Near East; Linguistic and Cultural Interactions Between Greece and Anatolia: In Search of the Golden Fleece*, Leiden, 197–232.
Waal, W. (2022a) 'Deconstructing the Phoenician myth: "Cadmus and the palm-leaf tablets" revisited', *JHS* 142, 219–254.
Waal, W. (2022b) 'Relations between script, writing material and layout: The case of the Anatolian Hieroglyphs' in Steele, P.M. and Boyes, P.J. (eds) *Writing around the Ancient Mediterranean: Practices and Adaptations*, Oxford, 121–144.
Wace, A.J.B. (1953) 'Introduction' to Bennett, E.L., *The Mycenae Tablets II*, *Transactions of the American Philosophical Society* 48, 1–122.
Wachter, R. (2021) 'The genesis of the local alphabets of Archaic Greece' in Parker, R. and Steele, P.M. (eds) *The Early Greek Alphabets: Origin, Diffusion, Uses*, Oxford, 21–31.
Wachter, R. (1989) 'Zur Vorgeschichte des griechischen Alphabets', *Kadmos* 28, 19–78.
Warnock, P. and Pendleton, M. (1991) 'The wood of the Ulu Burun diptych', *Anatolian Studies* 41, 107–111.

Warren, P. and Hankey, V. (1989) *Aegean Bronze Age Chronology*, Bristol.
Webb, J.M. (1999) *Ritual Architecture, Iconography and Practice in the Late Cypriote Bronze Age*, *Studies in Mediterranean Archaeology* 75, Jonsered.
Webb, J.M. (2005) 'Ideology, iconography and identity: The role of foreign goods and images in the establishment of social hierarchy in Late Bronze Age Cyprus' in Clarke, J. (ed.) *Archaeological Perspectives on the Transmission and Transformation of Culture in the Eastern Mediterranean*, Oxford, 176–182.
Weeden, M. (2011) *Hittite Logograms and Hittite Scholarship*, Wiesbaden.
Weeden, M. (2014) 'Anatolian hieroglyphs: Logogram vs. ideogram' in Gordin, S. (ed.) *Visualizing Knowledge and Creating Meaning in Ancient Writing Systems*, Berlin, 81–100.
Weilhartner, J. (2014) 'The influence of Aegean iconography on the design of the Linear B logograms for animals, plants and agricultural products' in Touchais, G., Laffineur, R. and Rougement, F. (eds) *Physis : l'environnement naturel et la relation homme-milieu dans le monde égéen protohistorique*, Leuven-Liège, 297–304.
Weilhartner, J. (2017) 'Les idéogrammes archéologiques: Does variation matter?' in Nosch, M.-L. and Landenius Enegren, H. (eds) *Aegean Scripts: Proceedings of the 14th International Colloquium on Mycenaean Studies Copenhagen, 2–5 September 2015*, Rome, 169–192.
Weingarten, J. (1986) 'The sealing structures of Minoan Crete, I: The evidence until the LM IB destructions', *Oxford Journal of Archaeology* 5, 279–296.
Weingarten, J. (1988) 'The sealing structures of Minoan Crete part II: The evidence from Knossos until the destruction of the palace', *Oxford Journal of Archaeology* 7, 1–25.
Weingarten, J. (1995) 'Sealing studies in the Middle Bronze Age, III: The Minoan Hieroglyphic deposits at Mallia and Knossos' in *Sceaux minoens et mycéniens*, *Beiheft* 5. Berlin, 285–311.
Weingarten, J. (2017) 'When one equals one: The Minoan roundel' in Jasink, A.M., Weingarten, J. and Ferrara, S. (eds) *Non-scribal Communication Media in the Bronze Age Aegean and Surrounding Areas: The Semantics of A-literate and Proto-literate Media*, *Periploi* 9, Florence, 99–108.
Weingarten, R. (2013) 'Comparative graphematics' in Borgwaldt, S.R. and Joyce, T. (eds) *Typology of Writing Systems*, Amsterdam, 13–40.
Wendrich, W. (2012) 'Archaeology and apprenticeship: Body knowledge, identity, and communities of practice' in Wendrich, W. (ed.) *Archaeology and Apprenticeship: Body Knowledge, Identity and Communities of Practice*, Tucson, 1–19.
Whalen, D.H., Moss, M. and Baldwin, D. (2016) 'Healing through language: Positive physical health effects of indigenous language use', *F1000Research* 5.852.
Whitelaw, T. (2022) 'Knossos during LM II–IIIB: Dynamism and development' in D'Agata, A.L., Girella, L., Papadopoulou, E. and Aquini, D.G. (eds) *One State, Many Worlds: Crete in the Late Minoan II–IIIA2 Early Period*, *Studi Micenei ed Egeo-Anatolici* n.s., supplement 2, Rome, 35–70.
Woods, C. (2015) 'Contingency tables and economic forecasting in the earliest texts from Mesopotamia' in Delnero, P. and Lauinger, J. (eds) *Texts and Contexts: The Circulation and Transmission of Cuneiform Texts in Social Space*, Berlin, 121–142.
Wolfram, W. (2004) 'Language death and dying' in Chambers, J.K., Trudgill, P. and Schilling-Estes, N. (eds) *The Handbook of Language Variation and Change*, Malden MA, 764–787.
Woolf, G. (2015) 'Ancient illiteracy?', *Bulletin of the Institute of Classical Studies* 58.2, 31–42.
Yakubovich, I. (2022) 'Once again on the evolution of the Anatolian Hieroglyphic script', *Kadmos* 61, 37–60.
Younger, J.G. (1996–97) 'The Cretan Hieroglyphic script: A review article', *Minos* 31–32, 379–400.
Zhang, H. and Mace, R. (2021) 'Cultural extinction in evolutionary perspective', *Evolutionary Human Sciences* 3, 1–20.
Zurbach, J. (2006) 'Les vases inscrits en linéaire B: tentative d'interprétation globale', *Mitteilungen des Deutschen Archäologischen Instituts*, *Athenische Abteilung* 121, 13–71.