Chapter 1: Introduction to the Discipline

This chapter will provide the rationale of this thesis and a basic outline of the difficulties in studying the Mycenaean military of 1600 to 1350 BCE.

An Introduction to the Difficulties with Studying the Mycenaean Military

There are many distinct difficulties involved in studying the Mycenaean Military circa 1600-1350 BCE. Documentary evidence is scarce, particularly so for military matters. As John Chadwick writes "*no document records the existence of an army, though there are lists of men assigned to [supposedly] military and naval duties*."[13] According to Chadwick there is more information in the sources on bronze smithing, with detailed accounts on how many smiths there were in a given area and what their allocated bronze would be, than there is on warfare.[14] On the military, there are only a few tablets from Pylos, Knossos, and a series of inventories from across the Mycenaean world, that provide any written link between modern scholars and military activities, however, as Chadwick suggests, none of these are direct.[15]

Linear B, the language of the Mycenaeans, was derived from a much older language called Linear A. The language originated in the palatial period of Minoan Crete,[16] and passed at an unknown date to the Greek mainland. The oldest surviving Linear B tablet, reportedly dating to 1450 BCE,[17] is a fragment of what appears to be a personal document of no military importance. The first useful Linear B evidence, for military discussion, dates to the LH IIIB period dates from the LH IIIB to the LH IIIC (1330-1060 BCE).[18] Coincidentally this latter period, particularly the period circa approximate 1200 BCE during which many of these writings were preserved, is where the majority of modern Mycenaean studies focus their attention. This lack of earlier writing thus poses a difficulty for early

[13] J. Chadwick, *The Mycenaean World*, Cambridge, 2007, p159
[14] J. Chadwick, *The Mycenaean World*, Cambridge, 2007, p118
[15] From Pylos can be found a single document over several tablets describing watchers guarding the coastal regions, specifically tablets An 657, An 654, An 519, An 656, An 661. Tablet An 610 includes a series of rowers, Tablet An 1 also has a reference to rowers, however this is debatable as tablet C 902 uses the same word amongst a series of governors making interpretation confusing). Inventory tablets include from Pylos tablets Va 1323-1324 and Vn10 which refer to weapons, ten suits of armour and chariots. The relevant Tiryns tablets include Si 5, and 8-10 which include references to two suits of armour and chariots. The Knossos Arsenal and other tablets primarily include references to chariots via the Sc and Sd series of tablets. There is also a tablet from Knossos referencing a suit of armour in SK 789.
[16] O. Dickinson, *The Aegean Bronze Age*, Cambridge, 1994, p193
[17] http://www.aegeanscripts.org/index.php?option=com_content&view=article&id=98:new-linear-b-tablet-found-at-iklaina&catid=80&Itemid=473 Retrieved 4/4/2013.
[18] J. Hooker, *Linear B: An Introduction*, UK, 1980; J. Driessen, Chronology of the Linear B Texts, *A Companion to Linear B Mycenaean Greek Texts and their Worlds Vol 1*, ed. Yves Duhouz and Anna Davies, 2008, pp69-79

research focusing on the LH IIA to LH IIIA2 (1600-1330 BCE) in several ways. First, the majority of scholarly writing which will be discussed in the literature review, focus only on the late period and not the period 1600-1350 BCE. Secondly, as much of the surviving text relates only to the 12th century or later, it is difficult to ascertain what aspects of Mycenaean culture is traditional or entirely new. Thirdly, the majority of relevant surviving text deals with the existence of fortifications and watch towers that were first built in the thirteenth century.[19] Features such as the eight metre high and five metre thick walls of Mycenae and the famous 'Lion Gate' – both significant advances in military defence – were first built after c. 1300 and previous fortifications of Mycenaean Greece were rudimentary in comparison.[20] This would inherently cause a significant change in either the nature or conditions of warfare in order to combat fortification, and may indicate significant change that mandated the construction of such defences. Such a change could even be rooted in a change of governance, either as a system or by a change in ruler, which – in accordance to the second point – may further alienate the early Mycenaean period from the latter Mycenaean period, in turn further reducing – but not eliminating – the relevance of evidence sourced from these latter periods. In effect, it is difficult to argue continuation from one period to the next based without evidence from both periods.

It is, however, in the period of the thirteenth century that significant changes in the nature of the Mycenaean military occur. Aside from the first significant development of fortifications during LHIIIB, artistic evidence shows a distinct shift from the earlier style of warfare of using two handed spears, bows, short thrusting swords and full body shields worn by a chest strap to a new style of fighting using single handed spears, hand gripped shields, double edged swords, javelins and the widespread use of bronze armour, including the popular use of helmets and greaves.[21] This shift appears to have occurred by 1350 BCE, and would have inherently resulted in a change in warfare due to functional differences between shoulder-slung body shields and hand gripped shields that can be moved.[22] Other evidence, such as the development of bronze armour between 1500 and 1350 BCE, also suggests that there may have been a gradual change in the nature of warfare that predates both fortification and documentary evidence. If evidence from the LH IIIB period is to be used for discussing the earlier periods, it must first be proven that there is a tenable connection between the nature and organisation of war in these distinct periods.

[19] All evidence from Linear B tablets used in Chapter 3 date to this late period.
[20] R. Osgood and S. Monks, *Bronze Age Warfare*, Sutton, 2000, p.119
[21] The most famous example is the Warrior Vase dating to 1330 BCE. See Appendix III, Fig. 31
[22] Several authors write on the military revolution, including: #Evidence or authors for military revolution

Without a definable internal link within Mycenaean culture, it is possible that external evidence may be found. Other cultures, such as the Egyptians and Hittites, make a number of references to the Ahhiyawans, a people living in the general area of Greece now believed to be the Mycenaeans.[23] However the earliest military reference to these people only occurs around 1250 BCE,[24] once the Ahhiyawans have entered the world stage and so do not make reference to earlier forms of warfare for which these other cultures were not interested. If the supposition that the Ahhiyawans are the Mycenaeans is true, which seems to be the case, then there is evidence for a powerful military from 1250 BCE onwards but little before.

Unless it can be shown that evidence from the later documentary sources can infer information about the former periods, the primary sources for matters of the military between LH IIA and LH IIIA2 are contemporary archaeological sources, particularly artistic evidence. Though some examples of swords, spear heads and armour survive, the only evidence for the historical shields and the length of spears are from signet rings, frescoes and miniature votive replicas.[25] Wood and leather artefacts, such as the shields and spears, decompose and quite often bronze is reused by later generations leaving little trace in the archaeological record of how common it may have been. As a result, much of the physical evidence does not survive. The strongest archaeological evidence is the artistic evidence, which is not only recurrent but provides the strongest direct link to the period. However, due to complications of interpretation, reliability, and artistic license, they require extensive analysis before drawing conclusions.[26]

The Difficulties of Studying the Mycenaean Military, the Homeric Sources

The Homeric poems, the oldest literary sources for ancient Greece, have been used as evidence for matters to do with Bronze Age society for centuries. Schliemann, the archaeologist who discovered both the archaeological site believed to be the site of Troy and first excavated Mycenae, is said to have used Homer as a guide to finding these sites. The works of Homer, if based on or reflecting a kernel of historical truth, describe events that purportedly occurred ca.1180 BCE, the siege of Troy, and its depictions of battle have been used by scholars and generalists to describe Bronze Age warfare from 1600-1060 BCE, and also for warfare and equipment of the Greek Dark Age dating from

[23] See the work of T. Bryce, *Letters of the Great Kings of the Ancient Near East : The Royal Correspondence of the Late Bronze Age*, London, 2003
[24] Kelder, Jorrit, 2005, *The Chariots of Ahhiyawa*, http://www.academia.edu/219041/The_chariots_of_Ahhiyawa Retrieved 5/04/13
[25] See images in Appendix III
[26] See said analysis in Chapter 4.

1060-700 BCE.[27] As such, it is worth discussing here the nature of the issues with using Homer as a source, and a few of the reasons why it is of limited use for this thesis.

Kirk identifies only three distinct time periods for which the Iliad provides potential evidence: the late Bronze Age, around 1200 BCE onwards; the so-called Dark Age of the eleventh and tenth centuries; and the age of large-scale composition of the poems in the eighth century.[28] Kirk's placement of relevance to the late Mycenaean period is later than the period being investigated in this thesis (1600-1300 BCE). By the time inferred by the Homeric poems, there had been a change in warfare from wearing the shield into battle to carrying them with a handle or grip. An increase in the availability of armour would also have affected how battles were fought. The experience of war, the rise of fortifications, and the nature of organisation, would have inherently changed between 1350 and 1200 BCE, and again between the collapse of Mycenaean centres and the rise of the kingdom states of the Dark Age period. Kirk's belief in the reliability of Homer stems from thorough historiographical research. Historians now know that several episodes of the Homeric works have been altered since their original composition, such as the Dolon episode of the tenth book of the Iliad, and books eleven and twenty four of the Odyssey.[29] Similarly a number of words known from Linear B texts, such as the word *basileus*, changed meaning during the Dark Ages,[30] in this case shifting from a word for a lesser official or 'mayor' to the highly prestigious 'king' by the time of Homeric literature. Though the Homeric poems may provide reflections of the Bronze Age circa 1200 BCE, there are several difficulties with their use for any earlier period.[31]

The Homeric works were originally put into their final form around the 8th century BCE, approximately 400 years after the events they describe. As the constant appearance and dramatic influences of various gods show, some of the story was embellished from what many perceive to be a kernel of historical fact. If the events of Homer reflect a historical siege that occurred in 1180 BCE, this is between 120 and 70 years distant from the last recorded image of the full-body shields, an isolated pottery shard dated between 1300-1250 BCE,[32] that form the crucial evidence of early

[27] A few examples include: R. Castledon, *Mycenaeans*, USA and Canada, 2005, p.121-122; P. Conolly, *The Ancient Greece of Odysseus*, New York, 2007; R. Osgood and S. Monks, *Bronze Age Warfare*, Sutton, 2000, p135; J. Warry, *Warfare in the Classical World*, New York, 2000, p18

[28] G. Kirk, *The Homeric Poems as History*, Cambridge, 1965, p3-4; Dickinson also wrote an article about how Homer is more likely to reflect Dark Age Greece than Bronze Age Greece, O. Dickinson, *Homer, the Poet of the Dark Age*, Greece & Rome, Vol XXXIII, No 1, 1986

[29] G. Kirk, *The Homeric Poems as History*, Cambridge, 1965, p9

[30] G. Kirk, *The Homeric Poems as History*, Cambridge, 1965, p24

[31] For more on the anachronisms and historicity of Homer, see T. Bryce, The Trojan War: Is There Truth behind the Legend?, *Near Eastern Archaeology* , Vol. 65, No. 3, 2002 p187

[32] See Appendix III, Fig 20.

Mycenaean warfare. This separates Homer from even the youngest non-contemporary evidence for the shields and equipment of the time period by at least 450 years, and by at least 550 years from the 1350 BCE military revolution.[33] If Homer's reports of battle are accurate to the Bronze Age, it must be considered that they may only reflect the warfare of 1200 BCE rather than the warfare of over one hundred years prior.

There are also varying interpretations on the design of shields in the Iliad. Van Wees writes that the shields described in the Iliad were universally circular, and are most comparable to shields that were used from the Greek Dark Age until 650 BCE.[34] According to Van Wees, the bronze facing that Homer describes is only a feature on shields dating from 700 BCE.[35] This conclusion agrees with a separate and more recent study by Dan Howard on the same subject.[36] In this study, Howard concludes that the shields of the Iliad are all invariably circular, including those traditionally described as 'towers'. Even the famous shield of the Greater Aias, translated by Samuel Butler and Latimore versions as 'like a tower', is noted by both Howard and Van Wees not as a description of the shield's shape but as a poetic convention describing the shield's impenetrability.[37] Both Wees and Howard conclude that the shield of Aias is not a reflection of the full body shields evident in the Bronze Age but instead reflect the equipment and experience of the poem's composition. It is clear that if the authors of the Homeric poets had any military experience, then that experience was founded in the Dark Age period of warfare.

Similar evidence appears in reference to chariots.[38] Cotterell, in a study of chariots throughout history, concludes that the Homeric poets did not understand chariot warfare enough to convey it accurately.[39] Similarly, the organisation of chariots described by Nestor (*Iliad,* Book IV: 250-325) is believed by Kirk to be an anachronism by the writers.[40] A historical Nestor, if one existed, would have lived during the height of chariot warfare in the Mycenaean period, thus making the historical Nestor a contemporary of chariot strategies, yet nevertheless the Homeric character in these passages

[33] As will be discussed in Chapter 4, the majority of artistic evidence for the shields ends by 1350 BCE, which coincides with the rise of the new style of warfare utilizing gripped shields and armour.
[34] H. Van Wees, *Greek Warfare Myths and Realities*, London, 2009, p.250
[35] H. Van Wees, *Greek Warfare Myths and Realities*, London, 2009, p.250
[36] For the type of shields and armaments Homer does refer to, see D. Howard, *Bronze Age Military Equipment*, South Yorkshire, 2011, Appendix 1
[37] D. Howard, *Bronze Age Military Equipment*, South Yorkshire, 2011, Appendix 1; H. Van Wees, *Greek Warfare Myths and Realities*, London, 2009, p. 250-251
[38] The role of the chariot in historical warfare will be considered in more detail in Chapter 3.
[39] A. Cotterell, *Chariot*, Great Britain, 2005, p.310
[40] G. Kirk, *The Iliad: A Commentary, 1. Books 1–4*, Cambridge, 1986

ascribes the strategies of chariot warfare as being the strategies 'of old', and his description of spear and chariot combat would almost certainly have gotten its user killed if applied practically.[41]

If the Homeric poems can be relied upon for preservation through oral tradition, Kirk's assessment precludes it from use in this thesis. Not only do the Homeric works conflate evidence from a variety of time periods, including non-Mycenaean origins , but it also reveals that the authors were more concerned with telling a good story than preserving history. If the Homeric poems do indeed shed light on the Bronze Age period, then it is the end of the Bronze Age between 1300 and 1060 BCE, the time after military revolution period and well outside the confines of this thesis.

Aside from the Homeric works, the only other Greek writer on the Mycenaean period is Herodotus who, although he writes further from the period (ca. 450-420 BCE), he is dedicated to the recording of history and records early methods of warfare as had been passed down to his day. Even this source, however, is limited to a passing comment on how the Carians invented the helm crests, devices on shields and also the shield grip later used in hoplite combat, replacing the old way of wearing the shields into combat via leather belts over the chest.[42] This effectively concludes the presentation on all written evidence in regards to Greek warfare for any given period of the Bronze Age.

Why investigate?

The most crucial of questions when approaching any topic is 'why study it?' Why produce a definitive study of how the Mycenaean full body shields impacted on Mycenaean warfare or ask whether the current understanding of the use of the Mycenaean tower shield is accurate? First, the shield is a major part of iconography in the early Mycenaean Bronze Age, and analysis could provide evidence for anthropologists on this early society. Second, several works have regarded the figure-of-eight shields as primarily a religious icon.[43] This needs to be addressed in contrast to its military use. Third, the Trojan War, a popular focus in military literature, often treats the technology of several distinct Mycenaean periods as if they belonged to just one period,[44] or hardly approaches the topic at all.[45] Fourth, for the study of Mycenaean civilisation and military prior to 1300 BCE and how it differed

[41] The reliability of Nestor's advice and whether Homer understood warfare is questioned by G. Kirk, *The Iliad: A Commentary, 1. Books 1–4,* Cambridge, 1986

[42] Herodotus, *Histories,* 1.171.4

[43] See E. Kyriakidis, *Ritual in the Bronze Age Aegean*, London, 2005; N., Marinatos, *Minoan Sacrificial Ritual: Cult Practice and Symbolism*, Stockholm, 1986; L. Morgan, *The Miniature Wall Paintings of Thera: A Study in Aegean Culture and Iconogoraphy*, New York, 1988

[44] See P. Connolly, *The Ancient Greece of Odysseus*, New York, 2007; B. Strauss, *The Trojan War*, New York, 2006; J. Warry, *Warfare in the Classical World*, New York, 2000; M. Wood, *The Search for Troy*, California, 1998;

from the military post 1300 BCE. To this date only broad overviews are readily available on the subject.[46] The contents of this thesis provides information that can be used to address all these areas.

Perhaps the best reason to investigate is because the study of the Mycenaean military has been neglected in the majority of modern Mycenaean studies.[47] One of the most comprehensive analyses of the Mycenaean period, *Ancient Greece: From the Mycenaean Palaces to the Age of Homer*, edited by Sigrid Deger-Jalkotzy and Irene Lemos, seeking to do now for Mycenaean studies what Snodgrass and others did in 1964, which was to offer as complete an overview of the period as is currently known, contains almost no reference to the Mycenaean military across a total of thirty three articles. It is difficult to see how a study of the Mycenaean period can be complete without a study of its military, in particular the period before Mycenaean military revolution ca. 1350 BCE that this thesis investigates.

Methodology

An effective approach to ensure that the final conclusions stand the test of time is by presenting strong arguments together with all relevant evidence in order to facilitate debate. To achieve this, this thesis will be based off the following model. The thesis will begin with research at a broad level, entering into surrounding fields where required, in order to gain a better understanding of the primary topic. This initial survey should cover all known aspects known to be part of or relating to the subject. After this initial survey, any primary evidence must be examined. Often the primary evidence will consist of literary or documentary sources, moving on to archaeological evidence and symbolic evidence, such as artistic evidence, that require interpretation. It is often easier to interpret a written source and often archaeological remains are best analysed with an informed knowledge of contemporary thought. It is important when considering the evidence that the archaeological data be given a thorough overview, even minor factors such as geographical placement of archaeological data can cause a profound shift in perspective and all perspectives must be considered. Treating the evidence first in isolation, then in the light of knowledge gleaned from other archaeological or contemporary sources, then from the historian's background research, and then finally the historian's own knowledge and personal experience. Once the primary evidence has been examined, and has been put into context by the repeated application of knowledge in order of relevance, then

[45] A single paragraph is dedicated to military matters in T. Bryce, *The Trojans and their Neighbours*, London, 2006, p103

[46] N. Grguric, *Mycenaeans c. 1650-1100 BC*, Oxford, 2005; also R. Osgood and S. Monks, *Bronze Age Warfare*, Sutton, 2000; Osgood's many assertions however need reconsideration, particularly in regards to Mycenaean melee warfare.

[47] See the literature reviews in Chapter 2.

consider what this means. In other words, it is at this point that any interpretation, of which there may be more than one, of the data be considered. Following these interpretations the hypotheses of the historian must be tested, either by repeating the previous process to apply new and linked historical data, or by engagement with the source material. One method of engagement can be via the application of physical experimentation, or practical archaeology. Using the evidence gained from directly or indirectly interacting with the source material, in light of the research previously performed. Repeated experiments may be necessary in order to accrue both data samples and to readdress or change the hypothesis in the light of testing. Only after engaging in this full methodology can the historian then collate and interpret the data confident that it will present a reliable conclusion.

Chapter 2: Literature Review

The following chapter reviews the history of scholarly interpretation of the Mycenaean military. An understanding of these views underpins the discussion of the practical experimentation detailed in chapter 6.

Literary Analysis: History of the Discipline

The earliest archaeological study of the citadel of Mycenae dates back to Heinrich Schliemann in the late 1870s. Schliemann, famous for uncovering what is believed to be the site of Troy in 1871, began excavations of Mycenaean sites in 1876 and published the results in his work *Mycenae: A Narrative of Researches and Discoveries at Mycenae and Tiryns*.[48] It is problematic to base interpretations on Schliemann's descriptions of his excavations as he sometimes fabricated where or how he came across many of his finds, and in some cases, such as at Troy, destroyed much of the evidence that modern historians would today strive to preserve. As a result Schliemann has also earned fame as being an unreliable, if not infamous, archaeologist.[49] Nevertheless, Schliemann single handedly began the discipline of Mycenaean studies.

Schliemann, having begun the study of Mycenaean archaeology, was followed by many others. Many of the finds and archaeological remains discovered by Schliemann and his successors, including Arthur Evans who identified the script of Linear B, continue to have a significant impact on modern studies.[50] The next major breakthrough was between 1951 and 1953, when Ventris and Chadwick produced the definitive work in regard to the deciphering Linear B,[51] identifying several symbols as Cretan cities, and positively identified the root language underlying Linear B as an early form of Greek. This major step leading to the decipherment of the Linear B script opened the Linear B archives as a resource for historians of all disciplines, and between 1953 and the present these tablets have aided historical research considerably in all areas. However an unfortunate change in the culture of historical investigation between 1950 and the late 1980s, prevented this discovery

[48] H. Schliemann, *Mycenae: A Narrative of Researches and Discoveries at Mycenae and Tiryns*, New York, 1880; Also published as *Mykenae: Bericht Uber meine Forschungen und Entdeckungen in Mykenae und Tiryns* in German and *Mycenes: recit des recherches et decouvertes faites a Mycenes et a Tirynthe* in French.
[49] Rather than direct readers to the many scholars on Schliemann, I direct them instead to C. Runnels, *The Archaeology of Heinrich Schliemann; An Annotated Bibliographical Handlist*, Boston, 2002.
[50] One of the most superb representations of what archaeological finds have been discovered is *The Well Built Mycenae* fascicule series being published by Oxbow books, many of the discoveries included in this series were made directly by Schliemann and his immediate successors.
[51] M. Ventris and J. Chadwick, *Documents in Mycenaean Greek*, London, 1973.

from having a major impact on the area of military studies, Mycenaean included, until the close of the twentieth century.

After the tragic events of World War Two and the later Vietnam War, military studies understandably became a taboo subject in many fields. Between 1950 and 1999, there were only two publications that approach the topic of the Mycenaean military in detail.[52] Snodgrass,[53] publishing in 1964, was to represent the pinnacle of Mycenaean military studies until Robert Drews' publication on the end of the Bronze Age in 1993.[54] These represent two of the most referenced books appearing in almost every bibliography on Mycenaean civilisation. Though many major publications recorded the existence of the many military archaeological finds, such as the swords and the Dendra plate armour found in the shaft graves,[55] these were almost exclusively limited to a basic description of the artefact's physical appearance with no attempt made at discussing their use. Between 1964 and 1999, a number of books and articles on Mycenaean society were published, but only in publications on cultic and ritual iconography did the weapons and large body shields of the LH IIA to LH IIIA2 periods receive significant investigation and scrutiny, which often played down their possible military roles. The next major publication dedicated to the Mycenaean military, treating these military items in their military role, would be the broad but scholarly work of Sarah Monks and Richard Osgood published in 2000, focusing on Bronze Age warfare as a whole, and dedicating only a single chapter to the warfare of the Mycenaeans.[56] An influx in publications has since appeared, with more publications released between 2005 and 2012 than out of any single decade before.[57] However, for the most part, these have followed the trend of 1964-1999 in only relaying the bare facts on archaeological finds and avoiding investigative interpretation. Each of the stages from 1964-1999, 2000-2005 and 2006 onwards will be reviewed here.

In 1964 Snodgrass's comprehensive publication on early Greek warfare compiled and presented the most up to date knowledge of his time in a single volume. In this work, which expands on almost every shield, helmet, armour and weapon design of the Bronze and Dark Ages, very little mention is made of the figure-of-eight and tower shields of the LH IIA-IIIA2 periods. In fact, the only mention of

[52] It is worth noting that in both cases the total amount of time spent on Bronze Age warfare across both books combined occupies less space than Chapter One of this thesis. Most of this text is merely a description of the artefact rather than an analysis. Suffice to say, the term 'In detail' here refers not to the quantity or quality of the text, but rather the notable inclusion of Mycenaean warfare and equipment as a subject.
[53] A. Snodgrass, *Early Greek Armour and Weapons*, Edinburgh, 1964.
[54] R. Drews, *The End of the Bronze Age, changes in warfare and the catastrophe C.1200 BC*, Princeton, 1993.
[55] P. Astrom, *The Cuirass Tomb and Other Finds at Dendra*, Gotteborg, 1977, p28-36.
[56] R. Osgood and S. Monks, *Bronze Age Warfare*, Sutton, 2000.
[57] R. Castledon, *Mycenaeans*, USA and Canada, 2005; Dickinson, O., *The Aegean Bronze Age*, Cambridge, 2008; D. Howard, *Bronze Age Military Equipment*, South Yorkshire, 2011

them is in comparison to the Dipylon and Boeotion shields of the Dark Age.[58] Snodgrass' reference for these shields is Higgins' paper which appeared in 1957. Higgins, whose comprehensive survey of the archaeology of the early Mycenaean shield took him down a path of categorization and aesthetic appraisal, discusses almost exclusively the nature of their representation rather than their function.[59] It is from here Snodgrass gathers his information comparing them with the potentially fictitious Dipylon and Boeotion shields of the Dark Ages.[60] In Snodgrass' work, where matters of warfare are concerned, he does not discuss the shields or weapons from the LH IIA and LH IIIA periods. Instead he focuses only on those artefacts dating to the thirteenth century onwards and the potential period of the Trojan War, for which he recognised that the full body shields and shaft grave swords, being three hundred years out of date, were not relevant.

In 1993 Drews published his work on the end of the Bronze Age. Though focusing on several different societies, he pays particular attention to the Aegean and late Mycenaean Greece. When considering the Mycenaeans, Drews' work deals almost exclusively with the end of Mycenaean society. Like Snodgrass, he recognises that the style of warfare related to the use of the Mycenaean full body shield had disappeared by his time period in the Mycenaean revolution of 1350 BCE and that they are outside of his own work's chosen time period of ca. 1200 BCE;[61] however, he also recognises the need to understand the previous types of warfare and armaments to understand how they may have differed or influenced the present form. He makes mention of the two types of full body shield, the figure-of-eight and half tower shields (which he calls half-cylindrical), describing them as being worn on the front of the body.[62] This is despite the most famous and popularly published images of these shields, the Lion Hunt Dagger and Battle Krater,[63] clearly depicting the shields being worn over the back. Drews' writing suggests that the Mycenaean shield must have been functional, if difficult to use, in combat. However, by the time of his publication the 'image' of Mycenaean warfare had been firmly shaped by both generalist literature and the iconographic studies of other fields.

Following on with the trends of ideological and ritual study, several writers have posed their own suggestions regarding the use of military equipment. Marinatos in 1986 and Driessen in 1999, publishing several years apart, both proposed that all shields and weapons in Aegean art were purely

[58] A. Snodgrass, *Early Greek Armour and Weapons,* Edinburgh, 1964, pp.58-60
[59] R.A. Higgins. BICS 4 (1957) 32-3, nn. 100-104; cf, BSA 52.
[60] R.A. Higgins. BICS 4 (1957) 32-3, nn. 100-104; cf, BSA 52.
[61] R. Drews, *The End of the Bronze Age, Changes in Warfare and the Catastrophe C.1200 BC*, Princeton, 1993, p178.
[62] R. Drews, *The End of the Bronze Age, Changes in Warfare and the Catastrophe C.1200 BC*, Princeton, 1993, p178.
[63] See Appendix III, Fig. 8 and Fig. 10

ritualistic in nature with no actual military function.[64] Driessen, who has published a number of articles on matters relating to the Mycenaean military since 1984, is among Snodgrass and Drews as one of the most referenced scholars in the field. Cheryl Floyd in 1999 concluded that Minoan 'weapons', many of which were identical or similar to Mycenaean ones, were merely tools for mundane purposes such as meat-processing.[65] Archaeologist Paul Rehak, publishing between 1980 and 2009, wrote on this subject throughout his career, and in 1999 suggested that figure-of-eight shields of the Minoan style could not have been used for fighting or hunting due to their being 'too cumbersome'.[66] The view that Mycenaean equipment being cumbersome may be found in almost every publication on Mycenaean civilisation and society.[67]

Across scholarly work as a whole, assessment of the Mycenaean military and their weaponry comprises a very small percentage of scholarly work. Between 1965 and 2000, several of the most informed publications spent little time on this important aspect of culture. Even in the most in-depth of studies, matters of military importance often receive only a few pages, if not a few paragraphs, of mention. Palmer in 1965, writing on all aspects of Mycenaean society, only mentions swords when discussing their decipherment in Linear B tablets.[68] Thomson, also publishing in 1965, does not discuss warfare at all over 626 pages.[69] Warren, published first in 1975 and revised in 1989, mentions only the fact that weapons such as swords and daggers appear in graves.[70] Dickinson, whose first edition appeared 1994, offers six and a half pages of text with accompanying black and white images on all weapons and armour from across the Bronze Age period.[71] Here, Dickinson discusses Mycenaean armament's overall evolution and appearance over several hundred years, pointing out that what evidence we have is biased towards the nobility,[72] and suggests that the chariot was used only for transporting heavy infantry.[73] He dismisses the notion of the Dendra armour being

[64] Marinatos, N., *Minoan Sacrificial Ritual: Cult Practice and Symbolism*, Stockholm, 1986; J. Driessen, The Archaeology of Aegean Warfare, in *Polemos: Le Contexte Guerrier en Egee a L'Age du Bronze. Actes de la 7e Rencontre egeenne internationale Universite de Liège, 1998.* Universite de Liège, Histoire de l'art d'archeologie de la Grece antique, ed. Robert Laffineur, 1999, pp.11–20

[65] Cheryl Floyd, Observations on a Minoan Dagger from Chrysokamino, in *Polemos: Le Contexte Guerrier en Egee a L'Age du Bronze. Actes de la 7e Rencontre egeenne internationale Universite de Liège, 1998.* Universite de Liège, Histoire de l'art d'archeologie de la Grece antique, ed. Robert Laffineur, 1999 pp. 433–442

[66] P. Rehak, *The Mycenaean 'Warrior Goddess' Revisited*, 1999, p.232, Paul Rehak is still highly referenced and influential to many Aegean scholars, with most modern publications referencing him among their sources, including Marinatos, Driessen and Cherryl Ford.

[67] Later in this chapter the sentences, often the sum total of information on the subject, that comprise the other works will be raised and analysed in more detail.

[68] L. Palmer, *Mycenaeans and Minoans*, London, 1965, pp.200, 277, 298

[69] G. Thomson, *Studies in Ancient Greek Society*, New York, 1965

[70] P. Warren, *The Aegean Civilisations*, New York, 1989, p77-78

[71] Dickinson, O., *The Aegean Bronze Age*, Cambridge, 2008, pp.197-207

[72] Dickinson, O., *The Aegean Bronze Age*, Cambridge, 2008, p197

[73] Dickinson, O., *The Aegean Bronze Age*, Cambridge, 2008, p203

cumbersome, based on a reconstruction in 1988, though on the topic of shields he writes only that their relative merits are 'unclear'.[74] Harding, in 2000, offered a similar approach over 36 pages on the entirety of Bronze Age warfare. However, though he mentions Homer and the Mycenaeans he spends less than a few scattered paragraphs discussing them.[75]

The year 2000 saw the first dedicated study on early Mycenaean warfare since Drews' brief 1993 appraisal. This work was *Bronze Age Warfare* by Osgood and Monks. Like Harding, Osgood and Monks cover a wide range of cultures, but dedicate a chapter to each and treat each in turn rather than as part of a single homogenous whole. After a brief description of the artefacts from early Mycenaean Greece, Monks presents a general consensus that early Mycenaean armaments were 'bulky', 'unwieldy' and 'cumbersome' and were most likely only ceremonial garb, going as far as to suggest that all bronze armour and helmets were simply ceremonial versions of more practical leather items.[76] She also posits that the large shields, being cumbersome and unwieldy, were useless for deflecting arrows and were perhaps only useful in melee for the deflecting of dagger thrusts.[77] Though Osgood and Monks recognise that iconography is the most important aspect of Mycenaean evidence,[78] they do not appear to use this evidence to support any of their conclusions. Most conclusions they present, such as infantry 'hunting' chariots down with javelins,[79] appear to be logical inferences however they do not reference any source evidence for javelins in the Aegean archaeology or iconography, or explain how such a 'hunt' would work. Their final conclusion in regards to the early period of Mycenaean warfare is: "*The overall impression of Aegean Bronze Age society is of one well versed in weaponry and warfare, but which, initially at least, lacked technical competence.*"[80] This conclusion raises the question of what it means to be well versed in weaponry and warfare, and what capabilities the Mycenaeans had in warfare.

[74] Dickinson, O., *The Aegean Bronze Age*, Cambridge, 2008, p202
[75] A. Harding, *European Societies in the Bronze Age*, Cambridge, 2000, p271-307
[76] Osgood and Monks, *Bronze Age Warfare*, Sutton, 2000, p.144. In rebuttal to this theory, both Osgood and Monks claim that a helmet thinner than 1.6mm is too weak to stop a sword cut, but anything thicker is too heavy to wear. Cross comparative studies across other periods of history show that not only do there exist many varieties of functional helmets that are both heavier and thicker, but also many that were lighter and thinner. These designs were all worn regularly into battle.
[77] Osgood and Monks, *Bronze Age Warfare*, Sutton, 2000, p.141, Though Sarah Monks' work here is one of the only modern works to focus on the Mycenaeans for their military virtues, her work suffers academically from the fact that she does explain how she reached them. This appears to be typical of Osgood's chapters as well.
[78] Osgood and Monks, *Bronze Age Warfare*, Sutton, 2000, p.134
[79] Osgood and Monks, *Bronze Age Warfare*, Sutton, 2000, p.124
[80] Osgood and Monks, *Bronze Age Warfare*, Sutton, 2000, p.136

This conclusion, however, fits well with the depiction of the shields and weaponry according to more generalist authors such as Warry,[81] or scholars such as Castledon,[82] as being 'cumbersome', or of authors who use iconographic evidence such as Marinatos and Driessen, claiming the shields were never used for military purpose.[83] Other common conclusions have included that the shields were flat,[84] or are described as if they were used concurrently with equipment of later periods.[85]

Between 2000 and 2012, several new publications on Mycenaean civilization have emerged, the most notable of which has been the 2006 anthology *Ancient Greece: From the Mycenaean Palaces to the Age of Homer*.[86] This work, the combined effort of 33 leading authors in Mycenaean studies, stands as one of the leading works on Mycenaean civilization. Though focusing on the years of 1200 BCE onwards, and so outside the bounds of this thesis, it is based on extensive research and offers definitive studies on a variety of subjects. However, on matters of the military, across all thirty three articles, the most informative is Palaima who offers the most detail when he writes: "*…it is surprising how little attention is paid in extant documents to military organisation. There are no references to rations, bedding, etc., though such things are monitored for workers (for instance, PY Aa, Ab, Ad series; PY Vn 851; MY V 659)*." He offers no further interpretation of what this might mean. It is strange that little reference is given to this important area of Mycenaean history in even the most eminent of collections. In addition many publications continue to promote the ideas as presented by Osgood and Monks that the shields, swords and armour of the early Bronze Age were impractical or exclusively ceremonial in use.[87]

However, despite this dearth of attention in major studies and anthologies, since 2000 several articles and books have now been produced that focus exclusively on the Mycenaean's capabilities from a military standpoint. The most exclusive of these, focusing entirely on military matters, is Grguric, 2005.[88] While describing in detail his interpretation of the nature of warfare, the weapons of the time, and the shields, he also takes the time to examine prior interpretations and addresses the

[81] J. Warry, *Warfare in the Classical World*, New York, 2000, p18
[82] R. Castledon, *Mycenaeans*, USA and Canada, 2005, p. 118-119
[83] Marinatos, N., *Minoan Sacrificial Ritual: Cult Practice and Symbolism*. Stockholm, 1986, 52-58; J. Driessen, The Archaeology of Aegean Warfare, *Polemos: Le Contexte Guerrier en Egee a L'Age du Bronze. Actes de la 7e Rencontre egeenne internationale Universite de Liège, 1998.* Universite de Liège, Histoire de l'art d'archeologie de la Grece antique, ed. Robert Laffineur, 1999, pp. 11–20
[84] V. Hanson, Hoplite technology in phalanx battle, *Hoplites The Classical Greek Battle Experience anth*, edited by Victor Davis Hanson, London, 2000, p68
[85] R. Castledon, *Mycenaeans*, USA and Canada, 2005, p. 118-119; J. Warry, *Warfare in the Classical World*, New York, 2000, p18
[86] *Ancient Greece: From the Mycenaean Palaces to the Age of Homer*, edited by Deger-Jalkotzy, Sigrid; Lemos, Irene, Edinburgh, 2006
[87] R. Castledon, *Mycenaeans*, USA and Canada, 2005, p. 118-119; L. Schofield, *The Mycenaeans*, London, 2007
[88] N. Grguric, *Mycenaeans c. 1650-1100 BC*, Oxford, 2005

long held conclusion that shields were worn across the front of the body. His conclusions, which will be addressed later in Chapter 3, run contrary to those of Osgood and Monks and represent the first real attempt to interpret how the Mycenaeans may have fought in a practical context. Since then archaeologist Barry Molloy has challenged notions on the limited cutting ability of the so-called 'Mycenaean rapier', proving through practical demonstration that the sword was more than capable of cutting as well as thrusting.[89] Finally, the most recent publication by Howard in 2011 on Bronze Age warfare dedicates significant time to the Mycenaeans throughout the work and goes to significant lengths to separate evidence for early forms of warfare from later periods.[90] Though conservative in his interpretations, this work represents a crucial step forward in the study of the Mycenaean military as one of the few dedicated works on the subject.

In wider scholarship, these publications are not alone. In recent years a number of studies on Bronze Age and Neolithic technology have appeared which employ experimental testing as a tool for research.[91] Other colleagues of Barry Molloy, a group of scholars called Combat Archaeologists, have demonstrated a definite trend through their study of Bronze Age worlds. Outside the Bronze Age, studies such as Chris Matthew's research on Classical hoplites have shown that this trend is not only useful for pre-literature societies alone but can be a crucial tool in analysing societies for which we already know much about.[92] However, as Whittaker, an author on experimental studies, writes "*Current neglect of experimental archaeology is largely because archaeological theory is now more concerned with questions of social and symbolic interpretation, and with epistemological wrangling.*"[93] As the publications of Marinatos and Driessen show, it is for similar reasons that military studies have received such limited investigative treatment in major publications on Mycenaean warfare. Though the majority of scholarly publications still avoid discussion of investigative military studies, giving relatively little space to military matters, and often repeating the same few paragraphs word for word, the shift is beginning to take place.

[89] B. Molloy, Martial Arts and Materiality: a combat archaeology perspective on Aegean swords of the fifteenth and fourteenth centuries BC, *World Archaeology Vol.40(1)*, 2008, pp.116-134
[90] D. Howard, *Bronze Age Military Equipment*, South Yorkshire, 2011
[91] Whittaker, John, 2010, *Experiments and Interpretation of Traditional Technologies, Essays in Honor of Errett Callahan*, Argentina, Ediciones de Arqueología Contemporánea
[92] C. Matthew, *A Storm of Spears, Understanding the Greek Hoplite at War*, Philadelphia, 2012
[93] J. Whittaker, Getting a Grip on Bronze Age Swords: Statements and Questions in Replicative Experiments, *Experiments and Interpretation of Traditional Technologies, Essays in Honor of Errett Callahan*, Argentina, 2010, p.59

Literary Analysis: The Basic View of Modern Historians on the Nature of Mycenaean Warfare and the Function of the Mycenaean Shield

According to Osgood and Monks, Mycenaean full body shields comprised of three types of shields: the rectangular, the rectangular with a curved top, and the figure of eight design. The rectangular shields were made of perishable materials, specifically ox-hide over a wooden frame, were held by leather straps over the shoulder, were heavy, cumbersome, and curved around the body to afford good protection.[94] In 1993, Drews had said in regard to the figure-of-eight shields that they '*enveloped the warrior on three sides from neck to ankles, while providing some freedom of movement for the arms at the indentations*',[95] and in regards to the tower or half-cylinder shield that, '*the absence of arm indentations must have severely restricted his wielding of an offensive weapon*'.[96] Also in 2000, Hanson remarked in his article on the evolution and tactical use of the armaments of the Classical Greek hoplite that the preceding Mycenaean shields were "…*flat…*" and that "… *concavity, on balance, offered few real advantages either to individual fighters or to those who hung their shield from the neck."*[97] That same year, Warry recorded that "*Shields were body-length. They were suspended from a strap round the neck and knocked against a warrior's ankles as he walked. They were made of bull's hide and were plated with bronze."*[98] More recently in 2005, Grguric, who also notes that many tower shields appear to be flat, records: *"…If a warrior tried to run with such a shield while still holding his spear with both hands, the former would bounce around very awkwardly, banging against his arm, lower face, and particularly, his shins*"[99] and when discussing the implications of this he states: "*Standing alone, his movement is clumsy and slow because he is hampered by his large shield and his long spear.*"[100] Castledon in 2005 records that, "*Both the figure-of-eight and the tower shields must have been very unwieldy*".[101] Finally, in Blakolmer's interpretation of the Battle Krater,[102] both the tower shields and figure-of-eight shields of the battle krater are

[94] R. Osgood and S. Monks, *Bronze Age Warfare*, Sutton, 2000, p125
[95] R. Drews, *The End of the Bronze Age, Changes in Warfare and the Catastrophe C.1200 BC*, Princeton, 1993, p.178
[96] R. Drews, *The End of the Bronze Age, Changes in Warfare and the Catastrophe C.1200 BC*, Princeton, 1993, p.178
[97] V. Hanson, Hoplite technology in phalanx battle, in *Hoplites The Classical Greek Battle Experience*, edited by Victor Davis Hanson, London, 2000, p.68
[98] J. Warry, *Warfare in the Classical World*, New York, 2000, p.18
[99] N. Grguric, *Mycenaeans c. 1650-1100 BC*, Oxford, 2005, p.10
[100] N. Grguric, *Mycenaeans c. 1650-1100 BC*, Oxford, 2005, p.15
[101] R. Castledon, *Mycenaeans*, USA and Canada, 2005, p.121
[102] See Appendix III, Fig. 10

depicted in his reconstruction as flat,[103] and as Ballard writes, *"Other works assessing the Mycenaeans between 1600 and 1200 BCE, often do not mention the Mycenaean shields at all*."[104]

The only conclusion that is common across all of these varying interpretations is that the Mycenaean shield was a cumbersome and unwieldy tool. Though other conclusions are reached by individual authors, very little else is common. Some authors have come to the conclusion that the shield was either primarily a religious icon, or was never used in battle at all.[105] Certainly, the descriptions of disadvantages to the bearer by either restricting movement or 'banging' against the shieldsman that the shield was a hindrance and burden to the wearer. With no other unison in scholarly opinion regarding these shields, the common belief in the cumbersome and unwieldy nature of these shields leads to the general, but ambiguous, understanding that the shields were of limited use in warfare, without any real studied explanation as to why beyond opinion.

This situation, however, is not only apparent in the discussion of shields, but also of military matters as a whole. Driessen in 1998 was recorded at the introduction to an international conference as saying: "…*the Linear B tablets provide us with rich information as to the production and issue of weapons, the rationing and deployment of military troops and even the use of mercenaries and captives."*[106] However no such richness of information or direct evidence for the rationing or deployment of troops is cited by Driessen. Nor can any use of mercenaries be found in recorded documents, as highlighted by Palaima in 2006, quoted earlier.[107] Even as recently as 2007, Chadwick one of the leading researchers in Linear B documents, reported that "*no document records the existence of an army*".[108] These statements, referring to the whole of the Mycenaean period from 1600-1060, are especially important for the centuries of 1600-1300 where documentary evidence of

[103] F. Blakolmer, The Silver Battle Krater from Shaft Grave IV at Mycenae: Evidence of Fighting "Heroes" on Minoan Palace Walls at Knossos?; *Aegaeum* vol. 28, 2007
[104] R. Ballard, *Mystery of the Ancient Seafarers*, 2004, p.169
[105] This sentiment is the primary conclusion of historians such as P. Rehak, *New Observations on the Mycenaean Warrior Goddess*, AA, 1984, pp535-544.; N. Marinatos, *Minoan Sacrificial Ritual: Cult Practice and Symbolism*. Stockholm, 1986, pp52-58; G. Mylonas, *Mycenae and the Mycenaean Age*, Princeton, 1966; L. Morgan, *The Miniature Wall Paintings of Thera: A Study in Aegean Culture and Iconogoraphy*, New York, 1988 and J. Driessen, The Archaeology of Aegean Warfare, *Polemos: Le Contexte Guerrier en Egee a L'Age du Bronze. Actes de la 7e Rencontre egeenne internationale Universite de Liège, 1998.* Universite de Liège, Histoire de l'art d'archeologie de la Grece antique, ed. Robert Laffineur, 1999, p19
[106] In this same article Driessen writes "*…as for instance the chariot, we may assume that this kind of equipment was mostly issued by the central authority and did not form part of the personal equipment of the warrior."* See The Archaeology of Aegean Warfare, *Polemos: Le Contexte Guerrier en Egee a L'Age du Bronze. Actes de la 7e Rencontre egeenne internationale Universite de Liège, 1998.* Universite de Liège, Histoire de l'art d'archeologie de la Grece antique, ed. Robert Laffineur, 1999, pp15-16
[107] T. Palaima, *Wanaks* and Related Power Terms in Mycenaean and Later Greek, *Ancient Greece: From the Mycenaean Palaces to the Age of Homer*, Ed. Deger-Jalkotzy, Sigrid; Lemos, Irene, Edinburgh, 2006, p7
[108] J. Chadwick, *The Mycenaean World*, Cambridge, 2007, p159

any kind is universally scarce. It is evident, however, that as of 2012 there is no authoritative work on the Mycenaean military.[109]

Religious v Military Significance

> *It is a common phenomenon that some otherwise physically functional items can also be 'symbols' (any type of sign), as, for instance, a physically functional sickle can denote revolution. If, however, their primary purpose is communicative (i.e. 'symbolic'), and is not directly related to their function, then the latter might fade over time*.
>
> E. Kyriakidis, *Ritual in the Bronze Age Aegean*, London, 2005, p.47

What was the extent and nature of the religious function of the shields, and if they had such a function to what extent would this restrict investigation into their military function? It is beyond question that the shield held symbolic and ritual value, for protection and as a representation of manliness respectively.[110] It is also possible that this value superseded its use as a defensive armament. However, without further scrutiny, it cannot be concluded that the shield possessed no military function. In brief, this section addresses the debate which revolves around the question of how many of the historic shields, both in iconography and as actual artefacts, were purely ceremonial in design and intent. If the conclusion is that all recorded shield depictions (and by theoretical extension, all Mycenaean shields) were purely cultic in intent, then the question of what evidence can possibly be gleaned for Mycenean fighting styles, has to be discussed.

Paul Rehak states this point quite well when he writes '*…although representations of weapons abound, a majority of these may be purely decorative*'.[111] Research by the present writer has confirmed this, with a significant portion of all available frescoes and pottery images depicting the shields outside of battle either hanging off a wall or in what looks like a cultic setting.[112] It is beyond a doubt that some, though perhaps not the majority, of images depicting Mycenaean weaponry are

[109] At current, the most in-depth study of Mycenaean warfare of any period is N. Grguric, *Mycenaeans c. 1650-1100 BC*, Oxford, 2005.

[110] N. Marinatos, *Minoan Sacrificial Ritual: Cult Practice and Symbolism*, Stockholm, 1986, pp52-58; Paul Rehak also began what could have been a very illuminating piece about ritual significance of the shield in regards to women before his death, unpublished it is available online at http://kuscholarworks.ku.edu/dspace/bitstream/1808/5247/1/Rehak_UnpublStudies.pdf

[111] P. Rehak, New observations on the Mycenaean warrior goddess, *Archaologischer Anzeiger*, 1984, p538

[112] One example is a Plaque from Mycenae (Fig.15) on display at the Athens National Museum (2666), depicting a shield worn by what is interpreted as a warrior goddess between two adoring women. P. Rehak, New observations on the Mycenaean warrior goddess, in *Archaologischer Anzeiger*, 1984, p535-544. Also worthy of note is N. Marinatos, *Minoan Sacrificial Ritual: Cult Practice and Symbolism*. Stockholm, 1986, pp52-58.

cultic or decorative in nature.[113] However, to suggest that the actual Mycenaean shields, particularly the figure-of-eight shields, were solely religious in function is to ignore a majority of seals and other images depicting these shield designs in use as military weapons.[114] Although undoubtedly, many pottery depictions of these shields are decorative in nature this does not therefore imply that the shields they depict were equally as decorative or purely ceremonial. Any depiction of a shield made for or used in cultic practice could arguably also have been used functionally as a weapon of war.

When it comes to any body of evidence scholars must always consider what the individual piece is trying to tell us about what is intended, without adding either personal bias or external assertions at the risk of biasing any interpretation.[115] As a colleague of mine once commented in regards to the interpreting of historical fencing manuals, 'we must let our mind go blank and let it tell us what it's trying to say'. This is as true for the study of military literature as it is in the study of military iconography and any religious bias in the artwork must be proven rather than assumed. On this basis, it is quite possible that that the depiction of these shields in hunting scenarios was a symbolic part of the cult rather than an accurate depiction of a historical hunt is arguable, though this does not lead to conclusion that such hunts did not, or could not, have happened.

However, as Marinatos, a staunch advocate of the cultic shield theory, writes, it is the natural assumption of historians when dealing with the Mycenaean shield to assume first and foremost that it is a form of war equipment.[116] Considering the nature of the term 'shield', its depiction in the Mycenaean context and the common knowledge that a shield is a weapon, it is understandable that such an assumption can and will be made by most readers. However, it must not be forgotten that religious function can, and in this case may, be more important than any military function.

Even so, if the cultic theory is proven as correct, many of the surviving shield depictions on rings and pottery quite clearly show these objects, both tower and figure-of-eight shield types, in active use in battle. Must it therefore be assumed that these depictions are all related to cult and ritual? Most of the essentially cultic depictions, such as the stucco plaque,[117] only show the figure-of-eight if they depict a shield at all.[118] Yet outside of cultic imagery, both shields are depicted together in scenes of

[113] Mylonas appears to have summed this up best in *Mycenae and the Mycenaean Age,* Princeton, 1966,
[114] L. Morgan, *The Miniature Wall Paintings of Thera: A Study in Aegean Culture and Iconogoraphy*, New York, 1988.
[115] This colleague was at the time discussing how to read and interpret renaissance fencing manuals, however I find his approach to be equally valid and useful in all areas of academic inquiry.
[116] See N. Marinatos, *Minoan Sacrificial Ritual: Cult Practice and Symbolism*. Stockholm, 1986, p52
[117] See Appendix III, Fig 15.
[118] One of the only representations of a tower shield in such a cultic setting has been questioned by N. Marinatos, *Minoan Sacrificial Ritual: Cult Practice and Symbolism*, Stockholm, 1986, pp52-58 who proposes

hunting and battle. This implies that the tower shield, from its distinct lack of cultic imagery, and the figure-of-eight, from its constant presence in battle scenes, should suggest that they were at some point considered war shields, even if also as cultic icons, and that this may have lasted for several hundred years.

In anthropological studies, the term 'ritual' has been used as '*…a catchall designation for anything which defies a crudely utilitarian explanation*'.[119] If these shields were weapons of war then it seems likely that they had an active military function during the Bronze Age. This seems highly likely given the dominance of these shields in battle scenes and a lack of any other designs to replace or contest them until the 14th century BCE. It is also difficult to conceive of them as being either symbolically 'protective' or 'masculine' unless they also had a military context. If they were not effective enough in warfare, it would appear surprising that achieved this role, or that they were not immediately replaced by a different design, despite the many non-Aegean shield variants available in the same historical period. Though scholars must still take into account the question of artistic license and cultic practice in their interpretation, the evidence supporting military function is strong enough to allow us this interpretation.[120]

However, another perspective must be considered. Whittaker, writing on the religion of the Middle Helladic, states, "*In all, however, the Middle Helladic period seems to have been lacking in religious symbolism and in specialised cult equipment. This lack of religious elaboration in itself suggests that in the Middle Helladic period religious activity did not play a significant role in validating claims to status and power*."[121] Developing this argument further, she concludes that socio-political dominance in the Middle Helladic was maintained by military rather than religious power. Religious symbolism, according to her assessment, first establishes itself during the Shaft Grave period. If Whittaker's assessment is accurate, then it is possible that the shield's military function predates the religious symbolism that later became associated with it.

Though the figure-of-eight – by far the most commonly represented shield in these cultic examples – may have become an entirely cultic icon over time, it presumably had in its original and contemporary form a military role between 1600 BCE and approximately 1300 BCE, the earliest and

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that it is in fact a cloak and represents a feminine part of what would otherwise be a male revitalisation ritual.

[119] C. Richards and J. Thomas, Ritual Activity and Structured Deposition in Later Neolithic Wessex, *In Neolithic Studies: A Review of Some Current Research*, edited by R. Bradley and J. Gardiner, 1984, p189

[120] For the relationship between hunting scenes and cultic practice see N. Marinatos, *Minoan Sacrificial Ritual: Cult Practice and Symbolism*, Stockholm, 1986, pp52-58

[121] H. Whittaker, Reflections on the Socio-Political Function of Mycenaean Religion, *Aegaeum 22*, 2001, p1

latest examples of the shield type. This is not simply based on the existence of various battle images on both rings and pottery, but also on the assumption that its value as a masculine cultic device stems from a tradition of being functionally used by men as a defensive object. On this basis, regardless of whether the figure-of-eight was or was not a cultic object in its later life, the military application of this shield design is no longer in question. Therefore, on the assumption that the potential cultic use of the shield was not mutually exclusive to that of military use, this discussion will consider the military function of the weapon, however historically widespread its use might have been. The symbolism and prevalence of the shield in cultic ritual shall be left to more specialist scholars in those areas.

Design Interpretations on the Generic pre LH IIIB2 Shield Types

In regards to attempts of analysing and understanding the design of the Mycenaean shields go, there have only been a handful of attempts. Two of these were published together in 1939 by Myres and Love focusing primarily on the figure-of-eight shield,[122] and a third attempt by Nicolas Grguric, mentioned earlier, which will be discussed in detail in Chapter 3.

According to these authors, there are several types of shield designs dating between the LH IIa and LH IIIB2 recorded from Mycenaean imagery.[123] The first is the tower shield, a large rectangular shield with a curvature on top, similar in shape to a parenthesis on a European keyboard. This shield is covered by a layer of hide. It is rimmed by an unknown material along the top edge in all images, while in some it is also rimmed along the edges of the entire shield face. A comparison of source images shows that this shield was deeply curved, presumably enough to conceal both the left shoulder – if the warrior was right handed – and the back, and possibly the right shoulder as well if worn strapped against the body. Painted or engraved images seem to show this shield being worn via a chest strap and interchangeably depicted on either the front or back of the body.[124] In these images both hands are either free, implying the shield is kept in place solely by the chest strap, or with only one hand visible holding the spear and the other concealed by the shield. This leaves open the possibility of deducing an internal hand grip, though there is very little other evidence to support this suggestion. The dominant depiction is of a strap worn armament with one arm sometimes out of

[122] J. Myres, The Structure and Origin of the Minoan Body Shield, *Man*, Vol 39, 1939, pp.36-40; A. Love, The Shape and Physical Qualities of the Minoan Shield, *Man*, Vol 39, 1939, pp.40-42

[123] Readers should note that the crescent style shields of the Mycenaean Warrior Vase, the oblong shields of the Mycenae Palace, and the variety of Persian-type designs discovered on Mycenaean pottery fragments are all dated post LH IIIB2.

[124] See for example Appendix III, Figs. 8 and 10

view. This rectangular tower type of basic shield design is one of the two most commonly depicted from the Mycenaean region.

The second shield type is the figure-of-eight shield, (also known in other literature as the 8-shield). From the front it appears to look like a figure-of-eight, occasionally with a wooden boss, occasionally interpreted as an elongated boss, running vertically through the centre. Viewed from the side it is deeply concave like two bowls face down, approximately to the same degree as the tower design. Like the tower shield, it is rimmed by an as yet unidentified material. But unlike the tower shield some surviving jewellery has led to speculation that these rims are flat and protruding perpendicular to the shield in a similar manner as later hoplite shields.[125] In the pictorial evidence this shield is often depicted worn with a chest strap, or, like the tower shield, shown with one hand hidden and the other holding a spear. Though there are some images depicting the shield used with a sword, both hands are typically visible in these images with the shield worn solely by strap. Again, the while possible, the implication of a solid grip or hand strap is still by no means certain. The long solid boss occasionally depicted could imply a form of hand grip on the inside, or it could be a split in the leatherworking technique, or it could be a structural improvement showing a difference between cheap and expensive designs. This is the most common shield image of the pre LH IIIB2 period, depicted on more pottery and on more jewellery than both the other shield types combined.

The third shield type is the half-tower, a shield type otherwise identical to the tower variant but half as long. Only two depictions of this shield appear to exist, and one, assessed here first, is speculative at best. The first comes from the Silver Siege Rhyton, a silver drinking or libation vessel discovered in Shaft Grave IV, Grave Circle A by Heinrich Schliemann at Mycenae. It was discovered along with the more published Lion Hunt Dagger and the less well published Battle Krater. On this rhyton two soldiers are marching with what may be spears in their right hands and wearing what look to many scholars like tower shields hanging over the chests.[126] These shields, however, cannot be tower shields as they are clearly half the size of the regular variants. However, if not shields, they may simply be tunics pinned up over one shoulder in the style of Classical Greek clothing. This latter explanation is considered more likely by the author as the 'shields' appear to fold and do not follow the same design patterns as the tower shield. If they are shields, the left and right hand of at least one of these soldiers is visible leading to the conclusion that these 'half-tower' shields are being worn

[125] See for example Appendix III, Figs. 11 and 24.
[126] The image is too faded to be conclusive regarding the spears but an unexplained pair of lines protruding from the hands of these individuals could be interpreted.

via a chest strap rather than held by hand. If they are not shields but are simply tunics then the 'siege rhyton' most probably does not depict a siege at all.

Our only other depiction of the half-tower shield comes from a seal stone from Knossos dated to the Late Minoan Ia period. This image clearly shows a shield much smaller than the traditional full-body tower shield. It is being held by hand with a single spear or possibly a pair of javelins on the wielder's back.[127] Though this shield has a clearly defined rim along the top, it is otherwise noticeably without rimming along the sides or base. This shield is the only clear instance of a pre LH IIIB2 shield being manipulated by hand, but without a solid depiction of the inner facing, it cannot be concluded whether this is evidence for hand straps, grips or bunching up the chest strap behind the shield to fit inside the hand. This is also the only definitive evidence for a third half-tower design, and may not be representative of the other larger shield types.

The fourth design is expanded on by the author on the basis of the compilation of the research in Chapter 3. As part of this research, two types of figure-of-eight shields are investigated, those with a 'keel' and those without. Based on their appearance in the archaeological record, they are divided distinctly into two different designs and purposes, with one, the 'keel' design, being entirely symbolic in function and the other, without keel, being entirely military.[128] Though of no obvious difference in design barring this strip through the middle, the design is frequent and notable enough to be included as a point of interest.

Chapter 2 Summary

The views of scholars on Mycenaean society have ranged from perceiving them as a highly belligerent society, inspired by bloody Homeric tales, to a society of religion and ritual. Whereas in the early part of the 20th century it was difficult to find a text that did not speak of the Mycenaeans as if they were highly militant, in the late 20th century it becomes difficult to find one willing to talk on the military in serious detail, even going so far as denying their weapons any military function. By 1999, modern authorship had suggested at least once that the swords and daggers of the time, the same kinds that archaeologist Barry Molloy experimented with, were nothing more than tools of meat processing, and that the large tower and figure-of-eight shields, despite the overwhelming pictorial evidence, could not have been used for fighting or hunting due to being too 'cumbersome' and 'religiously significant'.

[127] Appendix III. Fig. 1

[128] It is worth noting that every image identified as being 'cultic' by Rehak and Marianatos involved shields with the keel, and all images of these shields depicted in battle exclusively do not depict a keel at all.

As for questions of design and practicality, the belief of modern historians that the shields are flat, or that either shield type possesses a handle appears to be mistaken. No evidence survives indicating that any shield design of the period were either flat, and the only potential evidence for a handle could just as easily be a chest strap. In any case, no direct evidence exists that supports this conclusion. The four shield designs – tower, figure-of-eight, the unconfirmed half-tower and the keel – each follow the same basic design of being highly concave and worn by chest strap. The duration to which they survived in military depiction should also attest to some level of functionality. It would appear that the society of the time believed wearing these supposedly cumbersome shields was better than entering battle without them. This alone should make us question any notion of the shields being 'cumbersome' or impractical to use, or if not, should force us to consider what other benefits these shields may have had.

In conclusion , modern historical opinion of these shields has been greatly jaded in favour of dysfunction. The emphasis on religion and ritual, the menial and mundane and the persisting desire of historians to not study these weapons in a military context distracts us from the truth of military affairs. This truth is that the shields must have been considered functional in order to not have been replaced for nearly three hundred years. If they were used in the ways of religion and menial use, they were used only in conjunction with their purpose at warfare. If the religious and menial purpose was primary, then it cannot be argued that the 'other' use was anything other than an important secondary role. Though undoubtedly modern perception will change, it must never be forgotten that the role of the military was an important one in Mycenaean society.

Chapter 3: Military Affairs and Social Stratification

This chapter will provide an overview of the technology of the Mycenaean warrior and a discussion of the related elements of Mycenaean society in order to outline how the Mycenaean military could possibly have functioned as an institution. This will look at what divisions and components there were, how the military was viewed by society and how men and resources were probably organized.

Use of Evidence[129]

As has been discussed in prior chapters, the historical evidence for any century of Mycenaean Greece is relatively scarce. Though scholars have written much about the Mycenaeans, much of the information covers a broad spectrum of dates and times and there are no literary sources on which to rely. For the military during the period of 1600-1350 BCE, the only real evidence comes from seals and pottery shards, almost all of noble origin, and mostly discovered in the Shaft Graves of Mycenae. 1350 BCE was the approximate date of the military 'revolution' in which from worn shields changed to hand gripped shields and greaves. From 1350 BCE onwards, there is a rise in the available physical evidence for the military via the construction of permanent fortifications, watch towers, and some administrative records accidentally preserved for posterity, though these records offer only limited clues to the later thirteenth century and not to earlier periods.

However, it is possible that the institutions and structure of the military in the late thirteenth century may be traced back to earlier times and possibly reflect aspects of military organisation that predate the construction of the fortifications and towers. Though direct confirmation is impossible, indirect evidence may allow extrapolation that could date back to as early as 1400 or 1500 BCE, if not earlier. By investigating such factors as the social organization of the later periods, and the weapons and

[129] It is important to note that the value of armaments as a means of assessing warfare has recently been brought into question by Philip Sabin in his work 'Lost Battles'. Here he dismisses its value entirely, along with a variety of other scholarly research approaches such as Watley's Five Aids and the school of historiography. He instead promotes the idea that considerations of morale, skill, discipline, cohesion, and reputation are to be considered over and above weaponry, formations, numbers and fighting style. Though it is hardly appropriate to discuss this in more detail here, it is this author's opinion that while morale, skill, discipline, cohesion and reputation mean much when opponents are otherwise evenly matched, they are of little value when one side possesses only wooden spears, and the other side is armed with shields, body armour and bows, or more dramatically with only javelins when fighting against Spartan hoplites, a fighting style that worked repeatedly during the Peloponnesian War. It is notable that Sabin's dismissal of the value of both practical and disparate sources, as well as his dismissal of anything measureable, is not a solitary event and other notable scholars have abandoned adding practical or comparative components to their research in order to supplement their personal biases and beliefs. Such approaches to historical study, however, are useless when studying periods of history that are devoid of literary sources about the event.

armaments themselves, a tentative picture of the structure of Mycenaean society may be drawn for consideration. This will be investigated throughout the subsequent chapter.

Mycenaean Society and Mycenaean Military Culture

Knowledge of a society's culture can reveal much about how that culture perceived the world around them. Historians know, for example, that the Egyptians paid considerable attention to matters of death and afterlife as evidenced by their extensive and rich burial practices. Hypothetically, this same process of drawing indirectly upon evidence can be applied to matters of warfare. If nothing else were known about the ancient Greeks, for example, the *Iliad* would tell us that culturally they considered long range archery as less prestigious than melee warfare, which may have affected their military practices. If only singular examples of a hoplite's panoply were known, without recourse to literary documents, it would tell us that the Greek warrior placed an emphasis on melee combat and high quality armour.[130] This supposition might then suggest a form of pitched warfare, rather than commando or guerrilla tactics, evidenced by this choice of equipment. In contrast, if nothing more were known about the Romans, the prevalence of Roman forts all across Europe and their style and efficient construction would provide evidence of their strategic control of territory, discipline in construction and high degree of overall organisation and co-ordination. From such literary and archaeological finds, a basis for future investigation into how these classical cultures conducted warfare could be provided. In these cases, thanks to the wealth of surviving sources, historians do not have to rely on broad hypotheses to draw conclusions.

It is unfortunate then, in terms of investigation of the army, that very little is factually known or verifiable about Mycenaean culture and there is no 'wealth' of surviving sources. Unlike other cultures, where inferences can be made from their literary and documentary records, there are few surviving documents for the societies of the Bronze Age Aegean. These are also often not contemporary to one another, and often survive only via accident.[131] When attempting to analyse the military of Mycenaeans directly, only the later period can be investigated via Linear B, and the best sources of these are disparate administrative records. In brief, the researcher must rely almost entirely on a sparse few Linear B texts, including a stock-take of goods from Tiryns, a series of tablets discussing the distribution of watch towers around the south western coast from Pylos, and other

[130] A similar argument is posed by the author in an unpublished article on Classical Greece to explain the decline of the Corinthian helm and bronze armour due to a growing tradition of mass-production.
[131] Many of the Linear B that has survived since is the result of historic acts of destruction resulting in the clay tablets being baked and unintentionally preserved.

similar tablets found in Knossos.[132] A short review of the complications involved with using these sources follows.

Each of these documentary sources date after the military revolution of 1350, and certainly after the fortification of Mycenaean Greece, thus appearing after at least two fundamental changes in the nature of warfare had occurred. The thirteenth century was thus a time with different expectations on how war should be organized and fought. In regards to the tablets themselves, there is also no guarantee that the inventories, containing much more than simply weapons and armour, were in fact related to military organization. It is possible that they were a trade record, or served another unknown purpose entirely. The watch towers and deployment of men in the Pylian and similar Knossan tablets are certainly militarily inclined, though, as noted, they do not necessarily offer reflections on earlier periods of organization. Though some implications can be drawn, there is no variety of sources to draw from and no literary sources with which to verify conclusions.

As a result it would seem at first to be impossible to begin considering how the Mycenaeans may have fought, or even perceived warfare, on the basis of documentary sources. At present, historians do not know what part the military played in society, or how emphasised the impact of military activity may have been on their daily routines. Historians also do not know whether Mycenaean Greece was a warrior culture, a part time soldier culture, or at best a militia culture,[133] or how much of the society's income through government taxation or personal expense went into financing the military.[134] At this point, scholars cannot even be certain whether the military was an enterprise run and financed by the state during the time of intense fortification, as was common for the city-based Middle East, or merely directed by the state, as was common for Hellenic Greece and the more tribal communities of Europe. It is possible, judging by the prevalence and location of warrior imagery on seals and other artefacts in the early period, military matters were considered important among the ranks of nobility. It is not known however whether the populace had a say in military matters, or whether the images depicted represented an imagined ideal of combat rather than actual practice.

[132] Though similar to the Tiryns and Pylian tablets in content, these Knossan tablets may not be an accurate reflection of Mycenaean Greece and so will only be used for supporting evidence where evidence appears to correlate.

[133] The difference between soldier and warrior cultures, as defined in personal discourse by historian and educator Nigel Davies, is that a soldier culture sends its people into a year or more of mandatory training and service, often once the person has reached legal age. Warrior cultures, such as the Spartans, European knights or Samurai, begin their training at youth, typically at 7 years, and an individual's life is centered around war and warfare as their dominant pursuit. The term militia culture, provided by the author, is where men may be called to service, with all matters of training being the responsibility of the individual. These are both different from a soldier culture which is state funded.

[134] John Chadwick concludes that the lack of records indicates that warriors were expected to finance the equipment themselves. J. Chadwick, *The Mycenaean World*, Cambridge, 2007, p173

Only one definitive record of militarily related activities sourced from Mycenaean Greece has so far been found, the tablet discovered in Pylos. It has been generally agreed by scholars that this tablet shows the distribution of watch towers for defence against seaborne invasion, concluded on the basis of their prominence overlooking several key areas along the western coast. Similar conclusion is reached for the correlating tablet from Knossos.[135] Each tower holds a contingent of 300 troops, presumably divided by region of origin,[136] accompanied by what has been interpreted as a nobleman.[137] As the tablet was discovered in the palace of Pylos, this implies some level of involvement or record keeping by the government. It is difficult, however, to interpret this information without further context.

Whatever military connection, if any, and the implications of government run organisation is not as concrete or as informative as the word 'watch tower' might at first make it sound.[138] It is not enough to say that a watch service indicates an organised and effective military institution, or that it implies trained men. It has been argued, primarily by Driessen, that there is some evidence from naming conventions to support the notion that foreign mercenaries or perhaps war slaves were used in the military.[139] Though a valid interpretation, the suggestion that a major portion of the defence against seaborne invasion would be manned by either war slaves or mercenaries and not by citizens requires more explanation than Driessen supplies.[140] Even if Driessen's conclusion were accurate, there is no evidence to support the argument that the watch towers were manned by men of mercenary or war experience or training simply because they were on watch. Fourth-century Athens, for example, had an age group called *epheboi* who were tasked with city guard duties.[141] These Athenian boys, who

[135] J. Driessen and C. Macdonald, Some Military Aspects of the Aegean in the Late Fifteenth and Early Fourteenth Centuries B.C., *The Annual of the British School at Athens, Vol. 79*, 1984, pp49-56, for alternate views see J. Hooker, The end of Pylos and the Linear B evidences, in *Studi Micenei ed Egeo-Anatoloci (*SMEA*) Vol 23*, 1982, p209-217

[136] J. Driessen and C. Macdonald, Some Military Aspects of the Aegean in the Late Fifteenth and Early Fourteenth Centuries B.C., *The Annual of the British School at Athens, Vol. 79*, 1984, pp49-56

[137] One tablet from the *Room of the Chariots* in Pylos lists a potential total of 368 men, including 'officers'. J. Driessen and C. Macdonald, Some Military Aspects of the Aegean in the Late Fifteenth and Early Fourteenth Centuries B.C., *The Annual of the British School at Athens, Vol. 79*, 1984, p50

[138] Thanks to the translation of Linear B historians generally agree that these are watch towers due to the use of the term 'watchers' to describe the people who worked there. J. Chadwick, *The Mycenaean World*, Cambridge, 2007, p175

[139] J. Driessen and C. Macdonald, Some Military Aspects of the Aegean in the Late Fifteenth and Early Fourteenth Centuries B.C., *The Annual of the British School at Athens*, *Vol. 79*, 1984, p50

[140] Nevertheless this does not prevent Driessen from referencing himself in future articles as conclusive evidence despite the lack of such evidence. See J. Driessen, The Archaeology of Aegean Warfare, *Polemos: Le Contexte Guerrier en Egee a L'Age du Bronze. Actes de la 7e Rencontre egeenne internationale Universite de Liège, 1998.* Universite de Liège, Histoire de l'art d'archeologie de la Grece antique, ed. Robert Laffineur, 1999, pp. 11–20

[141] Lycurgus, *Against Leocrates*, 1.77

were recruited from the tribal units of Athens, were expected to man the walls of the city and watch for incoming threats. The duty described, and the fact that Athens organized its people via tribal units, could easily be considered as similar to the basic organisation of the Pylian tablet. Without literary sources it could be easy to misconstrue the tribal units of Athens as mercenaries or war slaves in the same way that Driessen asserts for Pylos. Alternatively, a historian of Sparta may consider these watchers in the same manner as the Spartan *helots*. However, having drawn this parallel, Van Wees has recently confirmed through extensive studies of the sources that the military training of the *epheboi* of ancient Athens did not begin until circa 326 BCE.[142] Even during the height of the Peloponnesian Wars training was not part of the Athenian system, and the boys of the watch were not obligated to participate in battle. If these Mycenaean towers were organised like the city watch of Classical Athens, then it cannot be assumed that they represented the military of Mycenae, as Driessen presumes, and it cannot be assumed that the organization of the watch reflects an organization of the military.[143]

What is clear, however, is that the palace of Pylos had, at least, a measure of involvement in the superintendence of the coast as the tablets were part of an administrative record. The precise level of involvement is unclear. Were these tablets simply a record for administrative use of what local communities were doing, such as the Domesday Book of medieval England, or was it an up to date report used for issuing orders? Were the men of the watch untrained civilians, a volunteer militia, professionals or mercenaries? If mercenaries, who paid them and guaranteed their allegiance? If civilians were they given military training during their watch? Were they expected to fight when an enemy was spotted or just send a chariot to raise the alarm? What position did they have in society? Was the task respected or considered a mandatory service? Were they issued with equipment or did they have to purchase their own? Equally, were the towers the financial responsibility of the palace to maintain, or the responsibility of local communities, and what impact would this have had on the number of troops the palace or local communities could support in time of crisis? Do the men of the watch represent the men of a standing army, and if so should it be assumed that Pylos was only able to field a few hundred men, potentially untrained, who were scattered across the coast, or was Pylos able to support these men and also a trained army of thousands? Each of these questions affects the nature of any interpretation and are vital for establishing the values and strengths of not only the army but also of the military perceptions of the culture surrounding it. At current, the Pylian and Knossan tablets offer no answers to these questions.

[142] H. Van Wees, *Greek Warfare Myths and Realities*, London, 2009, p94

[143] See J. Driessen, The Archaeology of Aegean Warfare, *Polemos: Le Contexte Guerrier en Egee a L'Age du Bronze. Actes de la 7e Rencontre egeenne internationale Universite de Liège, 1998.* Universite de Liège, Histoire de l'art d'archeologie de la Grece antique, ed. Robert Laffineur, 1999, pp. 11–20

Nevertheless, though the record of watch tower distribution may be nothing more than documentation of locally supported outposts, it does show a level of organisation by the palace of Pylos in recording such matters, at least in the thirteenth century. In similar fashion the administrative catalogues of the Mycenaean world, including such diverse items as metal ingots, tax forms, swords, armour and chariot parts, show a level of administrative organization, even if it is not a military one. Though they offer little context for these items, or how these documents were intended to be used, they and other Linear B inscriptions do provide an excellent source for the study of Mycenaean language, and by extension the study of culture through linguistic nuances.

Studies on the prevalence of military related words in Linear B texts, such as word roots and personal names, has uncovered a large proportion of words attesting to the social importance and linguistic frequency of military matters.[144] One study in particular deserves interest, that of the onomastic study by Palaima.[145] In this study, Palaima concludes that military matters were a cornerstone of noble life, with their position in society interlinked heavily with their duty to protect and take part in battle where necessary. Through this he argues that success in military affairs would have been a way to increase status and prestige.

This study suggests that military matters were relatively prominent in Mycenaean society.[146] Even a conservative analysis, dismissing many terms wherever possible as irrelevant, provides a significant sum of words relating to the military, particularly among personal names. This includes a significant number of names derived from the root *alk*- meaning 'fighting spirit', suggesting that it was a point of honour among the ruling elite to have a name associated with the military. Palaima concludes that this probably means that social progression in Mycenaean society could be achieved and held through the conduct of war. The conclusion he makes from these documents is that in the fourteenth and thirteenth centuries there was at least a social importance in overall Mycenaean society for war, though at this time there is no telling the exact extent and whether it rose or fell throughout their history.

[144] Bernabe, Estructura del lexico micenico sobre el carro y sus parties*, Atti e memorie 2, vol. 1* p195-207
[145] T. Palaima, "*Mycenaean militarism from a textual perspective. Onomastics in context: Lawos, damos, klewos*", Texas, 1999
[146] Palaima does not attempt to prove that the Mycenaeans were militaristic, merely that the ideal of battle and warfare were important in society.

This, when combined with the other studies on towers, suggests an association of the military with other major facets of noble life. The expansion of Bronze Age fortifications, detailed by Osgood,[147] suggests a concern by the social elite with military matters. Certain male graves, mostly from before the fortifications, are associated with weapon finds, with votive items and signet rings depicting scenes of hunting or battle.[148] These finds indicate, but do not of themselves confirm, that military concerns were considered of importance to the elite throughout Mycenaean history. The depiction of warrior scenes on seals and the weapons found in graves may also suggest that martial prowess had a role of some importance within society and are associated with prestige. The prestige associated with weapons in grave finds will now be investigated.

Swords and daggers come in two varieties, the ornate and the clearly functional. Though being ornate does not necessarily limit a weapon's functionality, the more heavily embellished the weapon, such as the Lion Hunt dagger, the greater the focus on status and luxury rather than combat in itself. There are, however, many more functional swords and daggers than there are decorative designs. It is notable that spears, despite being simpler and easier to make, are notably rarer among the grave goods.[149] This has been taken by some historians to imply that the spear was a less prestigious item than the sword and thus more likely to be used by a lower class of warrior. This would thus infer a distinction between noble warriors and common warriors. It is notable that though spearheads have been found in the Shaft Graves, no burial has been found with a spear as the sole weapon buried with the warrior.

When added to the association between personal names and the military, it becomes difficult to deny that the military was a prominent part of noble Mycenaean society. It could be that the legitimation of noble authority was based on military strength, which in death could be reflected by their high status burials, or that success in military matters was used for determining social status. Such an argument could be drawn from the Shaft Grave period, and the inclusion of weapons and bronze armour in burials, to the later development of Mycenaean fortifications, potentially revealing a continuity in culture across the centuries. However it is also likely that as Mycenaean Greece fortified and began leaving evidence of significant social organization, old notions of martial strength that were reflected in the physical tools of war may have been replaced by other means, such as through the ownership of prestige goods. Driessen in analysing the chariot records concludes that

[147] R. Osgood, and S. Monks, 2000, "*Bronze Age Warfare*" Sutton, 2000, pp117-121.
[148] In particular the Mycenaean Shaft Graves.
[149] See the analysis by N. Sandars, Later Aegean Bronze Swords, *American Journal of Archaeology*, 1963 pp144-153.

the chariot was a greater sign of wealth and prestige than an indicator of military strength,[150] an interpretation based partly on the extreme limitations imposed on chariots in the mountainous terrain of Crete. Though the exact nature of military culture may have changed over time, these facets when combined with the naming conventions that were retained until the very end of the Mycenaean civilization suggest that either military strength or the appearance of military strength was an active ideal throughout Mycenaean culture.

Armaments of the Mycenaean Military, 1600-1350

Though several new finds in archaeological digs and typology updates have been produced since the 1960s,[151] these discoveries have not diverged from Snodgrass' early work, *Early Greek Armour and Weapons*, which remains one of the most informed and informative catalogues of equipment types in the Mycenaean world.[152] Though this thesis intends to focus on the Mycenaean shield, in determining the style of warfare, the art of warfare – that is to say, war's strategic components – cannot be assessed without considering the full scope of Mycenaean offensive and defensive armaments.

Snodgrass breaks his work down into chapters, each of which deals with a different category of armament. The first, the helmet, includes from the early Mycenaean period the boars tusk helmet, which is commonly associated with noble warriors of the period. Being made of boars tusk, it is as much a prestige item as it is a defensive piece and due to the nature of its construction can easily be interpreted as a representation of masculinity.[153] This type of helmet, occasionally with bronze cheek pieces, dates back as far as the LH II period (ca. 1500 BCE), found buried with the dendra plate.

His next chapter on the shield succinctly records the existence of tower and figure-of-eight designs, which will be assessed in chapter 4. Body armour in Snodgrass' work includes only the Dendra panoply from the same period, known to him as the 'Bell-corslet'. This panoply was a suit of bronze armour that protected the user from chin to shins. It was made of wide metal bands arranged as concentric rings hanging from the shoulders down. Its manner of construction prevented effective performance of cutting actions, though it is now known that arm movement for thrusting actions

[150] J. Driessen, *The Arsenal at Knossos*, p494 http://www.academia.edu/653851/The_Arsenal_at_Knossos
[151] Such as the catalogue of Mycenaean swords by J. Driessen and C. Macdonald, Some Military Aspects of the Aegean in the Late Fifteenth and Early Fourteenth Centuries B.C., *The Annual of the British School at Athens, Vol. 79*, 1984, pp49-56
[152] A. Snodgrass, *Early Greek Armour and Weapons*, Edinburgh, 1964
[153] Having personally witnessed the brutality and fear generated by a boar hunt conducted without the assistance of ranged weaponry, the notion of such a hunt exemplifying masculinity through bravery is, in my eyes, a certainty.

remained unimpeded.[154] Aside from the Dendra armour, this period of Mycenaean history also saw several bronze shoulder guards designed to be worn over a warrior's sword arm. The Bell-Corslet, however, remains the only full body armour from within this period. Based on the scarcity of this type of armour in the archaeological and artistic record and the expense of bronze, and the sporadic presence of isolated shoulder guards, body armour appears to have been a rarity on the battlefield.

Leaving defensive armaments, Snodgrass' work then progresses to offensive armaments, inclusive of the sword, the spear and the bow and arrow.[155] The sword and spear were both primarily thrusting tools, though, unknown to Snodgrass at the time, cutting with either was certainly not impossible.[156] Snodgrass offers a catalogue of both the sword and the spear, though he is limited in how far he can go. To date, only 24 swords have been found from Mycenaean sites,[157] even though at least 50 are recorded in one Linear B document.[158] Similar issues arise with the spear as features such as shaft length are unknown from any period and the scarcity of surviving examples limits further knowledge. It can be presumed that as spears utilized less metal content in their construction that they were cheaper to construct than swords and were therefore significantly more common than swords on the battlefield.

As no Mycenaean bows have been preserved in the archaeological record, they were omitted from Snodgrass' work and only bows from the Geometric period (1100-700 BCE) onwards were included. The bow, however, is known to have been a weapon used in Mycenae from earlier periods as it is depicted pictorially in artwork from the shaft graves , the primary source of evidence for the early Mycenaean period.[159]

Though it is impossible to know for certain, it is possible to glean an idea of what the Mycenaean bow may have been like by studying the bows of other societies. The tomb of Tutankhamun, dating to 1323 BCE, included several composite bows, about 15mm thick, the largest of which was 1.4 metres in length. From the same tomb several self-bows were found of which the three longest were

[154] This was studied by B. Molloy, Martial Arts and Materiality: a combat archaeology perspective on Aegean swords of the fifteenth and fourteenth centuries BC, *World Archaeology Vol.40(1),* 2008, pp116-134
[155] Only one depiction of a sling has been discovered from our period, shown on the Silver Siege Rhyton, Appendix III, Fig. 4. As it cannot be certain whether the slinger was a Mycenaean or a Minoan, it is impossible to draw conclusions from this single depiction.
[156] B. Molloy, Martial Arts and Materiality: a combat archaeology perspective on Aegean swords of the fifteenth and fourteenth centuries BC, *World Archaeology Vol.40(1)*, 2008, pp116-134
[157] For the number of surviving swords see B. Molloy, Swords and Swordsmanship in the Aegean Bronze Age, *American Journal of Archaeology Vol. 114*, 2010, No 4, and for a recent print of Kirk Lee Spencer's typology see D. Howard, Bronze Age Military Equipment, South Yorkshire, 2011, Appendix 4.
[158] Knossos tablet RA 1540: J. Chadwick, *The Mycenaean World*, Cambridge, 2007, p171
[159] An example is the Lion Hunt Dagger, Shaft Grave IV Circle A dating to 1550-1500 BCE. See Appendix III, Fig 8

just over 1.9 metres in length.[160] Other bows of a similar design have been discovered in Assyrian finds.[161] Reconstructions by Tom Hulit and Thom Richardson, based on these finds, have demonstrated that the self-bow of the Bronze Age bow had a draw weight of 18-20kg.[162] Bows of this draw would have been capable of penetrating human flesh and untreated hide, but not wooden shields or most forms of body armour.[163]

Due to the overtly thrusting nature of both the sword and spear, and a similar effect of the direct angle flight from the penetrative arrow, it can be safely concluded that Mycenaean warfare primarily centred around thrust oriented combat. Any considerations of defence from the period would have to concern itself primarily against this angle of assault.

Aside from defensive and offensive equipment, however, Snodgrass also dedicates a chapter to Miscellanea, under which he placed all items that were not standard in Greek warfare or did not fit comfortably in the other categories. From the period of this thesis, this includes only the chariot.[164] Snodgrass' focus when discussing the chariot is on the geometric period, relating them to the earlier Mycenaean designs only by what features were retained. He notes the advances that occurred in other countries over the hundreds of years prior to the geometric period that were either not adapted in Mycenae or simply did not reach them. This suggests that the Mycenaean chariot was less effective than its contemporaries as a military platform. How the chariot was used in the Mycenaean world remains a matter of debate, and it is still uncertain whether they were used militarily at all.[165] In 1983, Littauer and Crouwel, writing in response to Greenhalgh, clearly explain not only the immense impracticalities of using chariots on the charge including the severe damages that the chariot would incur, but also considers the lack of military depictions of chariots in Mycenaean art.[166] In the sources, the function of the chariots in the thirteenth century appears to have been only as a means of transport for the social elite, or potentially as a message relay between watchtowers. In his study of the source tablets of Mycenaean chariotry, Driessen writes that though Knossos shows

[160] W. McLeod, *Composite bows from the tomb of Tut'ankhamun*, Oxford, 1970, pp30-31
[161] C. Cartwright and J. Taylor, *Wooden Egyptian archery bows in the collections of the British Museum*, The British Museum Technical Research Bulletin, Volume 2, London, 2008, pp. 78-79
[162] T. Hulit and T. Richardson, The warriors of the Pharaoh: experiments with New Kingdom Egyptian scale armour, archery and chariots, *The Cutting Edge: Studies in Ancient and Medieval Combat*, Stroud, 2007, pp52-63
[163] See Appendix I.
[164] The axe has not been recognized as a weapon in Greece since the Middle Bronze Age. See tablets An 657, An 654, An 519, An 656, An 661 for the chariot records at the watch towers of Pylos. For the Knossos tablets, see the study by J. Driessen, *The Arsenal at Knossos*, http://www.academia.edu/653851/The_Arsenal_at_Knossos Retrieved 25/04/2013
[165] See J. Chadwick, *The Mycenaean World*, Cambridge, 2007, p170-171
[166] M.A. Littauer and J.H. Crouwel, Chariots in Bronze Age Greece, *Selected Writings on Chariots, other Early Vehicles, Riding and Harness*, ed. P. Raulwing, Brill, 1983, p53-61

evidence for up to 250 functional chariots and a much smaller number for Pylos "*…there is little or no proof that large chariot forces existed elsewhere on the mainland*".[167] In recent conversation, Louise Hitchcock promoted the idea that if the chariot was not used solely as a means of transport – or at most an archery platform in warfare – it may instead have been an export item and a source of Mycenaean trade wealth.[168] In support of this, Howard's research shows that early chariot depictions are stylistic and develop slowly over time, while these developments, such as mud guards, do not appear to have been for military use.[169] It is difficult to infer from the artwork whether these would have functioned as vehicles of war or as 'taxis' transporting individuals to the battlefield, though it is notable that in the artistic record of the shield no depiction includes both a shields-man together with a chariot. If the chariot was used for war, Howard concludes they could only have been useful as archery platforms as it is difficult to see how they would have been otherwise useful.[170]

Due to the sizeable difficulties in 'charging' with a chariot it is unlikely that these were ever used to charge a mass of solid infantry and were at most used for archery, hunting, or as a carriage for the nobility.[171] Similarly, the terrain of ancient Greece is not conducive towards chariot movement, limiting its practicality. As Howard's research shows, it is more likely that the chariot was used as either a means of civilian transport and only had a military role in matters of logistics and strategy, and for communication with the Pylian watch towers.

Analysing Evidence for the Mycenaean Nobility, Rank and File

The question of who composed the rank and file, and what position they took in society, will now be considered. To begin, it is impossible to know whether the culture and 'noble values' inferred from seals, administrative writing and palace wall frescoes were a reflection of common society as well. Like most societies, the common people are mostly absent in the historical and artistic record. Though a culture of military strength may have been prominent among the nobility, the importance of military prestige may not have been the culture of regular or more 'common' society.

As almost all evidence is administrative and noble in origin it is difficult, by any assessment, to make definitive conclusions based on only one perspective. A few questions are important to consider

[167] J. Driessen, *The Arsenal at Knossos*, http://www.academia.edu/653851/The_Arsenal_at_Knossos Retrieved 25/04/2013

[168] Though not included in their list of trade goods, Preziosi and Hitchock investigate trade routes of the late Mycenaean world in D. Preziosi and L. Hitchcock, "*Aegean Art and Architecture*", Oxford, 1999, pp196-197

[169] D. Howard, *Bronze Age Military Equipment*, South Yorkshire, 2011, pp61-64

[170] D. Howard, *Bronze Age Military Equipment*, South Yorkshire, 2011, pp63-64

[171] The difficulties here being that it is impossible to have one warrior on a chariot fighting in all directions, while being unable to strike past the bodies of two horses, without those horses being killed on the charge.

regarding the interrelationship of aristocrats and the common people. If there were lower classes involved in the military, how might the armaments of these people have differed from the nobility? Was equipment restricted by wealth or by social class? Could they have been the same or were certain ranks of society exclusively assigned the bow and unshielded spear in order to separate them from the sword or shield wielding nobles? As most of the imagery depicts nobility in combat, should historians infer that the majority of combatants were the nobility and the leading men of communities, or should historians expect that there were considerably more bowmen or unshielded spearmen on the Mycenaean battlefield than is implied by noble artwork?[172] In situations such as this the surviving artwork is crucial in interpreting the relevant periods of LH IIA to the end of LH IIIA2. Above in chapter 2, this paper surveyed the conclusions of Palaima and others, establishing that there was a relationship between war and power in Mycenaean nobility. However, this relationship may not have predated 1450 BCE, currently the earliest dated Linear B text.[173] Most of Palaima's evidence comes from the thirteenth century onwards, and there is no significant confirmation of how far this culture predates the military revolution of circa 1350 BCE.

If the historian is make inferences concerning the Mycenaean populace, these should involve informed reading of the artwork matched with an understanding of the relevant military practices. The Battle Krater, discovered in Shaft Grave IV Circle A and dated to approximately 1550-1500 BCE, provides a useful example.[174] In this particular image there are apparently three types of warrior: the archer; the fully armed warrior with spear, shield and helmet; and the spearman armed only with spear and helmet. As noble insignia tend to focus more on the fully armed shields-man, bearing helmet, spear and shield, it is certainly worth noting those spearmen fighting without shields who are still wearing helmets. The head is a particularly vital area of the human body and injuries to the skull can be incapacitating if not lethal. In the absence of shields that may be lifted to protect the head, protection of the head may have been of paramount importance for the soldier. The Mycenaean helmet, often interpreted as being of boar's tusk, has also been conventionally considered an armament of the nobility, yet in this scene even the archers are depicted wearing some kind of head protection. It is also notable that though almost all of the warriors in the Battle Krater scene are wearing helmets, none of the warriors in this image are wielding a sword. Though these may simply be an artistic convention as other artefacts, such as the Lion Hunt dagger, depict shieldsmen without helmets, and several images depict spearmen without swords, it is nevertheless

[172] Out of the artwork assessed in this thesis, out of 41 depicted warriors only 5 are archers.
[173] J. Driessen, Chronology of the Linear B Texts, *A Companion to Linear B Mycenaean Greek Texts and their Worlds*, Vol 1, ed. Duhouz, Yves and Davies, Anna, 2008, p69.
[174] Appendix III, Fig 10; see Fritz Blakolmer, The Silver Battle Krater from Shaft Grave IV at Mycenae: Evidence of Fighting "Heroes" on Minoan Palace Walls at Knossos?; *Aegaeum* vol. 28, 2007, pp213-224

interesting that this is not the only example of helmeted spearmen with shields, helmets and no swords evident in the Shaft Grave record.[175]

It can be concluded from this that the shield was a prestigious piece of armour of at least equal status to the helmet and that the spear was the primary weapon of the nobility at this date. This would seem to identify shields, helmets and spears as noble or elite armaments, with swords being a particularly high privilege of the wealthy. In contrast to this, there is a small corpus of artwork depicting warriors armed solely with the spear in battle against other spear-wielding foes that has been found outside of grave finds in frescoes. These images are notable not only because they differ from the iconography of grave finds but also because they depict a form of fighting that is otherwise not shown within the highly prestigious grave finds. It appears that these images depict the more common warriors of the lower class who would have fought either beside or behind their more armoured allies and thus would not typically be found depicted on the seal stones and artwork of prestigious burials.

This lower class, which may have included craftsmen and farmers, could not necessarily afford the luxury of a helmet made of boar tusk and a shield of one or more cow hides. Such equipment, being expensive, would have meant poorer soldiers could only afford to fight with the spear. It is tempting to assume that those light armed troops fought as skirmishers on the battlefield, at the flanks on either side of the more heavily armed core, though the imagery gives very little indication as to where these warriors fought in the rank and file. If skirmish tactics were used, however, it is worth identifying what these skirmish tactics may have been. Skirmish tactics function almost entirely on the basis of hit and run manoeuvres, with the combatants causing as much damage as possible then escaping before the enemy can inflict significant damage in response. For this reason, skirmish tactics are typically employed using ranged equipment such as javelins or bows, striking from outside the range of most melee combatants.

The equipment of the lower class appears to have been primarily the spear, though it is possible the javelin and bow were used also. Without these, however, skirmish tactics would have been difficult. Though the most fluid use of the spear is commonly thought of as thrust oriented it is more than possible to wield it utilising the full range of quarterstaff techniques for both defence and attack, although this requires a considerable amount of space that can be easily countered by a straight charge by two or three opposing spearmen. The required space needed to wield the spear in this way

[175] See Appendix III, Fig. 7, 9, 18 and 27

for both striking and defence would also significantly distance the skirmisher from his allies and prevent the spearman from finding sanctuary or defence among his own men. Thus the naked spearmen most likely kept together in order to better concentrate their fighting potential and increase their survivability. The result tends to suggest that the unarmoured spearmen tended to fight similarly to their more armoured counterparts and any skirmishers in the Mycenaean army would have been the archers and any javelineers who would naturally have needed to keep away from the front lines unless also armed for thrusting.

One later Greek tactic was to place the most veteran and well equipped troops in the front ranks in order to maximize their potential across a wide front.[176] This may have been a tactic employed by the Mycenaeans, however it is also possible that the shielded warriors took up one flank as a group in order to maximize their potential as a unified body. If the lower class did not fight as skirmishers, it is possible that either of these tactics could have been employed. Where the archers may have been positioned is also a mystery that can only be loosely inferred from the available evidence. They are shown on vases as being among the frontline fighters though this may merely be an attempt by the artist to get archers into the image and may not have reflected their actual position in battle. If they were not strictly organised, or they were limited in numbers, it is likely their position could have altered greatly between individual battles.

Only two images give an example of what the battlefield formations may have been, the Lion Hunt Dagger and the Battle Krater of the Shaft Grave period.[177] As the Lion Hunt Dagger depicts a hunting scene, it may not be evidence of a battlefield formation, the Battle Krater however has been reviewed by Blakolmer,[178] and a copy of his diagrammatic interpretation of the formation depicted may be found in the Appendix.[179] This interpretation clearly shows shieldsmen standing in a kind of formation with archers and helmeted spearmen interspersed between them. The formations were most likely denser than Blakolmer proposes, in order to maximize the use of the shield and spear. However, though it is tempting to think the Krater may accurately depict historic formations, the positioning of troops may simply be a creative choice of the artist. Not only may the artist not have been familiar with military formations, its similarity to the hunting formation of the Lion Hunt Dagger

[176] Xen. *Cyr*. 6.3.25; Xen. *Mem*.3.1.7-8; see also C. Matthew, *A Storm of Spears, Understanding the Greek Hoplite at War*, Philadelphia, 2012, p169; Van Wees also believes such a formation could have been used by the Spartans at Plataea; H. Van Wees, *Greek Warfare Myths and Realities*, London, 2009, p181
[177] See Appendix III, Figs. 8 and 7
[178] Fritz Blakolmer, The Silver Battle Krater from Shaft Grave IV at Mycenae: Evidence of Fighting "Heroes" on Minoan Palace Walls at Knossos?; *Aegaeum* vol. 28, 2007
[179] See Appendix III, Fig. 10

may suggest that the artist is in fact more familiar with a method of hunting, or simply copying an artistic design. Therefore no conclusion should be drawn from this image alone.

Whether or not the formation depicted upon the Battle Krater reflected a standard Mycenaean formation, it remains unlikely that the Mycenaeans fought as individuals. Fighting as an individual requires not only significantly greater skill, and therefore training, but also requires the freedom of open space that the individual warrior would not have against a mass of infantry. Fighting as a formation requires combatants only to point the weapon in the right direction and hope that the defence provided by the quick dispatch of opponents will keep the individual alive. In the mess of spear shafts a single skilful warrior may also be able to use his spear to parry multiple spear points at once, or a shielded warrior protect both himself and a nearby archer or spearman while being less likely to find himself exhausted. Thus battles fought in densely packed formations increase the value of individually skilled warriors to those around them.

If the images of the Dagger and Krater represented a common manoeuvre among Mycenaean armies then presumably the shielded warriors at least had trained together to organize the troops and make the formation work. If true this suggests a level of discipline and cohesion among the nobility that would have vastly increased their effectiveness. An untrained soldier is unlikely to perform efficiently or enact complex manoeuvres due to a lack of the skill, discipline and cohesion required to complete the manoeuvre. The simple massing of troops would not produce formations such as that found on the Krater and Dagger. Thus, though it is not necessarily true that the commoners or nobility received training, it is probable that at least simple formations were practiced by the nobility in order to increase their chances of survival in battle.

Though there is little way for scholars to determine the level of individual or group training, one final point lies in tentative evidence from the gold ring from Shaft Grave IV.[180] In this image a shieldsman appears to be kneeling down and bracing his spear. This may be a point of artistry and not reflective of an actual combat position, if this represented a common manoeuvre among Mycenaean armies then presumably at least a few warriors had trained together to make the formation work.[181] This suggests a level of discipline and cohesion in the front lines though whether they were trained by the state or by individual commanders remains a matter of contention. However, it should be noted that though this is not the only interpretation of this scene, it is unlikely that the figure in this seal is kneeling. A close study of the figure shows that only one leg is depicted and the knee of the warrior is

[180] See Appendix III, Fig. 9
[181] See Appendix III, Fig. 9

at the wrong angle to be kneeling with his position suggesting that the warrior has his back to the viewer. This view is supported by the fact that the spear is on the far side of his body, suggesting that his chest is facing away from us in keeping with the position of the knee. As such, the warrior is probably standing and has simply been depicted awkwardly by the artist.

Social and Military Developments[182]

The military revolution of circa approximate 1350 BCE marks a turning point in the style of warfare in the Aegean. Shifting from shields worn by chest strap as the primary form of body armour, to corselets, greaves and hand manipulated shields, this new form of warfare increased the defensive capability of individual soldiers and marked a decisive change in Mycenaean warfare. However, though the moment of shifting from body shields to gripped shields marks a considerable shift, it is not the only change that occurred between the seventeenth and fourteenth centuries.

By studying the evolution of body armour, Dr Paolo Guida identifies four periods of change in Mycenaean military history between old and new forms of armour, associating these with changes in warfare. The first period dates back to either the late seventeenth or early sixteenth century (LH I or LH IIA) when the full body shield and boar's tusk helmet were added to the early Mycenaean warrior's armament. These armaments are chiefly known from art and artefacts known to be associated with warrior chieftains. She notes the first change from body shields to armour in the fifteenth century, citing the Dendra armour of 1400 BCE as the fundamental piece of evidence. Using this suit of armour, she concludes that by 1400 BCE the body shield had been replaced and soldiers with lighter corslets and smaller shields similar to those found on the Warrior Vase were present alongside their heavily armoured superiors at this time. The third stage she suggests to be the mass-development of this lighter armour, most likely occurring in the fourteenth and thirteenth centuries, replacing the previous Dendra-style armour. In the fourth stage, that of the latter thirteenth century, she postulates Syrio-Palestinian influence leading to a considerable variation in design, styles and detail.

Though fundamentally a sound theory, there are several issues with regard to her categorization of the second period as beginning in the fifteenth century. Firstly, the majority of individual armour plates and shoulder pieces that have been discovered dating between 1450 and 1350, have

[182] This section relies heavily on a 1973 monograph by Dr Paola Guida entitled *Le armi difensive dei Micenei nelle figurazioni*, or *The Defensive armour of the Mycenaeans* in English. This book, unfortunately not available in any library to which I had access, was reviewed by Peter Warren in 1978. I use his review as the basis for this section.

developed over time and thus suggesting a later rise in popularity and this is in keeping with their first appearances on the artistic record. Secondly, she predates the light corslets and hand manipulated shields into the fifteenth century though there is no evidence for their use prior to the mid-fourteenth. This suggests not only that the initial prototype stages of armour development first began around 1450 and would not have heralded a widespread change until much later, but also that the full body shield would not be replaced until much later again. The first full suit on record is the Dendra corselet dating to 1400 BCE, and this may represent one of the first full attempts at body armour.[183] If this is the case, then the 'armour' revolution that is Guida's second period of armour development could not have begun until after it had either become popular or had had a decisive effect on battles. A single shoulder piece, or any single instance of a full corselet, certainly infers an advance in technology, but not necessarily a profound shift in warfare, particularly given the expense of bronze and its notable absence in artwork until after 1400 BCE. If these shoulder plates and full corselets were only used by a handful of individuals on the battlefield, such as by chieftains or kings, then Guida's 'period' represents only an advance in technology and not a change in warfare as the majority of combatants would still have fought using the previous helmets and full body shields. Due to the lack of any armour prior to 1450 BCE, and the absence of its popularity in artwork prior to 1400 BCE, it is unlikely that this armour was commonplace between 1450 and 1400 BCE. If the shoulder plates and heavy corselets did become commonplace, and thus altered the tactics of or impacted noticeably on the outcome of battle, it is likely that this shift occurred after 1400 BCE, when it was subsequently depicted in Mycenaean imagery. This would push Guida's second period of armour development from the fifteenth century BCE to the early fourteenth BCE.

Guida's identification of a change in warfare based on armour is therefore in need of revisiting. On the basis of her evidence alone, this suggests three phases of warfare: the full body shields of the sixteenth and fifteenth centuries slowly accommodating body armour in the fifteenth century until it appeared in increasing numbers around the start of the fourteenth century represent the beginning of the second period circa 1400 BCE. This would finally culminate in the mass-adoption of lighter corslets and gripped shields in the mid-fourteenth century, representing the onset of the third period. Guida's assessment for a subsequent development of armour and weapons under the influence of Syrio-Palestinian designs would constitute a fourth stage of development, though it is much more likely that this influence began in the fourteenth century, explaining the sudden and swift adoption of gripped shields, greaves and light corslets. Thus we can predate the Syrio-

[183] According to Cynthia King, The Homeric Corslet, *American Journal of Archaeology* 74.3, 1970, pp294-96, approximately 117 fragments of bronze plates have been dated to around LH IIIA-LHIIIB2 (about 1370-1250 BC) which were found during the excavations of a tholos tomb at Nichoria in Messenia.

Palestinian influence and thus the Mycenaeans' fourth stage of development represents instead a closer connection with the greater Mediterranean world.

However, additional evidence from the study of the full body shields suggests a different interpretation. Though the physical remains of shields decay, the prevalence of the full body shield in Mycenaean artwork sees a notable decline around the start of the fifteenth century, disappearing almost entirely from elite depictions between 1500 and 1450 BCE. As assessed above, it is around this same time that shoulder plates, begin to make an appearance in the archaeological record. It may be that the reason for this decrease is because the shield, previously an expensive article of warfare, had lost prestige and was no longer purely a symbol of nobility. Nevertheless the full body shields make a resurgence in frescoes and religious imagery of the fourteenth century, but particularly in pottery and domestic scenes,[184] suggesting that these shields were not abandoned but in fact proliferated downwards in society, becoming instead a primary armament of the previously unarmoured spearman and simultaneously an icon of popular religious significance.

It is therefore likely that the rise of body armour mirrored the decline of the full body shield, and thus Guida's original suggestion of a second phase beginning with the fifteenth century is accurate. However instead of the unsupported supposition of light corslets and gripped shields appearing early, it is probable that the full body shield was retained and shifted from being in the hands of the nobility into the hands of the common soldier, making it more (rather than less) integral to the structure of war. With this information added to Guida's assessment, the four stages of Mycenaenan military development can be categorized as follows: the first phase was the dominance of the full body shield between 1600 BCE until circa 1500-1450 BCE. The second phase began between 1500-1450 BCE and was characterized by the presence of both armour and full body shields, with the full body shields taking on an increasing role outside of the nobility. This second phase lasted until the third period begins around 1350 BCE, the 'military revolution', with the adoption of gripped shields, corslets and greaves, probably inspired by Mediterranean influences. The fourth period of Guida's Syrio-Palestinian influences holds. During the second period of armour and full body shields, they may also have been a slow rise in body armour in the form of corslets with the first full corslet making an appearance on the archaeological record around 1400 BCE. These may subsequently have become more common than current evidence suggests. Regardless, this study suggests that the full body shield was used concurrently with bronze armour until the introduction of gripped shields in

[184] See Appendix III, Fig. 23

the fourteenth century BCE, at first only by the nobility then later by the common soldier and as time passed became more and more intrinsic to the conduct of Mycenaean warfare.

Archaeological Considerations on the Mycenaean Fighting Style between 1600 and 1300 BCE

Thanks to the evidence of various forms of artwork, there are at least three kinds of warrior in the Mycenaean army, the archer, the unarmoured spearman, and the shields-man, the latter of whom may on occasion have been equipped with a sword and who can be tentatively equated with the nobility. Though the prestige value of swords over spears can be concluded, the sword receives only limited attention in the artwork. However, though it receives little attention, it has been observed that there is no depiction of a swordsman being defeated by a spearman in Mycenaean art.[185] It also appears far more prevalently in grave findings and it is likely that the sword was considered highly useful in a military context, possibly more so than the spear.[186]

That warfare was considered important in the role of the nobility can be gleaned from Mycenaean naming conventions, and the prevalence of warlike objects and insignia in graves and its depictions on walls. The fact that an apparently religious symbology appeared out of the figure-of-eight design also indicates a level of importance for the military, at least in the early period when the religious symbology was being formed.

Based on the evidence of the Pylian watch tower tablets, the palace-centre of Pylos in the thirteenth century had a degree of involvement in its coastal defence. It is unknown whether this was a commonality across Mycenaean centres. Though the level of training of these warriors is uncertain, the work of Driessen on these tablets certainly argues for evidence of an officer class which probably extended across to other centres of the time.[187] Whether these officers are of noble status, represent warrior chieftains, or are merely administrative officers in charge of a post is uncertain. Though the

[185] Malafouris, L., *Is it 'me' or is it 'mine'? The Mycenaean sword as a body-part*, McDonald Institute, University of Cambridge, 2008, p4

[186] This does not, however, mean that any sword wielder would have received training. Xenophon remarks in his *Education of Cyrus* 2.3.9-10 that use of the sword comes naturally and he considered it less important than the spear, so it may be simply a modern perception that the sword was more useful.

[187] Driessen, J., 1984, *Some Military Aspects of the Aegean in the Late Fifteenth and Early Fourteenth Centuries B.C.*, The Annual of the British School at Athens, Vol. 79, pp49-56. This is assuming that Mycenaean centres were not independent of each other and Pylos was not the Sparta of the Mycenaean world. As Xenophon writes "Only the Spartans are true experts in warfare, while the other Greeks in military matters make things up as they go along"L *The Spartan Constitution* 13.5

Pylian tablets also clearly distinguish between groups of troops, Driessen's varied interpretation demonstrates that there is no certain interpretation of these differences.[188]

The following scenario can be presented for an interpretation of the Mycenaean military: The Mycenaean military had between two and three layers of stratification. Those who fought with the spear (1a), those who fought with the bow (1b), and those who fought with spear, shield, helmet and sword (2). Though the latter grouping may be able to be broken down further, due to the prestigious nature of both helmets and swords, and the expense of creating these shields it is almost certain that the shielded warrior was a member of the nobility, or funded by the nobility, at least prior to 1500 BCE. Chariots were most likely a prestige item with no military value except to carry a commander to the front lines or away from the battle. It does not appear to have participated in battle as both the source material and the chariot's poor military design imply. Warfare probably followed a system where shielded warriors were place in the front ranks and unshielded warriors, the spearmen and archers, took either to the flanks or further to the rear, possibly as close to the front as the second or third ranks.[189] Such a formation would theoretically allow them to charge and be charged by enemy formations while remaining relatively protected by rushing the enemy's front rank by the thrusting of spear points of the Mycenaeans' second or third ranks. Thus prestige and glory would go to the highly defended warriors of the front ranks, and less prestige to the untraceable arrows of the unreachable latter ranks.

As stated above, from around 1500 BCE pieces of bronze armour began to be added to the elite warrior's panoply, as demonstrated by the Dendra armour, a suit of full bronze almost completely covering a warrior from head to toe by 1400 BCE. Although a warrior equipped with such a panoply could physically be equipped with a worn tower shield, it would be incredibly difficult to put on and would offer no additional protection that the armour did not already provide. It is not evident that any great revolution in the type of armour took place during this time, and shield usage probably continued over the next hundred to two hundred years between 1500 and 1300 BCE. The nobility probably transferred gradually to using shoulder plates and body armour rather than shields somewhere between 1450 and 1350 BCE, though this may have only applied to the highest of the nobility. During this time, as more and more shields were built, it is possible that the clear line of social stratification changed to identification via armour as warriors other than the nobility and elite

[188] J. Driessen and C. Macdonald, *Some Military Aspects of the Aegean in the Late Fifteenth and Early Fourteenth Centuries B.C.*, The Annual of the British School at Athens, Vol. 79, 1984, p50
[189] Such a small number of ranks is tentatively related in

acquired full body shields, and more of these shields could have been brought onto the battlefield until approximately 1350 BCE when the shift to handheld shields was made.

It is now possible to ascribe an approximate time period for the development of body shield style warfare. Between 1600 and 1450 BCE, the Mycenaean full body shield had prominence of place as defensive armour. Between 1450 and 1350 BCE they were replaced among the upper nobility by shoulder plates, and in some rare instances by full suits of armour, but, as the only known alternative to expensive body armour, the shields likely continued in use among the lower nobility and wealthier peasantry. By 1350 BCE, it is probable that the shield had acquired a noteworthy religious significance, if not earlier, and possibly had either already faded from use in warfare, become entirely the weapon of the lower class, or was no longer the backbone of Mycenaean battle. Their last appearances in recorded imagery date between 1400 and 1250 BCE with half of these on pottery in non-military scenes,[190] implying a changed function for the shields. With this time period established, it is now possible to begin analysing the archaeological evidence in detail in order to better reconstruct the style of warfare from the periods prior to LH IIIB (approximately 1300 BCE).

Interpretations on the Use of Generic pre LH IIIB Full Body Shield Types

To date, the majority of interpretations on the use of body shields are found in broad surveys of ancient warfare, often based on Homeric depictions of the Trojan War.[191] The views expressed, and their logical counter-arguments, are neatly surmised by Nicolas Grguric in his 2005 publication, which stands as one of the most informative repertoires on Mycenaean warfare to date.[192] It is worth including his entire section on Mycenaean shields as it provides a representative body of interpretation of early Mycenaean warfare prior to its publication. This will allow neat summarization of points and allow readers a point of comparison for future consideration. Footnotes are the authors own addition in order to address particular points made by Grguric.

> **Shields**
>
> One of the most diagnostic signs of a heavy infantryman is his shield. This, in both of its patterns (i.e. 'figure-of-eight' and 'tower' shields), protects the body from neck to foot. These shields appear to have been made of wickerwork upon a wooden frame;[193] they were faced with one or more layers of

[190] See Appendix III, Figs. 20, 23 and 24.

[191] For example R. Castledon, *Mycenaeans*, USA and Canada, 2005, pp121-122; P. Conolly, *The Ancient Greece of Odysseus*, pp4-41 New York, 2007; R. Osgood and S. Monks, *Bronze Age Warfare*, Sutton, 2000, p135; J. Warry, *Warfare in the Classical World*, New York, 2000, p18

[192] N. Grguric, "*Mycenaeans c. 1650-1100 BC*", Oxford, 2005, pp9-11

[193] There has been no conclusive evidence suggesting wickerwork as no image or archaeological remains survive that demonstrate it. A form of willow-weave, however, is one of the more likely methods of construction from

hide, as can be seen in several coloured depictions of them from frescoes. They were carried by means of a *telamon*, a strap which passed over the left shoulder diagonally. Thus supported, the shield left both hands free. Such a large shield tells us specific things about its function. The warrior would have been very well protected from all manner of spear and sword thrusts, javelins, arrows, sling-shots, etc.[194] However, he paid for this protection with a serious restriction of his mobility. One could imagine that if a warrior tried to run with such a shield while still holding his spear with both hands, the former would bounce around very awkwardly, banging against his arm, lower face and, particularly, his shins.[195] It is impossible to know when the tower shield was introduced into the Aegean; no archaeological remains of such shields have been found (doubtless due to the fact that they were made of perishable materials), but the earliest depictions of them occur at Mycenae and are dated to around 1600 BC.

A boss is a common feature of a heavy infantryman's shield throughout the ancient period; it allows the shield to be used offensively.[196] This feature, along with the curve of the surface, would have made the figure-of-eight shield especially good for prising apart enemy shield-walls and breaking into a densely packed formation.[197] In this respect it would have been far superior to the tower shield. The figure-of-eight shield is more technically developed than the tower shield, and is therefore likely to be a somewhat later innovation. As far as is known, the earliest pictures of these shields date from around 1600-1550 BC at Mycenae, but they are found in the same context as the tower shields. The figure-of-eight shield is not flat in profile as some tower shields appear to be, but is concave;[198] it would thereby afford a deflective ability that would greatly increase its strength. In addition it had an elongated 'boss', in the form of a raised ridge of wood or tough leather. This and the characteristic 'waisted' shape, were deliberate elements which must have been developed for practical reasons. The function of the waist cut-outs is something of a mystery, as there are no actual depictions showing them being put to any direct use. If a line of soldiers formed up in close order with figure-of-eight

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our limited knowledgebase of contemporary technology, though wood slats and frameless leather moulds have also been argued as potential candidates.

[194] This contradicts Osgood and Monks, who believe leather shields would have been useless against arrows and only useful perhaps against daggers. However, Osgood and Monks do not support their claims with evidence and it is difficult to conceive of why this would be the case. See R. Osgood and S. Monks, *Bronze Age Warfare*, Sutton, 2000, p141

[195] Here Grguric appears to support the notion that the shields were worn on the front. Later, however, he does mention that the normal depiction of these shields shows them being worn on the back.

[196] Though bosses are common throughout the ancient period, strap shields can also be used offensively and certain designs are in fact more damaging when attempting to 'slap' with a shield rather than 'punch': see Chapter 5.

[197] Here Grguric misconstrues the 'strip' or 'keel' on many figure-of-eight depictions as being a boss. Though this is possibly true, there is no supporting evidence for this, and many shield depictions do not have this feature. The depictions seem almost universally more akin to being simple a split in the leather, which is the common view by every leather-worker and professional shield maker I have shown these images to, and far more in keeping with the depictions of their use. Also note that only a few images have the 'keel' in the first place, and every image of them used in battle distinctly lacks this feature, as will be discussed in Chapter 4.

[198] Tower shields, as evidenced by the imagery, were not flat but curved cylindrically, which is why Drews describes them as 'half-cylinders' rather than the common 'half-tower'. Drews, R., 1993, *The End of the Bronze Age, changes in warfare and the catastrophe C.1200 BC*, Princeton: Princeton University Press, p178

shields, the cut-outs would form a series of roughly diamond-shaped holes. It is possible that these were useful when the heavy spearman used his secondary weapon, the thrusting sword. Each soldier would have one of these holes to his right front, and could thrust at his enemy through it while still retaining the full-body protection of his shield. This possibly is further supported by the fact that the Mycenaean sword in use at this time was indeed better suited to thrusting than slashing.[199]

It is also conceivable that the series of holes presented in the shield-wall might have accommodated the spear, but this seems unlikely for two related reasons. Firstly, the depictions do not show the spear being used in this way; they show it being wielded with both hands, normally at shoulder level and with the shield worn around the back.[200] Secondly, the spears used by these troops would have been both heavy and unwieldy to grip in his right hand alone, as he would have to if he were using it to thrust through the shield cut-out; and if he held it near its central point of balance he would both waste half of its length, and disrupt the ranks behind him.

A question remains as to how the figure-of-eight shield was distributed amongst the heavy infantry. It appears to have been used at the same time as the tower shield, but it is unclear whether it was reserved for separate units, or mixed in with the tower shields to give the formation a 'biting edge'. Perhaps personal preference or wealth cannot be ruled out.

N. Grguric, "*Mycenaeans c. 1650-1100 BC*", Oxford, 2005, p9-11

To date this excerpt serves as the longest single treatment on these shields from a military perspective. Later in this same work Grguric expands on what he perceives are the tactical implications of the warrior with these armaments and proposes an example of how Mycenaean warfare was fought.

Tactical Implications

Mycenaean warriors armed with a long spear, a tower or figure-of-eight shield and a helmet fulfilled the typical tactical role of heavy infantrymen. Their weapons and armour tell us this: due to his relative lack of manoeuvrability this type of infantryman needed to be organized in a drilled, close-order formation in order to be effective. A warrior accoutred in this way and fighting on his own would fall easy prey to lighter, more mobile infantry and chariots. Standing alone, his movement is clumsy and slow because he is hampered by his large shield and his long spear; it is easy for a light swordsman, for example, to parry his spear point with one blow from several feet away and then close with him to stab around the clumsy shield before he can draw his own sword to defend himself.

[199] This, however, is refuted by the fact that if the Mycenaeans were fighting other like armed warriors, as the imagery tends to suggest, then their swords would only be able to thrust at their opponent's shields and could neither be well aimed or extended to reach any vulnerable organs due to the supposed bulk and constricting nature of the shield.

[200] At which point, any holes in the shield would be a moot point for the purposes of a shield wall anyway. This of course refutes the notion of a forward facing shield wall or the concept of them being worn on the front. It also suggests that there was no boss or hand grip, and, if there were, suggests it was not commonly used.

> To use some much later analogies that demonstrate similar practical limitations: in the Napoleonic period, when the lance made a resurgence of popularity among light cavalry, it was well known that if a cavalryman armed only with a sabre could get past the lance point, the lancer was done for.[201] Agincourt (1415) provides an even more similar parallel, when the lightly armed, largely unarmoured English archers closed with heavily armoured dismounted French knights, and exploited their far greater agility to kill them in large numbers with such weapons as daggers and hatchets.[202]
>
> On the other hand, if a heavily equipped warrior is placed shoulder-to-shoulder with several hundred like-armed comrades a very different picture emerges. The large rectangular and figure-of-eight shields held next to each other or even overlapping would present an armoured wall covering the whole battle line from neck to ankle.[203] This would not only render the front ranks almost invulnerable to missiles, but would prevent many missiles from passing into the rear ranks, which smaller shields could not do so effectively. The size of these shields may suggest a considerable missile exchange before contact.
>
> In such a massed formation, several ranks deep, the c.12ft spear is far from being impractically long, but is a perfect weapon either for levelling against an opposing line of infantry, or for defence against chariots. In addition, the light troops who would have proved so deadly to an isolated heavy infantryman in the open would themselves be vulnerable if they attempted contact with such a formation.
>
> N. Grguric, "*Mycenaeans c. 1650-1100 BC*", Oxford, 2005, p14-15

Based on common beliefs of how the shields functioned in battle, an extrapolation like Grguric's is vital to the study of any kind of warfare. It demonstrates the picture of how historians can interpret the archaeological record, and sets the parameters for how to discuss the concepts of 'cumbersome' or 'unwieldy'. It is interesting that in this depiction the shield does not appear to sound either

[201] Though an excellent point, the reason for this limitation is not what Grguric appears to imply. There is a substantial difference between fighting with a lance on horse and a spear on foot: as Captain Nolan of the battle of Balaclava wrote, "the spear from horse relies upon the momentum of the horse, after which it is useless. This is not so of the spear on foot." For a brief on cavalry warfare and Captain Nolan's comment see M. Prestwich, Miles in Armis Strenuus: The Knight at War, *Medieval Warfare 1000-1300*, edited by John France, Ashgate, 2006, p.189.

[202] That agility assisted in the outcome at Agincourt is a common interpretation of the battle, but one that does not stand well under scrutiny. It is notable that no explanation is given as to 'how' agility assisted in the battle. It should also be noted that there are countless recorded incidents of knights dismounting for battle rather than fighting on horseback, and this in fact seems to be the norm when it comes to medieval warfare, as has been the argument of cavalry supremacy. For more on the medieval archer and their role in various battles see J. Bradbury, *The Medieval Archer*, Suffolk, 2011; H. Soar, *Secrets of the English War Bow*, Yardly, 2006; for the related argument of cavalry supremacy, see M. Bennett, The myth of military supremacy, *Medieval Warfare 1000-1300*, edited by John France, Ashgate, 2006; M. Prestwich, Miles in Armis Strenuus: The Knight at War, *Medieval Warfare 1000-1300*, edited by John France, Ashgate, 2006; also see the Renaissance works of Niccolo Machiavelli's *Art of War*, and Rousseau Montaigne's essay *On War Horses* for more contemporary discussions on these beasts of battle.

[203] However, if shields were worn on the back, then there would be no forward facing wall unless the warrior's back were partially turned to his opponent.

cumbersome or unwieldy. It is also interesting that despite noting previously that the shields were normally shown worn on the back, and in fact using this as evidence for part of his argument, this is not how he has described the Mycenaean style of warfare, depicting them instead as front worn to form a shield wall. As will be revealed in Chapter 4, this is not the case. Nevertheless, based on the interpretation provided in his previous chapter, Grguric paints a fairly compelling picture of how the shields could have been used.

Chapter 3 Summary

Without literature, the knowledge and understanding of Mycenaean society is bound by the limitations of conjecture by modern historians on a voiceless material record. Despite the established limitations on sources, there are still a few things that can be concluded, almost decisively, about the Mycenaean people.

There was a definite segregation between the noble and peasant populace. Exactly how and what this divide entailed may never be known, but, based on several studies, it could be that a responsibility to partake in battle may have formed a significant part of that distinction. Prestige was acquired from military artefacts, and reflected in high status burials. Military scenes appear constantly in the pictorial record, at first only in administrative seal-stones and amongst artefacts of the nobility, but later in more civil contexts such as on pottery and in homes, suggesting not only prosperity but also a proliferation of the tools of war. One onomastic study of personal names concluded a high proportion of military words as part of noble Mycenaean naming convention, which further emphasised the important role of combat to the nobility.

What cannot be surmised from these studies, however, is manyfold. It is impossible to detect the level of separation between the noble upper class and the lower class. The ratio of noble to peasant in society is unknown, as is the more specific ratio between noble and peasant in the military. No information pertains on what roles the lower classes were allowed to fill in a military or social capacity, who was permitted to comprise the 'elite' shielded fighting roles, or whether there were was an officer system that allowed lower to middle ranking officers. It is also unknown how the bow fits into this system, whether it was an expensive noble artefact or if it was a weapon of commoners. It also cannot be certain who armed the populous in time of war. Without such information, it cannot be accurately gauged what the division of troops between shielded men, men with swords, naked

spearmen, or archers in a Mycenaean army could have been, which greatly limits further interpretation.

What is known, is that the armaments of the Mycenaean military from 1600 to 1300 consisted of the sword, the boar's tusk helm, the full body shield, a simple bow and the spear, listed here in what is presumed to be a descending order of prestige. Other weapons may have been added to this list, like the Bell Corslet armour and bronze shoulder plates, but they do not appear to have become a common item owned by the nobility until around or after 1500. Certainly armour did not become a common item of the masses until after 1400, around the same time that Mycenae became ruler of the Aegean and an empire noticeable on the global scale.

Prior to circa 1350, the Mycenaean military had up to four layers of stratification. Those who fought with spear (1a), those who fought with bow (1b), those who fought with spear and shield (2a), and finally those who fought with spear, shield, helmet and sword (2b). This stratification may also reflect the line of stratification between the nobles and the lower class, particularly if warriors were expected to equip themselves, however this is a best guess.

Chapter 4: The Evidence.

Research for the LH IIA-IIIB period shields is reliant on images, jewellery and votive offerings for the core of the evidence. Historically, little is known little about the major events of the Mycenaean period. It is almost impossible, for example, to construct a timeline of events that is neither broad nor leaves decades, or entire centuries, practically vacant. It is also impossible to find clear evidence of the Mycenaean formations, or clearly depicted battles against other cultures. The Mycenaean people only tend to enter the records of other people, such as the Egyptians and Hittites, near the end of their civilization after they have conquered the Aegean and accessed its trade routes. Thus documentary and literary sources refer only to the later periods of Mycenaean expansion from LH IIIB2 onwards, synonymous with the adoption of grip shields and the change in Mycenaean warfare. Thus do not belong to the period being investigated. Any probable conclusion must be uncovered by reconstructed evidence, in turn based entirely on the evidence from archaeology.

This, however, poses a problem. Wood and leather remains do not survive hundreds of years of decomposition, let alone three to four thousand, except in very rare circumstances. As early Mycenaean shields were, like most shields, made of such perishable materials, no direct physical evidence currently exists for their shape and design.[204] In consequence, this section shall first introduce the reader to the historical situation of the period, and then discuss the images, jewellery and votive offerings available from the Mainland and the islands. All images can be found in Appendix III. This archaeological data will then be used to support conclusions that may be drawn from this evidence.

Before assessing the evidence, however, any reader must be aware of the difficulties of drawing any conclusions from artistic sources. A casual glance at one image may suggest armour if viewed in a military context, but the shape and design may appear elsewhere in a civilian scene, suggesting it is in fact just a way of depicting clothing.[205] Colour is no help in differentiating between materials. Pigment decays over time and dyed cloth, painted leather and enamelled metals can all produce similar colours. Finally, even if materials could be distinguished, both leather and layers of textiles and felt are used for both clothing and armour. There would be no way of knowing for certain

[204] This issue poses a difficulty even in military studies of classical Greece: see C. Mathew, *A Storm of Spears, Understanding the Greek Hoplite at War*, Philadelphia, 2012, p2

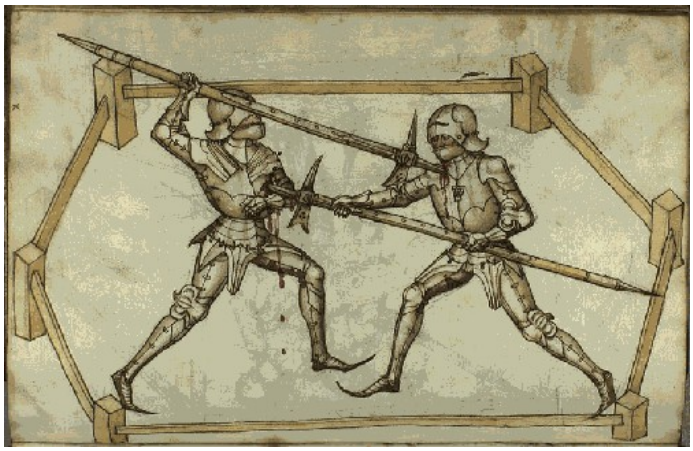
[205] Dan Howard uses such an example to query the notions of armour being worn by the Mycenaean warriors on the famous 14th century Warrior Vase, D. Howard, Bronze Age Military Equipment, South Yorkshire, 2012 p67

whether these articles being depicted had been designed for use in combat or were merely civilian wear.

Issues of proportion also propose a significant problem. The issue is best summarized by Christopher Mathew when talking about battle depictions on pottery, "*…with limited space available, there is much less scope for the accurate depiction of length for a weapon held horizontally, as in a combative scene. By their very nature, a combat scene will include at least two figures, and possibly more, all vying for space in the one image*."[206] He goes on to explain that the compression of the horizontal plane, and the dedication of the artist with depicting the details together with the limitations of the medium itself, limits how accurate the image can be, especially in relation to size. A study by Richter in 1970 analyses how ships, buildings and furniture appear much smaller in scale to their occupants in illustrations on ancient vases and that as a result they can only be considered broadly accurate at best.[207]

A single image from Talhoffer's Fechtbuch manual of two warriors fighting in Gothic full plate armour will serve to demonstrate the immense difficulty and wariness all readers should consider before making assumptions.[208]

The following image shows two warriors in full plate armour fighting in a ring. At first it looks as if the



two warriors are facing us and each other, and thrusting across their own bodies at their opponents. Careful analysis reveals that this interpretation may in fact be wrong. In this view it could be argued that the combatant on the right has his chest to us, and the one on the left is showing us his back. This is evidenced by the pattern of armour on the left combatant, with exposed shoulder plates, revealing that it is in fact a back plate being

[206] C. Mathew, *A Storm of Spears, Understanding the Greek Hoplite at War*, Philadelphia, 2012, p24
[207] G. Richter, *Perspective in Greek and Roman Art*, London, 1970, pp14-48
[208] H. Talhoffer, *Fechtbuch,* 1459, facsimile available online at http://www.thearma.org/Fight-Earnestly.htm p286

depicted.[209] This example demonstrates the immense difficulty historians have in interpreting historical data such as this. Caution is always required when interpreting evidence.

The difficulty with working from artistic evidence is summed up in the following way. "*One of the many problems of working with Aegean Bronze Age iconography is that there are often only a few examples of very important iconographical detail and sometimes only one. The relatively small corpus of Aegean art pieces… …leaves us in the position of being forced to rely on a few, often damaged depictions, or even on the "once only" portrayal… … it is not good practice to argue from such a small basis… the narrow basis for some of the identifications must always be kept in mind."*[210]

[209] Counter to this argument is that the gauntlet of the supposedly right hand is showing us the knuckle rather than the palm of the combatant on the left, suggesting that this is in fact the left hand and the thumb placement of the hand holding the poleaxe is clearly the right. This could suggest though that the left knight is currently fighting left handed, which appears to be true of the other images in Talhoffer's Fechtbuch. However, the artist clearly depicts those extended shoulder plates as part of a back plate in other images. Without further investigation, however, either argument is tenable.

[210] K. Kilian, From Chief to King in Mycenaean Society, *Politea Society and State in the Aegean Bronze Age, Proceedings of the 5th International Aegean Conference,* eds. Robert Laffineur and Wolf-Dietrich Niemeier, 1988, p488

Mycenaean History and Evidence

Known history from the Mycenaean period is scanty at best, and interpretation has undergone several revisions. Between the 1920s and 60s, the dominant view of Mycenaean Greece was that of an overly belligerent civilisation, which before ransacking Troy, raided and conquered the Aegean region. This was set in stark contrast to the other, preceding, civilisation of the period, the Minoans, who were centred on Crete and were depicted as a completely peaceful people.[211] The Minoans had a trade network spanning the Aegean and reaching into Ancient Egypt, long before the Mycenaeans were recognised at a global level.[212] Sometime after the eruption of Santorini (Thera) around 1627-1600 B.C.E. (previously thought to be around 1500 B.C.E.)[213] Crete went into a decline and was eventually occupied by the Mycenaeans. Now the new owners of the Aegean, the Mycenaeans, who were mostly devoid of natural resources for trade, took over the commercial empire, their artisans, and developed their own empire on the back of the Minoan civilisation.[214] This view has been supported by a variety of authors, sometimes as being completely self-evident, and the Siege Rhyton has been taken as evidence to support this theory.[215]

From the late 1960s, however, opinions swung toward the notion of a gradual transition from Crete to Mycenae, evidenced by the gradual inclusion of Cycladic and Minoan style artwork into Mycenaean graves, and supported by the fact that there was no sudden influx or mass replacement of Mycenaean goods by conquered or subjugated Minoan artisans.[216] The notion of a peace-loving Crete and a belligerent Mycenae, however, has since been disputed. [217] One of the key factors in

[211] Interestingly Brannigan estimates that approximately 15% of metal production in Greece went to weapons and in comparison Crete put in up to 80%, suggesting that military expenditure was more important to Crete than it was to Mycenae. K. Brannigan, *The Nature of Warfare in the Sourthern Aegean during the Third Millenium B.C.*, in R. Laffineue (ed.), Aegaeum 19: *Polemos, Le Contexte Guerrier en Egée a l'Age du Bronze*, University de Liege, 1999, pp87-96.

[212] The term *Hau-nebwet* is taken to mean "inhabitants of the Greek mainland", however this has been disputed as being "the islands of the Mediterranean" by J. T. Hooker, The Mycenae Siege Rhyton and the Question of Egyptian Influence, *American Journal of Archaeology 71 No. 3*, 1967, pp269-281.

[213] See S. Manning, C. Ramsey, W. Kutschera, T. Higham, B. Kromer, P. Steier, and E. Wild, Chronology for the Aegean Late Bronze Age 1700-1400 B.C, *American Association for the Advancement of Science*, 2006. 312 pp565–569.

[214] G. Karo, *Die Schachtgräber von Mykenai* , 1930; Wilamowitz, *Der Glaube der Hellenen I*, 1931, pp57-58; see also Schachermeyr, Welche geschichtlichen Ereignisse führten zur Entstehung der mykenischen Kultu?, *AO 17*, 1949, pp331-350.

[215] Appendix III, Fig 4-5.

[216] J. Hooker, The Mycenae Siege Rhyton and the Question of Egyptian Influence, *American Journal of Archaeology 71 No. 3*, 1967, pp269-281.

[217] Manning even goes as far as to say that Minoan Crete functioned analogous to Sparta as an explanation for the archaeological lack of fortifications. S. Manning, The Military Function in Late Minoan I Crete, *World Archaeology Vol. 18 No. 2*, 1986, pp. 284-288

recent years has been the successful radiocarbon dating of the Theran eruption,[218] placing it some one hundred years earlier than previously estimated. Thus the eruption could not be readily connected to the fall of the Minoans post 1500.

Currently, it can only with apparent safety be concluded that prior to the Mycenaeans, the Minoans ruled the Aegean region with a mercantile rather than military empire. Either by a process of slow decline, sudden collapse or invasion and take over, the Minoans were replaced by the Mycenaeans. Thus the centre of the Aegean shifted from Crete to the Greek mainland. The Mycenaeans conducted their affairs in a way that differed greatly from the Minoans with a heightened emphasis on war. A change in warfare followed, and the rest of Mycenaean history is outside the scope of this thesis.[219]

While this outline is important, what it does not show is that, despite the manner of transference, the Minoans culturally influenced the Mycenaeans, and it was primarily through the Minoans that the Mycenaeans were connected to Egypt and the Middle East, the main power players at this time.[220] Militarily speaking, this means that the Mycenaeans had the most opportunity to interact with the Minoan people more than any other civilisation of the time. Unfortunately even less can be deduced about Minoan military practices. The Minoan language of Linear A continues to remain undeciphered, and there is almost no archaeological data for a Minoan military. Only by studying the archaeology of the Mycenaean and Minoan worlds can a picture of Mycenaean military history be obtained.

Inferences from the Evidence from the Mainland

Keeping only to imagery and physical evidence from the mainland, and thus excluding for the moment evidence from the Cyclades, Crete, Cyprus and Palestine, an in-depth survey isolates fourteen articles of evidence. These are two frescoes, one religious plaque, an inlaid dagger, one gold signet ring, three seal stones, one rhyton, one krater, a piece of pottery, one gold pendant and two ivory votive shields. Of these, only eight show the shield with people,

Fig 1. Sealstone, Knossos, Middle Minoan 1600-1550

[218] See W. Friedrich, B. Kromer, M. Friedrich, J. Heinemeier, T. Pfeiffer and S. Talamo, Santorini Eruption Radiocarbon Dated to 1627-1600 B.C, *American Association for the Advancement of Science*, 2006, p548.
[219] That which is outside of this thesis includes the recently translated Hittite texts, which to date deal only with the Mycenaeans after 1350 BCE post becoming the centre of the Aegean and long after warfare has changed. As such they shed no light on warfare from earlier periods.
[220] Connections between Mycenae and Crete has been measured through shaft graves finds as connected first through the Cycladic isles and then direct to Minoan Crete itself. It is not until much later that a direct influence from other cultures is evident, see J. Hooker, The Mycenae Siege Rhyton and the Question of Egyptian Influence, *American Journal of Archaeology 71 No. 3,* 1967, pp269-281,

depicting a total of seventeen warriors. The other six simply depict the shield. This evidence comes from approximately the same 100 year period between 1600 and 1500, with the majority of the oldest mainland evidence dating at the latest to 1450. Two exceptions dating from 1450 onwards are a pottery shard and an ivory votive shield dated to approximately 1300 BCE.[221]

What inferences can be drawn from t
depicted worn by men in these image
of ten figures, show the shield clearly
these, two clearly depict the chest st
omitted the straps from the depictio
warrior's chests are clearly in view.[224]
are entirely ambiguous in nature.

Fig 2. Akrotiri Soldier, fresco, West House, North Wall, Room 5, Thera, 1600 BCE

These sources do not clearly show or
interestingly all three of these show
ring from shaft grave IV,[226] clearly shows the shielded man in a lowered position, possibly squatting or sprawled vulnerably before the swordsman, however this depiction may be due to limited space on the ring. Both hands appear to be on his spear. Two other sources are of ambiguous in nature. The first is the possible depiction of shields on the silver siege rhyton,[227] which will be examined in more detail later,[228]and the second is of a figure-of-eight shield in what ha
plaque.[229] Finally, two shields-men appear on a pottery shard from T
BCE, depicting both a tower and figure-of-eight style shield, represe
portrayal of both shield types. The shieldsman with the tower desig
helm and may also be armed with a javelin or short spear. Not enou
useful interpretation. In all cases, the tower shields and figure-of-ei

Fig 3. P

Figs 4-5. Siege Rhyton, Shaft Grave IV Circle A, Mycenae, LHIB 1550-

[221] These images may be found in Appendix III, Figs. 4-15 and 20-21.
[222] These include Appendix III, Figs. 6, 8 and 10.
[223] Appendix III, Figs. 8 and 10.
[224] Appendix III, Fig. 6.
[225] Appendix III, Figs. 7, 9 and 13.
[226] Appendix III, Fig. 9.
[227] Appendix III, Figs. 4-5.
[228] The siege rhyton has received much attention in academia, including G. Kato, *Die Mykenai*, 1930; W. Smith, *Interconnections in the Ancient near East*, 1965; and J. Ho Rhyton and the Question of Egyptian Influence, *American Journal of Archaeology Vo* 281.
[229] Appendix III, Fig. 15.
[230] Appendix III, Fig. 20

detail later,[228]and the second is of a figure-of-eight shield in what has been interpreted as a religious plaque.[229] Finally, two shields-men appear on a pottery shard from Tiryns,[230] dating to 1300-1250 BCE, depicting both a tower and figure-of-eight style shield, representing the last known historical portrayal of both shield types. The shieldsman with the tower design is equipped with a boar's tusk helm and may also be armed with a javelin or short spear. Not enough of this shard survives for useful interpretation. In all cases, the tower shields and figure-of-eight shields are depicted either clearly worn on the back,[231] or entirely ambiguously.[232] Only in the case of the silver siege rhyton,[233] which may in fact depict a tunic and not a design of half-tower shield, is the shield clearly worn across the front of the body.

Another inference is that the shields were all deeply curved. Across five of the nine mainland sources depicting shields with people, the twelve of the shields are drawn face on and thus appear to be flat.[234] However five sources,[235] if including the siege rhyton, depict the shields as clearly concave, for a total of six concave shields. Of the sources not yet mentioned, specifically one wall frescoe and three votive shields,[236] all three votive shields are concave.[237] Analysis reveals that a total of eleven warriors in the imagery (thirteen if including the siege rhyton) are equipped with shield and spear, and only one is armed with shield and sword.[238] Ten are depicted with boars' tusk helmets, as are two of three archers.[239] Six examples reveal a series of lines along either the centre or near the rims of the shields that may be interpreted as lines of stitches used for securing a layer of hide.[240] In total, there are six tower shields, sixteen figure-of-eight shields and supposedly two half-towers depicted across all the sources. Based on this, there would appear to be

Fig 7. Sealstone, Shaft Grave III Circle A, Mycenae, LH I-LH II

Fig 8. Lion Hunt Dagger, Shaft Grave IV Circle A, Mycenae, LHIB 1550-1500

[226] Appendix III, Fig. 9.
[227] Appendix III, Figs. 4-5.
[228] The siege rhyton has received much attention in academia, *Mykenai*, 1930; W. Smith, *Interconnections in the Ancient near* Rhyton and the Question of Egyptian Influence, *American Jour* 281.
[229] Appendix III, Fig. 15.
[230] Appendix III, Fig. 20
[231] Appendix III, Figs. 6, 8 and 10.
[232] Appendix III, Figs. 4-5, 7, 9, 13 and 20.
[233] Appendix III, Figs. 4-5.
[234] Appendix III, Figs. 6, 8, 10, 15 and 20.
[235] Appendix III, Figs. 4-5, 7, 8 and 9.
[236] Appendix III, Figs. 11, 12, 14 and 21.
[237] For more on the ivory shields, see the catalogu
[238] Appendix III, Fig. 6.
[239] Appendix III, Figs. 8 and 10.
[240] Appendix III, Figs. 7, 9-13.

a clear consensus on these images of Mycenaean shields. Mycenaean large shields were almost always worn into battle by means of a chest strap and was commonly worn, if not always worn, over the back. Some exceptions – noted above as ambiguous – appear to show the large shields worn across either the front or side. In the majority of these cases, it is possible , if not probable, that the shield is still being worn over the warrior's back, but the warrior himself is standing at an oblique angle. The only clear demonstration of a shield worn over the front is in the case of the supposed half-tower shield on the siege rhyton, which as mentioned before may in fact not be depictions of shields. Due to the obvious physical constraints of wearing such a large shield over the front of the body,[241] it is probable that the shield was in fact worn over the back. This suggests that large shields were worn back only, with exception only to the proposed half-tower design which did not suffer from the physical constraints that large table-sized shields could cause.

Other definitive conclusions are as follows. The three Mycenaean shield designs depicted on the mainland were concave in design. Though several are depicted as flat, these are all depicted from the front. Every depiction of the shields in profile or the physical replicas of the votive shields reveal that the shields were deeply concave. The spear was the favoured weapon over the sword, and that though the boars' tusk helmet was common in seals and noble artefacts, it is not a universal feature. Similarly, there is not necessarily a correlation between figure-of-eight shields, boars' tusk helms, swords and the elite upper class. The 1300-1250 BCE pottery fragment and the gold ring from shaft grave IV clearly depict a boar tusk helmet on warriors with spear and tower shield, while the lion hunt dagger shows figures with spear and figure-of-eight without swords or boar tusk helms at all. The only appearance from the mainland of a sword on a warrior with a boar tusk helmet and figure-of-eight shield is on a noble sealstone, however one image is not conclusive. Finally the frequency of tower to figure-of-eights appears to be uneven at a ratio of two tower to every three figure-of-eight, suggesting a lower popularity for the tower designs among the nobility. Whether this reflected actual numbers on the battlefield is debatable due to such a small and biased sample size.

In some of the images, the figure-of-eight shields show what appears to be a long wooden strip, called a boss or 'keel' running vertically through the centre of the shield.[242] All of these shields are also covered with what appears to be untreated rawhide for the outer layer. Upon further analysis it is evident that all of these shields totalling at four figure-of-eight shield depictions, are of either a religious or decorative nature.

Fig 14. Fresco, Inner Forecourt of Old Palace, Tiryns

[241] For evidence of this, see the experiments in Chapter 6.
[242] Appendix III, Figs. 14-15.

None of the shields associated with warriors possess the wooden strip and therefore this strip may be indicative of cultic symbolism rather than military function. Additionally, only the Lion Hunt Dagger, which may also be a decorative or religious scene, and the shard from Tiryns, which dates after the 1350 revolution, depicts rawhide on shields that are intended for active use. It is therefore likely that shields depicting a keel, and possibly those with fur-covered rawhide, reflect artefacts that are primarily religious or symbolic in nature and are not depictions of military models.[243] It is notable that the long vertical strip is not evidenced in any of the physical or warrior sources from the Cyclades, Cyprus, or Palestine. Only in Knossos, Crete, does something similar appear again on a broken seal stone depicting what appears to be the lower half of a procession scene.[244]

It is notable that in all of the mainland sources, there is no evidence to support the conclusion that a grip or a strap must have been used by the Mycenaeans for their shield designs.[245] On close analysis, even the relative position of the shields is inconsistent with what one would expect from a hand manipulated shield which should reveal changes in angle, position, and should move depending on the position of the weapon hand. None of this is apparent. Similarly, none of the images require the use of a strap or grip in order to explain their position. Additionally, the primary weapon of the Mycenaeans appears to be the two handed spear. It can therefore be concluded, based on the frequent evidence of the use of chest straps, the use of weapons that required both hands, and the lack of supporting evidence, that the conclusion that these shields were manipulated by hand is unsustainable.

[243] In contrast to this theory, however is a gold pendant found in Knossos, Appendix III, Fig. 24. Assuming the pendant was worn for religious, and not decorative, reasons, it is surprising that this pendant does not possess either a 'keel' or depiction of rawhide. However, this may be explainable if the pendant is proven to serve a different purpose, such as an accessory of fashion or evidence of a different form of symbolism.
[244] Appendix III, Fig. 16.
[245] For a reconstruction of the Mycenaean shield assuming that a strap design was in use, see the documentary series by the History Channel, *Ancient Discoveries, Season 3, Episode 1*, UK, 2007, 25:52-27:15.

Inferences from the Evidence, from the Aegean Islands

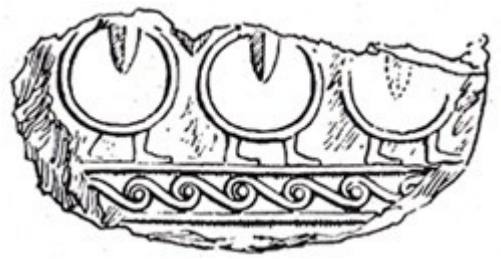


Fig 16. Seal Stone, Knossos, Crete, LM IB-LM II, 1550-1500 BCE

Having dealt with the mainland evidence, which comprises the fundamental basis of future analysis, it is clear that despite certain trends there is not enough evidence to provide definite conclusions. Therefore, additional evidence must be sought from the surrounding Aegean region of Crete and the Cycladic islands.[246]

Fig 17. Pottery, Knossos, Crete, LM IB, 1500 BCE

Prior to Mycenaean dominance, the Aegean was dominated by the Minoan civilization centred on the isle of Crete. Much of Mycenaean culture is traceable through to the Minoans, including the font of Linear B and the earliest evidence for a design of tower shield. Much like the mainland, much of the evidence for Aegean shields come in the form of either frescoes or seal stones. However, in Crete has been found another ivory votive shield from LM II, circa 1500-1450 BCE. The isle of Delos also contributes an intricate ivory plate detailing a warrior with shield from the LH III A-B period, approximately 1350 BCE. Other evidence comes in the form of pottery with three fully intact vessels and one shard having been preserved. This gives us a total of thirteen sources from the combined islands of Crete and the Cyclades. Of the thirteen, however, only four date to the time of Mycenaeans, the other nine date to the Minoan periods of either the late Middle Minoan (ca. 1600 BCE) or from the late LM IB and LM II periods (ca. 1500 BCE).

Fig 18. Traida II, 155

The Cyclades and Crete provide three effective periods from which evidence can be sourced. From Crete and the isle of Thera there are a total of three sources dating prior to 1600 BCE, including at least one depiction of each shield type.[247] From Haghia Triada and Crete between 1600 BCE and 1450 BCE (LM I - LM II) there are six sources of

Fig 19. Ivory Shield, Crete, LM II, 1500 BCE

[246] All images presented in Appendix III, Figs 16-19 and 22-27
[247] See Appendix III, Figs. 1-3.

evidence consisting of four seal stones,[248] one ivory votive shield,[249] and one intact pot.[250] Between 1450 and 1380 BCE there is a notable break in new evidence, with one surviving wall painting in Knossos forming the sole corpus of evidence from across this period.[251] In 1380 BCE evidence appears again from three distinct sources each depicting shields of figure-of-eight design. These sources consist of a pottery shard, a pendant and the aforementioned ivory plate from Delos.[252] For ease of reference, artefacts will here be considered in approximate chronological order.

The earliest evidence for large shield design in the Aegean dates to approximately 1600 BCE with the Akrotiri wall painting and one vase found on the isle of Thera.[253] This isle was preserved by volcanic ash and thus these images were preserved in excellent condition. The wall painting from West House depicts eight men on the march each sporting large trapezoid shields (henceforth known as the trapezoid tower variant). Each of these men are carrying a long spear around 150% their height, gripped from the rear of the shaft. Due to the angle at which they are held this suggests that either artistic license has been used in the depiction of these weapons or that these men possessed spectacular wrist strength. The warriors are also wearing boar tusk helmets and what has been tentatively interpreted as tasselled sword hilts hanging from their hips. The shields are each almost the height of the man, stretching from below the knees to the base of the neck, and are covered in cowhide.

Fig 20. Pottery, Tiryns, LH IIIB2, 1300-1250 BCE

The trapezoid tower variant shown here are very different from the later tower shield designs. First they are trapezoidal rather than rectangular in shape and are lacking in the parenthesis lip along the top of the shield. The shields are painted front on and offer no indication as to whether or not they are concave. Assuming that the shields have been represented accurately, they are being held or worn at an awkward angle in front of the soldiers in a position that does not seem physically maintainable even with a grip or hand strap. As mentioned earlier, they each hold long spears in their right hand from the very base of the shaft in such a way that they would have been almost impossible to carry. The physics of this scene leave much to be desired. Nevertheless, it is clear that the shields are being

[248] See Appendix III, Figs. 16, 18, 22 and 27.
[249] See Appendix III, Fig. 19.
[250] See Appendix III, Fig. 17.
[251] See Appendix III, Fig. 25.
[252] See Appendix III, Figs. 23-24 and 26.
[253] These are Figs 2 and 3 in Appendix III respectively. See L. Morgan, "*The Miniature Wall Paintings of Thera: A Study in Aegean Culture and Iconography*", New York, 1988 for more on these.

either worn or held in front of the body rather than behind. That these Minoan shields are also of a clearly different design from the later mainland tower design also separates them from the later Mycenaean shapes. Assuming an accurate depiction, it may be that these are early precursors of the tower shields, however, it is much more likely that the artist simply did not portray the shields accurately.

The vase from the same island constitutes an example of non-warrior imagery from this period. It depicts a figure-of-eight shield with a keel and has been painted with cowhide and what looks like a sun shining over the top. Dating to roughly 1600 BCE, this is the oldest known image for the figure-of-eight design. It is notable that the figure-of-eight on the vase shows the wooden strips that was previously identified to appear only in non-military scenes and potentially as cultic iconography. This suggests that either the symbolic connotations or the military practice of these shield designs predates this period.

The seal stone from this period (ca. 1600-1550 BCE) depicts a man, interpreted as a god, holding a half-tower shield with what may be either a single long spear or two javelins.[254] He is wearing a large conical headpiece, reminiscent of the crowns worn by Babylonian gods and so can be interpreted as a deity. He is wielding the shield in one hand, suggesting that it is being gripped, however the positioning suggests that he may in fact be gripping the chest strap. The shield is concave. If this is not a depiction of a half-tower shield, it may in fact be a depiction of the full tower shield shown at half the size in order to express the gigantic size and power of the god. Certainly, the ability to carry a shield in one head that mortal men must carry over their backs would be an excellent sign of power. If this is not a depiction of the full tower shield, however, then it is the first and only definite evidence for the half-tower design.

The next oldest discovery is a seal stone from Haghia Traida dating from between 1550-1500 BCE.[255] It depicts a man with a figure-of-eight shield ambiguously positioned over his back, or perhaps his right side, with either his left or right hand holding a spear shorter than the length of his body. Two additional figure-of-eights are depicted on either side of the warrior but with no soldier accompanying. Possibly, these are leaning or hanging against a wall or they are simply not important to the scene. These shields do not have the long wooden strip evident as in the previous vase images or evidence of hide patterns suggesting that they are military models.

[254] Appendix III, Fig 1
[255] Appendix III, Fig 18

The next oldest is the procession seal stone,[256] mentioned earlier, dating to, TM IB or TM II (1550-1500). This seal stone is broken halfway and only the bottom half is visible. These shields appear to possess keels of the ritual nature, however there is no evidence of a spear in the image.

Around circa 1500 two more seal stones appear in Crete, one from Knossos and the other from Zakros.[257] Both seal stones display tower shields, each clearly having great curvature, and one also depicting a figure-of-eight design.[258] The seal stone from Knossos, however, details a unique anomaly not seen in any other imagery. It depicts a warrior with a short spear fighting against a man with sword yet here, however here the shielded warrior is left handed and the shield is clearly depicted as being worn in front of the warrior's body. There is no ambiguity in this image. Both seal stones contain what are likely boar's tusk helms, but they are difficult to determine.

The vase and ivory votive shields from circa 1500 each depict standard figure-of-eight design shields. No vertical strip is present on the vase. There is what looks like circular stitching is clearly etched onto the votive shield and the rim appears to be flared. The vase is unique in that instead of a cow hide pattern the surface of the shield appears to be mottled.

After the Minoans disappear there is an absence of shield depictions in the historical record. Crete, provides only three sources of evidence, a wall painting at Knossos,[259] dated somewhere between 1500 and 1350 BCE, a pottery shard and a pendant,[260] each from LM IIIA (approx. 1380 and 1370 BCE). From the Cycladic islands**,** Delos produces one ivory plate from approx. LH IIIA-B (approx. 1350 BCE).[261] All three sources depict figure-of-eights.

The wall painting, like others of its time, is simply another vertical strip figure-of-eight. The pottery shard depicts a figure-of-eight being suspended from a wall by its chest strap. Another item is present, but the shard is too damaged to view further. The pendant appears to be almost entirely artistic in nature, displaying an intricate dual-spiral pattern on the upper and lower bowls of the forward facing that is not replicated in any other known image. This may be interpreted as a cultic

[256] Appendix III, Fig 16
[257] Appendix III, Figs 22 and 27.
[258] The Tower of the seal stone with both Tower and Figure-of-Eight, Fig 22, has been interpreted by at least one author as potentially being a cloak representing the feminine and part of a masculine-feminine ritual. This however is unlikely as the item in question does not follow the form or general shape of a cloak and overall looks far more like a tower shield and boar tusk helm than a cloak and hook. Marinatos, N., 1986, *Minoan Sacrificial Ritual: Cult Practice and Symbolism*, Stockholm, Paul Astroms forlag
[259] Appendix III Fig 25
[260] Respectively Figs 24 and 23.
[261] Appendix III Fig 26

symbol, or simply aesthetics. The last of the evidence, the ivory plate, depicts a warrior with a large figure-of-eight, short spear in hand and a boar tusk helmet. The image is superbly detailed. The shield appears to be covering the warrior's left side and the left arm is hidden from view. Though a superb specimen, this plate offers no interpretive information in regards to how the shield was worn or held.

Fig 6. Sealstone, Shaft Grave III Circle A, Mycenae, LH I-LH II

It is clear that on the whole the Cycladic and Cretan evidence supports the conclusions based on the mainland evidence, however, there are a few anomalies that bare mention. First, the Akrotiri wall painting,[262]

Depicting what may be a precursor to the tower design, it is approximately the same size and shape to the tower shield design found on the mainland. However, unlike mainland images, it depicts the shield in front of the body, suggesting that the shields were worn into battle this way. However, closer scrutiny would suggest otherwise. In the Akrotiri wall painting, all the warriors wear what has been interpreted as tasselled sword sheathes hanging from the waist. If this is true, and the shield is being worn over the chest, then the shield would be physically covering the hilt of the sword and blocking it from being drawn. In order for this shield to be an accurate depiction, the shield must be manipulated by hand in order to expose the hilt and allow the sword to be drawn. However, as previously assessed, the image is simply not reliable enough on its own to draw definite conclusions and, as the spears have been depicted equally unrealistically, it is unlikely that the position of the shield is an accurate reflection on historical practice.

The seal-stone presents us with a different issue.[263] There is no way to escape the fact that the shield is clearly worn over the front of the warrior's body. It is possible that the artist did not know how shields were worn, or it is possible that he is depicting a particular scene. The warrior is represented as left handed, another anomaly in the artistic record, and is wielding his spear with only one hand. Assuming that it is a single handed spear, this implies that the tower shield is being manipulated by the right hand on the inside. If this is true, then this may be evidence for a hand grip or strap, or at least a practice of gripping the shield by the chest strap. Unfortunately, such speculation is tentative at best and does not provide anything conclusive.

[262] Appendix III, Fig. 2.
[263] Appendix III, Fig. 27.

Fig 9. "Battle of the Glen" (CMS I, No. 16) Gold Ring, Shaft Grave IV Circle A, Mycenae, LHIB 1550-1500

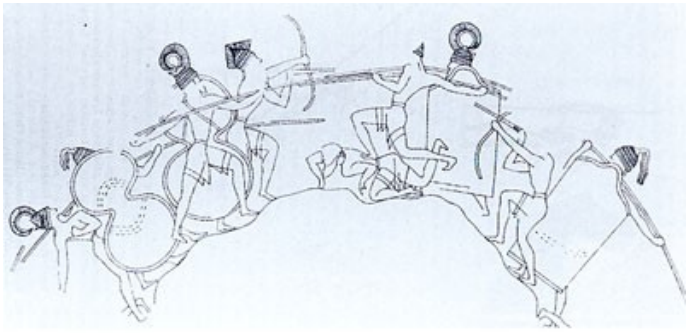


Fig 10. Battle Krater, Shaft Grave IV Circle A, Mycenae, LH IB 1550-1500 BCE

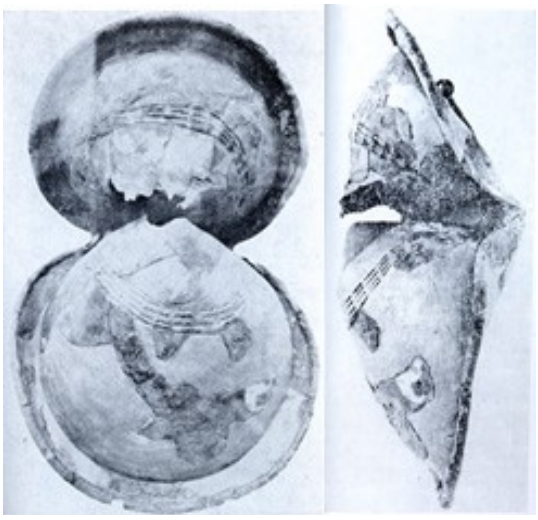


Fig 11. Votive Shield, Shaft Grave IV, Circle A

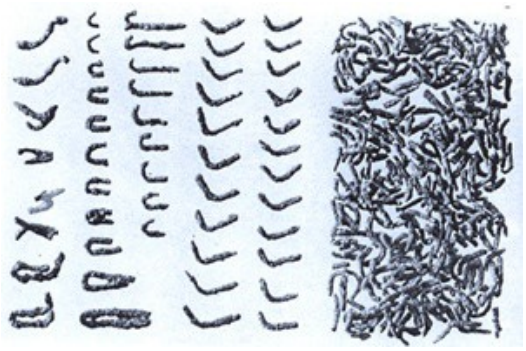
Inferences from the Evidence, from Cyprus and Palestine

Fig 12. Gold Pendant, Pylos, LH II

To date only two other regions have offered evidence for the Mycenaean shield designs, specifically the figure-of-eight design. In Cyprus, two items of jewellery have been found, a necklace and a bracelet.[264] From Gezer in Palestine, a single vase with a painted figure-of-eight.[265] All three sources show a rimming around the shields though they offer no additional evidence as to their construction or what this rim is composed of. The jewellery from Cyprus have been dated to roughly 1450-1200 BCE and the vase painting dating from 1500 to 1370. The vase painting clearly displaying a polka-dot pattern which may be interpreted as cow hide. These examples appear to be decorative in intent and clearly demonstrate a connection to the Mycenaean world. Whether these are the products of trade or of Mycenaeans living abroad is unknown.

Fig 13. Seal stone, Vafio, LH II

Inferences from the Evidence, Other Archaeological Evidence



In Tomb V at the New Hospital Site at Knossos, approximately 150 copper staples were discovered. A similar cache was later discovered in a warrior grave near Ayios Ioannis, also near Knossos. At the time of discovery, the purpose of these staples was unknown, however the excavators believed they may have been used to secure ox-hide to a shield. The reporting historians proposed an alternate explanation,[266] suggesting that due to the staples' blunted ends they were better suited for attaching leather to leather, as in a helmet or between layers of shields. If so then it suggests that Mycenaean shields may have comprised of more than one layer of hide.[267]

[264] Appendix III, Figs. 28-29.
[265] Appendix III, Fig. 30.
[266] Andrea Salimbeti and Raffaele D'Amato, http://www.salimbeti.com/micenei/shields1.htm
[267] This is possibly attested in the Homeric poems, *Iliad*, XII, 260-261: '*The several ox hide layers of Sarpedont's shield were stitched with golden wires.*'

Assessment of the Key Evidence for Overall Fighting Style

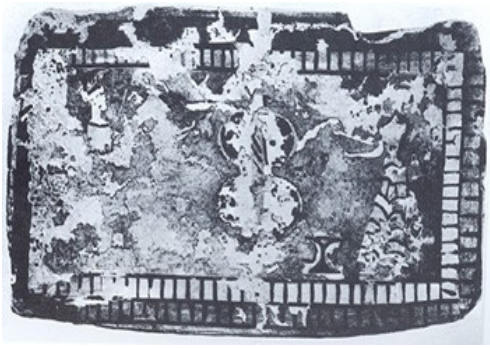


Fig 15. Stucco plaque, Tsountas' House, Mycenae

This section will go over each of the arguments from the previous chapters, highlighting some key points of evidence for considering, intellectually, the function, construction and use of the shields. The highlighted evidence that will be used follows:

- The famous inlaid Shaft Grave dagger and accompanying gold signet ring and seals.[268]
- The LH IIIB pottery fragment from Tiryns.[269]
- A set of Mycenaean wall paintings from Mycenae and Tiryns.[270]
- The silver siege rhyton from Shaft Grave IV and the less famous battle krater also from Shaft Grave IV.
- Staples

The first major feature is shape: the tower and figure-of-eight designs are both very clear and consistent in their shape and form across the 350 year time span of their existence. They are most clearly depicted and easiest to see together on the inlaid dagger entitled 'the lion hunting scene'. Here two large rectangular shields with an ellipses style curve on the upper lip and two large figure-of-eight shields are depicted side by side while the warriors wearing them fight a lion. An archer is also present behind the lines. Two shields, one of each design, are clearly depicted worn over the back. One figure-of-eight is depicted side-on showing its distinct multi-angle curvature. The bearer of the shield closest to the lion however, the remaining tower, is in the process of being mauled and the inside facing of the shield is visible. Unfortunately, key areas are concealed and do not appear to have been detailed. The warriors fight with long spears, which as has been shown, would appear to be the dominant offensive weapon in the imagery.

Alone, this image tells us that the Mycenaean shields were large, in all cases almost the full height of a man, that they could be worn by a large chest strap, in this case the straps passing under the right arm and over the left shoulder, and that at least one of the figure-of-eight designs was concave.

[268] Dated to the 16th century, Shaft Grave IV of Grave Circle A, Mycenae, currently located in the Athenian Museum, Appendix III, Figs. 8-9.
[269] This fragment sets the latest known period depiction for these shield types. Appendix III, Fig. 20.
[270] Appendix III, Figs. 14-15.

Other sources from the same site show similar evidence. For the strap, one of the Shaft Grave seals depicts two men in a duel with shields worn strapped on their backs. One of these warriors has his accompanying sword drawn and both wear helmets of the boar's tusk design. Another seal-stone of two warriors battling shows one soldier with figure-of-eight, clearly deeply curved, wielding a long spear while being stabbed over his shield by another man with sword. The shields-man at least wears a helmet. This evidence tends to suggest that figure-of-eights were commonly curved and worn on either the back or the front, helmets were often worn and the spear and sword were both common weapons. Finally the gold signet ring found in Shaft Grave IV depicts a tower shield, clearly curved and not flat. This last item will be of significant use for cross-examination later. Other evidence from both mainland Greece and Crete offer additional support for the conclusion that all rectangular tower shields were curved. How much of this evidence actually reflects historical realities rather than a particular aspect of the noble class or ideological thought is not certain.

There is also the evidence from several artefacts like the gold signet ring of Shaft Grave IV that shows the large tower shields were curved and not necessarily flat. This shape, as shall be discussed later, has a drastic effect on how the shields would have been used, as does the physical position of the warrior who appears to be kneeling.[271] This image shows the tower shield at an angle that would appear to be facing forward, clearly over the soldier's chest, which could be maintained there by chest strap or hand grip. However, further assessment indicates that this is not the case. Under closer scrutiny, a second hand gripping the front of the spear can be distinguished behind the shield. This would be impossible if a hand were required to physically hold the shield. Because both hands are on the spear, one arm is clearly visible, and the spear itself is on the far side of the shield, it would appear the wielder of this shield has his left shoulder facing forward and his right shoulder behind. The warrior is simply at an angle and looking to the left. In this position, he would have his back against the inside of the shield. This tells us that the shield is being worn over the back via the same strap as seen in the shaft dagger. Thus it is only artistic license and modern interpretation that makes it appear as though it is being worn on the front. To further support this theory, if the shield were gripped by any form of arm strap, rather than a hand strap, thus placing the shield over the shoulder and allowing the shield to move, then one edge of the shield would naturally follow the extensions of the spear as the arm moves and thus the overall shield would adopt a number of strange angles in the imagery. In this image or any other, this is not the case. From this it can be concluded that hand straps or grips in Mycenaean shields are a myth.

[271] See Subsection 'How Shields Work'.

Two other shaft grave artefacts, the seal stones, depict the figure-of-eights in combat against swords. In one case, a sword is being used to thrust over a shield worn by a helmeted man with a two handed spear. The shield here is in profile and clearly curved. The shields-man may be kneeling as with the gold ring, or his body may be visibly compressed due to the artist having to work on a small medium. In the other seal stone image, two men with figure-of-eight shields are in combat, one man with a sword thrusting it down into his opponent's chest. In these depictions it shows that the shield worn on the back, either clearly or identifiable by the exposed right arm as with the gold ring before. It is worth noting that all warriors with shields are helmeted.

The last piece of evidence chronologically for both figure-of-eight and tower shield designs is the previously mentioned pottery shard from Tiryns.[272] Though fragmented and difficult to draw conclusions from, does not in any way disagree with any of the prior assessments and to all appearances shows similar design traits as those discussed above.

Other sources, however, show different supplementary evidence. Two wall paintings for example, one from Mycenae and the other a set of three shield paintings from Tiryns, display figure-of-eights with what has been interpreted as an elongated boss running vertically from top to bottom. This 'boss element' is likely to be a split in the covering of hide and follows the general shape that one would expect from stretched leather.[273] Similar images appear on pottery depicting only the shield. These images constantly appear in depictions of rural or religious import and are not depicted in a context of battle, duel or active use. This design may be wholly symbolic in nature.

In battle scenes, however, the shield is always depicted without the keel. The famous *Battle Krater* shows us the clearest depiction of what is most likely the common use of the great shields in battle, namely back protection while the warriors fight with two hands on spears. There appear to be no swords, but there are archers in the battle. In almost all cases, the spear is being used over the lip of the shield where it would appear to make practical sense, as shall be discussed later. Of the nine figures, seven are wearing helmets, and one has lost his head due to damage.

Though it has been raised previously, it is worth mentioning again that there is one seal-stone from Crete that offers a clear depiction of the shield being worn across the front of the chest.[274] Also in

[272] Appendix III, Fig. 20.
[273] Another potential explanation is that these ideologically represent the keels on a ship and function on the shield in the same way. Both these interpretations came from Alex Kharnam, a leather worker and shield maker who assisted in building the shields used in this thesis.
[274] Appendix III, Fig. 27.

battlefield imagery, the silver Siege Rhyton,[275] with its half-tower shields also shows an exception to the rule – assuming of course that these shields are not in fact poorly detailed tunics. However, in regards to the seal-stone the view on the shield could be the result of artistic license and a desire by the artist to show his skill by showing the front facing of the shield, which may also be why this warrior is left handed. However it is far more likely that the shield is being worn across the chest. Above all, it is not being gripped or held as the position of the shield is far too close to the body.

Fig 21. Ivory shield, Mycenae, LH IIIA, 1300 BCE

The famous Theran fresco is also worthy of note, depicting eight warriors marching onto shore. The position of these shields is ambiguous and is clearly the result of artistic license. From an artistic perspective the shields appear flat while the warriors are walking side on. Either this is because the shields are being actively held in position on the opposite side of the body, and thus directly evident of a hand grip, or the artistic impression simply was altered in order to fully depict the shields. Based on the lack of other supporting evidence, it is far more likely that this is the result of artistic perspective rather than representing a completely different shield design to the Mycenaean variants that uses an internal centre grip. There is no real way of knowing if these particular shields were curved or flat, an internal grip would also be very difficult to interpret as there is no boss or inclination visible on the outer front of these shields. If these shields are in fact being worn across the chest, then they are highly dysfunctional, preventing the warrior from drawing his secondary sword with either his right or left hand as the handle is pressed neatly between the shield and the warrior's chest. Based also on the difficulty in carrying what is clearly a two handed spear from the butt end and held at a

Fig 22. Seal, Zakros, Crete, LM II, 1500-1450 BCE

Fig 23. Pottery, Knossos, Crete, Second Palace Period, 1380 BCE

[275] Appendix III, Figs. 4-5.

clearly awkward angle, the conclusion is that the Theran frescoe is clearly the result of artistic license.

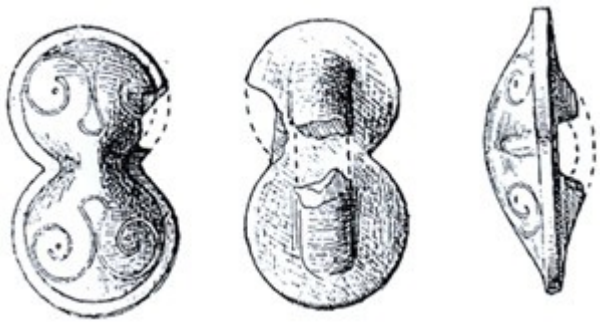


Fig 24. Pendant, Knossos, Crete, LM IIIA, 1370 BCE

Physical representations, such as votive shields do exist. However, they offer little reliable information. Modern studies have no basis of knowing whether or not these were accurate 'to-scale' replicas, allowing for approximate measurements on curvature of the shield, or whether they were at the opposite end of the spectrum, being in every way symbolic and deliberately unrealistic. However, even if deliberately symbolic and unrealistic, the votive designs may provide supporting evidence alongside the corpus of imagery.

Fig 25. Wall painting, Knossos, Crete, LMII and LM IIIA1, 1500-1350 BCE

Overall, the shield, when depicted alongside a warrior, is often depicted at almost three quarters the height and roughly twice the chest width of a man. They stretch from just below his knees to either just above or below the shoulders - with the larger designs measuring about 120cm (based on comparison between sizes displayed in the images and forensic examination on the height of Mycenaean corpses).[276] For smaller half-tower designs, the basis for distance is between the lengths of mid chest and equal to the knee, and the length of an arm, possibly the same length at approx. 80-90cm. In width, all shields show they almost reach the elbows, even when fully extended. This makes the total horizontal width approx. 80cm.[277] Thus, whilst not explicit in all cases, the position of most of the large shield depictions in the artwork are indicative of being worn over the back by chest strap. From this information, it will be primarily a matter of theory together with practical assessments to establish the ways in which the Mycenaeans probably fought.

In this initial conclusion, the most likely form of these shields' usage in war can be interpreted as follows. Both of the large curved shield designs were worn strapped to the back, not gripped, by

[276] In the grave circles A and B of *Mycenae* the average height of the men was 1.71 m (about 5'6'') and at least three of them were over 1.80 m (6'). For these measurements, see: Astrom, Paul and Verdelis, N., 1977, *The Cuirass Tomb and other finds at Dendra, Part 1 the Chamber Tombs*, Studies in Mediterranean Archaeology Volume IV also Mylonas, G., 1964, *Grave Circle B of Mycenae*, Studies in Mediterranean Archaeology Volume II

[277] This is the flat width measurement from edge to edge and does which does not account for curvature.

warriors equipped primarily with spear, and for the most elite of the social elite, only secondarily with sword. Spears were used thrust over the ellipses of the tower shields and over the upper edge of the figure-of-eights, and among the figure-of-eight designs it can be seen utilising the gap closer to the waist. These warriors would either march forward, or perhaps the front rank would kneel to form a static shield formation, all brandishing spears. Other unshielded spear warriors evidenced on the battle krater and by frescoes not included in this thesis would have fought behind or beside these shield-laden warriors, as would the archers who are depicted hiding among shield walls. Such a staggered formation would have likely protected men from enemy arrow fire, and would have allowed the archers to quickly disperse, giving the spear warriors more room to fight with either spear thrust on the charge or the sword in close quarters. However, it is possible that the unshielded spearmen took position in the third or fourth ranks in order to make greatest advantage out of the weaknesses that wearing the large body shields propose. Archers, if not dispersed through the ranks, would likely have been positioned on one side in order to gain greatest tactical advantage against the unshielded flank.

Fig 26. Ivory plate, Delos, LH IIIA-B, 1350 BCE

Fig 27. Seal, Knossos, Crete, LM II, 1500 BCE

Wearing the shields on the back, it is conceptually impossible to form a solid shield wall without the soldier turning his back to his enemy. Therefore, against charging warriors, it is highly likely that holes will almost immediately appear in the fighting lines as enemy warriors slide through the gaps between the shield on a given warrior's back and the chest of the warrior beside him. This is especially true when charging with a spear which will either penetrate and get stuck fast to the shield, or will glance off and slide between the two warriors to the second rank behind. This, however, would allow the second rank a chance to thrust their spear into the exposed face or chest of the still advancing enemy. Though this puts the second rank at greater risk, it also allows them to exploit what would otherwise be a weakness in their own defence, and reduces the risk to fighters without shields by placing them in such an advantageous position.

It is therefore reasonable to suggest that the officer corps of a mostly unarmoured army would have fought like two reasonably small phalanx formations charging directly into one another, angling their bodies so their shields protected most of their shoulder and side, and ignoring any soldiers or blows that went behind them. Warriors who did this would be relying on the ability of the ranks behind them to kill the soldier they have ignored while they concentrate on pressing further into the enemy ranks, most likely drawing swords once the initial charge with the spears are spent. This would allow all weapons to be utilised in combat, and would also allow those warriors in the front (or second rank) to turn and stab their enemies in close quarters as the situation allows for it. Though ineffectual against a shield wall that would hold formation it could be especially effective against unshielded warriors fighting with either spear or sword, or other shield wearing warriors when separated from their ranks. This sort of scene could be considered reminiscent of 'heroic' style combat.[278]

The fighting itself would have been predominantly thrust oriented, though quick cuts with a sword would be possible and potentially efficient when used in the front-most rank for shots at the opponent's exposed chest or face. Unfortunately, as long as the warriors in the ranks behind do their job of finishing off those the front rank allow to pass through, it is possible that the front rank would therefore be able to continue pushing further into the heart of the enemy formation.

Assessment of the Key Evidence for Construction

At present, the current opinion based on the limited available evidence is that the shields could have been stretched and stapled, stretched and glued, or both. In regards to the figure-of-eight there were at least two ways to spread the leather over the body of the shield, split hide and un-split. However the un-split shields may have also had a boss design added to their structure, as is suggested by the use of the word 'keel'. However, a simple split in the hide would achieve the same visual result. As for un-split shields, those that appear to be war shields, the evidence from metal blunt ended staples found in various grave sites, a Homeric passage, and staple-like imagery in both artwork and votive replicas, suggests there were often at least two layers, if not more that were attached together by staples. If this is so, then the average shield likely had either one or two hides, possibly more if references found in the *Iliad* are to be believed.

[278] Though as Lorimer points out, there is no reference to a heroic swordfight in Homer Lorimer, 1950, *Homer and the Monuments*, London, Macmilan.

It cannot be certain whether any of these hides were tanned, even partially, or added completely raw. However, it is unlikely that they were brain tanned. Brain tanning is a common method of historical and modern tanning, using the animal's own brain to treat the hide. However only a brain from the species of animal from which the hide came, in this case cow, can be used for the tanning, and a cow's brain is not large enough to tan the entire hide.[279] This means that for every layer of hide to be tanned, two cows must be killed. Hence if the shields had two hides, four cows must be killed, and if the *Iliadic* depiction of Ajax's seven layered shield is to be considered accurate, then fourteen cows must have been killed for one seven layered defence.[280] It is thus very likely that rawhide was used rather than brain-tanning, although dung pounding may have been a possibility.[281]

Behind the outer layer, the shield is a complete mystery. From many shield makers there are a variety of theories, based on available goods and techniques, ranging from a willow weave frame to utilising bent planks.[282] Within academia one theory sponsored by Richard Osgood promotes the idea that there is no wooden frame at all.[283] After consulting a wide variety of historical shield makers, however, no one has yet been able to identify a practical means of constructing the figure-of-eight design without using wickerwork. On account of this, wickerwork seems the most likely candidate for both shield designs.

[279] This information has been confirmed by two Victorian leather workers, including Michael Kearney who helped build several of the shields used in the experimenting.
[280] Iliad, Book VII; 260
[281] Again, from the same leatherworkers, I have learned that dung pounding was typically performed historically using bird and canine dung, which may have limited the number of shields that could be produced.
[282] Both of these options will be briefly explored in Chapter 6.
[283] It is worth noting that Osgood, R.; Monks, S., 2000, *Bronze Age Warfare*, Sutton, Sutton Publishing, p141 also claims that these shields would only be useful against daggers and were utterly useless against arrows, spears and swords - a notion that is not supported by any practical assessment or historical evidence.

Fig 28. Necklace, Enkomi, Cyprus, Late Cypriote II, approx. 1450-1200 BCE

Chapter 5: Principles and Physics of Shield Design

Fig 29. Necklace, Pyla-Kokkinokremos, Cyprus, Late Cypriote II, 1450-1200

In this chapter I will focus on the physical mechanics of the shield, considering it in terms of its physical and technical characteristics. This will provide the readers with an understanding of the technical properties of both the Mycenaean shields and shields in general to provide a common platform from which a more coherent assessment of shields can be progressed.

Fig 30. Vase, Gezer, Palestine, TM IB and TM II-IIIA, 1500-1370

What is a Shield?[284]

A shield is a portable object designed to protect the wielder. Due to its ability to be hand manipulated, moved or held still to defend the body, perform bashes, pin an opponent's shield and be lethal in its own right, shields are commonly thought of in martial arts circles as defensive weapons rather than armour. The shield protects from both ranged and melee attacks, though it must be positioned between the attack and the wielder to form the defence. Some divergent designs such as the small medieval buckler were designed with only melee combat in mind or the very specific Judicial Duelling Shield which was intended, as the name might suggest, for judicial duelling.[285] Despite their specialisation, shields are still more effective in defence against range and melee blows than not having them at all.

A few basic properties of a shield are:

- **Size**: Shields range from the very small 23cm diameter buckler, to the very large, up to and exceeding 183cm in height. In theory, the larger the shield the greater the

[284] For a few leading works on shields and shieldsmanship, see S. Hand, P. Wagner, Talhoffer's Sword and Duelling Shield Techniques as a model for Reconstructing Early Medieval Sword and Shield Techniques, *SPADA*, Highland Village, 2002, pp72-86 and S. Hand, Further thoughts on the Mechanics of Combat with Large Shields, *SPADA 2*, Highland Village, 2005, pp51-67; W. Short, *Viking Weapons and Combat Techniques*, Pennsylvania, 2009.

[285] For more information on Judicial Dueling shields, see Hans Talhoffer, *Medieval Combat: A Fifteenth-Century Illustrated Manual of Swordfighting and Close-Quarter Combat*. Edited and translated by Mark Rector. London, 2000, and S. Hand, P. Wagner, Talhoffer's Sword and Duelling Shield Techniques as a model for Reconstructing Early Medieval Sword and Shield Techniques, *SPADA*, Highland Village, 2002, pp72-86

protection. However equally, the larger the shield the slower and less manoeuvrable it is, typically making a warrior more static.

- **Shape**: Most shields are either round or rectangular, though some, such as the infamous kite or heater designs of the medieval period, taper towards the bottom.
- **Curvature**: Some, not all, shield designs show curvature, designed to better deflect incoming blows to both further protect the wielder and make the act of carrying and fighting with it easier on the shield arm by dispersing weight and impact. Shield curves come in a variety of types both in degree of curve, either very deep or very shallow, and degree of angle, ranging between a single arc of curve to multi angle bowl shapes.
- **Handle**: Two types of handle are commonly known, the strap and the grip. Straps often came in pairs and grips can be anywhere between just enough to fit the hand to 152cm long.[286] Each have their advantages and disadvantages.
- **Boss**: A shield boss is, typically, a small dome-shaped add on to the shield. Its purpose is either to add better protective quality to the shield and often to make room for an internal hand grip. It is always made of a separate material piece to the core, most commonly metal though wood bosses have been discovered.
- **Materials**: Wood was the most common shield material followed by leather. Wicker and metal variants have also been discovered. Type of wood and metal is often dependent on what is either available locally or can be obtained at the time of construction. The common leather used was historically of a thicker variety than the leather used in common manufacture today. Currently the closest equivalent is a breed of Scottish cattle, kyloe, whose hides have been kept bred thick since the medieval period.[287]

Each of the categories listed above describe several properties per category. No one shield contains all of these properties, however all shields contain most if not all of these elements. Reviewing the properties of the three Mycenaean shield designs, reveals the following:

[286] See Talhoffer's judicial dueling shields.

[287] This is a common belief among re-enactors, though I have yet to find any distinct evidence for this. For a more in-depth look at leather and cattle of the past, see, http://rstb.royalsocietypublishing.org/content/354/1379/99.full.pdf+html and http://dysci.wisc.edu/sglpge/posters/SNP%20analysis%20of%20ancient%20cattle%20remains%20reveal%20pre-industrialised%20selection%20for%20milk%20traits%20-%20Svensson.pdf, each last accessed 28/01/2013

- **Size**: Two of the shield designs, tower and figure-of-eight, are full length body shields approximately 120 centimetres or five feet in height. Another potential shield type, the half-tower, is of much smaller variety, approximately half size, setting it at approximately 60 centimetres or two and a half feet in height. The three appear to have similar width of 80 centimetres or two feet.[288]
- **Shape**: Two of the shield types, the tower and half tower, are rectangular in shape with an ellipses shaped lip. They are of distinctly varying lengths. The figure-of-eight is in the form of a figure eight or, more accurately, of two bowls put together often joined by a long diamond strip down the middle.
- **Curvature**: All designs when viewed from the side depict these shields as curved. This would imply that all Mycenaean shield designs from this period are curved. The type of curvature in the tower and half-tower designs is cylindrical, while the figure-of-eight design is concave.
- **Handle**: With one exception on a half tower depiction, none of the three Mycenaean shield designs appear to have a handle attached. In fact it would appear that all of these shield designs were carried by use of a long leather chest strap worn over the back and not manipulated in any way by hand.
- **Boss**: Neither the tower or half tower show any sign of functional grip protecting boss. A number of figure-of-eight shield images, though not the majority, show definitively a long and narrow strip of some material running vertically between the 'bowls' down the centre, though this is possibly a deliberate split in the leather. A number of images show a number of dots or lines which may represent decorative shield bosses but are more likely staples for securing multiple hides.[289]
- **Materials**: Depictions of all three shield types reveal that the Mycenaeans made use of cow hide for all their shields. It is not known whether they tanned one side of this to create leather or left both sides untanned to maintain the tensile strength of rawhide. It is likely that multiple hides were typically used on the shields and mounted in layers.

Many of the frescoes and pottery do not depict military action.[290] As such it is difficult to discern, purely based on the current look of the evidence, how these defensive weapons were used. However

[288] As no shields have survived these measurements are calculations based on an analysis of the imagery investigated in Chapter 4. The final measurements would alter based on the size of the individual wielder.
[289] See Appendix III, Figs. 7, 9 and 10, compare with Figs. 11, 12 and 19
[290] See Appendix III, Figs. 1, 3, 11-12, 14-26, 28-30

to assume they were defensive weapons may be a mistake. As stated initially, a shield is a hand manipulated device. On the defensive it can be moved to defend against incoming blows from multiple angles, and it has the potential of being used offensively. These 'shields' however, being back worn, show no evidence of being capable of this. Aside from one image of the half-tower shield held in hand,[291] there is little to no existing evidence to support the concept of handgrips, and even this image could simply be showing a shield gripped via the chest strap. The majority of images, particularly those few images of soldiers in action, all show the shields worn statically over the soldiers' backs exposing their chests. The shields are angled over a shoulder, and are not hand held or manipulated. These shields were being worn.

As Mycenaean shields do not fit the typical definitions of a shield, that is being hand manipulated, capable of being moved to the defence and able to perform offensive actions, means that this particular variety of items are clearly not in the same category as other shields. These 'shields' appear to be more like armour with shield aesthetics. Physically they resemble much more closely the stationary medieval pavise, a portable wall used to protect archers, or an oversized backplate. However, since a pavise is intended primarily as a stationary arrow barrier, and is not intended to be carried into melee, 'shield armour' is perhaps a more appropriate term for these devices rather than pavise or the standard 'shield' which denotes a defensive weapon. Either way, it denotes a different style of 'shield' combat than what one would normally expect from a medieval weapon. Careful consideration is now required in assessing how the Mycenaean 'shield armour' works in practice to avoid confusing it with a 'normal' shield. To achieve this requires a thorough understanding of how shields work.

The following details how typical 'shields' are designed and built and the traits shields of similar designs share.

How Shields Work

Though much information could be gleaned about the shields and shield work from images alone, it is still theoretical. Written sources, shield design and practical experiments are all required to fully understand the function and functionality of a particular item. Because of this, it is important to investigate the manner in which typical shields work. Such a topic is easily a body of a much longer essay, and has been treated very well at least once in the recent past.[292] Above all, it will focus

[291] See Appendix III, Fig. 1.

[292] S. Hand, Further thoughts on the Mechanics of Combat with Large Shields, *SPADA 2*, Highland Village, 2005, pp51-67

attention on the most likely functions and functionality of the Mycenaean shields in theory and practice.

As noted previously, the base defining criteria or prerequisite capabilities of a shield are that they are able to be hand manipulated, to be moved where required or held stationary to protect various parts of the body, they are physically able to perform shield bashes and pin an opponent's weapon, including an opponent's shield, and they are capable of behaving as a weapon in their own right. Effectively, the shield is meant to be used both defensively and offensively and is capable of being used for both.[293] Any shield is able to fulfil this role, though its effectiveness at performing any of the above functions is dependent on the nature of the shield's design, with some shields designed with certain preferred functions at the expense of others.

A basic summary of a shield at use in duels and in combat are as follows:

> "…The shield is used to close a potential line of attack, usually the outside line. This is done by the shield being interposed between the defender's body and the attacker's weapon. Opponent's shields can be engaged in the same manner as swords. Attacks are made by binding with the shield, closing your line of attack while opening the opponent's same line."[294]

In other words, the shield is used to defend the body by interposing or forcing the shield in the path of an incoming attack. This may be used effectively against both an opponent's blade and an opponent's shield to the same effect. A shield bash is effectively the collision of a shield against another object with the primary intent to cause damage or break bones. This is often performed as a punch with the shield. The offensive action of binding with the shield against the opponent's weapon will pin either the engaged weapon or opponent's shield in place, or in some cases both. Finally, by binding with the opponent the warrior exposes one or more places on the opponent's body so that he can't defend them which you can then attack with your own weapon. Good technique will also still maintain a defence from incoming attacks, what is called closing the line, while still exposing a line against the opponent, what is called opening the line. By being capable of these three aspects, defence, bash and bind, an object becomes both a defensive and offensive weapon, and thus a shield.[295]

[293] Some shields are particularly effective on the defence or, in some cases, such as the buckler, particularly effective on the offense. It does not need to be effective at all of these, merely capable. What makes a shield good or poor at these factors is the focus of this chapter.
[294] S. Hand, P. Wagner, Talhoffer's Sword and Duelling Shield Techniques as a model for Reconstructing Early Medieval Sword and Shield Techniques, *SPADA*, Highland Village, 2002, p78
[295] For more on this, see the original article by Hand and Wagner, ibid op. cit.

Like other weapon types, differences in basic design have an effect on the techniques used. For example, a Viking flat, round shield, while achieving the same role as any other shield type, functions differently to the curved medieval kite. Likewise, these perform differently to the many varieties of strap shields, the heraldic heater, the Greek aspis, the Roman scutum, the crescent moon design and other shield types throughout history. At times, differences in design appear to result in vast differences of technique; however, a few basic points on design are as follows:[296]

Curved v Flat

One of the most obvious differences between shield types is curved v flat. One of the easiest observable differences in shield designs, one of the most important effects this has on combat is on the shield's ability to bind, or be bound, by the opponent's shield. Against other shield types, a curved shield cannot easily be bound, nor can it easily perform a bind. However, it can be pressed, effectively pinning the shield against the wielder's body. In addition a curved shield can still bind an opponent's offensive weapon, either trapping it in a press between the two shields or deflecting it to one side and pressing directly against the weapon. As for bashing, it is difficult to perform a bash with a curved shield against an opponent, particularly as the most typical shield bash is a punch with the shield edge against the opponent's body or face. This is because the curved edge disperses the effect of the impact rather than delivering it. However, as a shield is a hand manipulated object, it is still possible to perform a bash with a curved shield by using any flat edge or narrow point on the shield for greatest effect. Effective bashes and binds may still be made against either an opponent's weapon or an exposed arm regardless of curvature.

When defending, the curvature of the shield assists greatly against thrusts, pins and bashes as these are far more likely to glance off. Due to the curvature, the kinetic impact is more easily reduced, causing less strain on the shield bearer and also doing less damage to the shield itself allowing it to survive combat for longer. This immunity to pins, binds, thrusts and bashes, while still allowing a certain extent of return offensive, makes the curved shield superior to the flat on defence in many ways.[297]

[296] Though Mycenaean shields are not like typical shields, several of the design features are still relevant to the Mycenaean shield even as they function as armour, for example how curvature absorbs impact. Additionally, any contesting theory promoted on how these shields might function by promoting a handheld design would make this section very important for a thorough understanding of how the shield would function under that theory. Nevertheless, as Mycenaean shields and standard shields do not behave the same, it is important that the reader fully understands how standard shields work so that they might better understand how and why Mycenaean shields do not work in this way.

[297] This is, of course, all assuming the curved shield is a concave or 'backwards' curved shield, where the curvature of the shield is wrapping around the wielder's body rather than towards the enemy. On a convex or

A shield is not a warrior's only weapon and it is assumed that it will typically be used in conjunction with a primarily offensive weapon, like a sword or spear. When paired with any offensive weapon, an issue with the curved shield becomes apparent that does not occur with the flat design. The weapon arm is constantly left exposed. Whenever a strike is made, the attacking arm must project from the body past or around the shield to attack. With a flat shield, the shield may be extended with the weapon so as to continue protecting the arm and keep it 'shielded' from any incoming attack. With the curved shield, the curvature in the shield forces the weapon arm to become exposed on the attack, with the arm being exposed longer during a cut than a thrust. The flat shield, being a more offensive shield design, is also better paired with a non-thrusting weapon in the absence of arm or hand protection.[298]

Equilateral v Long

Another of the easiest ways to visibly distinguish between shield types is on the basis of shape, round shields v long oblong shields for example. However though shields can come in a variety of shapes, sizes and decoration, the question on how it affects the shield usage is whether the approximate shape configures to being either equilateral in shape or long. For a shield to be equilateral it must have approximately similar measurements from centre to edge around the shield. A long shield is therefore any shield that has a measurably longer diameter in one direction over another, typically either horizontally or vertically.

A long shield is typically ineffective in the techniques of a bash or bind, due partly to the positioning of the hand grip/strap behind the shield. First, on the basis of length and hand positioning, the shield can be divided into long and short ends and the long and short edges. The long end is the side with the end furthest away from the hand steering the shield with the short end the side with an edge closest to the hand. The long edge represents the edge with the longest measurement while the short edge represents the edge with shortest measurement. First, it is difficult to bash with a shield if the bashing edge is too distant from the hand to transfer the kinetic energy. In addition, the further it is the more liable part of the shield is to break upon impact. Thus a hand close to the edge is preferable for bashing.

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forward shield design, the respective advantages and disadvantages would be in many cases reversed, however, the author knows of no shield historical shield design that matches such a description, with the exception of jousting shields designed for lance breakage.

[298] As a historical note, this explains further why the Romans preferred the thrust over the cut with their curved shield design and why arm protection was enforced on the Danubian frontier after a high rate of arm losses against the two handed Dacian falx. This corresponds to the historical point raised by Hand and Wagner, on the evolution of full mail sleeves only appearing in the imagery after the re-adoption of curved shields.

However, on a long shield, this advantage is negated due to the length of the shield in question. If the hand is positioned close to the short edge of the shield, then in a bash it suffers from a measure of drag from the added weight and distance behind the thrusting edge.[299] Conversely, if the hand is positioned close to the long edge of the shield, then it suffers from the added dispersing effects of the length, which in a bash will sap some of the impact from the intended thrust point. In addition, the longer the edges the more likely these will impede the thrust by catching the opponent's shield, weapon or body before the point of percussion hits its intended target. Keeping the bashing edge near to the short end however would appear to be much better, as drag has less effect on kinetic force than dispersion.

Though this may be the case for performing a bash – or a pin – the reverse effect is in place when trying to resist a bash or pin. A hand nearer to one end increases the vulnerability of the all other ends to be bound and pinned. On defence the shield becomes almost useless when resisting from these positions. Conversely, while the defence it much stronger along the end where the hand is positioned, the force of impact is also further imparted against the holder, with a greater chance for hand injury than a more central or distant grip. Thus a central grip and an equilateral shape are far more even for kinetic energy than a non-central or long design. In addition, due to the centralised balance, the more central and equilateral a shield is, the easier it is to manoeuvre and recover from a bind. Because of this, it is also a faster design to use.

The long shield does, however, offer a unique solution to an otherwise difficult problem – coverage area. As the human body is not equilaterally shaped, for an equilateral shield to defend the entire body it must be expanded in all direction equally, making oversized equilateral shields incredibly large and difficult to wield. In addition, the larger the shield the more kinetic energy is lost through drag and dispersion. Long shields, however, resolve this issue by only expanding in certain areas in order to provide additional protection for the body while retaining as much of the equilateral advantages as possible. Thus a large long shield is more efficient than a large equilateral shield, while medium sized equilaterals cover less area but benefit from greater balance and speed.

Strap v Central Hand Grip

[299] This is a result of a thrust having to resist gravity to maintain accuracy as opposed to a downward cut, and that a thrust utilizes slightly different muscle groups than a punch or a cut, which are both natural striking motions of the body.

The handling of the shield, aside from location, is not altered by the type of strap or grip applied to the hand. In both cases the hand takes up near identical position, wrapped around a length of leather, wood or metal for grip. Because of this, straps and grips form almost exactly the same role and can perform the same techniques. However the hand grip, which is inherently more firmly secured to the shield than the strap, generates more power to strike and resist than a hand strap. The only exception to this rule of non-effect is Talhoffer's duelling shield in which more than one hand is used on the grip. A single strap or grip, aside from the material used, has no particular advantages or disadvantages that have not already been mentioned in equilateral v long, that is, advantages and disadvantages based on positioning. Multiple straps on a shield, however, do have several particular advantages over the single strap/handgrip system.

The dual-strap system, consisting of a non-central handgrip/strap and a secondary strap known as an arm strap, has a marked effect on the shield's use. Though a hand strap is far less effective than a hand grip at bashing and binding due to the strap's flex, a dual-strap can be just as effective on the bash and even more effective on the bind. First, with an arm strap in place the shield is far more securely fastened to the wielder's arm. The shield thus becomes far more resistant to bashes and binds than a single handed or central grip because it disperses the incoming kinetic energy through two or more structural points, the straps attaching it to the arm. On the offensive, the bash is supplemented by the non-central hand positioning while the arm strap reduces the inherent drag, dispersion and unwieldiness of the shield. In addition, as the shield is at all times kept close to the arm, this allows the arm's kinetic energy to be more effectively added to that of the hand in bashes and its resistant energy to shields in binds. Thus on the offence, the non-central and dual strap system is far more effective and on the defensive the wielder gains the added benefit of extra contact between his body and the shield increasing resistance and dispersing force of impact from the weapon.

Accordingly, the secondary strap over the arm is far superior for applying physical force for both offence and defence to the single grip, be it a soft hand strap or hard handgrip. The added strap, set at a distance from the manipulating hand, serves to further disperse the shield's weight across the human limb. This makes the shield easier to carry and allow it to be wielded for longer. However, the single grip system has two strengths the arm strap does not have. These are fighting at a distance and shield manoeuvrability.

At distance, a shield can only be extended as far as the arm can reach with extra distance gained from however far the edge is from the hand. On a centre grip, this extra distance is about half the length of the shield while on a dual-strap grip, it can be significantly less than this. This lesser distance means that a warrior lacks the added protection an extended shield can give - such as blocking an incoming blow to the head simply by a forward extension – and it also means that the shields-man must be closer to the enemy in order to defend himself. This makes the shields-man himself less manoeuvrable as he cannot readily dodge or outstep an incoming attack. In addition, under the dual-strap, defending the weapon arm becomes difficult, similar to the situation with the curved shield described earlier.

Other advantages of the centre grip shield stem from its inherent manoeuvrability, both from the main body being so far extended from the hand but also from the ability for the centre grip to act as a pivot. With the extra space between the shield and the body at full extension, with the smaller shields a weapon may be passed over or under the shield to attack. In other words, with the extra arm length of space, a wider range of fighting techniques can be employed, such as cutting or thrusting from the other side of the shield, something far more difficult to achieve on the strap variant. On the handling of shield bashes, binds or deflection of an opponent's attack, the centre grip shield is much quicker to respond and recover with, both because the shields-man has suffered less injury on his arm but also because the handgrip automatically acts as a pivot point to readily disperse kinetic energy from incoming force away from the arm, however this can cause more impact trauma to the wrist. Though this increases the ability of this shield to be caught in a bind and pinned, this also makes the centre grip a more manoeuvrable, and thus faster, design shield. The centre grip is also less liable to break unless the shield is deliberately braced. Finally, a centre grip shield cannot be easily pressed while a dual-strap shield can be.

Aside from merely the better protection gifted by the centre grip system to the weapon arm, and the additional speed and manoeuvrability of the weapon, a centre grip shield also allows the wielder to make use of a wider range of fighting techniques, such as cutting or thrusting on the other side of the shield. Dual-strap shields, however, are far more reliable in receiving impact due to their emphasis on resisting and applying force rather than rotating. Thus they require less training to use effectively and lend themselves more to direct defensive and offensive shield-work over speed, manoeuvrability and distance.

In Practice

All shields share or combine many of these design features. For example, the Viking round shield is a flat, equilateral, central gripped shield with a metal or wooden handgrip protected by a boss. A Medieval kite is its functional opposite, curved and long with an off-centre dual strap system. These two shields lead to two very different styles of fighting. The Roman Scutum, however, is an example of a long**,** curved, central gripped shield with a metal or wooden handgrip protected by a boss whereas the round Greek Aspis is a concave, equilateral, off-centre dual strap type.[300] Talhoffer's duelling shield presents a unique case in that it is a long**,** flat, centrally gripped shield with a 5ft handle, however, despite such a major difference, in practice it still shares many of the techniques and styles and most of the advantages and disadvantages of the aforementioned Viking round shield, which aside from diameter they are mechanically very similar.[301]

Heater shields

As a historical side note, putting aside the many flaws in the heraldic heater design for use on the battlefield, the heraldic heater would appear to be the perfect symbiosis between the various shield types. It is flat or only slightly curved, approximately equilateral and strapped with the hand positioned closer to a corner of two edges. This appears to be a carefully measured balance in order to preserve the greatest speed, defence, balance and bashing strength in a time when tournament duelling, not group combat, was prevalent. Its flaws are many, its poor shape cannot readily defend the legs, the shape also forces large movements for defence and cannot be extended for better coverage. However, in one on one combat, such a shield design is in practice far more 'showy' and flashy than other broader designs. Also, due to the curvature it was possible to make a longer lasting design of shield. Overall, this makes it far better for public display combats at tournaments. This historical side note exemplifies a question of history on the matter of changing shield designs, whether designs changed to accommodate for combat, or combat changed to accommodate different design.

Mechanics

There are a number of mechanical terms that can apply to a discourse on the shield. These are: the shield's point of percussion, or the point where impact with another object transfers the least physical shock to the hand; the centrifugal point of force, where force is directed; the shield's centre of balance; and finally the shield's centre of impact. Each of these mechanical structure points in a shield effect and are affected by the design differences listed above. The shape of the shield, long or

[300] A basic description of these shields may be found in Appendix II

[301] See S. Hand, P. Wagner, Talhoffer's Sword and Duelling Shield Techniques as a model for Reconstructing Early Medieval Sword and Shield Techniques, *SPADA*, Highland Village, 2002, pp72-86

equilateral, determines the point of percussion. The location of the strap or grip determines the centrifugal point whereas the type of grip directly affects its impact point, as does the curvature or lack of curvature on the shield. Balance is determined by shape and weight distribution. The speed of the shield is dependent on whether this balance is evenly dispersed around the hand or located somewhere else. The further the centre of balance is located from the hand, the slower the shield will be.

Chapter 6: Practical Experiments on the Mycenaean Shield

The following chapter details an assessment of a range of possible fighting styles based on the analysis of previous chapters, followed by a brief practical experimentation phase performed by the author and several test subjects.[302]

It is undoubtable that the shield forms the most important part of the Mycenaean armament for the historian to research. Being of such unique design and character, and in many cases the only bodily defence for many of the noble warriors, the shield must have had a very real and direct influence on how the nobility perceived their survival on a battlefield that was otherwise devoid of personal defence. In addition, due to the inherently linear thrusting nature of Mycenaean warfare reflected by both the weapons and the existing armour, the shield may reflect a unique type of formation or style of warfare utilised by the Mycenaeans that cannot be understood by studying other cultures who rely on thrust oriented weapons.[303] Thus, as both the primary means of defence, and the most unique item of the Myecnaean armament, it is crucial that any experimental study begins with the shield.

As archaeological remains have not survived, detailed analysis on construction methods can only be established at a rudimentary level through assumptions. Thus certain tests, such as penetration tests, cannot be made reliably and will be limited in their results. In addition, without recourse to contemporary literary sources, it is difficult to suggest whether the Mycenaeans would have focused on maximising defence by concentrating their shieldsmen together, or whether they would have been divided over the battlefield. Similarly, it cannot be conclusively determined whether the warriors focused on using the shield to defend themselves, or whether they focused on charging with the spear, relying on the shield to act as armour and hoping – rather than attempting – that incoming attacks would be deflected as they charged.

For these experiments, six shields intending to replicate the shape and size of the Mycenaean tower shields were built. These shields were constructing by bending and cutting planks of 5 ply Australian

[302] The experiments reported here represent the second phase of experiments performed in 2014 for this thesis. The first phase, performed in 2012, are included in Appendix VI. It was considered by the author that the 2012 experiments were not of a sufficient standard due to constant changes in participants, insufficient lighting, and as a result were not reliably documented. As such, it has been included in the appendix only for reference and does not form a basis for the conclusions of this thesis.

[303] A review of the other weapons and armaments of the Mycenaeans has been added to the appendix in order to avoid repetition. See Appendix V.

pine into the appropriate shape and covering them with between two and three layers of rawhide. This was to ensure that the shields were of the right size, shape and of equal or greater weight than their historical equivalents. These shields, each between 60-65cm in width once bent, were designed to be worn by a man of 180cm in height, which was approximately the average height of warriors from excavated remains, and to protect a man of lean build, as depicted by the imagery. A number of shields were also built out of dried willow, however these were only used in the initial 2012 experiments.

However, these shields deviated from the historical shields in the following ways. First, it is unlikely the historical shields were built using Australian pine-wood or glued together in layers of 5ply, thus they are unsuitable for accurate penetration tests. In addition, though accurate in length, in width they are between 15cm and 20cm under what is depicted by the imagery. Thus up to 10cm on either flank is missing from these shields which must be assumed for accurate results. Finally, it is likely that each shield was designed to fit the warrior who owned it in order to provide maximum protection for the wearer, however, as these shields are based on an assumed standard depicted by the artistic and archaeological record, they are inadequate when worn by taller, shorter, or larger test subjects. As identical test subjects are often difficult to come by, certain individual experiences do vary. Thus results considered common across a range of test subjects of all sizes are considered more reliable than results stemming only from individuals who meet the 'perfect' standard, and results of the standard height and build the shields were designed for are considered more reliable than those of non-standard height or build.[304]

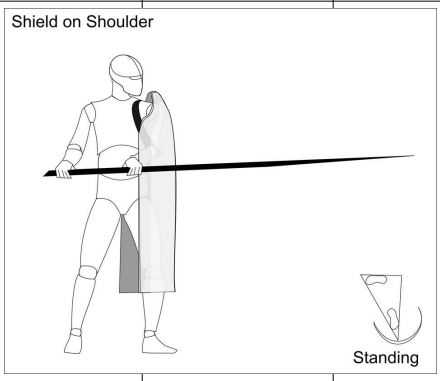
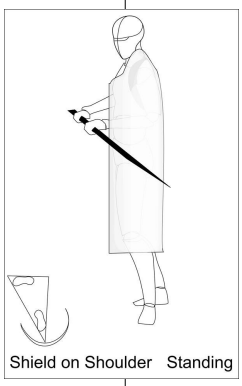
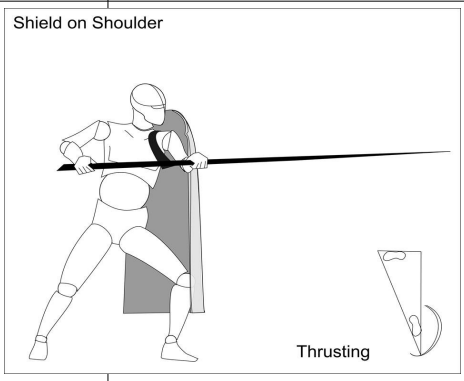
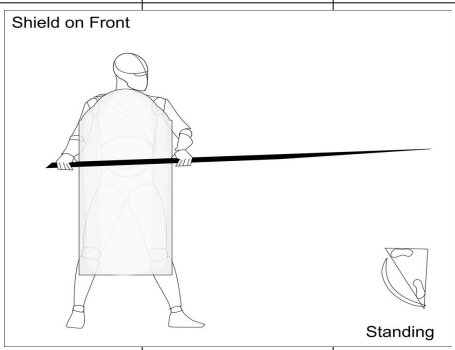
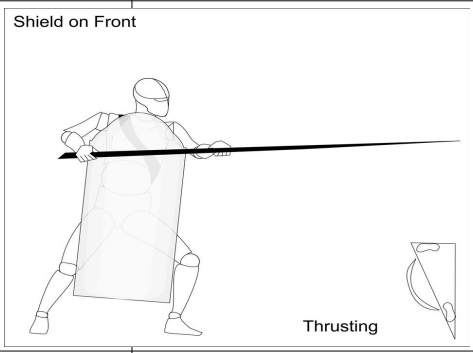
The participants for these tests included several non-history major university students, several previous or current practitioners of Eastern Martial Arts, and several members of Historical European Fighting Tasmania, a school of European martial arts focusing on the German tradition. Several of these practitioners also studied the manuals of Fiore and George Silver, and had considerable experience in medieval and renaissance re-enactment. Thus test subjects included a range of people both with or without prior experiences. Each experimenter was allowed free play with the shields before the experiments began to familiarise themselves with the weapon. They were encouraged to construct their own views on how the shields may have been used independent of each other before the experiments began in order that neither the thesis nor the experiments nor other experimenters could bias their personal interpretations. Experimenters were consulted for their interpretations after the final experiment.

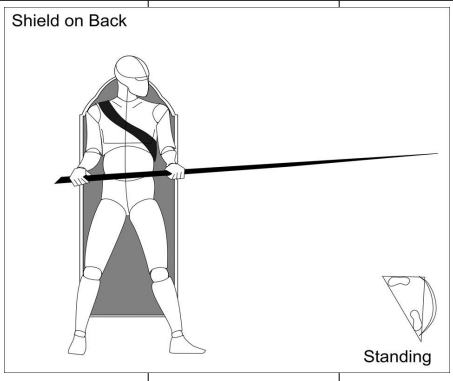
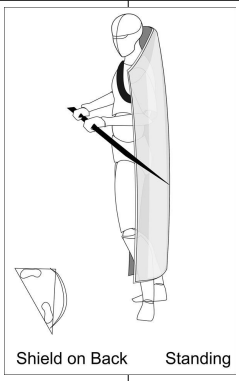
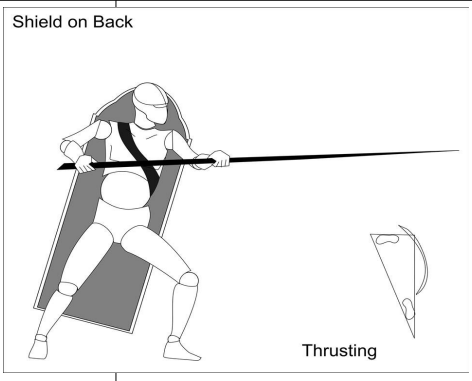
[304] Photos of the shield, and accompanying diagrams may be found in Appendix VII.

The Tower Shield Experiments

First Tests

The initial tests involved the question of placement of the shield. Three theories were tested, wearing the shield so that it sat in front of the shoulder, wearing the shield so that it sat over the chest, and wearing the shield so that it sat over the back. With all three theories, participants were asked to go for a walk, a run, thrust a spear and then attempt to defend themselves against an opposing spear. The following table lists the results of each test:

Table: 1	Walk	Run	Thrust	Defend
Over-the-Shoulder	Yes but with significant pull against the neck and a risk of shin bashing.	Knees or shins often bashed the shield and the shield bounced and arm quickly got tired from bracing the shield. Participants could only manage a controlled jog safely without bumps or the shield falling off.	Only a single hand could be kept on the spear without completely displacing the shield. Thrusts unwieldy, uncomfortable to hold, and were inaccurate.	Defending the body was relatively easy and the shield could be manoeuvred into position, however the impact of a good thrust risked unbalancing the wearer who was not firmly grounded.
				
Over-the-Chest	Constant knee, chin and throat bashing.	No participant was willing to engage in a run due to fear of the bouncing shield into knee and chin.	Two hands could be kept on the spear, however the shield dug into both arms and restricted movement.	Receiving a spear thrust from any angle risked unbalancing the bearer. Participants found it difficult to brace against a blow without adopting a deliberately wide stance or leaning forwards.
				
Over-the-Back	Participants could walk without	Participants could easily run and stop without risk of	Two hands could be kept on the spear and thrusts	Receiving a spear thrust felt more stable than previous tests, however

	difficulty except those who were too short for the shield.	being injured by the shield.	were made easily without restriction.	turning to deliberately block it either resulted in a loss of balance or the loss of eye contact or both.
				

In all three tests, deliberately attempting to block an incoming attack resulted in a certain amount of imbalance by the participant. It was found that if the participant stood naturally and allowed the thrust to hit them without attempting to actively block or intercept the blow, wearing the shield over the back was the most effective. However, actively defending the body with the shield was most effective when wearing the shield over the shoulder and participants felt psychologically more comfortable wearing it this way as wearing the shield over the back left many participant's feeling that their chests were exposed. It was postulated that this concern may have been alleviated had the shields been 80cm instead of 60cm wide which would have been enough for the shield's concavity to protect up to the elbows, however as the chests still would have been exposed it would have only be mildly more comforting. It was concluded that despite this defensive concern, wearing the shield over the back was the most efficient and physically comfortable method of the three presented.

After testing the three positions, alterations were made to the over-the-back experiment by wearing the shoulder strap over the left or right shoulders and repeating the experiments. Some participants felt more comfort wearing the shield over the right shoulder due to a feeling of additional protection, others felt they could move more freely over the left shoulder, however, this depended entirely on which side the participant choose to angle their body and there was not enough consensus on either side to determine whether in practice one shoulder was inherently more favourable beyond personal bias. By overwhelming consensus, the over-the-chest method was abandoned for subsequent experiments due to it being not only nearly impossible to defend oneself, but impossible to move and the impact of walking or being thrust at repeatedly injured experimenter's shins or throat.

The second set of tests involved determining at what angle the body most comfortably stood in when facing the enemy while wearing the shield in the over-the-shoulder and over-the-back methods, while maximising possible defence. The three positions tested were with the feet and chest set at a diagonal angle with the chest exposed toward the target, the shoulder and forward foot angled toward the target with the rear foot directly behind, and a reverse diagonal angle where the back and shoulders were angled as much as possible in order to exert as much cover as possible. Experimenters were then made to advance on their enemy and receive thrusts at their shield and body and report on levels of comfort and feelings of protection. The tests were repeated with participants set at various distances in order to reflect the effect of close, intermediate and loose formations. During the experiments, it was suggested that use of the shield as a static pavise also be attempted, these were also tested at each of the various distances.

Table: 2	1 square metre per person.	1.5 square metres per person	2 square metres per person
Over-the-Shoulder Chest Forward	Spear thrusts were convenient and easy, however it was difficult to defend actively against an incoming attack. Nearby shields regularly got in the way of a clean thrust.	Spear thrusts were convenient and easy, however it was still difficult to defend actively against an incoming attack and participants still felt they were impairing others.	Spear thrusts were convenient and easy, however participants felt the freedom of movement to actively block with the shield.
Over-the-Shoulder Shoulder Forward	Though difficult to thrust directly forward, the shields-man had a range of targets that stood directly in front of him or slightly to the right. He could not thrust towards his left flank and further along his right flank was often impaired by an ally's forward shield and shields often clashed with movement.	Though difficult to thrust directly forward, the shields-man had a range of targets that stood directly in front of him or slightly to the right. He could not thrust towards his left flank. Participants found they had greater freedom of movement but were still concerned with striking an ally during movement either with the shield or with the back of their spears when trying to thrust around their shield.	All participants found considerable freedom of movement and were able to thrust and defend in any direction. All participants felt they could defend themselves in this position and less likely to strike each other by mistake, however the inability to easily see their neighbour on their left at various times made several feel insecure.
Over-the-Shoulder Back Forward	It was impossible for the shields-man to thrust at an opposing target or brace against an enemy thrust, vision was greatly restricted. Ally shields often got in the way of personal movement.	It was impossible for the shields-man to thrust at an opposing target or brace against an enemy thrust, vision was greatly restricted. Ally shields occasionally got in the way with movement.	It remained difficult for participants to thrust at opposing targets due to physical contortion of the body. Despite the opening of ranks, participants with no prior experience with shields still managed to strike their allies. The inability to see their nearest neighbours also made participants insecure.
Over-the-Back Chest forward	Participants felt considerably exposed, but freely able to thrust in any direction they chose so long as there was not a row of men behind them. Defending themselves with the shields was next to impossible and shields often clashed.	Participants continued to feel exposed, but could continue to thrust in any direction pleased. Several participants expressed that they saw no point of wearing the shield in this position as it seemed to offer no benefits whatsoever unless they were running away.	Participants felt they were far too open and exposed. Though thrusting was easy and effective, the shield offered no protection and they felt too distant from their allies to do any good.
Over-the-Back Shoulder Forward	Participants still felt somewhat exposed, but they felt safe on their shielded side and on their unshielded side they felt boxed in but defended by their ally's shield. Spear thrusts directly forward were easy, though were otherwise obstructed by ally shields. Participants felt they could fight from this position, but more space would be better for both defence and offence.	Participants felt exposed but comfortable in the amount of defence they had against opponents in front of them and on their shielded side. They did not feel insecure about either flank as each felt comfortable in their position, naturally assumed others were, and could see their neighbours with a quick turn of the head. Ally shields also felt like protection even if several participants admitted it probably didn't offer any whatsoever.	Participants felt just almost as protected as at 1.5 metres, however it was pointed out that at this distance on a charge they would expect the second rank to slip in through the gaps and would naturally form into effective 1 metre increments. It was generally agreed that either more or less space would be preferable.

Over-the-Back Back Forward	Participants felt they could not thrust directly forward with comfort and could not easily see opponents coming towards them. Shields often clashed and participants did not feel they could easily stand with strength against an enemy assault.	Despite having the shield forwards, the lack of effective vision made participants feel vulnerable. Although turning their head and body was now an option, it felt foolish and awkward to do so, and most declared they preferred standing side on and shifting to this position for defence rather than starting in said position.	Participants declared they didn't like the feeling of being so distant from their allies while in an awkward position that did not feel defended. In addition, the idea of charging or receiving a charge in this position was raised and on both counts participants refused the idea, citing an inability to move when pressed and a pile up of their own ally's shields in their faces as reasons.
Pavise	The shield fell over when anyone attempted to thrust, advance or retreat. Otherwise advocates of the idea felt defended.	The shield fell over when anyone attempted to thrust, advance or retreat. Advocates of this theory began to seriously doubt its usefulness at these distances.	The shield fell over when anyone attempted to thrust, advance or retreat. All participants remarked that the restriction to movement made this position unreliable.

After conducting the tests, a few general conclusions were posited. First, that in all but one of the two metre spacing, most participants reported that in a mass charge, either receiving or engaging, they expected either to either get knocked around as people charged through the gaps and in these cases the shield would be a liability. Only in the case of the over-the-back and shoulder-forward position was it reported that they felt that in a charge they could both hold their ground and not feel knocked about by charging warriors around them. In addition, in each test done using the pavise and over-the-shoulder methods, regardless of spacing, had at least one result of the shield either shifting to an encumbering position or simply falling off. As a result, in terms of general safety, balance, encumbrance, and maintaining the shield for prolonged fighting, it was determined that only the over-the-back shoulder forward position offered all of these, with maximum ability to shift to other positions, with minimal loss.

At this point, participants engaged in a hypothetical conversation and other advantages and disadvantages of the various positions became apparent. Against arrow fire, it is difficult to turn one's back to the incoming arrow fire and maintain awareness of surroundings. For maximum protection, the warrior must hide behind the shield, forcing them to either turn their back or drop at the knees. Such a position made it difficult to either advance on an enemy, observe when a new volley of arrows were incoming, and while in this position, it becomes difficult to manoeuvre. As a result defenders would have to choose between advancing and defending. However, with the shield in the over-the-back with shoulder-forward position, the curvature of the shield offered some protection for the shoulder and the back against incoming arrows without limiting their movement.

It became clear by this point that the shield-over-back method was the superior method of wearing this equipment. Not only did it have significant advantages in not causing injury to the bearer, but additionally it had proven itself capable of not falling off on a regular basis. For these reasons, and additionally expressions of general comfort, it had also proven to be the preferred method by all experimenters. However, it was decided that before declaring fully between the two, it would be worth seeing how the shields stood up in grapple and melee.

Two sealstones from Shaft Grave III, figures six and seven, show two warriors engaged in melee combat. In both images, one warrior is armed with a sword and appears to be doing something with his free hand against his opponent's figure-of-eight shield. Theorising that the free hand may in fact be grabbing his opponent's shield, we decided to test the effects of grappling on both the over-the-back and over-the-shoulder methods of wearing the shield. As we did not have figure-of-eight shields, it was decided the tower shields would have to suffice. A total of four experiments were performed. Grabbing the shield by the top and pulling it left and right, and grabbing it by the side edge to pull left and right. These experiments were trialled multiple times, first with the shields-man not resisting, and secondarily with the shields-man attempting to resist.

The results are collated below:

Table: 3 Shield-over-back (attacker perspective)	Not resisting	Resisting
Grappling top, pull left and down	The shield pushed against the left shoulder and right chest, inverting the shields-man's torso downwards. By applying a slight downwards pressure, the shieldsman was easily pushed so his head would reach toward the ground.	In all circumstances the grapple was either successful, or instantly transferred into the opposite direction.
Grappling top, pull right and down	The shield pulled against the right shoulder and pushed into the shields-man's thighs or inside of the knees. It was almost impossible for the shields-man to remain standing, especially against a downward pressure.	In all circumstances the grapple was either successful, or instantly transferred into the opposite direction.
Grappling side, pull left, push back	The shield pushed against the left shoulder and pulled against the right. As it did not have much downwards pressure, the shields-man was able to remain standing, however was forced to step and was unable to resist unless exceptionally stronger.	In all circumstances the grapple was either successful, or instantly transferred into the opposite direction.
Grappling side, pull right and back	The shield pulled across the chest and also into the right hip, thigh and leg. The result was a full torso contortion accompanied by a downward spiral. Quite often with a sharp movement the shields-man hit the ground.	In all circumstances the grapple was either successful, or instantly transferred into the opposite direction.

In all cases of the shield-over-shoulder, the shield simply flew off the opponent's shoulder, entangling their arm and, often, ramming into their knee. It was decided not to continue experiments due to the potential for serious injury.

It was clear in all experiments, that the shield simply didn't handle well against grappling in close-quarter combat. In fact, it was abundantly clear that due to the length and strap of the shield it was in fact more detrimental to the bearer than protective. In some cases, it was even possible for the sword-wielding assailant to use the shields-man as a human shield against other opponents. This could have greatly increased the survivability of otherwise unarmoured swordsmen in battle.

After a final discussion with the experimenters, the following conclusions were reached. First, that the over-the-back method was the preferred method of combat, offering the greatest amount of safety for the minimal amount of impact. Second, it would have assisted greatly against the bow, and in many cases against the thrusts of an opponent's spear. However, against the grapples of a swordsman in close quarter combat, it could be a serious disadvantage. For experimenters familiar with theories of medieval shield-work, it was not considered surprising that these shields would be replaced once the strap and grip designs of middle eastern shields were encountered.

Chapter 7: Summary and Conclusion

The standard armaments of the Mycenaeans, the two handed spear, the thrusting sword, and the shield are very telling of Mycenaean combat. They indicate a strong reliance on thrust oriented battle tactics, and by extension a reliance on group oriented combat.

In Chapter 3 a perspective of Mycenaean warfare as conceived by Nicolas Grguric was presented. The conclusion of this perspective was that Mycenaean warfare centred around the shield which, while described as clumsy, offered great protection though it limited mobility. Grguric concluded they could fall easy prey to more agile lighter armed swordsmen, though in formation light troops would have stood little chance of getting in range. This proposal offered no practical explanation of how the lighter swordsman would have gotten into a position to use their swords, how the shields-man would fall prey to the agile sword, why the light troops would have stood little chance of getting into range, or how a typical battle might have been conducted.

After engaging in a number of experiments, it was clear that the shield was neither clumsy nor difficult to use. If worn on the back, it also did not limit personal mobility. Although Grguric's conclusion that they could fall easy prey to swords-men was proven true, it was not due to the fact that the swordsmen were 'lighter' or 'more agile' but instead due to the fact that swordsmen had a free hand to take advantage of the shield's inherent weaknesses. This could be performed even if the swordsman was wearing the same shield or even heavier armour.

In Chapter 4, a preliminary perspective was proposed by the author, prior to any form of practical experimentation, on how the Mycenaeans might have fought. In this depiction the shields were worn on the back and marched into battle, with the officer corps forming a small phalanx while surrounded by their unarmoured spearmen and archers. A separation from traditional phalanx was the idea that the front rank could kneel for a greater defence, however, this is unlikely. Unshielded spearmen would fight behind or on either side of the shielded front rank, and the emphasis is placed on the second rank as responsible for closing any gaps that would occur from receiving an enemy’s charge. Warriors in the front rank therefore relied on the second rank to do their job while they either held position or pushed forward. Archers were presumed to be dispersed among the ranks or positioned on one side to exploit weakness. It was presumed the shield would not be particularly clumsy as it would undoubtedly have been replaced if it had been.

It was inescapably clear after testing that the Mycenaean shield was a formation shield. In single combat, the shield was functionally deficient and an unnecessary liability. However, against strikes from a distance, and when arranged together in great numbers, it became clear that the benefits were at their maximum. Though the exact numbers of shields-men, and the size, discipline or cohesion of any distinct 'formation' is unknown, it is probable that the shieldsmen worked together to protect each other by staying in a huddled mass. Whether this looked in practice like an untrained militia huddling together for mutual protection, or a disciplined regiment seizing the optimum strategy for the situation remains unknown. Advanced formation tactics, though experimented on,[305] were highly suggestive but by no means conclusive, and thus no further conclusions have been drawn.

At the conclusion of this thesis, however, the final theory is that the Mycenaean shield, or shield-like body armour, was indeed an effective means of defence. Coupling the theoretical analysis with the experimental tests provided, the Mycenaean way of war of using thrusting weapons and full body shields was undoubtedly an effective means of fighting in a world without body armour. The shield was not a cumbersome, clumsy or otherwise unwieldy object. When worn on the back it was incredibly comfortable and did not hinder movement, even for running. At full size it protected all the way up to the elbows and down to the knees and could easily be used during a thrust without restricting the body's natural angles of movement. In practice it could be used to protect against both ranged and melee, with the sole exception being when fighting against the one-handed grapple performed by a swordsman, however this first required the swordsman to close. In fact, this was a superb piece of defensive equipment for formation combat in an age where armour and other designs of shield was not yet commonplace.

On the basis of this, it is easy to imagine that the shieldsmen formed the core of the Mycenaean army however this may not have been the case. Though it may seem likely that the shielded warriors formed the officer's corp and most probably the front rank, this does not therefore mean that there were not also naked spearmen standing in the front rank, or that the officers did not prefer to send their naked infantry in first, preferring to stay back and not put themselves at risk. Perhaps the shielded warriors amassed on one flank while the shieldless warriors amassed on the other in order to cause the shielded warriors to dominate one flank on the battlefield. On the other hand, unshielded spearmen may have appeared on the flanks of the shielded spearmen, effectively

[305] See Appendix VI.

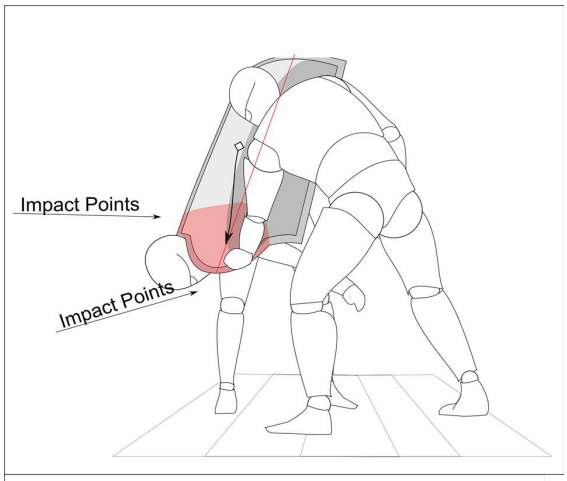
defending them with their bodies while the shielded soldiers charged through. Most likely all of these were used by different commanders over various battles at different times, and at this time it is impossible to declare which incarnation was more commonplace. As armour evolved, the shield appears to have made its way down from the upper echelon of the nobility, passing further and further down into the more common ranks, until finally disappearing somewhere between the 15th and 14th centuries from noble hands, and being replaced by hand-gripped foreign designs. It is therefore likely that as the proliferation of shield-armour increased, that the tower and figure-of-eight shields formed greater and more important roles on the battlefield as time went on. This would have continued until shields become handheld somewhere in the 14th century and a definitive change in the way in which Mycenaean warfare was conducted becomes evident.

One final question remains about the nature of Mycenaean warfare and that is why the Mycenaean body shields of the 16th to 14th centuries lasted the duration. At the beginning of the period, it can be imagined that this shield was the best form of body armour the Mycenaeans had access too. However, as armour became more prevalent, and time went on, why did the Mycenaeans not adopt a strap or grip system earlier? The answer may be remarkably simple. Until the Mycenaeans gained dominance over the Aegean sometime around the 14th century, the Mycenaeans were not a contender on the global stage. In fact, it is quite probable that aside from the occasional northern invasion or attack from Crete, the Mycenaeans only had to fight themselves. If this is the case then the answer is simple. Safety of the nobility was the paramount concern of the Mycenaean elite. Although the design of the shield gives the swordsman a distinct edge in close quarters, these swords were only used by other members of the nobility. In addition, the strap or grip shield offered less protection from arrows, which were indiscriminate in their killing. If the Mycenaeans were unable initially to provide large numbers of shields to their followers, and were disinclined to train their soldiers in effective 'noble threatening' formations, it may be that the nobility simply hoarded what they had. Thus it is possible that the Mycenaean body shield, which had proved effective in the days before armour, was continued in order to ensure that the armoured nobleman would always have an advantage on the battlefield.

One thing that can be certain of is that the shielded warriors themselves did not act like Homeric heroes on the battlefield. The shield, being an excellent weapon in formation combat, is a liability on its own due to the ease with which a warrior may be grappled and thrown to the ground while wearing it. Shielded warriors had to stick together and maintain something resembling a formation. Without this, the battle line fails and the army crumbles just as fast as if there were no shields at all.

Thus the ‘heroic’ style of fight claimed by many scholars to have existed prior to the classical age could not have existed using shields of this design during this Mycenaean period.

With this evidence, it can finally be concluded that the Mycenaean full-body shields were fully functional, and for most of that period, an integral part of Mycenaean combat between 1600 BCE, and approximately 1450 BCE. From 1350 onwards, the evidence of a change in warfare to armoured warriors and gripped shields, indicating a change in how battle was conducted, strongly suggests that the swift changes were the result of an increased relationship between Mycenaeans and the global stage. Without further literary, archaeological or documented sources, further conclusions can only be considered tentative. However, for the first time in thousands of years, the Mycenaean military may be seen for what it was. An effective, vital, and above all important institution of Mycenaean society. It was effective in war at a time when practicality and innovation could mean the difference between hundreds and thousands of lost lives. It was important in creating and maintaining prestige among the nobility, and its success on the field added much prestige to the kingdom. Finally, its efficiency, and the connotations and connections produced from a lifetime of use, gave rise to a religious following that may have continued long after the style and equipment of that period’s warfare had passed down from noble hands and been replaced with more modern substitutes.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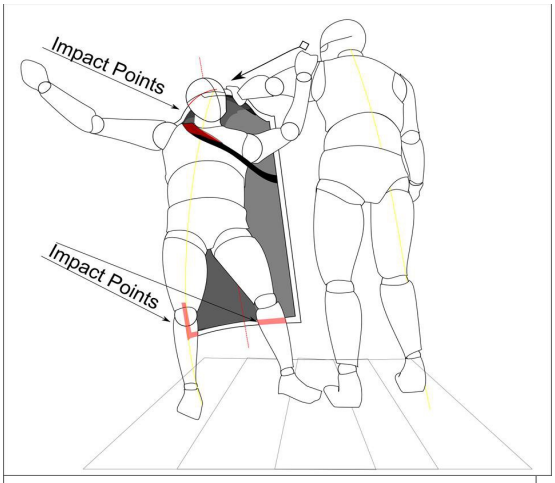
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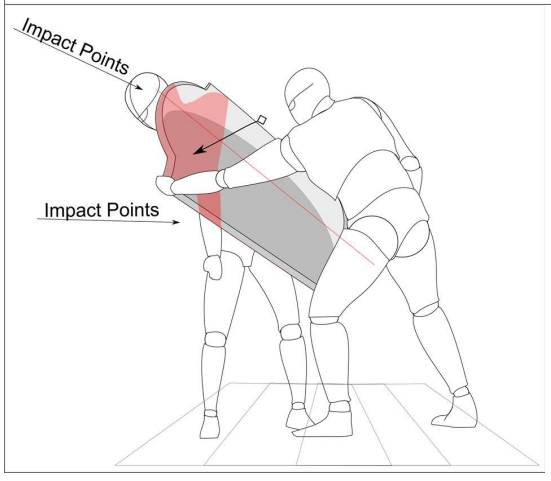
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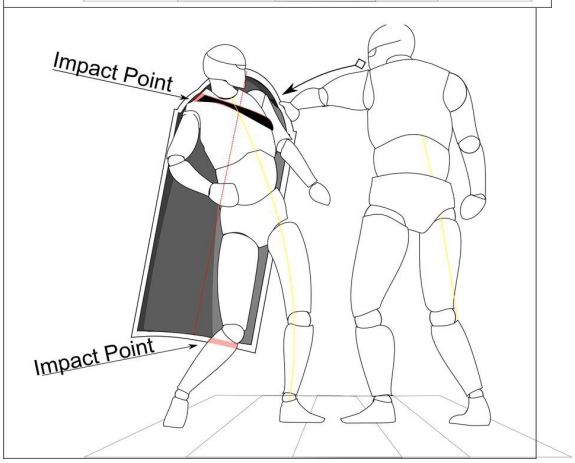
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Bibliography

Achille Marozzo, *Opera Nova dell'Arte delle armi*, Libro 4, translations compiled by Richard Cullinan, 2007

Anglim, S., 2002, *Fighting Techniques of the Ancient World*, New York, Thomas Dunne Books

Astrom, Paul and Verdelis, N., 1977, *The Cuirass Tomb and other finds at Dendra, Part 1 the Chamber Tombs*, Studies in Mediterranean Archaeology Volume IV

Ballard, Robert, *Mystery of the Ancient Seafarers Early Maritime Civilizations*, Washington, National Geographic, 2004

Bennett, Mathew, *The myth of military supremacy*, Medieval Warfare 1000-1300, edited by John France, Ashgate Publishing LTD, 2006

Bernabe, "Estructura del lexico micenico sobre el carro y sus parties" Atti e memorie 2, vol. 1 195-207

Bickerstaffe, Pip, *The Old English Warbow*, parts 1&2&3, Primitive Archer, vol. 9, issue 2

Blakolmer, Fritz, 2007, The Silver Battle Krater from Shaft Grave IV at Mycenae: Evidence of Fighting "Heroes" on Minoan Palace Walls at Knossos?; *Aegaeum* vol. 28

Bradbury, Jim, 2011, The Medieval Archer, Suffolk, Boydell and Brewer LTD

Brannigan, K., 1999, *The Nature of Warfare in the Southern Aegean during the Third Millenium B.C.*, in R. Laffineue (ed.), Aegaeum 19: *Polemos, Le Contexte Guerrier en Egée a l'Age du Bronze*, University de Liege, pp. 87-96

Bryce, T., 2002, The Trojan War: Is There Truth behind the Legend?, *Near Eastern Archaeology* , Vol. 65, No. 3, pp182-195

Bryce, T., 2003, *Letters of the Great Kings of the Ancient Near East : The Royal Correspondence of the Late Bronze Age*, London, Routledge

Bryce, T., 2006, *The Trojans and their Neighbours*, London, Routledge

Castledon, R., 2005, *Mycenaeans*, USA and Canada, Routledge

Chadwck, J., 2007, *The Mycenaean World*, Cambridge, Cambridge University Press

Connolly, P., 2007, *The Ancient Greece of Odysseus*, New York, Oxford University Press

Cotterell, A., 2005, *Chariot*, Great Britain, Pimilco

Daly, G., 2002, *Cannae, The experience of battle in the Second Punic War*, London, Routledge

Dawson, D., 2001, *The First Armies*, London, Cassel and Co

Edited by Deger-Jalkotzy, Sigrid; Lemos, Irene, 2006, *Ancient Greece: From the Mycenaean Palaces to the Age of Homer*, Edinburgh, Edinburgh University Press

Dickinson, O., 1986, *Homer, the Poet of the Dark Age*, Greece & Rome, Vol XXXIII, No 1

Dickinson, O., 2008, *The Aegean Bronze Age*, Cambridge, Cambridge University Press

Doumas, C., 1983, *Thera*, London, Thames and Hudson Ltd

Drews, R., 1993, *The End of the Bronze Age, changes in warfare and the catastrophe C.1200 BC*, Princeton, Princeton University Press

Driessen, J.; Macdonald, C., 1984, *Some Military Aspects of the Aegean in the Late Fifteenth and Early Fourteenth Centuries B.C.*, The Annual of the British School at Athens, Vol. 79, pp49-56

Driessen, Jan, 1999, The Archaeology of Aegean Warfare, pp. 11–20 in Laffineur, Robert, ed., *Polemos: Le Contexte Guerrier en Egee a L'Age du Bronze. Actes de la 7e Rencontre egeenne*

internationale Universite de Liège, 1998. Universite de Liège, Histoire de l'art d'archeologie de la Grece antique

Driessen, J., 2008, Chronology of the Linear B Texts, *A Companion to Linear B Mycenaean Greek Texts and their Worlds*, Vol 1, ed. Duhouz, Yves and Davies, Anna

Driessen, J., *The Arsenal at Knossos*, http://www.academia.edu/653851/The_Arsenal_at_Knossos Retrieved 5/04/13

Fagles, R., translation, 1991, *The Iliad*, London, London Folio Society

Floyd, Cheryl, 1999. "Observations on a Minoan Dagger from Chrysokamino," pp. 433–442 In Laffineur, Robert, ed., *Polemos: Le Contexte Guerrier en Egee a L'Age du Bronze. Actes de la 7e Rencontre egeenne internationale Universite de Liège, 1998.* Universite de Liège, Histoire de l'art d'archeologie de la Grece antique.

Friedrich, Walter L; Kromer, B, Friedrich, M, Heinemeier, J, Pfeiffer, T, and Talamo, S, 2006. *Santorini Eruption Radiocarbon Dated to 1627-1600 B.C*, *Science*, American Association for the Advancement of Science, 312 (5773)

Gabriel, Richard, 2012, *Man and Wound in the Ancient World; A History of Military Medicine from Sumer to the Fall of Constantinople*, Virginia, Potamic Books

Gallwey, Ralph, 2007, *The Crossbow: Its Military and Sporting History, Construction and Use*, New York, Skyhorse Publishing

George Silver, 1599, *Paradoxes of Defence Brief Instructions*

Grguric, N., 2005, *Mycenaeans c. 1650-1100 BC*, Oxford, Osprey

Guida, P., 1973, *Le Armi Difensive Dei Icenei Nelle Figurazioni* , Rome, edizioni dell'Ateneo

Hand, S., Wagner, P., 2002, *Talhoffer's Sword and Duelling Shield Techniques as a model for Reconstructing Early Medieval Sword and Shield Techniques*, anth. SPADA, Highland Village, Chivalry Bookshelf

Hand, S., 2005, *Further thoughts on the Mechanics of Combat with Large Shields*, anth. SPADA 2, Highland Village, Chivalry Bookshelf

Hanson, V. D., 2000, *Hoplite technology in phalanx battle*, anth. Hoplites The Classical Greek Battle Experience, edited by Victor Davis Hanson, London, Routledge

Harding, A. 2000, *European Societies in the Bronze Age*, Cambridge, Cambridge University Press

Hardy, Robert, 1976, *Longbow – a Social and Military History*, Great Britain, Patrick Stephens

Harrel, K., *A War of Words, Comparing the Performative Cross-Craft Interraction of Physical Violence and Oral Expression in the Mycenaean World*, http://www.academia.edu/2574293/A_War_of_Words_Comparing_the_Performative_Cross-Craft_Interaction_of_Physical_Violence_and_Oral_Expression_in_the_Mycenaean_World Retrieved 5/04/2013

Hayes, C., 1968, *Ancient Civilizations*, New York, Macmillan Publishing Co., Inc

Hooker, J.T., 1967, *The Mycenae Siege Rhyton and the Question of Egyptian Influence*, American Journal of Archaeology, Vol 71, No. 3 pp269-281

Hooker, J.T., 1980, *Linear B: An Introduction*, UK, Bristol Classical Press

Hooker, J.T., 1982, *The end of Pylos and the Linear B evidences*, in Studi Micenei ed Egeo-Anatoloci (SMEA) Vol 23, p209-217

Howard, Dan, 2011, *Bronze Age Military Equipment*, South Yorkshire, Pen & Sword Books Ltd

Hulit, Tom; Richardson, Thom, 2007, *The warriors of the Pharaoh: experiments with New Kingdom Egyptian scale armour, archery and chariots*, The Cutting Edge: Studies in Ancient and Medieval Combat, pp52-63

Kelder, Jorrit, 2005, *The Chariots of Ahhiyawa*, http://www.academia.edu/219041/The_chariots_of_Ahhiyawa Retrieved 5/04/13

Kilian, K., 1988, From Chief to King in Mycenaean Society, *Politea Society and State in the Aegean Bronze Age, Proceedings of the 5th International Aegean Conference,* eds. Robert Laffineur and Wolf-Dietrich Niemeier

King, Cynthia, 1970, *The Homeric Corslet*, American Journal of Archaeology 74.3 294-96

Kirk, G., 1965, *The Homeric Poems as History*, Cambridge, Cambridge University Press

Kirk, G., 1986, *The Iliad: A Commentary, 1. Books 1–4*, Cambridge, Cambridge University Press

Kitto, Frank, 1991, *The Greeks*, London, Penguin Books Ltd

Knight, David; Hunt, Brian, 2008, *Polearms of Hector Mair*, Colorado, Paladin Press

Kyriakidis, E., 2005, *Ritual in the Bronze Age Aegean*, London, Gerald Duckworth & Co. Ltd.

Littauer M., Crouwel, J., Chariots in Bronze Age Greece, *Selected Writings on Chariots, other Early Vehicles, Riding and Harness*, ed. P. Raulwing, Brill, 1983, p53-61

Lorimer, H., 1950, *Homer and the Monuments*, London, Macmilan

Love, A., 1939 The Shape and Physical Qualities of the Minoan Shield, *Man*, Vol 39

Luttwak, Edward, 1979, *The Grand Strategy of the Roman Empire*, London, Johns Hopkins University Press

Lycurgus, *Against Leocrates*, 1.77

Malafouris, L., 2008, *Is it 'me' or is it 'mine'? The Mycenaean sword as a body-part*, McDonald Institute, University of Cambridge

Manning, S., 1986, *The Military Function in Late Minoan I Crete*, World Archaeology, Vol. 18, No. 2, pp. 284-288

Manning, Sturt W; Ramsey, CB, Kutschera, W, Higham, T, Kromer, B, Steier, P, and Wild, EM, 2006. *Chronology for the Aegean Late Bronze Age 1700-1400 B.C*, *Science*, American Association for the Advancement of Science, 312 (5773): pp. 565–569

Marinatos, N., 1986, *Minoan Sacrificial Ritual: Cult Practice and Symbolism*, Stockholm, Paul Astroms forlag

Matthew, Christopher, 2012, *A Storm of Spears, Understanding the Greek Hoplite at War*, Philadelphia, Casemate

McLeod, Wallace, 1970, *Composite bows from the tomb of Tut'ankhamun*, Oxford, Oxford university Press

Molloy, B., 2008, *Martial Arts and Materiality: a combat archaeology perspective on Aegean swords of the fifteenth and fourteenth centuries BC*, World Archaeology Vol.40(1): 116-134

Molloy, B., 2010, *Swords and Swordsmanship in the Aegean Bronze Age*, American Journal of Archaeology Vol. 114, No 4

Morgan, Lyvia, 1988, *The Miniature Wall Paintings of Thera: A Study in Aegean Culture and Iconogoraphy*, New York: Cambridge University Press

Mylonas, G., 1964, *Grave Circle B of Mycenae*, Studies in Mediterranean Archaeology Volume II

Mylonas, G. 1966 *Mycenae and the Mycenaean Age*, Princeton: Princeton University Press.

Myres, J., 1939, The Structure and Origin of the Minoan Body Shield, *Man*, Vol 39

Novati, Francesco, Flos duellatorum: Il Fior di battaglia di maestro Fiore dei Liberi da Premariacco, Bergamo, 1902, Pisani-Dossi Collection

Osgood, R.; Monks, S., 2000, *Bronze Age Warfare*, Sutton, Sutton Publishing

Palaima, T., 1999 "*Mycenaean militarism from a textual perspective. Onomastics in context: Lawos, damos, klewos*", Texas, University of Texas

Palaima, T., 2006, *Wanaks* and Related Power Terms in Mycenaean and Later Greek, *Ancient Greece: From the Mycenaean Palaces to the Age of Homer*, Ed. Deger-Jalkotzy, Sigrid; Lemos, Irene, Edinburgh, Edinburgh University Press

Palmer, L., 1963, *The Interpretation of Mycenaean Texts*, Oxford, Oxford University Press

Palmer, L., 1965, Mycenaeans and Minoans, London, Faber and Faber Ltd

Peruzzi, Emilio, 1980 *Mycenaeans in Early Latium* Rome, Edizioni Dell'Ateneo and Bizzarri

Poursat, Claude, 1977, *Catalogue des ivoires mycéniens,* Paris

Prestwich, Michael, 2006 *Miles in Armis Strenuus: The Knight at War*, Medieval Warfare 1000-1300, edited by John France, Ashgate Publishing LTD

Preziosi, Donald; Hitchcock, Louise, 1999, "*Aegean Art and Architecture*", Oxford, Oxford University Press

Price, B., 2005, *Teaching and Interpreting Historical Swordsmanship*, Highland Village, Chivalry Bookstore

Richards C. and Thomas J., 1984, Ritual Activity and Structured Deposition in Later Neolithic Wessex, *In Neolithic Studies: A Review of Some Current Research*, edited by R. Bradley and J. Gardiner, London, p189-218

Richards, and Thomas, 1984, *Ritual Activity and Structured Deposition in Later Neolithic Wessex*, eds. Bradley and Gardiner, p189-218

Richter, 1970, *Perspective in Greek and Roman Art*, London, Phaidon press Ltd

Sabin, Philip, 2009, *Lost Battles*, London, Hambledon Continuum

Sandars, N., 1963, *Later Aegean Bronze Swords*, American Journal of Archaeology

Schofield, Louise, 2007, *The Mycenaeans*, London, British Museum Press

Short, William 2009, *Viking Weapons and Combat Techniques*, Pennsylvania, Westholme publishing

Snodgrass, A., 1964, *Early Greek Armour and Weapons*, Edinburgh, Edinburgh University Press

Soar, Hugh, 2006, *Secrets of the English War Bow*, Yardly, Westholme

Strauss, B., 2006, *The Trojan War*, New York, Simon and Schuster

Swinney, Richard; Crawford, Scott, 2005, *Medical Reality of Historical Wounds*, anth. SPADA 2, Highland Village, Chivalry Bookshelf

Talhoffer, Hans, 1459 *Fechtbuch,* facsimile available online at http://www.thearma.org/Fight-Earnestly.htm p286

Thomson, George, 1965, *Studies in Ancient Greek Society*, New York, The Citadel Press

Van Wees, H., 2009, *Greek Warfare Myths and Realities*, London, Gerald Duckworth and Co. Ltd

Ventris, M., and Chadwick, J., 1973, *Documents in Mycenaean Greek*, London, Cambridge University Press

Vilborg, E., 1960, *A Tentative Grammar of Mycenaean Greek*, Göteborg, Almqvist & Wiksell

Warren, P., 1989 *The Aegean Civilisations*, New York, Peter Bedrick Books

Warry, J., 2000, *Warfare in the Classical World*, New York: Barnes and Noble

Whatley, 1964, *On the Possibility of Reconstructing Marathon and Other Ancient Battles*, JHS 84

Whittaker, Helene, 2001 *Reflections on the Socio-Political Function of Mycenaean Religion* Aegaeum, Volume 22

Whittaker, John, 2010, Getting a Grip on Bronze Age Swords: Statements and Questions in Replicative Experiments, *Experiments and Interpretation of Traditional Technologies, Essays in Honor of Errett Callahan*, Argentina, Ediciones de Arqueología Contemporánea

William, Alan, 2004, *The Archaeometallury of Armour*, University of Reading

Wood, M., 1998, *The Search for Troy*, California, First California Paperback Printing

Xenophon, *Education of Cyrus,* Loeb library translation

http://www.aegeanscripts.org/index.php?option=com_content&view=article&id=98:new-linear-b-tablet-found-at-iklaina&catid=80&Itemid=473 Retrieved 4/4/2013.