

tomb and they are situated in the Lower town of Asine.<sup>21</sup>

Infant mortality was high at Bronze Age Asine. To judge from the grave material even very small children were regarded as members of the society and were buried with care. At Lerna, as well as at Asine, it was not unusual to bury infants in jars. Could wooden boxes have been used in the same way?

As the archaeological evidence concerning Greek infant burials in wooden boxes is rare, I have tried to find parallels in other areas and other times. In historical times, in Norway and Sweden, aborted or miscarried foetuses were usually laid in wooden boxes that were placed in the church wall.<sup>22</sup> The boxes were cemented with resin just like the boxes at Asine. In Sweden a miscarried baby was sometimes called a box-child (Sw. *ask-gosse*).

I believe that the custom of placing a stillborn or deceased baby or a miscarried foetus in a box could be natural human behaviour. This custom has existed in different times and areas in the world, and might have to do with the feelings people have for their children. Maybe the lining is a symbolic component that was used in order to create a

safe space for the deceased infant, or even recreate a womb. The infants at Asine were apparently given special treatment.

My interpretation of the boxes from Asine is thus as infant coffins. To be sure, other possible functions exist: as containers for food or drink, or in connection with burial rituals. Some kind of object or gift could have been placed in the boxes. As however no traces of other objects have been found and there is a tradition of lining infant coffins with resin, the most likely possibility in my opinion is that of wooden coffins for infant burials.

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<sup>21</sup> *Asine* I, 124, 127.

<sup>22</sup> O. Bø, 'Øskjer i kyrkjemuren', *Norveg* 7, 1960, 99-152; J. Granlund, *Träkär i svepteknik* (Nordiska museets handlingar, 12), Stockholm 1940.

## Small parts of society—skeletal remains of children at Asine

By

Anne Ingvarsson-Sundström

### Abstract

The 1922-1930 excavations at Asine in Argolid were remarkable for the fact that the excavators collected and documented all skeletal remains, be it of animal or human origin, at a time when normally only well-preserved, complete skeletons of human adults were collected for analysis. This fact allows us to re-analyse the skeletal remains of children, to this day a part of the population that has virtually been ignored in specific studies and analyses. With the emergence of more precise methods for determining age and sex and new methods of analyses unknown at the time of these early Asine excavations, it has become feasible to study sub-adult populations regarding for example health status.

In the present paper, I present three possible methods for the analysis of the health of children at Middle Helladic Asine, thus making possible a deeper understanding of the lives and deaths of this significant part of ancient societies.

### Introduction

In our own times and cultures, children are often said to be the most precious thing we have, but this opinion is probably not exclusive to us or our century. The time has come for a general re-assessment of the importance of the lives and deaths of prehistoric children in the study of ancient cultures: they undoubtedly formed as much a part of their contemporaneous societies as do our own offspring in ours.

Presently, little is known about the living conditions of children in the Bronze Age community probably because of two main factors: children have not been regarded as objects of interest since they had no easily recognisable impact on the political, economical or cultural development of the society. Secondly, they have left few traces in the archaeological record—for instance, their graves are often simple and empty of finds.<sup>1</sup> However, if we are interested in knowing more about this—indeed—large part of the population, there is one particular find category that is available but frequently underestimated in importance: the skeletons of children.

The Asine excavations from 1922-30 were unique for their time in the sense that all bones were collected, not only the well-preserved skeletons from adult graves, but also bones from the children's graves. Also collected were the animal bones and the bones that could not be determined either species-wise or contextually. A large number of children's graves

<sup>1</sup> Even if most of the graves in the intramural cemetery from the Lower Town were empty of finds there is at least one example (MH18) of a child in a richly furnished grave. G.C. Nordquist, *A Middle Helladic village: Asine in the Argolid* (Boreas. Uppsala Studies in Ancient Mediterranean and Near Eastern Civilizations, 16), Uppsala 1987, 102.



Fig. 1. A child's cist grave (MH18). Photo: Antiquarian-Topographical Archives, National Heritage Board in Stockholm, neg. no. C 7894.

were found: 59% of the 111 MH graves belonged to non-adults (Fig. 1).<sup>2</sup> Despite this fact, with only one exception their bones were not subject to any osteological examination.<sup>3</sup> On the other hand, most of the adult skeletons were examined and published by Fürst and Angel.<sup>4</sup> It is high time, in my opinion, for an appraisal of the lives of prehistoric children. They can no longer be separated from the other evidence of past societies.

#### What can be measured

The analysis of paleodemographic data, of which for example the level of child mortality forms a part, is of major interest as it can contribute to the understanding of the general

health of a society. Often it is assumed that the level of child mortality was as high in most prehistoric populations as it is in many of the developing countries today. This assumption is founded mainly on basic demographic

<sup>2</sup> Nordquist (supra n. 1), 128-134.

<sup>3</sup> C.M. Fürst, *Zur Anthropologie der prähistorischen Griechen in Argolis, nebst Beschreibungen einiger älteren Schädel aus historischer Zeit* (Lunds Univ. Årskrift, N.F., Avd. 2, Bd 68), Lund & Leipzig 1930, 24.

<sup>4</sup> L. Angel, 'Ancient skeletons from Asine', in S. Dietz, *Asine II. 1: General stratigraphical analysis and architectural remains* (ActaAth-4°, 24:1), Stockholm 1982, 105-138; Fürst (supra n. 3).

knowledge about the mortality of non-industrialised populations from various geographic areas.<sup>5</sup> At the same time, the bones of children from archaeological sites are often regarded as under-represented due to their smaller size and fragility, taphonomic factors and/or cultural bias concerning mortuary practices.<sup>6</sup> A problem when dealing with estimations of child mortality, is that their bones, when actually preserved, seldom have been examined, and thus it becomes impossible to determine the distributions of the children's death-ages.

#### The skeletal remains of Asine

The skeletal material from Asine examined here consists mainly of isolated finds of bones found in a stratigraphic context, but I have also identified individuals from 33 of the 57 MH graves that were classified as infant or child graves in the publication of Asine, as well as five other MH graves that were identified but never published.<sup>7</sup> When I analysed these skeletons, I found that the published age intervals labelled "infant" and "child" were wide and partly overlapping: the term "infant" has been applied to individuals from 6 foetal months to 6 months, and the category "child" includes the ages 8 foetal months to 11 years. This definition makes the large age group "late foetal to six months" impossible to distinguish. It has also resulted in an overestimation of the number of children, and an underestimation of the number of infants.

I have also been able to identify several individuals who could not be attributed to any identified graves. These are frequently represented by only a few bones. In order to quantify the number of individuals who generated these bones, I made calculations of the "Minimum Number of Individuals" (MNI in osteological terms) for the 77 different "find units" that I defined as being within the limits of the Lower Town.<sup>8</sup> I constructed these "find-units" by evaluating the information found in the field diaries, plans and other related sources together with the datings from the sherds that

were found in the same context as the bones.<sup>9</sup> The result of this calculation yielded a minimum number of 62 non-adult individuals with an age ranging from 6 foetal months to approximately 10 years.

One may ask why these children were found in the state they were: without a specific grave context and frequently with only parts or single bones remaining of their skeleton. I think that the answer must be sought in the interaction between the different so-called taphonomic factors that regulate what is actually left from the original death

<sup>5</sup> T. Waldron, *Counting the dead*, Chichester 1994, 16-20, figs. 2.3- 2.4.

<sup>6</sup> R.R. Paine & H.C. Harpending, 'Effects of sample bias on paleodemographic fertility estimates', *American Journal of Physical Anthropology* 105, 1998, 231-240; S.R. Saunders, 'Subadult skeletons and growth related studies', in *Skeletal biology of past peoples: research methods*, eds. S.R. Saunders & M.A. Katzenberg, New York 1992, 1-20; F.E. Johnston & L.O. Zimmer, 'Assessment of growth and age in the immature skeleton', in *Reconstruction of life from the skeleton*, eds. M. Y. Iscan & A.R. Kennedy, New York 1989, 11-21.

<sup>7</sup> O. Frödin & A.W. Persson, *Asine I. Results of the Swedish excavations 1922-1931*, Stockholm 1938, 115-128 and 142-146. I have also attributed six infants and children to six graves which are not explicitly defined as being graves which contained infants or children. These are: MH 19, MH 29, MH 62, MH 75, MH 86, MH 98. For information about the identified but unpublished graves see Diary 3: 27th April, 11th May, 15th May, 17-18th May, 18th June 1926; Diary 5: 22-23rd June 1926. For further references about the documentation of the Asine excavations, see G.C. Nordquist & R. Hägg, 'The history of the Asine excavations and collections, with a bibliography', in *Asine III: Supplementary studies on the Swedish excavations 1922-1930*, Fasc. 1 (ActaAth-4°, 45:1), eds. R. Hägg, G.C. Nordquist & B. Wells, Stockholm 1996, 11-18.

<sup>8</sup> These calculations will be included in my forthcoming doctoral thesis together with a description of the constructed "find-units".

<sup>9</sup> I am most grateful to Dr. Gullög Nordquist for spending a lot of time and effort in helping me with the dating of the sherds.

assemblage.<sup>10</sup> One such taphonomic factor is the disturbance of some graves through various sorts of building activity that took place during the long history of the site. Since the dominant type of children's graves is simple pits, these could easily have been overlooked during such reconstruction. If the earlier graves were intentionally destroyed or removed, this is an interesting aspect of how the graves were looked upon by the contemporaneous society.

Another taphonomic factor that must not be underestimated is the hazards of excavation: it is explicitly mentioned in the publication that the majority of the tombs that escaped the notice of the excavators were indeed the tombs of children.<sup>11</sup> It is also mentioned in the field diaries that disturbed skeletons of infants were found that were judged to be too fragmentary to pay attention to.<sup>12</sup>

A third taphonomic factor, and thus source of bias, must be accounted for: the bones from newborn infants can be difficult to distinguish from the bones of small animals. Since many of these bones from children were found in the bags containing animal bones, I find it possible that they were often mistaken for animal bones and their graves were never noticed nor recorded.

### The prehistoric children of Asine and the Argolid

If the age distribution of all the individuals in my material determined to be sub-adults in a biological sense is viewed (i.e. both the individuals from identified graves and those lacking a grave context), it can be seen that almost all ages are represented in the intramural graves from the Lower Town (Fig. 2).<sup>13</sup> Age thus probably did not constitute a criterion that excluded individuals from a burial within the actual settlement. Even foetuses exist that seem to have been treated in the same way as older individuals and that have received a similar form of burial. This can be considered to be an indication that the current sample is fairly representative for the proportional mortality of various age groups, at least for the ones up to 15 years of age.

In a normal prehistoric population the children's graves are normally thought to make up approximately 50% of the total grave population, but since bones from children are more inclined to disappear due to their composition and size, 30% on average (with a range between 7-90%) is often the observed proportion found at many European sites.<sup>14</sup> The immediate impression one receives considering the infant-child mortality is that it is higher at Asine than at most other European sites dated to the prehistoric period, since from Middle Helladic Asine, 70% are determined as non-adults. If the measure is used with caution, the proportion of infants and children compared to adults might give some insight into the infant-child mortality and its trends over time, as well as the difference between sites. The problem with comparative data from MH sites in Greece is that the skeletal remains from very few graves have been examined, and almost no site has been totally excavated. Furthermore, most of the individuals have probably been classified as infant or child on

<sup>10</sup> S.P. Nawrocki, 'Taphonomic processes in historic cemeteries', in *Bodies of evidence: reconstructing history through skeletal analysis*, ed. A.L. Grauer, New York 1995, 49-66; Paine & Harpending (supra n. 6).

<sup>11</sup> Frödin & Persson (supra n. 7), 146.

<sup>12</sup> See for instance Diary 5: 22nd June 1926.

<sup>13</sup> The biological age of a given individual may differ from the chronological age depending on individual variation and environmental and genetic factors. For instance, the growth may be delayed in an individual who is suffering from malnutrition and this can produce a misleading age determination if the skeletal age is translated into chronological years. Johnston & Zimmer (supra n. 6), 12. The upper limit for individuals to be classified as non-adults is defined here at <15 years. This limit is also used by Angel for the non-adults from Lerna, Angel (supra n. 4), 71-73.

<sup>14</sup> H. Guy, C. Masset et al., 'Infant taphonomy', *International Journal of Osteoarchaeology* 7, 1997, 221-229; S. Welinder, *Prehistoric demography*, Lund 1979, 83-84, tab. 10; G. Acsádi & J. Nemeskéri, *History of human life span and mortality*, Budapest 1970, 187-214.

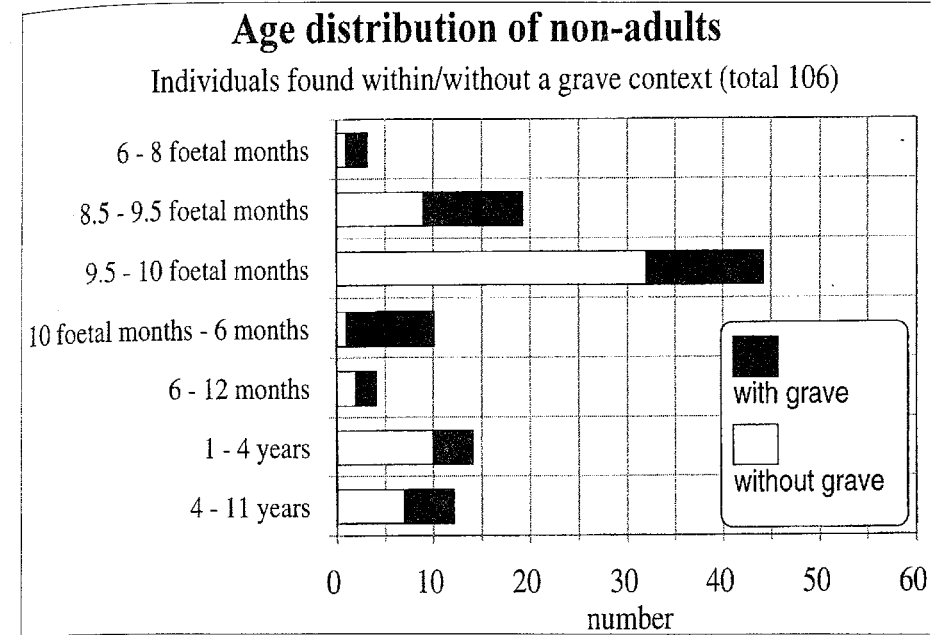


Fig. 2. Age distribution of non-adults from individuals found within/without a grave context. (Three individuals could be determined only in the categories Infants I (0-7 years) and Infants II (5-14 years)). Here they have been assigned a mean age and included in the relevant age categories.)

the basis of the approximate size of the skeleton or the grave.

In Blackburn's investigation of MH graves from 16 sites in the Argolid it can be observed that most of the individuals have been referred to the category of "age unknown".<sup>15</sup> Nevertheless, I have made comparisons between some of these sites and Asine, including only those sites that have less than 10% of the skeletons classified as being of unknown age, even though only the skeletons from Lerna have been examined by an osteologist (Fig. 3).<sup>16</sup>

It is interesting to note that Asea and Malthi seem to have a larger relative frequency of child deaths relative to infant deaths than the other observed sites, where the proportion of infants in contrast is higher. Unfortunately, this tendency is very uncertain since an accurate age determination is lacking for most of the individuals at these sites. It is also evident that Asine seems to have a very high proportion of

infants and children in relation to adults compared with the other sites. The relative frequencies of Asine have been calculated from the published and unpublished graves complemented with the new individuals that I have identified.<sup>17</sup> The question is whether this could reflect the actual conditions of infant- and child mortality at Asine under the MH period?

I think that these proportions could well reflect reality, even if reservations must be

<sup>15</sup> E.T. Blackburn, *Middle Helladic graves and burial customs with special reference to Lerna in the Argolid* (PhD thesis), Cincinnati 1970, 294.

<sup>16</sup> Angel (supra n. 4).

<sup>17</sup> For the calculation of the ~~asine ratio~~ <sup>asine ratio</sup> I have used Blackburn's figures for infants, children and adults complemented with the individuals found without a grave context. Also added were the six infants/children which I have attributed to published MH graves that were not specified to have contained

Proportion dead children : 10 adults (intramural graves)			
	Infant (<1 year)	Child (>1 year)	Adult (>15 years)
Asine (tot. 209 ind.)	10:	8:	10
Lerna (tot. 241 ind.)	9:	4:	10
Kirrha (tot. 57 ind.)	3:	1:	10
Asea (tot. 27 ind.)	0:	8:	10
Malthi (tot. 49 ind.)	6:	15:	10

Fig. 3. Proportion of dead children to adults (intramural graves).

made because of the sample size as well as the unknown effects of various taphonomic processes at the different sites. It is perhaps unwise to draw any conclusions about a higher prevalence of dead infants and children at Asine compared to Lerna, but it is interesting to note that both sites had a very high proportion of individuals who died at an early age.<sup>18</sup>

There are also indications that age could have been used as a criterion for selecting individuals in one of the two external cemeteries at Asine (as opposed to the intramural burials mentioned supra): in the so-called East Cemetery, only two infants were found, neither of them newborn.<sup>19</sup> Even if this sample is small (26 individuals have been excavated) it is possible that the youngest individuals were intentionally excluded from the cemetery. If this cemetery was used for a special segment of the population, it is conceivable that they had other rules that prevented them from burying their newborn babies among the older inhabitants.

Further, the large proportion of dead infants and children at Asine could be indicative of serious health problems. It is not easy to inter-

pret the morbidity of past populations, and even more difficult to understand the relation between the mortality and morbidity of children. The main causes of the mortality of children under five in developing countries today are malnutrition, respiratory infections and diarrhoea.<sup>20</sup>

### Indicators of health and illness

The different types of morbidity in past populations that could be reflected in skeletal

children. There were also remains from 22 adults that could not be assigned to an identified grave, these have been added to the 25 adults found in Blackburn's study.

<sup>18</sup> Some scholars believe that a large amount of sub-adult skeletons more likely represent a high fertility (a high number of births per adult female) than a high infant/child mortality. See for instance C.S. Larsen, *Bioarchaeology: interpreting behavior from the human skeleton*, Cambridge 1997, 339.

<sup>19</sup> Nordquist (supra n.1), 134f.

<sup>20</sup> WHO home page, esp. <http://www.who.int/aboutwho/en/preventing/integratedm.htm>; <http://www.who.int/aboutwho/en/promoting/nutri->

materials are difficult to distinguish because of the limited and often unspecific responses that specific diseases have on the skeletal remains. Many types of acute infectious diseases that can be fatal, especially to children, do not leave any traces at all in the skeletal material, and many pathological conditions require a long period of illness before the skeleton becomes involved. Despite these problems, some lesions, commonly referred to as "nonspecific indicators of stress" could be indicative of the general health of the children: one such indicator is so-called dental hypoplasia. This defect can be seen as horizontal grooves or pits in the enamel surface of the teeth. The marks appear when the formation of enamel slows down or stops, as a response to a period of malnutrition or disease during the initial stage of enamel formation. When this period of biological stress is over, the formation process is restored. The enamel, unlike bone, cannot be rebuilt, and therefore gives us a permanent record of the different periods of stress during the early part of the individual's life.<sup>21</sup> A number of conditions, for example congenital defects, neurological disturbances and premature birth are known to disturb enamel formation, but the most common causes for hypoplasia seen in modern small-scale societies are malnutrition and infection.<sup>22</sup> The connection between these two conditions and hypoplasia has also been proven by experimental studies on animals.<sup>23</sup> Because of the synergistic relationship found between these stress factors, other causes need to be considered before any interpretations of the causes can be made. In the Asine material, few teeth are preserved for such examinations, but despite this circumstance, hypoplasia is actually found among some of the individuals.<sup>24</sup>

Similar effects of malnutrition and disease that occur during children's growth can also be found in the skeleton: these defects are called Harris lines or "Lines of arrested growth". These marks can be seen on radiographs as dense transverse lines at the end of the long bones. If the bone formation process becomes

interrupted due to a period of disease or malnutrition, the bone stops growing. When the stress episode is over, new bone immediately begins to form but the period of interrupted growth can be observed with the help of X-ray examinations.<sup>25</sup>

So far, I have made such an examination of 152 complete long bones from children at Asine.<sup>26</sup> The ages of the children from whom the bones derive were very low due to the incomplete state of many of the long bones from older children. Most of the bones examined belong to newborn individuals and only two were more than six months old. The result of this preliminary investigation was that only two bones proved to have lines: one bone belonging to a child of approximately 6-7 years old showed three lines at the end, and the other bone, from a newborn, showed just one faint line. Harris lines are most frequently found in children older than six months, but on the other hand, few studies of this type have been made on the bones from newborn individuals.<sup>27</sup>

tion.htm; <http://www.who.int/peh/resources/supercourse/test5.1/08.htm>

<sup>21</sup> C. Roberts & K. Manchester, *The archaeology of disease*, Ithaca 1995, 58-61.

<sup>22</sup> M. Skinner & A.H. Goodman, 'Anthropological uses of developmental defects of enamel', in *Skeletal biology of past peoples: research methods*, eds. S.R. Saunders & M.A. Katzenberg, New York 1992, 153-174, esp. 162.

<sup>23</sup> Skinner & Goodman (supra n. 22).

<sup>24</sup> The examination and analysis of the teeth was made by Dr. Helena Soomer, DDS at the Department of Forensic Medicine, University of Helsinki, Finland.

<sup>25</sup> S. Mays, 'The relationship between Harris lines and other aspects of skeletal development in adults and juveniles', *Journal of Archeological Science* 22, 1995, 511-520.

<sup>26</sup> This examination was carried out at the Department of Forensic Medicine, University of Helsinki, Finland by Dr. Tarja Formisto.

<sup>27</sup> D.C. Cook, 'Subsistence and health in the lower Illionis Valley: osteological evidence', in *Paleopathology at the origins of agriculture*, eds. M.N. Cohen & G.J. Armelagos, Orlando 1984, 235-269, esp. 248.

Both the enamel hypoplasias and Harris lines are indications that the individuals had recovered from a period of physiological stress. However, since many infants at Asine probably expired in connection with birth or immediately after, these defects would not be found in such infants unless they were formed during the foetal period. Even if the causes for enamel hypoplasia and Harris lines are poorly understood, these defects could be used as interesting indicators of the health of ancient children.

At present, the paleoepidemiology of children is a complex subject, and larger samples need to be available for analysis. We also need to investigate several other factors connected to the health of children. For instance, the time of weaning is known to be a critical time in a child's life: during this process, the child is deprived of the protective agents offered by breast milk, and thereby becomes more liable to infections and other diseases.<sup>28</sup> It would be interesting to know if there was a culturally defined age for when weaning should occur. Several studies have dealt with the presence of diet indicators in the skeleton by means of different chemical investigations of the bone content, but only a few of them have focussed on the shift from a diet primarily consisting of mother's milk to solid food.<sup>29</sup>

In my further studies on Bronze-Age children I will investigate whether or not certain weaning ages can be determined through a sta-

ble isotope study of the bones. If it is possible to identify a weaning age, it would be interesting to examine if there is a correlation between that event and the age of hypoplasia formation.

It is evident that further studies of human remains of children from earlier excavations can make valuable contributions to our knowledge of these "small but significant parts of society".

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<sup>28</sup> S.K. Clark & P.S. Gindhart, 'Commonality in peak age of early-childhood morbidity across cultures and over time', *Current Anthropology* 22:5, 1981, 574f.

<sup>29</sup> Some of the more recent are: D.A. Herring, S.R. Saunders & M.A. Katzenberg, 'Investigating the weaning process in past populations', *American Journal of Physical Anthropology* 105:1998, 425-439; M.R. Schurr, 'Using stable nitrogen-isotopes to study weaning behavior in past populations', *WorldArch* 30(2), 1998, 327-342; L.E. Wright & H.P. Schwarcz, 'Stable carbon and oxygen isotopes in human tooth enamel: identifying breastfeeding and weaning in prehistory', *American Journal of Physical Anthropology* 106, 1998, 1-18.

## Economic interaction on the Argive Plain. A research note on Late Helladic Asine\*

By

Birgitta L. Sjöberg

### Abstract

The purpose of the symposium is to apply new theories to old material. With this in mind the following paper will focus mainly on the theoretical background of an emerging criticism of long-held notions of centralisation and redistribution and propose a reappraisal of existing theoretical research and archaeological evidence. The theoretical background will constitute the first part of the paper, followed by a presentation of an alternative model and methodological implications. The last part will report some tentative findings culled from a larger work in progress focussing on the material from the village of Asine.

### Introduction

It is commonly asserted that the Mycenaean society was one characterised by centralised decision-making over a politically integrated and culturally homogeneous region. In matters political and economic, the lords of the palaces, and in particular that of Mycenae held sway over a population subject to taxes in kind and corvée labour. Beyond the obligations to the palace, the Late Helladic inhabitants of the area commanded little in the way of resources to engage in anything but subsistence activities. Indeed, the average subject had no apparent reason to engage in trade above the level of simpler barter or in any other economic activity on his or her own account. This was left to palatial control.

Not everyone would concur. Increasingly, Aegean scholars have begun to question the received wisdom. In particular, the notion of a predominantly—or even exclusively—redistributive system in the Polanyian sense has been subject to recent re-evaluation. For instance, Halstead has recently argued that various transactional modes are likely to have co-existed.<sup>1</sup> As a result, palatial collection of resources from its hinterland is more appropriately viewed as taxation and the raising of funds for the needs of the palace rather than as a pure system of redistribution among nominally equal partners to the transaction.

\*I am most grateful to Dr. Berit Wells for asking me to participate and give a paper at the celebration of the 50th anniversary of the Swedish Institute at Athens. The purpose of the symposium was to present work in progress where new theories are tested on old material, a subject which suits my own work very well.

<sup>1</sup> P. Halstead, 'The Mycenaean palatial economy: making the most of the gaps in the evidence', *PCPS* 38, 1992, 57-74. For the idea of several exchange systems co-existing, although in a more general perspective, see C. Gillis, 'Trade in the Late Bronze Age', in *Trade and production in premonetary Greece: aspects of trade. Proceedings of the Third International Workshop, Athens 1993* (SIMA-PB, 134), eds. C. Gillis, C. Risberg & B. Sjöberg, Jonsöred 1995, 75.