The Houses of Gournia: An Analysis of the Late Minoan IB Period Residences

by

Kaylyn Lehmann
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Abstract

The way people build and structure the spaces around them are connected to their ways of knowing the world. While the so-called palaces of the Minoans have been studied at great length, their houses have not had the same attention. The town site of Gournia, dating to 1750-1500 BCE, provides us with many examples of Minoan houses. My research explores the ways in which we can understand the ordering of Minoan house space by what has been left behind, namely the architecture and material culture. I ask: What patterns can be seen in these houses at the Minoan site of Gournia? Are we able to learn anything about the social dynamics of the town and households via these patterns? My findings indicate certain use-related zones within the houses at Gournia can be seen architectonically and through material culture, and that these patterns may tell us about the worldview of the people who created them. In this paper, I discuss my research findings including what housing architecture suggests about private versus public space, and how that knowledge can help us understand Minoan society better.

Keywords
Minoan culture, houses, spatial syntax, domestic space

TABLE OF CONTENTS

"There is a land called Crete in the midst of the wine-dark sea,
a fair land and a rich, begirt with water, and therein are many men
innumerable and ninety cities…"

-*Odyssey*, XIX, 172

INTRODUCTION

The Minoan civilization flourished on the island of Crete from the 30th – 11th century BCE. This time period is typically divided into thirds, the first of which is the Early Minoan period from 3000-2100 BCE. Characterized by new pottery shapes and decoration, the Early Minoan (E.M.) period saw the movement of people from scattered, mainly cave-based encampments to more centralized, larger settlement patterns. The Middle Minoan (M.M.) period followed, from 2100-1500 BCE, with fine polychrome pottery, new exportation patterns between North and Eastern Crete, and the potter's wheel was also introduced at this time (Cadogan, 1983, p. 508-511). The emergence of larger administrative buildings within certain larger settlements – the so-called "protopalaces" – also appeared at this time. Around 1700 B.C., there was an island-wide catastrophe that destroyed the palaces, after which they were rebuilt on a much grander scale (Lobell, 2015, p. 31). Finally, the Late Minoan (L.M.) period lasted from 1500- 1100 BCE. The palace structures underwent a period of restructuring and redecorating, and are now a hallmark of the Minoan culture. Trade flourished between Crete and the near Mediterranean civilizations such as Egypt (Popham, 1970). Each period can be divided into thirds, usually based on innovations in pottery decoration, and labelled I, II, III respectively. In turn, each of these can also be subdivided into A, B, or C, but this distinction is only included when discussing specific, shorter periods, and not when referring to the period as a whole.

History of Excavations

The site of Gournia near the Gulf of Mirabello in the Ierapatra region of Eastern Crete was occupied from the M.M. III period (*c.* 1900-1700 B.C) until the end of the L.M. I.B period (*c.* 1500 B.C.), where there was a large fire that seemed to destroy the whole site. There occurred a brief reoccupation in the L.M. III period, circa 1400 B.C. (Boyd-Hawes et al., 1908, p. 21). First excavated in 1901 by the Americans, Gournia is an urban settlement based on the acropolis on a small hill near the shore of the Gulf of Mirabello. Harriet Boyd-Hawes led excavations during the summers of 1901, 1903, and 1904, and focussed on the settlement itself, with special attention paid to the structures deemed houses (Watrous, 2012, p. 521). A house consists of a cluster of rooms bordered by an enclosing wall with at least one access point to the street, with access between rooms inside (Grahame, 2000, p. 13). These rooms were the setting for a similar range of activities, and consisted of the fundamental building blocks of the town (Whitelaw, 2007, p.72). There was additional work done in 1910 by Richard Seager, extending the excavations downwards towards the sea, and in the cemetery that had previously been discovered. In the 1970s a programme of cleaning and consolidating the site was undertaken, with limited further excavation (Watrous and Heimroth, 2015, p. 199). Cestis Davaras and Jefferey Soles explored more of the cemetery at this time, and in 1992 Davaras went back with Vance Watrous to survey the land west of the river, speculated to be the town's agricultural lands(Watrous, 2012, p. 522). The latest excavations at Gournia have taken place during the 2010-2014 seasons, under Watrous (Watrous et al., 2015). Excluding the original excavations in the early 1900s, the focus has remained on the palace, the tombs and cemetery, and the surrounding areas including a possible harbour and extra-urban house.

Literature Review

The publications that have arisen from the excavations at Gournia that specifically focus on this site have, in turn, centred around the pottery and metallurgical activities within the town (Betancourt, 1979; Betancourt and Silverman, 1991; Shaw and Shaw, 2014; Watrous and Heimroth, 2011), as well as the tombs (Soles, 1973; Soles, 1992), palace (Buell and McEnroe, 2015; Soles, 1991; Soles, 2002; Watrous, 2007), and rural areas (Watrous, 2000). It is only when there is a wider net cast that we encounter the domestic sphere. The houses of Gournia are often combined with the houses at other sites on Crete in these studies, and have never been looked at independently. Quentin Letesson in particular has focussed on the topic of Minoan housing, but in doing so has taken a wide approach to data collection. He includes most settlement sites on Crete in his studies, as well as the Minoan town of Akrotiri on Thera (Letesson, 2009; Letesson, 2013). While this is good practice when attempting to demonstrate a very general overview of Minoan housing, it does not provide an understanding of each specific site. When discussing a culture, it is of course necessary to look at the broad picture: what is shared between people makes a culture, after all. So a broad study of Minoan houses has its merits, providing a general basis for knowledge about Minoans. But in order to understand the complexity of a culture as well as discover potential variation and change, case studies of specific areas must also be undertaken. These can provide information on how people within a culture differ from each other, and how they lived in their own specific set of circumstances and surroundings. These observations, when combined with the general knowledge, provide a nuanced and more complete understanding of how the culture functioned.

John McEnroe has also explored Minoan housing in the same broad manner as Letesson, and has suggested three types of houses can be loosely defined (1982). His publication provides a brief discussion of architectonically-based room types, and categorizes houses by the room types they possess. Again, while useful when looking at Minoan housing in the broad sense, it does not discern the essence of each individual settlement's community. While there has been significant work published within the last couple decades discussing Minoan housing, when compared to the corpus of Minoan studies there is still much to be done. Discussions about the so-called palaces dominate the conversations even now (Pantou, 2014, p. 370), and most scholarship of the last century concerns the political and economic aspects of the culture. This has created a somewhat "cart before the horse" scenario, given that the household was the most common and basic unit of production within most ancient societies. In studying the economy but not the household a large piece of the Minoan puzzle has been overlooked, especially in regards to the economic structures within towns. While palaces can tell us about the administrative, large economic, and even elite sectors, they cannot tell us about the domestic sphere because they are, in essence, not domestic (relating to the house). Especially within smaller settlements like Gournia, palaces were buildings that were shared by everyone in the community and functioned as autonomous entities used for communal ceremonies, storage, and industry (Lobell, 2015, p. 31).

Gournia is an excellent candidate for the study of the Minoan domestic sphere within a specific settlement, as the majority of the urban settlement has been excavated (Boyd-Hawes et al, 1908). More than 50 house-structures and industrial areas have been found, as well as a small palatial structure (Lobell, 2015, p. 33). The houses date from the

L.M.I.B period, ranging from 1500-1450 B.C., and exhibit relatively good preservation of architectural features, as well as having material culture present within the structures. By studying the physical houses of a specific community we can get a sense of the worldview of the people who lived in them, and through that how society and families were structured. Houses can tell us much more about the day-to-day life of Minoans than the palaces can, because not only were they spaces that people frequented every day, they were directly influenced by the people living within them. The spaces within each house that were considered the most important, the spaces that were more or less accessible – all this provides important information about how the inhabitants viewed their world.

Objectives

The goals of this study are as follows: to find whether common spatial patterns in room usage between houses can be identified, and if yes, do those patterns suggest anything about the nature of Gournian houses in general? Can anything be suggested about specific houses, and what can these patterns tell us about the Gournian house as a social unit? As there are no undeciphered texts from the Minoan culture and no way to see evidence of it architecturally, I will not be discussing age or gender based divisions within the house.

This analysis of the houses at Gournia will contribute to the existing debates and knowledge of the Minoan houses on Crete, especially in the area of Ierapatra. Both adding and building off the corpus of work that explores the meanings and uses of space in the Minoan world, it will open a window to the domestic sphere in Gournia specifically. Significantly, it explores both the methods used to analyze the houses of an ancient culture,

and the interpretation of the information gained by these methods in a way that proves useful to understanding said civilization. The methods that will be used here can be applied to other Minoan urban settlements, and further prove that the current methodologies that have been adapted from other studies are sound. The exploration of how space is understood by those living within it is not a new one, but one that is rooted in the ideas of cultural anthropology; people are shaped by the spaces they frequent, just as they shape the space in turn. As architecture is a product of human actions, it says something about humans and the social patterns that have created it (Grahame, 2000, pp. 3-4). When combined with an understanding of the material culture associated with the architecture, it gives insight into how people thought of themselves in the context of a built structure they called home – in other words, the lived-in reality of the site experienced from a viewpoint other than our own. The significance of this in a Minoan context is great, because there are no written records from this time; the only way to "see" what the Minoans saw is to look at the archaeological evidence.

Argument

Through the analysis of the thirteen houses at Gournia it is apparent that there were certain areas within every house to which a similar use-related function could be ascribed. The division of use-related spaces appear to have been standardized to an extent across the settlement, with apparent patterns between each house. This tells us that there could have been a standardized set of practices shared between the inhabitants when it came to how the domestic sphere should be organized. Industrial rooms were accessed off the anterooms or through a separate annex, suggesting that these workshops had to be

accessible from the street, and thus to people who did not belong to the household. Principle rooms were accessed mainly from the anteroom, and commonly had more than one function, acting as anterooms, extra storage space, and industrial rooms as well. Often they had a low control value, meaning that they did not provide access to most parts of the house, and were not the central room. I argue that the houses of Gournia exhibit similarities in the way spaces are structured. The people of Gournia had accessible principal rooms and storerooms, and industrial rooms that could be separated from the rest of the house. Since Minoan houses were not only living spaces but work spaces as well, it was important for them to be able to welcome non-inhabitants into their homes, but only up to a certain point. Storage was a focus for many households, and had to be accessible from wherever in the house, but was not hidden. Houses with more accessible industrial areas often had less storage areas, and thus the household had to rely on trading their manufactured goods for grain and other such necessities. I also argue that each house was probably inhabited by nuclear families, given the ethnological parallels to current Cretan nuclear families' houses, and that the social structure of the town was less hierarchical than other places such as Knossos, where there was clear social stratification.

When studying houses, the uses of spaces cannot be seen wholly architectonically, but must be supplemented with the artefacts found within the spaces. This both deepens the analysis and accounts for the possibility of spaces changing functions after they have been built. I also argue that the methods presented here are sound, and can be used as a template for further studies of use-spaces within ancient households.

My arguments build off the work of Letesson, who has previously analyzed the spatial syntax of houses and palaces from Neopalatial sites on Crete, including the palace and thirteen houses from varying periods at Gournia (2009). Eight of these houses (Ba, Bb, Ce, Ck, Da, Fd, Fe, Fi) are included in my analysis. He showed that there are certain general patterns within these houses: there is a lack of transitional spaces within the buildings, that the largest room remains fairly accessible, and that the rooms that control the circulation through the rest of the house often adopt an angled profile from the main entrance to the house. Letesson did not take into consideration the material culture from each house, nor the uses of each room. This is what I will supply, as well as adding five houses to the eight already studies. The addition of artefacts deepens our understanding of these spaces, as well as changes our assumptions about the usage for each space, while the addition of more houses increases the data available to study – thirteen houses from the same period can provide evidence of trends within the site on a more complete scale than eight can. For example, in undertaking the study of thirty atrium houses in Pompeii, Allison has created a comprehensive methodology for this type of study and compiled a reference book for anyone studying Roman atrium houses (2004). She wanted to include as many houses that fit her criteria as possible, in order to have more of a sense of the town's atrium houses. This is what I strive to do for the LM IB houses at Gournia.

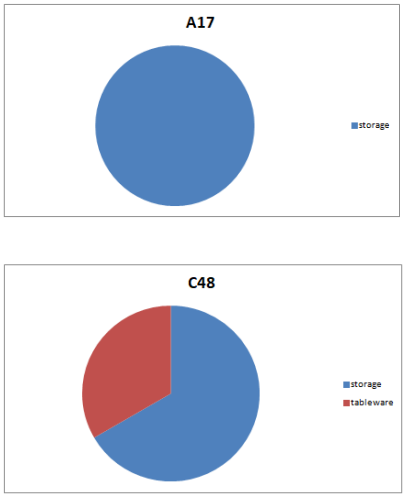
Overview

First, I look at the architecture, as Letesson did, and with his methods involving space syntax. Space syntax involves looking at how a physical space is laid out and people interact with the space; something very useful when attempting to determine how peoples'

houses reflect their lives. This includes creating justified gamma trees for each house, which map out the spatial connections between rooms. Calculating the Integration Value (*i*) and Control Value (*CV)* (see Appendix III) for each room allows the level of integration and control for each room to be compared with others essentially, on a one-to-one basis with other rooms within and between houses (Hillier and Hanson, 1984). These two calculations allow conclusions to be drawn about the complexity of room arrangements within each house, and how much control between rooms existed. Control, in this case, is defined as the number of boundaries between other rooms that must be crossed before access is possible to that room (Grahame, 2000, p. 34). Rooms with fewer access points are more isolated and controlled, while the opposite is true of rooms with more access points.

Secondly, the artefacts for each room are assigned a usage based on the known uses of the type of object – for example, jugs were labelled as "liquid storage." Those rooms with larger groupings of same-use labelled objects were assigned that use label. Room A17 had four objects that were assigned a "storage" label, and thus has been labelled as a "storeroom," while C48, although having both "storage" and "tableware" labels, was also considered a "storeroom" because there were more artefacts with a "storage" labels (Fig. 1). Additionally, rooms that did not have larger groupings of same-use items but contained items that are very specific in their usage were assigned the label that corresponded to that object. Room A21 contained only two "industry" items, but as these items were oil presses, it was apparent that this room was primarily industrial in nature. The third step consisted

Fig. 1



of analyzing the connections between use-labelled rooms to see if patterns occurred. It is apparent that patterns do exist; anterooms are more likely to lead to principal rooms, and storerooms are most often connected to other storerooms, for example. Next, each house's artefact assemblage was considered, to see if any patterns or preferences between houses can be discerned. Because people both organize their own space and have influence over the objects that are allowed within that space, each house's remain speak directly to the preferences of the people who inhabited them (Allison, 2004; Grahame, 2000). Archaeological remains can thus help in understanding the social aspects of a culture that has no deciphered written records to speak on their behalf.

METHODS AND ANALYSIS

The social unit of a household in Minoan society is not known from any texts, nor is it spoken about by foreign trade partners. Therefore, the only way to gain insight into it is by the material objects and spaces the culture left behind.

To answer the question of whether patterns are apparent in the houses of Gournia, both artefacts and space have been analyzed. The houses studied were selected because they conformed to certain criteria; they were occupied at the time of destruction (*c. 1500 B.C.*), were not reoccupied afterwards, and had data accessible. Thirteen houses fit these criteria: Ab, Ac, Ad, Ba, Bb, Ce, Cg, Ck, Da, Fd, Fe, Fi, and the Pit House (henceforth referred to as PH). While each of these thirteen fit the initial

Fig. 2: Artefact count per house

House	Artefact Count
Ab	5
Ab/Ac	2
Ac	18
Ad	6
Ba	6
Bb	12
Cg	4
Ck	10
Da	9
De	2
Ea	28
Fd	65
Fe	3
Fi	14
Pit House	137
Grand Total	**321**

criteria, not all were suitable for all parts of this analysis. It was not possible to do a syntactical analysis on houses Ad, Cg, Da, and Fe due to there being too few surviving doorways. House Ce has almost no artefacts published, and thus it was no possible to learn much about the household from the material culture. Four houses displayed the most preservation and had the most complete artefact lists published; Ac, Ea, and Fd were discussed by Boyd-Hawes in depth (1904-1905), while PH was excavated and published according to modern-day standards and thus much more completely than any other house in this sample (Fig. 2) (Watrous et al., 2012).

Data

The data came from three main sources: the published reports of the original three seasons of excavations in 1901-1904, the single scanned field notebook of Boyd-Hawes, and the published report from the 2010-2012 excavations (Boyd-Hawes, 1904; Boyd-Hawes, 1094-1905; Hawes et al., 1908; Gournia House Notes, 1901; Watrous et al., 2015). While the 2010-2012 excavation reports are very detailed and have an extensive list of artefacts and their find-spots, only PH is discussed. The main part of the town was excavated during the 1901-1904 seasons (Watrous, 2012, p. 521), and while the reports were thorough for their time they do not hold up to today's standards. The report describes the town, the artefact trends, and the artefacts deemed "most interesting" by excavators (Watrous and Heimroth, 2011, p. 200). Below each section of text detailing the general trends of the site, within the footnotes, other relevant artefacts are listed with varying degrees of completeness. This results in some artefacts having much more information than others, which has the potential to skew the results. Unfortunately, there does not exist

a complete published list of artefacts; instead, the objects appear either in the main body of the text or as the aforementioned footnotes. The field notebook helped fill in some of these gaps, but only one, from 1901, has been digitized and is available online. The rest of the originals are in the Special Collections of the University of Pennsylvania, and were inaccessible to me at this time. Where there were details within the notebook and the publications, they matched with certain artefacts from Gournia that were in the University of Pennsylvania's collection, proving the text both accurate and trustworthy. Thus, these artefacts that information has been given for are included in the artefact data set. The second type of data set consists of all information given about architectural features, such as built benches, paved floor, raised platforms, or built bins attached to the walls.

Space Syntax

Hillier and Hanson outline their rules for spatial syntax in their 1904 publication *The Social Logic of Space,* and their methodology has since been used with excellent results to study the flow of space at a variety of sites across the world (Letesson, 2009). Architects and archaeologists alike both use the theory of syntax to help predict how people can interact with the built environment around them. Letesson uses their theories, specifically justified gamma maps, to look at space in the Minoan world (2009). He also discusses thirteen houses at Gournia, as well as the palace. Seven of these houses are included within my data set as well. Justified gamma maps are constructed by creating a nodule for each room, and linking each nodule to the ones that it has access to via doorways. Then each nodule is assigned a depth, based off the minimum number of doorways needed to reach it from the entrance to the building. The links and nodules form a tree-like structure

depicting the relationship of each nodule, and thus space, to all other spaces (Hillier and Hanson, 1904, p. 149). This is useful to archaeologists because it "eliminated cultural biases inherent in architectural descriptions that conflate function and value (Shapiro, 1999, p. 421)." McEnroe has also used this methodology to look at Minoan structures, specifically the appearance of halls within houses and palaces (2010).

Creating a justified gamma tree provides the base from which a number of calculations can then be done (Fig.3; Appendix III). The calculations that were most useful in this analysis were those that yielded the Integration Value (*i*) and the Control Value (*CV*). Integration values are calculated by inverting the Relative Symmetry (RA) calculation where k is the total number of nodes per system, and MD is the average depth between a nodule and the root (start point). A high number indicates a high level of integration within the house. Integration refers to the accessibility of each room; a highly integrated house has many links between each room (Manum et al., 2005, p. 98).

$$i=1/RA^5$$

$$RA=2(MD-1)/(k-2)^4$$

The Control Value is calculated by giving each nodule the total value of 1 to distribute to connected nodules. Thus, if nodule *n* is connected to three other nodules, it will have a *CV*=3.00, while each of those three rooms receives a value of 1 from that nodule *n (*Manum et al., 2005, p. 98). The higher the *CV*, the more control nodule *n* has over the flow of space within the house. If a house has one room with a high *CV* and a low *i*, then it has one room controlling access to the rest of the house, and low integration. This can help in analyzing which spaces were easily accessible, if the house was tightly controlled, and overall adds to

our understanding of the Minoan mindset about domestic spaces.

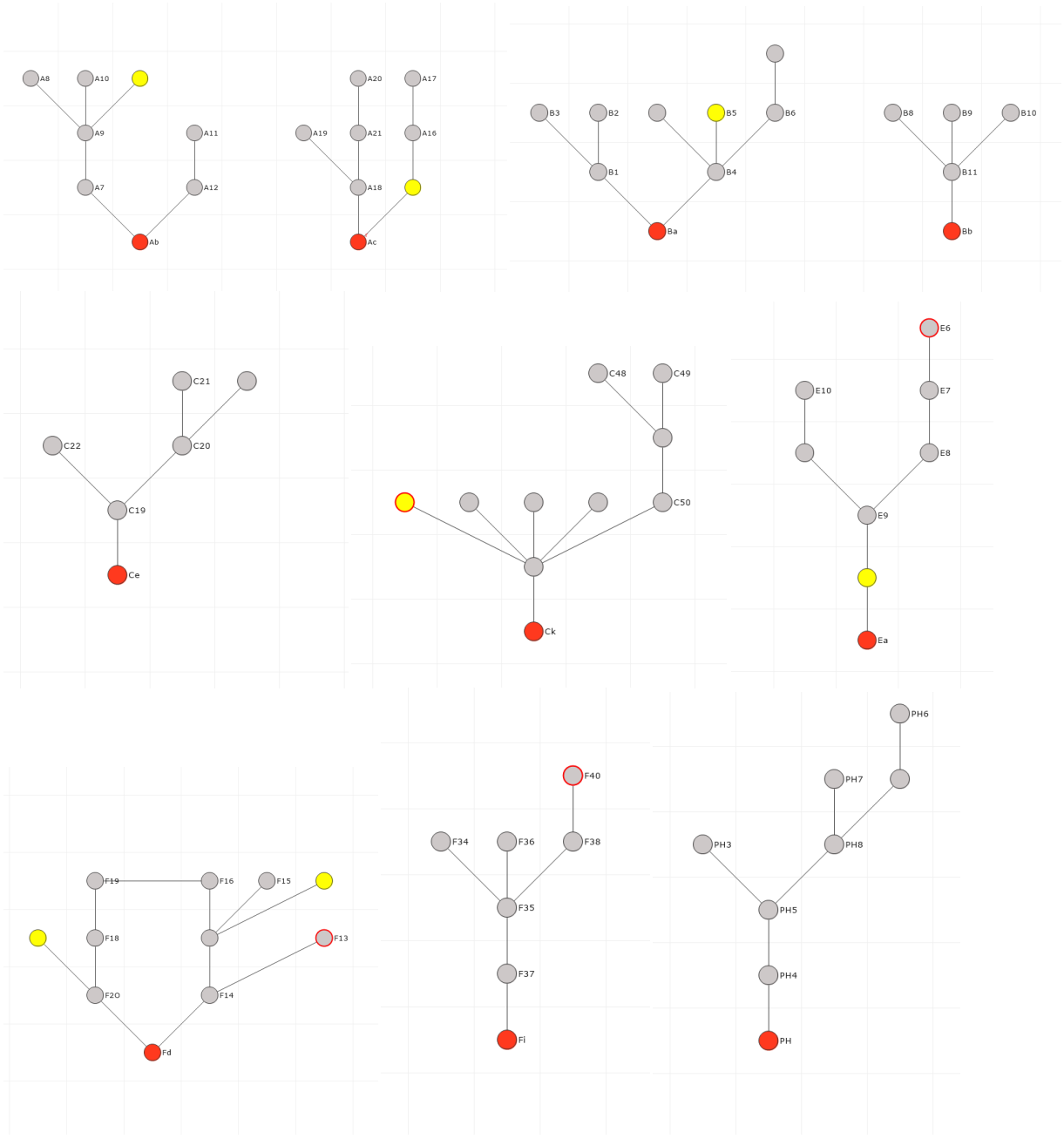


Fig. 3: Justified Gamma Trees of Gournian Houses

(yellow being stairways, red being the root)

Artefact Analysis

As in Penelope Allison's study of the houses of Pompeii (2004), artefacts play an integral part in this analysis. Stating that "artefact assemblages indicate final room use," she argues that "predominant patterns of more permanent items or of particular collections across the sample... provide information concerning the habitual use of particular room types (2004, p. 64)." In much the same manner, I have used the artefact assemblages from each room to determine the use-label for that space. As numbers of recovered artefacts vary between rooms, I have not set a minimum number of use-related items needed to determine a function for a room, but instead have set general categories into which artefacts fall according to their usages, and the most common category determines the usage of the room. The use for each artefact was determined form a variety of sources (Pantou, 2014; Paus. [*Macmillan, 1898]*; RISD Museum; Shaw and Shaw, 2014; The J. Paul Getty Museum).

I chose twelve categories of use based on the artefacts found: tableware, administration, industry, illumination, play, luxury goods, ritual, food processing, liquid storage, and storage. Any artefact that had a multitude of uses, such as a knife, had its usage left blank (Fig. 4). Tableware consisted mainly of various types of cups, administration included objects such as seal stones (used to imprint an administrative seal into wet clay) and balance weights, and industry items were those that either facilitated the practice of a trade within the house, or the products from such an industry. Illumination use items were lamps and braziers, while those used for play were miniature versions of larger ceramic

	A	B	C	D	E	F	G	H	I	J	K	L
1	House	Room	Artefact	Use	material	Quality of Clay	lustre/ polish level	Colour	painting colour	[illegible]	height/ length (cm)	Diameter
2	Ab	A11	ring-stand		clay							
3	Ab	A13	conical rhyton	ritual	clay		low lustre	p. Buff	black-red, white dots	[illegible]	28.5	
4	Ab	A16	jug	storage	clay			grey	black bands	[illegible]	6	
5	Ac	A16	knife		bronze							
6	Ac	A16	stamnos	storage	clay	coarse		red		[illegible]	30.5	
7	Ac	A16	cooking pot	food processing	clay	coarse		red		[illegible]	12.6	
8	Ac	A16	amphora	storage	clay	fine	lusterous	buff	red	[illegible]	10.8	
9	Ac	A16	jar	storage	clay	coarse		buff	black	[illegible]	13.9	

Fig. 4: Example of data table

vessels. Luxury goods were those that were not strictly necessary, or were comprised of imported or expensive materials. Ritual items included double-axes and *rhyta* (a vessel shape used for ritual purposes throughout the Mediterranean). Food processing use was assigned to cooking pots, chimneys, querns, handstones, pounders, mortars, gournes (large grinding stones), and any food waste. Liquid storage use items included various types of jugs and vases, while storage use items were such things as pithoi, amphorae, pot covers, and jar types.

Creating a typology for artefacts is standard practice in archaeology; from those created, various information such as preference per household, elite goods distribution, and industry per household can be inferred. Household preference can provide insight into if there were individual tastes present within the town, or if all the inhabitants had the same staple household goods. Elite goods, as per Watrous and Heimroth's definition, consist of metal objects that are typically clay, bronze swords and daggers, administrative objects, and often correspond to houses with ashlar masonry and large house sizes (2011, p. 208). I have also included those objects made or decorated with expensive or imported materials. This methodology for categorizing and interpreting the artefact assemblage along with the architectural elements has been done at the Minoan site of Fournou Korifi with success, proving it is possible in the Minoan context (Whitelaw, 2007).

The architecture of the buildings offer a framework upon which ideas about usage and house preference can be built, using the artefact assemblages. Together, they offer a clearer picture of what each Gournian household needed to function. As not every house exhibits the same features, room orientation, or same-use rooms, the decisions of what to exclude and how to organize the space tells us about what was vital to each household; whether there was a need for more storage or more space for industry, or for a larger principal room. In short, these decisions can tell us about the main activities prioritized within each house**.** It has been long known that the way people structure their space has a direct correlation with their worldview. Social theorists work with the idea that architecture shapes social identities, and thus there is an interrelationship between society and architecture (Pantou, 2014, p. 369). Minoan archaeologists have focussed on the social practices within sociopolitical structures, mainly the palaces (Pantou, 2014, p. 370). It is certainly feasible to then state that the houses and the individuals living within have the same connection as the wider society and the gathering-places; it is the same theory, in a smaller and more private setting. Architecture is meant to inform the user as to the expected use of the space, and thus from the architecture we can extrapolate this expectation, even through the centuries (Pantou, 2014, p. 386). Shared architectural elements denote shared ideas within the community of how space should be adapted to suit their needs, and changes in patterns of access between houses suggest different mindsets about the private and public functions of that house (Pantou, 2014, pp. 392-394). Architecture can be used as an analogue to how society functions and sees itself (Grahame, 2000, p. 3).

Ethnographic Comparisons

In order to provide meaning from the results, ethnographies from different time periods and places around Greece informed the interpretation of what was found (Campbell and Sherrard, 1968; Dubisch, 1986; Friedl, 1963; Kenna, 1976; Kenna, 1990). Island-based agricultural communities had close parallels to the structures and settlement patterns found at Gournia, and modern Cretan communities provided particular insight into the structures of the household of people that could have inhabited the Gournian homes. Although there are drawbacks to using ethnological studies to understand ancient societies – such as taking into account that cultures are not static, and the various occupation periods that occurred on Crete – it is essential to provide some sort of comparison. While archaeology provides the tangible backbone of evidence for this study, it is the ethnographic comparisons that can flesh out the humans that created the structures still present today. Archaeological evidence can have meaning by itself, but it is when the human experience is added that the true picture of life at Gournia starts to emerge.

Analysis

A data table for the artefacts was constructed, with column headers for: house, room, artefact type, use, material, quality of clay, lustre/polish level, colour of clay, paint colour, additional information, and dimensions (see fig. 4 above). Both "house" and "room" are filled in by the object's location, while "artefact type" described the general shape (IE. jug, amphora, *bugelkanne*). Not every artefact had information for all eleven columns, whether it was because the column wasn't pertinent (a bronze artefact wouldn't have "colour of clay" information), or because it wasn't given. The pottery was not assessed

based on the painted design, which would be the usual typology, because there was not enough of a description given to do so for each artefact. Artefact use was determined by consulting various sources, and assigned as the most common known use for each artefact shape (Pantou, 2014; Paus. [*Macmillan, 1898*]; RISD Museum; Shaw and Shaw, 2014; The J. Paul Getty Museum). Tables were then generated, including but not limited to: artefact count per house, clay colour present in each house, materials of artefacts present in each house, and artefact use per room.

Determining Room Usage

The use of each artefact was taken into account to determine the use of rooms. A room had clear indicators of being used for a specific purpose when the majority of the artefacts had the same use function, such being made up of multiple storage vessels, cookware, or industry materials (Fig. 5; Appendix II). When a use had been assigned by excavators, these were compared to the artefact assemblages and when agreed with the main usage, the rooms were labelled as such. When there was a discrepancy between excavation labels and the artefacts, such as in rooms C48 and C49, it was between similar use labels (here, storage and food storage), and thus both were assigned because of their similarity. Architectonic features were also taken into consideration, such as the storage bins in A8 and the raised work surface in PH7.

Next, spatial syntax trees, otherwise known as justified gamma maps, were created for each house where it was possible (see fig. 3 above). The seven that appear in Letesson's publication were used, and the remaining trees were drafted by me (Letesson, 2009, fig. 388). The room use labels were applied to the corresponding room nodule within the trees.

From there, patterns could be analyzed between houses to determine which rooms were commonly linked. Spatial patterning for anterooms, principal rooms, storerooms, industrial rooms, and cellar rooms were studied. Principal rooms were determined as being larger, squared rooms with at least one entrance.

Row Labels	economic	fishing	food processing	illumination	industry	liquid storage	luxury goods	oil pressing	play	ritual	storage	tableware	(blank)
⊟ Ab									1	1	1		2
A11													1
A13										1			
A16											1		
A8									1				1
⊟ Ab/Ac						1							1
corridor						1							1
⊟ Ac			1			1				3	9	1	3
A16			1			1					5	1	3
A17											4		
A20										3			
⊟ Ad				1		1		2		1			1
A21								2					
A22				1									
A23						1				1			1
⊟ Ba		1	1			1					1		2
B2		1											
B3											1		
B4													2
B6			1										
count						1							
⊟ Bb					1	4					4	2	1
B7						2						2	
B8											4		
B9					1	2							1
⊟ Cg		1			1					1			1
C30					1								
C31		1								1			1
⊟ Ck										1	6	2	1
C47													1
C48											2	1	
C49											2		
C50										1	2		
x												1	
⊟ Da	1					1					3	1	3
D11	1					1					2	1	
D12											1		1
D13													2
De											1		1
D34											1		
D45													1
⊟ Ea			3	1	7	2	1				11	1	2
E1			1										
E10					1						6		
E4			1			1	1				2	1	
E6				1	3	1					3		1
E7			1										
E8					1								1
E9					2								
Fd	1		4		28	7	5		1	1	12	1	5
F13			1								2		
F14					1	3	1				5		
F17						1					1		
F18	1		3		26	2	3		1	1	4	1	4
F19					1		1						1
x						1							
⊟ Fe						1					2		
F24											1		
F27											1		
F28						1							
⊟ Fi			2		1	7					2		2
F35													1
F40			2		1	7					2		1
⊟ Pit House			29	1	1	9	3			2	36	35	21
PH1												4	1
PH2			11			2				1	14	16	5
PH2 upper			5								1		
PH3			1			1					2	8	2
PH4			3				1				5	2	7
PH4 upper						2					1		
PH5											1		
PH6			5		1	3	1				5	1	1
PH7			2				1				1		2
PH8			1	1						1	5	3	3
PH8 upper			1			1					1	1	

Fig. 5: Count of use items per room

Spatial Syntax Analysis

To conduct the spatial syntax analysis I used the programme AGRAPH. First, the plan of the house was uploaded, and each room assigned a nodule. The nodules were then connected, the root (beginning nodule) determined, and the calculations were done (Appendix III). This programme allows for certain values to be calculated, two of which are used within this analysis(Manum et al., 2005). The Control Value (*CV)*, and the Integration Value (*i)* have been chosen because they illustrate the amount of control each room possesses, as well as give an overall picture of the integration of each room. They provide insight into the importance of each room to the overall house structure, in other words. These have been discussed above in detail (see "Space Syntax"). This was done for each house, and resulted in a justified gamma map, a map of nodes with their actual layout, and a calculation table for each. Four houses could not be assessed this way, due to lack of known pathways between rooms. These houses were Ad, Cg, Da, and Fe.

RESULTS

The results of this analysis are divided into two sections: those pertaining to use-related rooms, and those for each individual house and household.

Use-Related Rooms

Anterooms

It is apparent that there are patterns governing the use of spaces in the houses of Gournia. Each building entrance that was connected with a road led into an anteroom, which was always paved. From there, the anteroom led into the principal room in ten of the

thirteen houses (Ad, Bb, Ce, Cg, Fi, PH, and via a hallway in Da, Ea). The other three houses either had no apparent principal room (Ab), the anteroom was also the principal room (Ac), or the principal room was directly accessed from another entrance to the house (Ba, Fd). In house Ac, the anteroom accessed a cellar space directly, and five houses had stairs leading to a second storey accessed off the anteroom (Ac, Ba, Cg, Ck, Fd). As most Minoan houses are theorized to have a second storey, the existence of stairs leading upwards is not surprising (Preziosi, 1983, p. 4). Having this access point be directly off of the anteroom could point to a division of space between what the two floors would have been considered; perhaps the upper floors were more family-use oriented, and thus not integrated with the more publically used lower floor? Living quarters and storage or industrial rooms are often separated this way in the ancient world (Allison, 2004). Storerooms were accessed directly off the anteroom in three houses (Bb, Ck, PH) and via a hallway in two (Ba, Ea). Industrial rooms were also directly accessed from anterooms in three houses (Cg, Ck, Fd) and a second industrial room off of the anteroom via a hallway in one house (Cg). Only one house had access from the anteroom to a food processing/storage area (Ba), though it is interesting to note that it appears PH4 may have been used as food storage as well.

Seven of the nine houses for which integration values could be calculated had the highest level of integration present in the anteroom (Ab $i_{A7}=3.00;$ Ac $i_{A18}=7.00;$ Ba $i_{B4}=4.00;$ Bb $i_{B11}=10.00;$ Ck $i_{C47}=7.00;$ Ea $i_{E9}=3.00;$ Fi $i_{F37}=7.00)$. Anterooms then were most integrated and thus most accessible within the household. This points to Minoan households being less segregated into “public” and “private” domains, as the first room within the house also grants access easily to most other parts of the household. The control values of the

anterooms were also high in these seven houses, with six being the highest value of all rooms in that house; this supports the idea that the anteroom was the control point of the household; any visitor or inhabitant would have to, at some point, pass through this room.

Principal Rooms

Principal rooms were determined to be larger, squared rooms that were accessed from at least one known point. Four of these rooms also exhibited a unique feature along one wall – D3 had a thin section of the eastern floor paved (Da), E10 had a raised, paved platform along the southern wall (Ea), and there was a raised section of the floor in PH3 (PH). There was evidence of a wooden column in the eastern part of F14 as well (Fd). The raised platform in both E10 and PH3 had various storage vessels found on top, suggesting this was a storage area within the principal room of the house. In fact, principal rooms were determined to function primarily as storerooms, in Ck, Ea, Fd, and PH. The access to storage vessels from the principal room of the house, especially in those houses where the principal room was accessed directly from the anteroom and thus easily from the outside, suggests that storage of food and other items within the storage vessels was not restricted, but planned for ease of access. There was no hiding of the storage vessels, and thus no shame or debasement attached to the action of taking the objects out of storage for use. This debasement can be seen in other cultures where the storerooms are at the back of the house, strictly controlled by the adjoining rooms, so that whatever tasks that are performed there are more hidden: these rooms are largely used for tableware and object storage, as well as preparing meals and washing(Allison, 2004).

In two houses the principal room had the highest *CV*: Ac (CV_{A18}=2.00), and Ce (CV_{C20}=2.00), suggesting that within these houses the most control over the rest of the house was exercised by this room. However, in most of the other houses, the principal room had a low *CV* – Ba, Bb, Ea, Fd, and PH's principal rooms all had the second lowest or lowest *CV* of all other rooms. Thus, principal rooms were not the point of control for the household. Interestingly, four had an integration value of 2.00 or lower (those of houses Ba, Bb, Ea, PH), while five had an integration value of 4.00 or higher (Ac, Ce, Ck, Fd, Fi). The level of integration within houses was either on the higher end of the scale (average *i*=5.6) or quite low (average *i*=2), with seemingly no pattern. Principal rooms that functioned as storerooms fall under both categories, as do those that are accessed directly from the anteroom.

Storerooms

Storerooms are characterized by the presence of three or more "storage" or "liquid storage" use-labelled items, making up the majority of the artefacts within the room. The presence of pithoi, amphorae, jugs, and many cups are most indicative. In addition to being easily accessible, storerooms were also more likely to lead to other storerooms in the Gournian houses. Six houses had one or more storerooms linked together (Ac, Ad, Cg, Ck, Ea, Fd), with three of these being cellar storerooms (Ac, Ad, Cg). Cellar storerooms were not a new invention, for the subterranean rooms were cooler and thus preserved materials better – subterranean storerooms are seen as far away as Knossos (Myers et al, 1992, p. 110). Gournia is also not built on flat terrain, so the terracing of houses would have been the natural response to the environment. All houses had at least one room that can be

identified as a storeroom; most had more than two, with the exceptions being houses Ab, Ce, Da, and Fi. Of these single-storeroom households, houses Da, Ce, and Fi's storerooms were cellars.

Of the rooms that functioned only as storerooms (and not as principal rooms as well), the integration values were invariably average for each house, with perhaps the exception of house Ce, which had quite high integration values compared to other houses in three of its rooms. However, the integration value of Ce's storerooms fit within the range of values from the other houses, despite being low for the house. The average storeroom's *CV* was 0.00. This is indicative of rooms that are not used frequently each day; there is no need for more than one access point, and while the argument could be made that this contradicts the theory that storage spaces were not heavily controlled, it does not necessarily prove this because it makes sense that storerooms would be underground, and thus not heavily integrated into the rest of the house. Despite this, they could be accessed from the main areas easily, and are not tucked away out of sight.

Industrial rooms

Industrial rooms are defined by an extra abundance of similar objects produced from the same material, tools present for the manufacture of goods, and waste material from that production. Nine of the thirteen houses had no identifiable industrial room; this does not mean that industry was not practiced within the house, but that one space set aside for such activity does not present itself clearly. In fact, most houses within the town of Gournia practiced some sort of industry (Watrous and Heimroth, 2011). However, of the four houses that did have a clear space for industrial pursuits, three had more than one

area identified. One room, containing oil pressers, was identified in Ac (A21), two rooms for industry were identified in house Cg (C30, C31), two definite and one possible room in house Ck (C48, C49, C50? – also identified as storerooms, thus becoming dual-purpose), and possibly two in house PH (PH2, PH7?). Both the one industrial room of Ac and the two industrial rooms of Cg are accessed off of the anteroom, as is one of the rooms from Ck. The remaining two rooms from CK stem off of this initial industrial room. In house Fd, the industrial room (F18) is directly off of the second anteroom, connected to the open courtyard. The least accessible industrial room belongs to PH (PH7), with first having to walk through the anteroom and two storerooms; there is also some discrepancy with the use of this room (discussed in "Food Processing/Storage" below). However, the second industrial room (PH2) is one of two rooms in the annex, built later. Thus this room is easily accessible from the outside, but not from the inside of the house. Most industrial rooms then are near the front of the house, with quick access from the outside. Perhaps this was in order to facilitate craftsman/customer interactions without involving the rest of the house and household.

House Ac's industrial room (A21) had the largest integration value (i_{A21}=4.00), if C50 is discounted (i_{C50}=5, but also functions as the principal/ storeroom). Both rooms in PH have an integration value of 1.00, while F18 has a value of 2.00. C50, PH2, and Ph7 all have a *CV* of 0.00, with A21 and F18 having a *CV* of 1.00. Clearly, industrial rooms did not exert much control over the house, but instead were controlled. Industrial rooms then exhibit all the traits that would mark them as easily accessed from the outside, but it would have been difficult to move throughout the household – these were places where outsiders to the

household were probably welcomed in for business with the least impact on the rest of the house.

Food Processing and Food Storage

Rooms used for food processing and storage of food were determined by the presence of objects used in cooking activities and food waste. As no hearths are mentioned (the closest being parts of a chimney found in PH2), cooking pots were the main indicator for food processing/storage activities. Oil presses were not included in this category because, although they undoubtedly provided oil to their household, they also were used to provide oil to other houses as well; thus, they fit more comfortably into the industrial category. Because of the nature of excavating in the early 20th century, much of the food waste and residue that could have been found within homes was lost. As a consequence, it is difficult to determine food processing/storage areas adequately. However, evidence such as the bones and grain residue found in the PH during the 2012-2014 excavation indicates these areas did exist within the house and had the capacity to be quite widespread (Watrous et al, 2015). Six rooms have been identified, based off the artefacts present within each. Cooking pots were found in A16, F18, PH2, PH4, PH6, and PH8; shell and bone were also found in PH7, which could have served as both an industrial room and for food processing/storage, as strange as that may seem. The issue with this room is that, while possessing a clear work surface architectonically, the artefacts point towards a more food-based usage. The shells and bones, combined with the fine ware alabastron, the pithos, and whetstone all support this latter theory. I propose that it may have been first used industrially, and may have continued this usage occasionally, but the primary usage

switched to food processing and storage, and thus may be included to bring the total of rooms up to seven.

Of these seven, then, there is no discernible pattern as to where they have been placed within the house. That may be because of the small sample size – only four houses (Ac, Ba, Ea, PH) containing identified rooms – and not enough data, or it may be simply that food processing and storage rooms were placed as conveniently as possible wherever there was room. A16 is a cellar, connecting to a storeroom and itself doubling as a regular storeroom; B6 connects to the anteroom via a hallway, and PH4 itself is an anteroom; both PH7 and PH6 connect to PH8, all of which are food processing/storage areas; and E4 connects to two other non-labelled rooms.

A16 has the largest integration value of 3.00, while B6, PH4, and PH8 all have a value of 2.00. E4, PH6, and PH7 all have a value of 1.00. These low integration numbers offer the conclusion that food processing/storage areas, unlike other storage areas, were not easily accessible from most points of the house. With most having a *CV* of 1 (A16, B6, E4, PH4), and two having a *CV* of 0.00 (PH6, Ph7) these rooms were not meant to be the focus of the house. Indeed, the only room with a *CV* of 2.00 was PH8, which led into two other food processing/storage rooms. What can be said about these rooms is that it is apparent more work needs to be done to indentify more within each house, before many conclusions can safely be drawn.

Houses and Households

Having looked at the houses as a group to determine spatial patterning within the rooms, I now turn to the individual houses and what can be learned about each. Watrous

and Heimroth have already looked at which industries each house was probably involved in (2015), and thus this topic will not be covered here. They have also categorized each house into three types based on whether or not there was enough storage capacity to be self-sufficient, with Tier 2 being involved in regional trade activities and having enough storage to be self-sufficient, Tier 3 consisting of those households who did not have enough storage within to be self-sufficient, but produced goods for trade (Watrous and Heimroth, 2011). Usually, according to Watrous and Heimroth, this tier was associated with smaller houses. Tier 4 lacked both industry and storage pithoi, and the households were presumed to be both lower-class and agricultural workers (Watrous and Heimroth, 2011, p. 211). Comparing the houses that appear both within Watrous and Heimroth's study and my own, we can see that certain patterns appear within each tier.

Tier 2: Regional Trading and Self-Sufficient

Tier 2 consists of houses Ad, Ea, and Fe (Watrous and Heimroth, 2011, p. 211). Based on the amount of amphorae and pithoi found within the PH, as well as the industrial debitage, I would consider the PH to be part of this tier as well. Beginning first with house Ad, it is important to note that a ritualistic bronze double-axe was found in A23, one of three found within the Gournian houses. Ad is an irregularly shaped house, being an elongated trapezoidal shape rather than the usual squared-off or rectangular shape often seen. Due to lack of artefacts recovered or reported from this house, not much can be stated about room use. It is possible there was a household ritual space, due to the presence of a double-axe, and that this household was involved in the activities at the shrine that was in close proximity; it was literally across the road. House Ea is a different story, with a

number of artefacts published (Boyd-Hawes, 1908). It appears that this household was home to a metalworker, given the discovery of a large mould stone, cones, and slag in E10, the principal room. Weights were also discovered, as well as various awls. This all points to a household that prioritized industry, with them giving the largest spaces on the ground floor over to either storage or industry. Much like Ad, Fe is also an unusual shape, fitted to the corner of the two streets that meet in the north of the town. Again, like Ad, it also had few artefacts published. What have been found all have a storage use capacity. On the other hand, the PH has the most artefacts published, due to the modern excavations (Watrous et al, 2015). In this house, it appears that the ground floor was dedicated to storage mainly, with food processing/storage areas. There are two industrial rooms as well, but the majority of the focus in this house seemed to be on storage.

All four houses have a justified gamma map that branches into two (three, in the case of Ab) sections that have no loops or overlap between them. All nodules are contained within these two branches, with no additional branches off of the original stem. While each house seems to have had slightly different foci – ritual (Ad), industry (Ea), and storage (PH) – they all are made of a similar structure of rooms. Interestingly, the area occupied by these houses ranges from 96 m^2 (Fe) to 139 m^2 (Ea) (Whitelaw, 2001, p. 175). With the exception of the annex built onto the PH, all four houses only had a single entrance. Both PH and Ea have low integration values, while Ad and Fe could not be evaluated. Of the three houses possessing items with the label of "luxury goods," two fall into this tier (Ea: conch shell; PH: triton shell, bird's nest bowl, fine alabastron). The third (Fd) falls into the next tier.

Tier 3: Producing Trade Goods

Tier 3 seems to be Watrous and Heimroth's catch-all, consisting of the majority of the houses: Ab, Ac, Ba, Bb, Cg, Ck, Da, Fd, and Fi (Watrous and Heimroth, 2011, p. 211). House Ab has two entrances; the main front door and then a smaller backdoor leading into A12. The first two rooms, A7 and A8, are both either basement or shallow cellar rooms, leading into more elevated rooms via stone doorjambs. A conical rhyton, often associated with ritual activities, was found in A13, one of the unfinished storerooms accessible from the second floor. A8 had an unusual feature; along the eastern wall two storage bins were built, connecting to the wall and each other. It appears that the primary focus of Ab's architecture was to provide spaces for storage. House Ab was connected by a narrow corridor to house Ac, within which was found both a firebox and stirrup jar for liquid that could have belonged to either house. House Ac was constructed as a nearly symmetrical layout, with the north side consisting of a long cellar room. This room (A16) was divided down the middle by a low brick wall ending in a pilaster, with a low stone platform built around the easternmost wall. On the southern side of the house in the eastern wall there was a second door, and in A21 there was a stone bench built into the wall. Ac is the most symmetrical of these houses, with even the staircases leading up to the second floor and down to the cellars situated opposite each other in the northwest and southwest corners. This household seemed to focus on ease of access between rooms, and symmetry, with each room possessing a low *CV*.

Houses Ba and Bb are situated on the slope at the easternmost border of the settlement, and both possess Cyclopean walls as their eastern boundary, perhaps to combat

the terrain. They are the smallest houses, being just 68 m^2 (Ba) and 53 m^2 (Bb) (Whitelaw, 2001, p. 175), and possess long narrow rectangular profiles. Ba has a reddish limestone threshold and a second entrance to B1 off of a semiprivate courtyard to the north. A sealstone was found within this courtyard. The southernmost wall of Ba makes up the northernmost wall of Bb, shared between the two houses. The household of Bb owned both coarse and fine ware for liquid storage and serving, while Ba owned simply coarse ware. Fine ware was more finely made, consisting of thinner walls and, in most cases, finer milled clay and better decoration. Coarse ware was thicker, less decorated, and overall less finely made. It is entirely possible that both houses owned both however, but is important to note that house Bb seems to have had more fine ware for serving, with thin handled cups and two fine ware *schnabelkanne* (used for serving and storing liquid), while preferring coarse ware for simple storage (amphora, askos). This could mean that the household of Bb could afford finer wares than house Ba. House Bb was more integrated than house Ba, which was sectioned into more rooms with less flow between them. House Ba had more rooms with a higher *CV* than Bb; all this points to house Ba being a more segregated house than Bb, with the latter providing easy access to all but one room from the doorway. House Ba did have two entrances, allowing the principal room to be accessed without the rest of the house being involved. This could mean that the household of Ba was more private than that of Bb.

House Cg possessed an area of two rooms that was completely self-contained (C33, C34) within a thick wall, separated from the rest of the house and appearing only to be accessible from the second floor. It seems that this household used this space for something specific that was not necessary to access from the street or otherwise open-plan ground floor. A double-axe was also found in C31 – this is the only house with a double-axe that is

not across from the town shrine, perhaps indicating that the household had its own shrine, or was somehow involved remotely in the shrine's practices. House Ck was likewise open, with all rooms accessed easily from the anteroom. Unlike house Cg, there was no space that was inaccessible. Both houses consisted of long narrow rooms with open sides to either a hallway or anteroom, and are about the same size (Cg=86 m^2; Ck=94 m^2) (Whitelaw, 2001, p. 175). This is in stark contrast to house Da, which is one of the largest houses in Gournia at 166 m^2 (Fig. 6). It is made up of small and large squared rooms connected by a series of small hallways. Few doors are extant within this household, so a syntax tree cannot be drawn accurately. The household of Da appears to have needed many rooms for specific uses, as there are around 8 small rooms compared to the 4 larger rooms (D3, D6, D8, D13). A statuette was found in D13, either used for ritual or for decorative purposes. The smaller rooms were more likely to have storage objects within them, suggesting that the household had need of many smaller storerooms. Modern inhabitants of Crete are known to subdivide their rooms into work, living, and storage space as needed much in the same manner (Blitzer, 2006, p. 35).

Fig. 6

House	Metres Squared	Tier
Ab	149	3
Ac	88	3
Ad	111	2
Ba	68	3
Bb	53	3
Ce	80	4
Cg	86	3
Ck	94	3
Da	166	3
Ea	139	2
Fd	140	3
Fe	96	2
Fi	67	3

House Fd, like Ba, has two entrances and a small connected courtyard. The first entrance opened up into the principal room (F14), while the second entrance opened to stairs to the second floor, an industrial room, and the courtyard. Much like houses Cg and Ck, there was a narrow hallway with long narrow rooms leading off the principal room. With the second-highest artefact count, it is clear that the household was involved in

industrial efforts, with so-called carpenter's tools found in the doorway from the courtyard to F18. This was the also the third house to possess luxury items, consisting of a short sword, various beads, and two blossom bowls. At 140 m^2, it is among the largest houses, only smaller than Da (166 m^2) and Ab (149 m^2) (Fig. 6) (Whitelaw, 2001, p. 175). Fd also possesses the most bronze artefacts, though many of these consist of the industrial tools found (saw, chisels). Included in these bronze objects are three bars and a balance pan, indicative of economic activities taking place within the house – the action of weighing goods could have taken place here. A double-axe was found within the industrial room (F18), which could point to either a ritual connection or manufacturing practices involving hafting these axes. However, like house Ab where a double-axe was found, Fd is very close to the town shrine. Tweezers were also found, which point to an upper-class household, as tweezers were highly prized (Ferrence and Giumlia-Mair, 2017). Combined with the bronze short-sword discovered in a pit in the principal room (F14), the balance pans, and the room structure of having the industrial room accessed from a different street than the main entrance it is fairly safe to say this household was operating a lucrative business that allowed the household to be part of the upper-class of the town. House Fi in contrast is one of the smallest houses at 67 m^2, and appears to have had a focus on liquid storage, with seven large liquid storage vessels found in F40. Five of these were medium to fine ware, suggesting that although this house was small, the household preferred fine ware and could afford it. There were also signs of economic or industrial activities, with weights either for weighing goods or weaving also found in storage (F40).

Houses within Tier 3, although varied, do show some patterns. All of the houses that possess more than one entrance fall into this category, as do those with attached

courtyards or corridors. Modern inhabitants of Crete rely on courtyards to foster a sense of community, as well as space for washing, hanging clothes, and various activities that need good light, such as tasks like weaving (Palyvou, 2004; Allison, 2004). Though each house had a somewhat different focus, most have a space set aside for some sort of industrial purpose. This category is defined by houses that produce goods to trade; it appears that the architecture reflects this. However, I would disagree with Watrous and Heimroth that this is associated with small houses – three of the largest houses in Gournia fall into Tier 3, and at least one (Fd) was operating a large business and exhibited hallmarks of an elite family. The other two large houses (Ab, Da) both seem focussed more on storage capacity than industry however, which would make all three more like the Tier 2 houses, despite their morphological difference to those houses. Tier 3 houses also exhibit a tendency to have hallways with elongated rooms branching off, as seen in Cg, Ck, Fd, and Fi. All houses in Tier 3 have low average integration values.

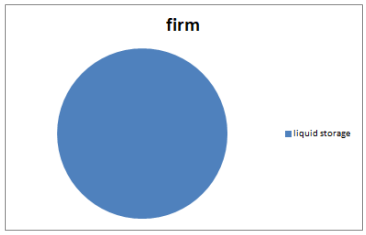
Tier 4: Lacking Storage

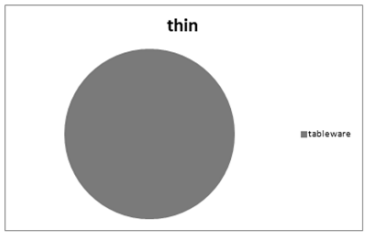
Only one house from this analysis fits the Tier 4 criteria (Watrous and Heimroth, 2011, p. 211). House Ce is comprised of a squared perimeter and open plan inside; a paved hallway serves as an anteroom (C19) which leads into a paved central room (C20) and rectangular principal room (C22). Almost nothing has been written about this house; Watrous and Heimroth state that four unbroken vessels were found within (2011, p. 200). It is possible that this house was used in much the same manner as its neighbours (Cg, Ck), with a focus on storage. All three of the C-area houses have an open floorplan, with few inaccessible rooms.

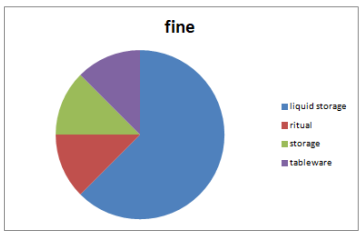
Known Colour of Clay per House	brown	brown-red	buff	grey	p. Buff	pink	red	yellow	Grand Total
Ab	1			1	1				3
Ab/Ac							1		1
Ac			2				2	3	7
Ad				1			2		3
Ba						2			2
Bb	1				1	1	1	2	6
Ck	1								1
Da					1				1
De							1		1
Fd		2		2	1		1	1	7
Fi			1		4	3		1	9
Grand Total	**3**	**2**	**3**	**4**	**8**	**6**	**8**	**7**	**41**

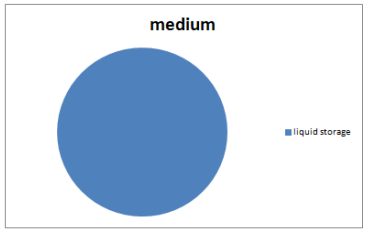
Fig 7: Known colour of clay per house

Fig. 8: Use of objects per quality of clay









Patterns

Comparisons between the clay artefacts found within each house were looked at, focussing on the clay colour as well as the quality of the clay when given. If there was a predominance of a single colour of clay in one house it would point to a preference within that household; perhaps that clay was more or less expensive than others. However, no such pattern was found in any of the thirteen houses. There were at least two clay colours present in all but CK, Da, and De; however, there was only one known clay artefact with clay colour reported within these three houses, and thus no conclusions can be made for these houses (Fig. 7). The same can be said for the quality of clay. Where fine clay was found, coarse clay was also present. However, when looking at which uses each quality of clay was most used for, it would make sense each household would

have all sorts (Fig. 8). Fine clay was commonly used for ritual, storage (both liquid and regular), and tableware, while both medium and firm clay appears with liquid storage use items. Thin clay was used for tableware. As each household would have to have an assortment of these items, it is logical that each quality of clay would be present in each house.

Critical Review of Data and Methods

There are both strengths and limitations to this analysis. By using more than one method and type of data – here both the architectural elements and artefact assemblages – more can be concluded about each room and house. When one type of evidence agrees with another, it provides a strong basis for interpretation. The data available about the houses at Gournia is, for the most part, legacy data from a time with different conventions and expectations than exist in archaeological excavations and publishing today. This makes creating a complete data set nearly impossible, but with the data available valuable conclusions can still be drawn. Although the full sherd count or count of artefacts remains unknown, the information available is valuable in that it most likely represents the common finds and the uncommon; if there were seven pithoi in one room, and only one was found, it is still useful as it demonstrates that there were a number of these within the room and thus it was easier to find than say the single cup that was also in the room, but not found. The data, in this way, is still representative of the overall material culture within the houses.

The use of well-established methods for interpretation, such as space syntax and artefact typologies, means that there are decades of scholarship reinforcing both my

methods and how they have been used (Allison, 2004; Briz Godino and Madella, 2013; Buell, 2015; Hitchcock, 2000; Hitchcock, 2007; Letesson, 2009; Letesson, 2013;McEnroe, 2010;Whitelaw, 2007). Empirical data such as artefact counts and integration/control values allow a one to one comparison for each house, without the possibility of misinterpretation that can be added later. That is, the original data is sound, and only in the interpretation of this data can there be errors. While published sources provided excellent detail about three houses in particular (Ac, Fd, PH), the other houses were not as detailed in their description. This means there are persistent gaps in the data, and thus interpretations cannot be entirely secure.

There is also room for human error and bias when creating typologies, and the transient nature of artefacts must be acknowledged. The known locations of artefacts were at the time of destruction and may not represent the location of conventional or most frequent use. In addition, objects may have had more than one use, unknown to us (Allison, 2001, p. 153). The way archaeologists think of and define artefacts today may not reflect the actual use and attitudes that were originally associated with them, because today's social constructs are being applied to the data in order to explain it satisfactorily. Defining fine ware pottery as more elite than coarse ware pottery, for example, includes taking a social belief held today and using it to extrapolate meaning from these artefacts. By integrating both archaeological methods and social anthropological ideas such as the division of space being reflective of a household's needs, deeper understanding of the data may be attained. This, combined with the ethnographic comparisons, gives us a picture of life that otherwise would not be seen. Syntax trees provide diagrams of spatial organization; it is only through considering what limits and function each room has and

what that mean to a household or society that meaning can be given to that diagram. While there are some drawbacks to the methods and sources used, I feel that there is a strong theoretical basis, backed up by decades of studies. To analyze the available data, I have chosen methods that have been tested and proven both useful and accurate.

Discussion

In sum, the houses at Gournia exhibit similarities between them: each house had a paved anteroom that, in most cases, led to a large principal room. The anterooms had the highest level of integration present, and the principal room had low control over the rest of the house, and were more isolated. Storerooms were accessed easily from main areas, and industrial rooms were similarly accessible. Food processing and storage areas could be nearly anywhere in the house. Tier 2 houses have two distinct branches to their gamma trees, while Tier 3 houses are, in general, more linear. Tier 3 houses were also less integrated on average than Tier 2 houses. Clay colour and quality was pretty equal within all houses, and of the thirteen houses, eight were under 100 m^2, with a total range of area between the thirteen from 53 m^2 to 166m^2.

The small areas of the houses indicate that nuclear families were most likely to inhabit them. Small houses with limited storage capacity can be seen in the ethnographic record as being inhabited by nuclear families on Crete until at least the 1950s (Herzfelt, 1947, p. 135). Houses on Crete were traditionally passed from generation to generation, with the families having a sentimental connection due to the work and effort put into the construction. Like the Minoans, the modern people of Crete would often build their own houses, having a direct influence on how it was structured (Boyd-Hawes, 1908). In many of

the Aegean islands it is customary for each nuclear family to have their own residence as well; indeed, it seems to be the traditional way throughout mainland Greece too (Dubisch, 1986, p. 197). The houses at Gournia would have probably followed this pattern as well, though there is a high probability that most of the town was related through marriage or through blood: kinship ties in small towns are often very important, with each house a part of a "net of friendships and alliances with certain other families" (Campbell and Sherrard, 1968, p. 46). This is seen on the island of Nisos in modern-day villages, with Kenna stating that "each family is residentially separate, [but] it has ties with kin... employers, workmen, and specialists (1976, p. 22).

The multiple uses of the principal rooms, with evidence of storage and food preparation within some, are also mirrored in the ethnographic record. In Vasilika, a small village, two-storey houses had the ground floor divided into two or three rooms. One would have a fireplace, stuccoed walls, and cement flooring, and be used as a kitchen, bedroom, and general living space for the family (Friedl, 1963, p. 39). The second room would be used as a storage area for agricultural produce, household supplies, and wine. This is very familiar, with storerooms often very close to the principal room in the Gournian houses, and used to store tableware, liquid (via amphorae), and occasionally food as well.

The structures of the houses and the households are both mirrored in the ethnographic records of modern-day Cretan and Grecian populations, which in turn provide insight into life at Gournia. The thirteen houses studied here seem to be the residences of close families, passed down generation to generation and lovingly maintained and added to, as seen in the annex of PH and the shoring up of the Cyclopean walls in

houses Ba and BB. Socially, they seem to be divided by few things: the larger houses correlate to the houses that luxury goods and ritual objects have been found within: Ea, PH, and Fd all had luxury goods, while Ad, Ac, Cg, Fd, and PH all have ritual objects (double axes being found in Ad, Cg, and Fd). The largest houses, in order, were Da, Ab, Fd, Ea, and Ad. Therefore, of the largest houses, only Da is not connected with ritual or luxury items. But between all thirteen houses there is no discrepancy between either the quality of pottery or the selection of clay, and it can be assumed that the social standing of each house was roughly the same, given that each could afford fine and coarse pottery. The layout and amount of rooms within each house seems not to correspond to the area of the house, but instead to the area of the settlement the house was located in. A-area houses had large cellar rooms, while B-area houses were long and narrow – probably due to the nearby cliff. C-area houses had the most open floorplans, and F-area houses were irregular in shape. As only one house from areas D and E, nothing can be determined about these areas. Thus, it seems as if each area of town had its own personality, while at the same time being cohesive with the other areas in the settlement.

Conclusions and Future Directions

Gournia was a closely connected town, with nuclear families undertaking house industries. The blocks of town that make up the A, B, C, and F areas had their individual house structures, while the whole settlement had similar values when it came to how domestic space was structured. Like the similar study done at Fournou Korifi by Whitelaw in 2007, this study adds a nuanced understanding of the LM IB houses of Gournia to the research already conducted on general Minoan houses. In doing so, a more accurate picture

of how Minoan communities not only were similar, but how they differed as well. With enough studies, the overall picture of Minoan Crete can be formed not only geographically, but diachronically as well. Knowing now that Gournia in the LM IB period was a town comprised of nuclear households, socially similar and some with the ability to be self-sufficient storage-wise, the next step would be to compare it to another LM IB site in order to determine if this was usual in the Minoan world or particular to Gournia. If more sites are looked at in detail, more of these comparisons can be done.

The easternmost site of Palaikastro has similar traits to Gournia: some work on the site has been done, but a comprehensive study on the houses there in the manner of this study has not been undertaken as of yet. The site is a prime candidate for this methodology, with most of the site being discovered by Bosanquet and Dawkins in 1901 onwards, and subsequently excavated by various teams of archaeologists (Sackett et al, 1965, p. 249). At least ten "blocks" of axial street have been uncovered, with the remains of the buildings in a similar state of preservation as those in Gournia (Cunningham, 2007, p.99). The Minoan world is slowly revealing its secrets, as each excavation and publication pushes it farther into the light. But it is only by studying the houses and the people who inhabited them that the true picture of everyday life can be seen. It is important that scholars acknowledge the importance of the domestic sphere, and only through both broad and specific studies can the full picture of the Minoan worldview be made known.

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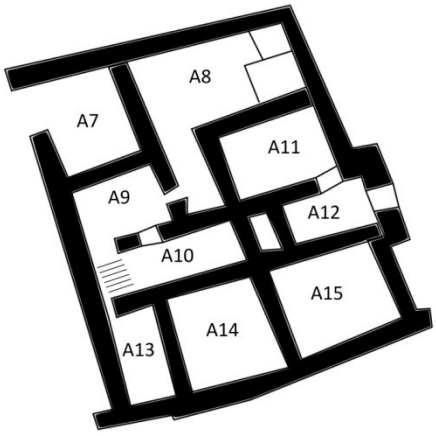
Appendix I. House Plans



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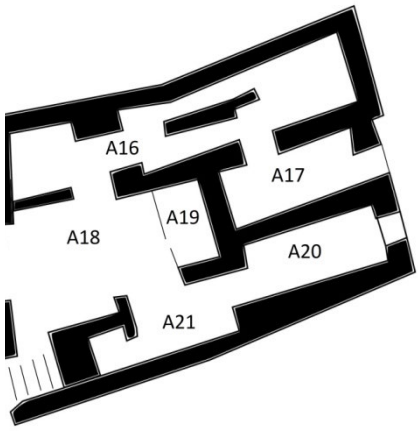

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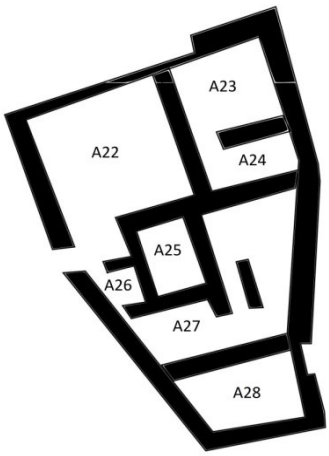

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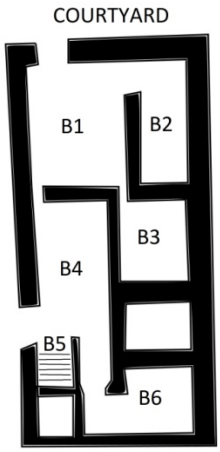

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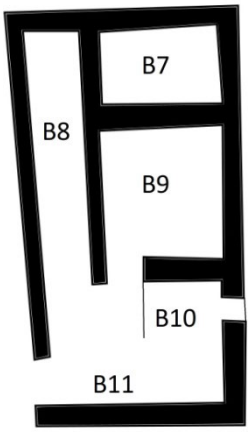

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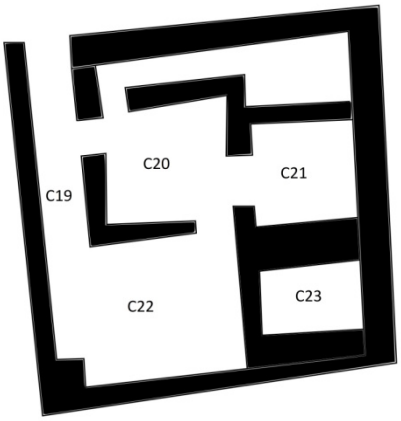

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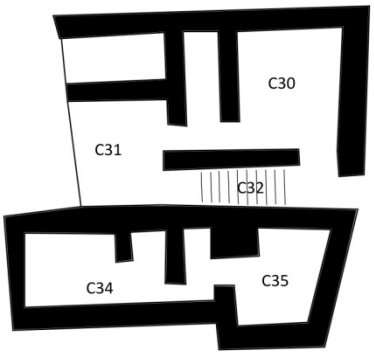

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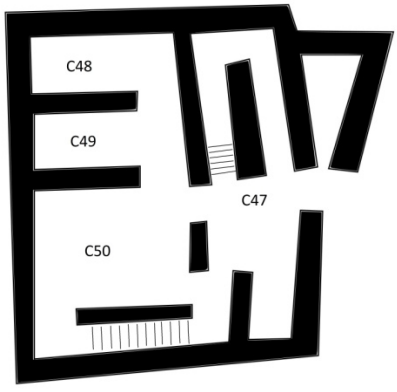

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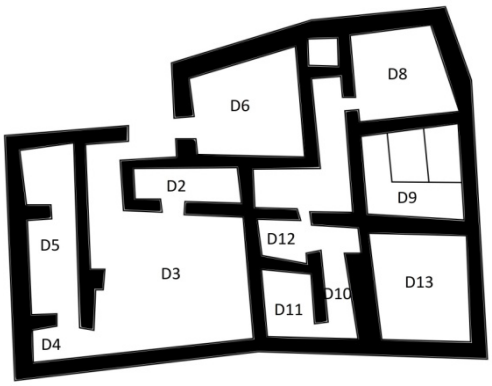

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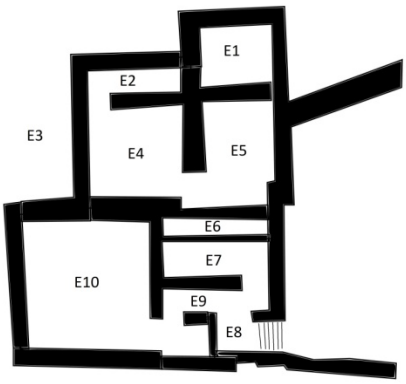

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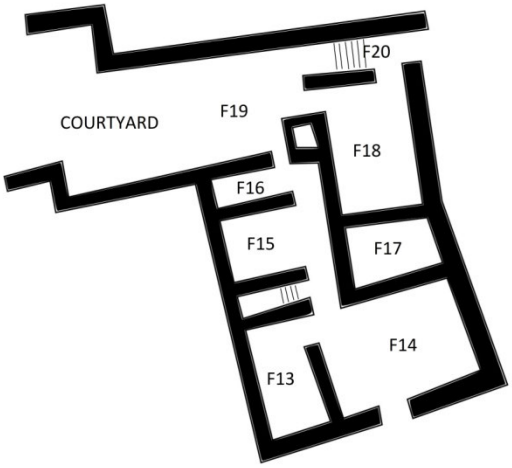

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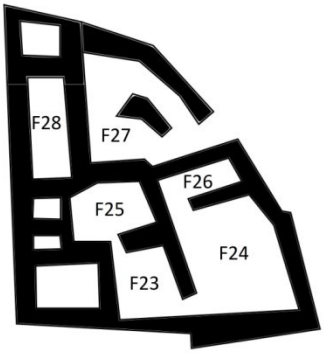

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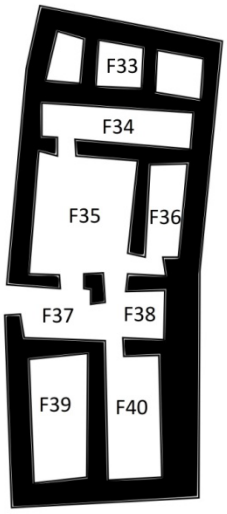

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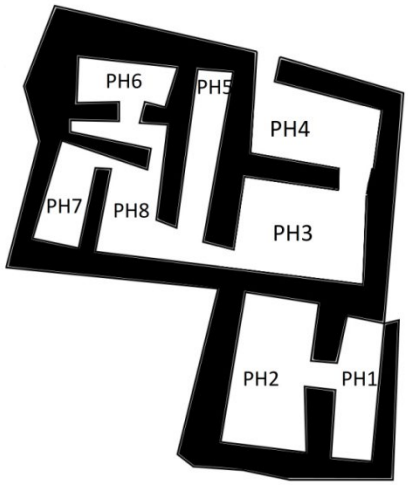
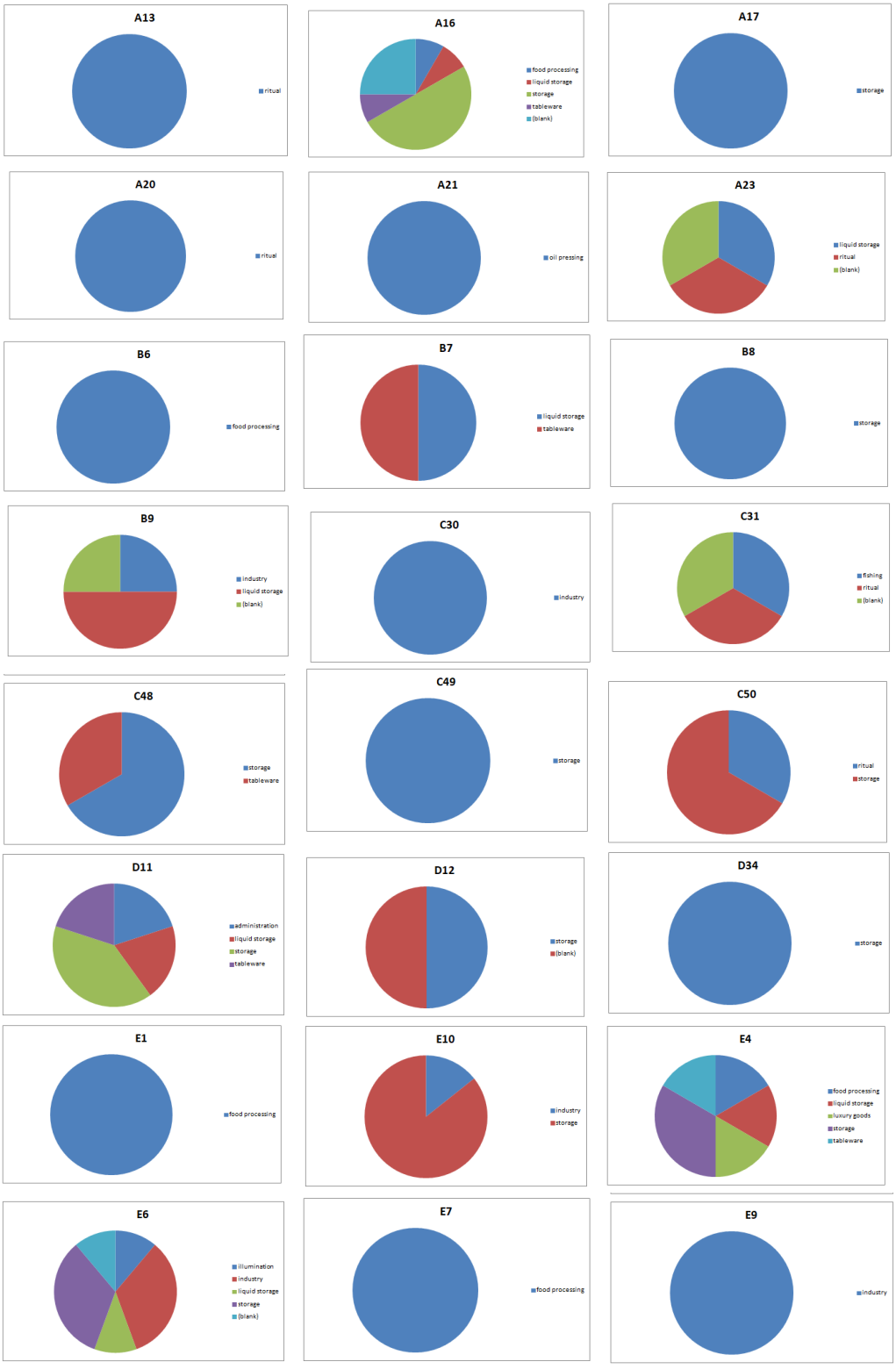
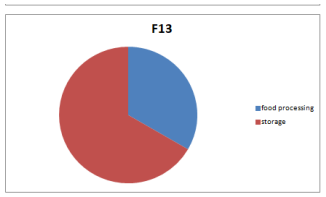


PIT HOUSE

Appendix II. Room Use By Artefact Use Charts

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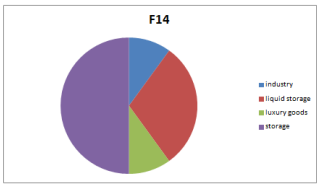
food processing
storage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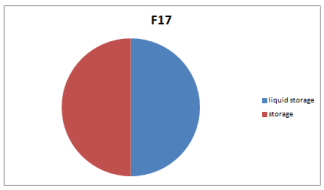
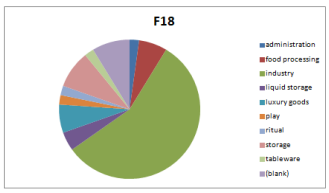
industry
liquid storage
luxury goods
storage


F17
liquid storage
storage


F18
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industry
liquid storage
luxury goods
play
ritual
storage
tableware
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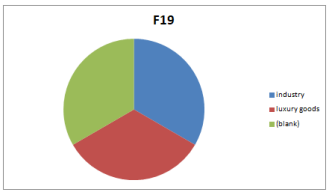
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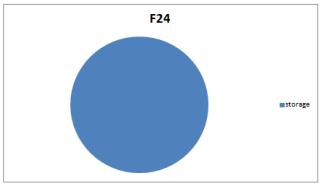
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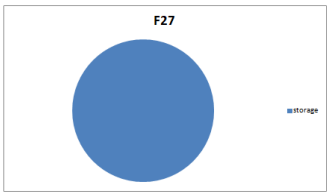
F27
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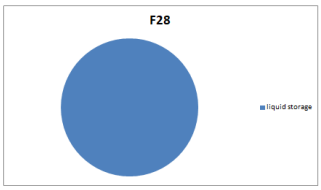
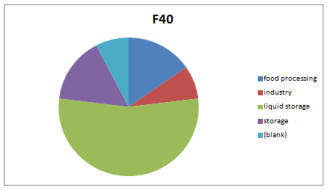

F28
liquid storage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liquid storage
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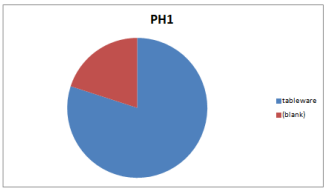
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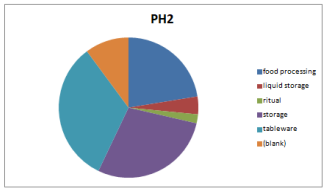
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liquid storage
ritual
storage
tableware
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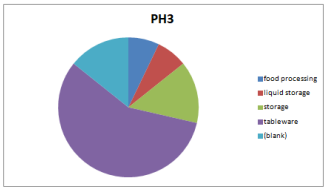
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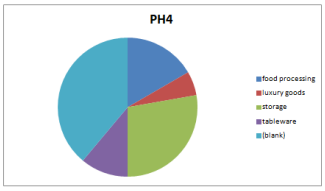
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luxury goods
storage
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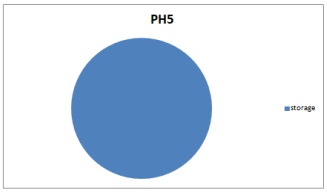
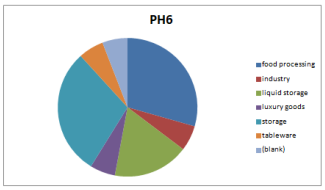

PH5
storage


PH6
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industry
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luxury goods
storage
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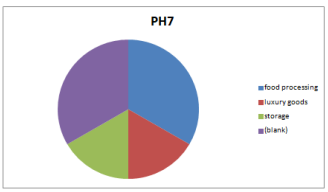
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food processing
luxury goods
storage
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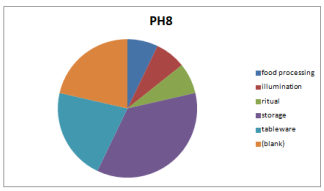
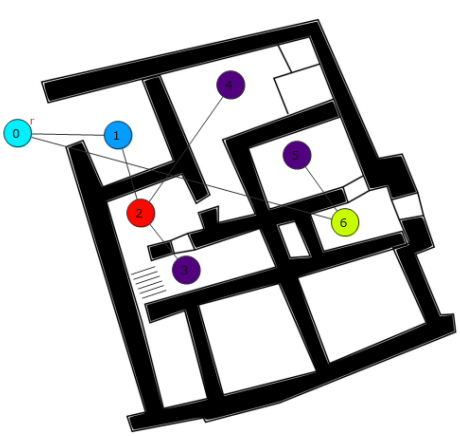

PH8
food processing
illumination
ritual
storage
tableware
(blank)

Appendix III. Space Syntax Values

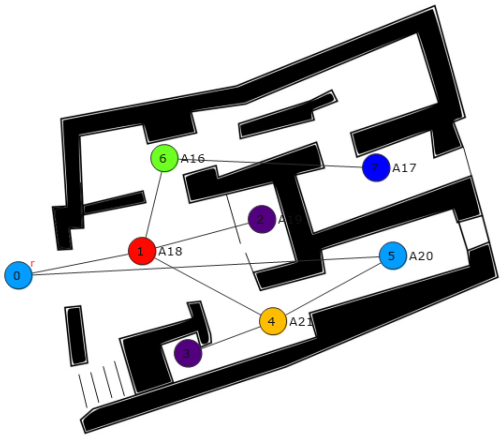
		TDn	MDn	RA	i	CV
0	0	12	2,00	0.	2.	1,00
1	1	11	1.	0.	3,00	0.
2	2	12	2,00	0.	2.	2.
3	3	17	2.	0.	1.	0.
4	4	17	2.	0.	1.	0.
5	5	20	3.	0.	1.	0.
6	6	15	2.	0.	1.	1.
	Min	11,00	1.	0.	1.	0.
	Mean	**14**	**2.**	**0.**	**1.**	**1,00**
	Max	20,00	3.	0.	3,00	2.

Ab Summary



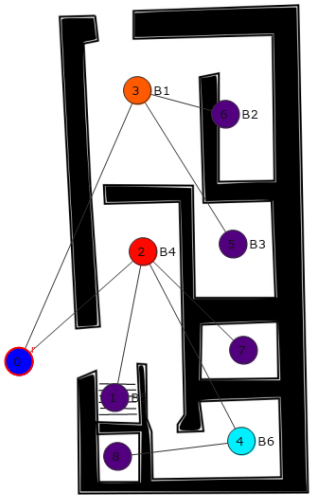
		TDn	MDn	RA	i	CV
0	0	14	2,00	0.	3,00	0.
1	A18	10	1.	0.	7,00	2.
2	A19	16	2.	0.	2.	0.
3	3	18	2.	0.	1.	0.
4	A21	12	1.	0.	4.	1.
5	A20	16	2.	0.	2.	0.
6	A16	14	2,00	0.	3,00	1.
7	A17	20	2.	0.	1.	0.
	Min	10,00	1.	0.	1.	0.
	Mean	**15,00**	**2.**	**0.**	**3.**	**1,00**
	Max	20,00	2.	0.	7,00	2.

Ac Summary



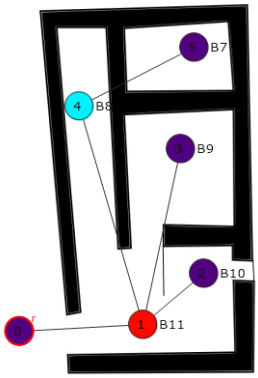
		TDn	MDn	RA	i	CV
0	0	15	1.	0.	4,00	0.
1	B5	21	2.	0.	2.	0.
2	B4	14	1.	0.	4.	3,00
3	B1	18	2.	0.	2.	2.
4	B6	19	2.	0.	2.	1.
5	B3	25	3.	0.	1.	0.
6	B2	25	3.	0.	1.	0.
7	7	21	2.	0.	2.	0.
8	8	26	3.	0.	1.	0.
	Min	14,00	1.	0.	1.	0.
	Mean	**20**	**2.**	**0.**	**2.**	**1,00**
	Max	26,00	3.	0.	4.	3,00

Ba Summary



		TDn	MDn	RA	i	CV
0	0	10	2,00	0.	2,00	0.
1	B11	6	1.	0.	10,00	3.
2	B10	10	2,00	0.	2,00	0.
3	B9	10	2,00	0.	2,00	0.
4	B8	8	1.	0.	3.	1.
5	B7	12	2.	0.	1.	0.
	Min	6,00	1.	0.	1.	0.
	Mean	**9.**	**1.**	**0.**	**3.**	**1,00**
	Max	12,00	2.	0.	10,00	3.

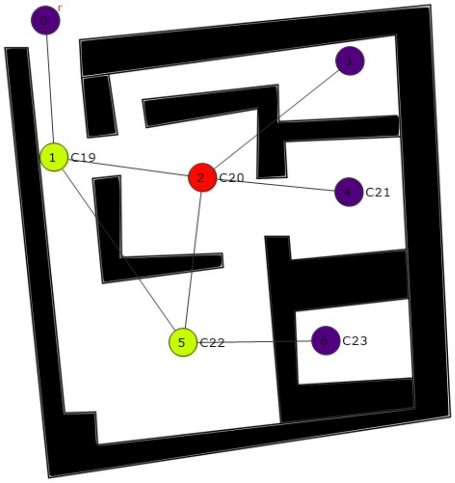
Bb Summary



[redacted]

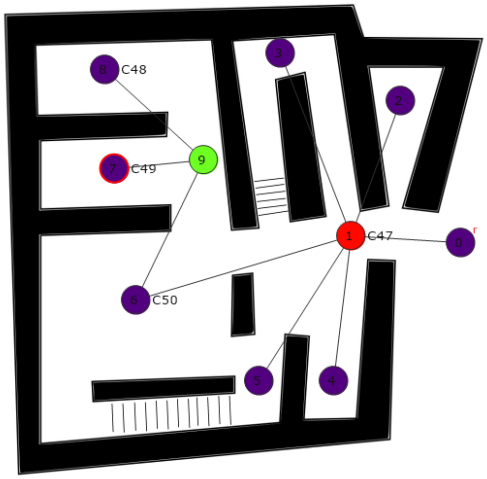
		TDn	MDn	RA	i	CV
0	0	14	2.	0.	1.	0.
1	C19	9	1.	0.	5,00	1.
2	C20	8	1.	0.	7.	2.
3	3	13	2.	0.	2.	0.
4	C21	13	2.	0.	2.	0.
5	C22	9	1.	0.	5,00	1.
6	C23	14	2.	0.	1.	0.
	Min	8,00	1.	0.	1.	0.
	Mean	**11**	**1.**	**0.**	**3.**	**1,00**
	Max	14,00	2.	0.	7.	2.

Ce Summary



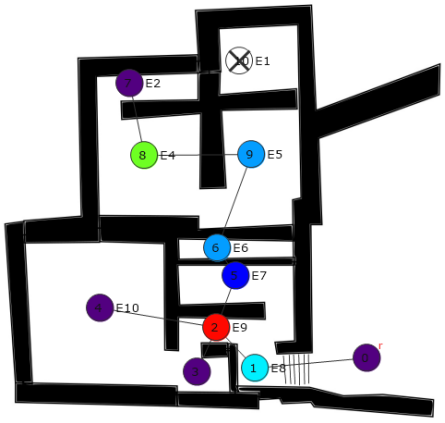
		TDn	MDn	RA	i	CV
0	0	22	2.	0.	2.	0.
1	1	14	1.	0.	7.	5.
2	2	22	2.	0.	2.	0.
3	3	22	2.	0.	2.	0.
4	4	22	2.	0.	2.	0.
5	5	22	2.	0.	2.	0.
6	6	16	1.	0.	5.	0.
7	7	28	3.	0.	1.	0.
8	8	28	3.	0.	1.	0.
9	9	20	2.	0.	3.	2.
	Min	14,00	1.	0.	1.	0.
	Mean	**21**	**2.**	**0.**	**3.**	**1,00**
	Max	28,00	3.	0.	7.	5.

Ck Summary



		TDn	MDn	RA	i	CV
0	**0**	34	3.	0.	1.	0.
1	**E8**	26	2.	0.	2.	1.
2	**E9**	20	2.	0.	3.	3,00
3	**3**	28	3.	0.	1.	0.
4	**E10**	28	3.	0.	1.	0.
5	**E7**	20	2.	0.	3.	0.
6	**E6**	22	2.	0.	2.	1,00
7	**E2**	40	4.	0.	1.	0.
8	**E4**	32	3.	0.	1.	1.
9	**E5**	26	2.	0.	2.	1,00
10	E1	-	-	-	-	-
	Min	20,00	2.	0.	1.	0.
	Mean	**27**	**3.**	**0.**	**2.**	**1,00**
	Max	40,00	4.	0.	3.	3,00

Ea Summary



		TDn	MDn	RA	i	CV
0	**0**	22	2.	0.	3.	0.
1	**F14**	20	2,00	0.	4.	1.
2	**F13**	29	2.	0.	2.	0.
3	**3**	27	2.	0.	2.	0.
4	**F15**	27	2.	0.	2.	0.
5	**F17**	37	3.	0.	1.	0.
6	**F18**	28	2.	0.	2.	1.
7	**F16**	27	2.	0.	2.	0.
8	**F19**	20	2,00	0.	4.	0.
9	**F20**	21	2.	0.	4.	1.
10	**10**	18	1.	0.	5.	3.
	Min	18,00	1.	0.	1.	0.
	Mean	**25**	**2.**	**0.**	**3.**	**1,00**
	Max	37,00	3.	0.	5.	3.

Fd Summary